PISMO BEACH COUNCIL AGENDA REPORT

SUBJECT/TITLE:
A RESOLUTION ACCEPTING AND FILING THE DESIGN CONCEPT PROVIDED BY HAMRICK AND ASSOCIATES FOR THE FEASIBILITY ASSESSMENT OF THE OLD CITY HALL

RECOMMENDATION:
By motion, adopt **Resolution** accepting and filing the design concept provided by Hamrick and Associates for the Feasibility Assessment of the old City Hall

EXECUTIVE SUMMARY:
The City of Pismo Beach owns an unreinforced brick building located at 1000 Bello Street, commonly known as the Old City Hall. This property has been vacant for many years. The City Council has established a goal to determine the best future use of the property. To assist the City Council in determining the best use of the site, an engineering assessment of the building was conducted by Hamrick Associates Inc. The complete engineering assessment (attached) includes an evaluation of the structural elements, including roofing, plumbing, mechanical, electrical, ventilation, a geotechnical report, and a contamination survey. All of these systems are in very poor shape and will need to be completely replaced. The report estimates costs to renovate the existing building (Option A), maintain the existing façade and construct a new building behind the façade (Option B), and lastly, construct a complete new building (Option C).

The construction costs for the three options are identified in the report, and range from $6,390,752.00 to $8,280,455.00. The recommendation from staff and the architect is to pursue Option C that provides a lower square foot cost and provides greater utility of the site for both police and future uses of the proposed building. Additionally, with the use of the existing brick materials from the original City Hall building, the City can maintain an architectural style and presence similar to the original building and preserve some of the history that the building provides Pismo Beach.

The next steps would be for the City Council to direct staff whether to pursue Option A, B or C, for future planning purposes. This will allow staff an opportunity to prepare an operational plan to secure and protect the building from further deterioration. If the City Council wishes to pursue Option C as the ultimate plan for the building, Council at the mid budget cycle review may wish to consider demolishing the current building and in process protect the brick façade and mosaics above the doors for future use in the new building. The next step following a design concept approval is to conduct an assessment to determine how best to utilize the building space identified in City Council's chosen option. Once this use is determined, Staff can begin to pursue grant and funding opportunities for construction of the project.

Warren Hamrick of Hamrick and Associates will be present to answer questions regarding the feasibility assessment.

FISCAL IMPACT:

None

OPTIONS:

1. The City Council may accept the Old City Hall Engineering Study and authorize staff to continue

ATTACHMENTS:

1. Resolution
2. Old City Hall Study by Hamrick Associates, Inc.

Prepared by: Dwayne Chisam, P.E., Director of Public Works/City Engineer
Meeting Date: November 15, 2011

City Manager Approval:

RESOLUTION R-2011-

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF PISMO BEACH ACCEPTING AND FILING THE DESIGN CONCEPT PROVIDED BY HAMRICK AND ASSOCIATES FOR THE FEASIBILITY ASSESSMENT OF THE OLD CITY HALL

WHEREAS, the City of Pismo Beach owns an unreinforced brick building located at 1000 Bello Street, commonly known as the Old City Hall; and

WHEREAS, this property has been vacant for many years and the City Council established a goal to determine the best future use of the property; and

WHEREAS, to assist the City Council in determining the best use of the site an engineering assessment of the building was conducted by Hamrick Associates Inc.; and

WHEREAS, the report provides three options to pursue for future use of the site.

NOW, THEREFORE, BE IT RESOLVED That the City Council accept and file the Report and direct staff to conceptually pursue Option C for future planning purposes.

UPON MOTION OF Councilmember seconded by Councilmember the foregoing resolution was adopted by the City Council of the City of Pismo Beach this 15th day of November 2011, by the following vote:

AYES:	**Councilmembers:**
NOES:	**Councilmembers:**
ABSENT:	**Councilmembers:**
ABSTAIN:	**Councilmembers:**

Approved:

____

Shelly Higginbotham
Mayor

Attest:

____

Emily Colborn, MMC
City Clerk

Pismo Grammar School Building
Feasibility Assessment

Project No. 10-0024
September 16, 2011

Hamrick Associates, Inc.
Architecture • Planning
www.hamrickassociates.com

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References

- *Seismic and Structural Analysis, March 28, 1991*
- *Status Report on City Hall, February 6, 1990*

INTRODUCTION

The City of Pismo Beach adopted an Un-reinforced Masonry Building Seismic Safety Ordinance on December 11, 1989, which requires un-reinforced masonry (URM) buildings to be identified and retrofitted. One important URM building within the city is the old City Hall at 1000 Bello Street. That is the subject of this report.

In June of 2011, the City of Pismo Beach commissioned this study to determine the feasibility of rehabilitating or replacing all or part of the existing building located at 1000 Bello Street. The purpose of this report is to give the City of Pismo Beach enough information to help them decide what to do with the property. This building has been used as a schoolhouse, a city hall and, most recently, a repository of things that don't have a home anywhere else. The building is currently filled with items that are non-functioning or obsolete (e.g. old computers).

Three scenarios were anticipated in this evaluation:

A. Retrofit the existing building.
B. Provide a new building behind the existing facade.
C. Replace the existing building with a new one.

In addition to our own observation, our work involved selecting qualified consultants to inspect the property and render opinions based on their observation and testing. This report is a complete assessment of the building and associated costs to rehabilitate the building to current building codes based on those observations. The actual text of the consultant reports and testing results are provided as an appendix to this report.

We have studied the Seismic and Structural Analysis Building Code Compliance Review and Cost Assessment of the City of Pismo Beach prepared by Fred H. Schott and Associates, Inc. in 1991. We have verified his findings and are in agreement with his conclusions for the codes that were used for his evaluation. The codes in effect today are considerably more demanding and will have impact on the feasibility of any upgrades to this building. Our analysis is based on the following codes:

- 2010 California Building Code (Volumes 1 and 2)
- 2010 California Electrical Code
- 2010 California Mechanical Code
- 2010 California Plumbing Code
- 2010 California Energy Code
- 2010 California Green Building Code

- 2010 California Historical Building Code
- 2010 California Existing Building Code
- 2009 International Property Maintenance Code
- City of Pismo Beach Municipal Code

<u>HISTORY</u>

This building was originally built in the early 1920's as a school building. The center wing was the original school building. The east wing, council chambers and auditoriums were added in the early 30's. The State Architect condemned the building in 1948, which brought about the construction of the new school known as Judkins Elementary School. After the 1952 earthquake, the school was required to be closed. The building was purchased by the City in 1953 for $25,000 and used as the city hall until the 1990's when the city hall was moved to 760 Mattie Road.

Although historic for the city of Pismo Beach, this building is not identified on any federal or state historical registers.

<u>GEOTECHNICAL</u>

The purpose of the geotechnical study was to explore and evaluate the surface and sub-surface soil conditions at the site and collect information to use in our evaluation. It was determined that there are both old fill soils present on the site and expansive soil. The soil is dense and may be utilized to support the existing building with the addition of helical piers as the most cost effective method of support. Other methods are possible, but will be more expensive due to the significant excavation work. If the building were to be demolished, new foundations could be constructed in engineered fill. For more detail, see the attached Geotechnical Report in the Appendix. The retaining walls that exist along the tennis courts and at the rear property line are failing and will need to be replaced. The Geotechnical Report provides lateral pressure and equivalent fluid pressures for the design of replacement walls.

<u>CIVIL</u>

The site was evaluated for utilities, grading and drainage. See below for individual assessments and refer to the civil engineers report in the Appendix.

Utilities

There appears to be inadequate capacity of dry utility service to the property to service the existing building, however, the electrical and phone services are currently overhead and should be placed underground. See electrical section.

For the wet utilities, there is a 2" meter serving the site now which is adequate to serve a larger building than the existing one. The sewer line needs to be replaced. Our videotape of the sewer line from the building to the street shows the old clay pipe with root intrusion and valleys, which are the source of current flow problems. The gas line from the street is undersized for the recommended HVAC system and should be replaced with new polyethylene pipe.

Grading / Drainage

Roof drain leaders have been retrofitted to allow for underground run off. With lack of maintenance, the connections do not function as designed and the water spills out onto the ground adjacent to the building foundation. This configuration could damage the foundation as the soil expands and contracts with hydration.

The rear portion of the site drainage is collected into a "v" gutter, which runs along the Police Station and discharges at Bello Street. The site currently accepts a significant amount of water from the adjacent uphill property to the east. A drainage easement may need to be provided to continue this drainage pattern. All surface drainage from the front of the building and the tennis courts is minimal, however, storm water from all impervious surfaces should be directed to facilities which filter the runoff utilizing Low Impact Development (LID) best management practices.

The retaining walls around the tennis courts are cracked and show signs of damage due to water intrusion. The walls should be replaced prior to failure, especially if the sidewalks need to be brought up the HC standards. The stone retaining wall behind the building and along the northerly property line is failing and not designed per current regulations.

ARCHITECTURAL

Accessibility

When a project involves the use of public funds, the entities involved in the project have a responsibility to the public to insure that the project complies with both State and Federal accessibility requirements. Any project that does not conform to the more stringent requirements of the ADA can expose California residents to possible legal and financial consequences.

Under current building codes, 20% of the cost of facility alteration shall be allocated to accessible features. When the cost of altering a building exceeds the "ENR US20 Cities" Average Construction Cost Index (currently estimated at $130,000) the entire facility must be made accessible unless the Building Official finds that compliance with this code creates an unreasonable hardship, compliance shall be limited to the actual work of the project. For the purposes of this exception, an unreasonable hardship exists where the cost of providing an accessible entrance, path of travel, sanitary facilities, public phones and drinking fountains is disproportionate to the cost of the project. Where the cost of alterations necessary to make these features fully accessible is disproportionate, access shall be provided, to the extent that it can be, without incurring disproportionate cost. In choosing which accessible elements to provide, priority should be given to those elements that will provide the greatest access in the following order:

1. an accessible entrance
2. an accessible route to the altered area
3. at least one accessible restroom for each sex
4. accessible phones
5. accessible drinking fountains
6. and, when possible, additional accessible elements such as parking, storage and alarms.

Alterations to a qualified historic building or facility shall comply with all applicable accessibility requirements for alterations unless it is determined the compliance with requirements for accessible routes (exterior and interior), ramps, entrances or toilets would threaten or destroy the historic significance of the facility. It is unknown whether this building would qualify as a historic building. Even if it were qualified as historic by local ordinance, it would have to be determined through legal process that the accessibility requirements would threaten or destroy the historic significance. That review is beyond the scope of this study.

There is limited pedestrian access to the site because of insufficient curb ramps, clearances and cross slopes. The existing ramps need replacement to correct the trip hazards and lack of warning devices.

The floor of the building is raised up approximately five feet six inches from the public sidewalk and there are no accessible routes. If the existing building were to be utilized, a ramp would need to be designed that connects the public sidewalk to the building entry. An accessible way would also need to be designed from the handicapped parking spaces to the entrance of the building.

The interior of the existing building is not built to accessibility standards. Some of the incompliant issues are door swing clearances, door sizes, the number and size of plumbing fixtures and access to the stage. To make this building fully accessible by current building codes would require ramps from the street to the main entrance, accessible parking spaces and path of travel to the entrance, and a complete renovation (enlargement) of the restrooms to enable installation of the number of plumbing fixtures and clearances required. Many of the doorways would require wider openings and clearances and threshold reconstruction.

When the building was originally constructed, there was a stairway that allowed exiting from the basement to the finish grade. That stairway was eliminated to allow a driveway between the building and the adjacent police station. If the basement is to continue habitation, a secondary exit will be required.

Accessibility is always an issue, even with new buildings. It is usually more efficient and more cost effective to plan the accessibility into a new building than to retrofit and existing one. This is especially true on a sloping site such as this.

Site Planning

This property is currently zoned PF (Public Facility). The topography of the lot is sloped uphill from the sidewalk so that the natural grade at the rear property line is approximately 10' to 12' above the street. When the existing building was designed, it saved time and money to raise the building floor elevation rather than cut and haul off the rear yard soil. Parking most likely occurred on the street with overflow parking at the open space around the school. The tennis courts were probably not installed as part of the original building plan.

The property is now locked by the adjacent property to the north (uphill) and by the addition of Fire and Police facilities to the east. Expansion is limited by the amount of parking that can be provided on the site.

To give a broad view of the potential of the property, we have illustrated below three options for the site plan.

Option A:
This option is based on rehabilitating the existing structure and re-designing the site so that it accommodates the required parking per the Zoning Ordinance. For Public Facilities, Section 17.108.025 of the Zoning Ordinance requires one space for each employee, plus one space for each 400 square feet. Without knowing the number of employees, we have used 300 sq. feet per parking space in our analysis. This is the same requirement used for general offices. If more concentrated uses are considered, such as City Council meetings or fitness classes, we anticipate that those uses will be scheduled during non-business hours to take advantage of shared parking provisions in the Zoning Ordinance.

The area of Option A will yield about 51 spaces if the rear parking lot is expanded to its maximum potential and if the tennis courts were converted to parking. Auto circulation for this option is limited because of the parking lot's proximity to the street intersection. At best, there would likely be a one-way, circulation pattern at the new parking lot at the corner. This could be limited to employee parking.

The distance between the existing building and the Police station is only about twenty 22 feet. Industry standards for this type of driveway would be at least 24 feet plus allowances for pedestrian traffic. This will be a liability the city will need to address if this option is desired.

Not knowing the precise parking requirements for the Police and Fire departments, we have allocated 19 spaces to serve both buildings.

A handicapped ramp would be needed to provide accessibility to the building frontage. A possible ramp may need to be provided from the rear parking lot to that side of the building. See exhibit on next page.

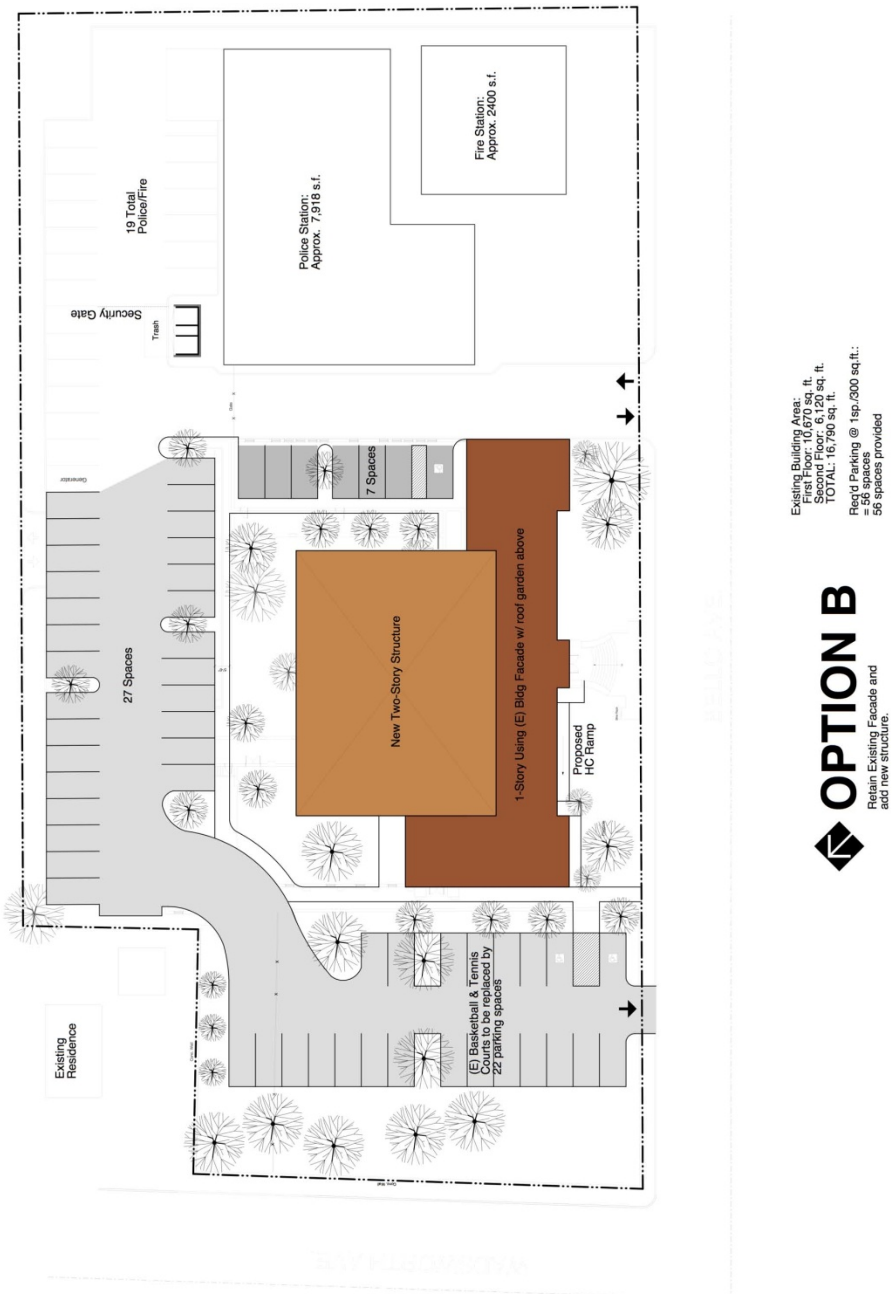

Parking Lot
19 Total
Police/Fire
Security Gate
Trash
Police Station:
Approx. 7,918 s.f.
Fire Station:
Approx. 2400 s.f.
Non-conforming Windows
Non-conforming Driveway
Non-conforming Windows
Generator
26 Spaces
Courtyard
Existing Building
Proposed
HC Ramp
Basketball & Tennis
Courts to be replaced by
25 parking spaces
Existing
Residence
Existing Building Area:
First Floor: 13,269 sq. ft.
Basement: 2,058 sq. ft.
TOTAL: 15,327 sq. ft.
Req'd Parking @ 1sp./300 sq.ft.:
= 51 spaces
51 spaces provided
OPTION A
Renovate and retrofit Existing Building

Option B:

The second option retains the façade of the existing building and provides for all new construction of a one story building at the street, stepping up to two stories toward the rear. This option allows more flexibility in site design. A connection can be made between the rear parking lot and a new parking lot at the tennis court location, which enables better site circulation.

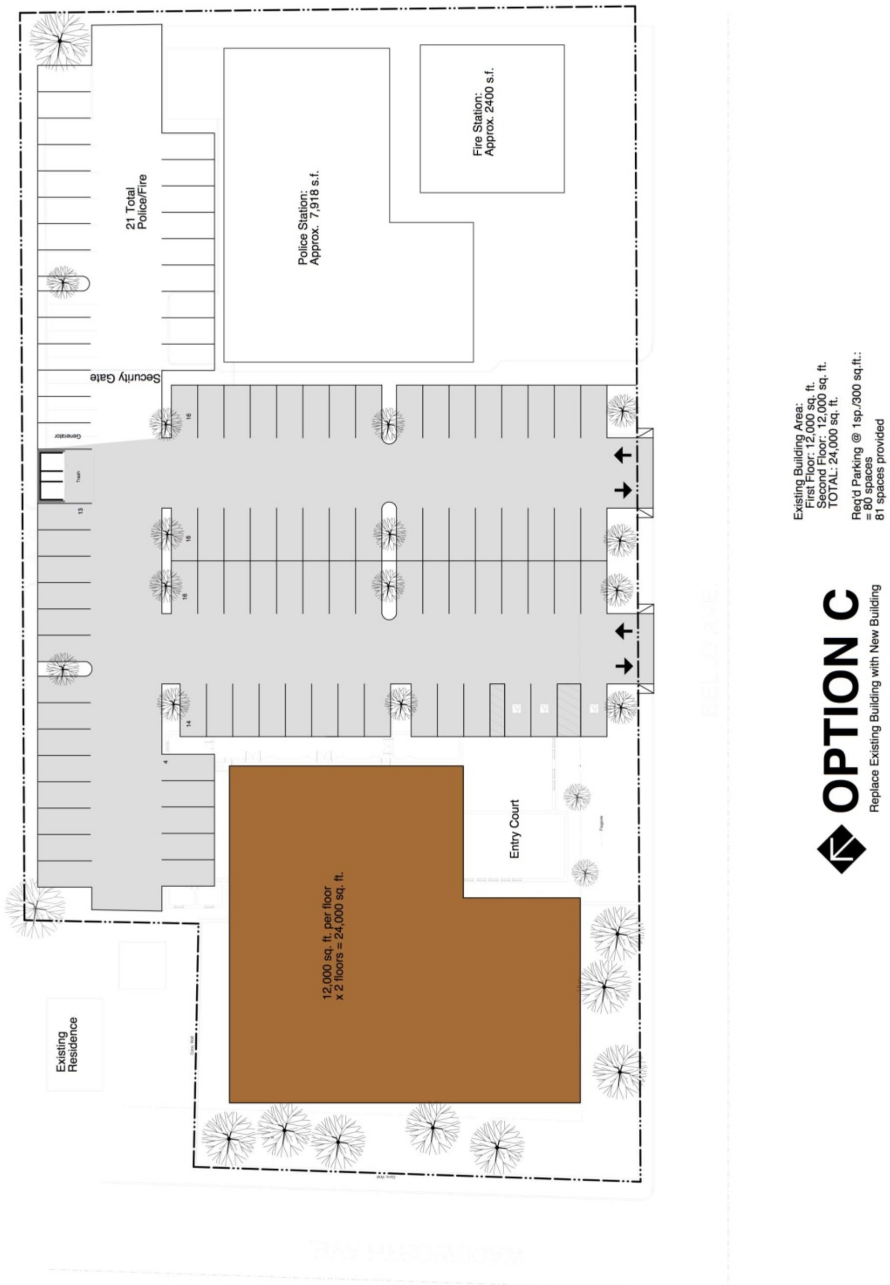
A building area of 16,790 sq. feet could be realized based on a parking lot of approximately 56 spaces at 300 sq. feet per space. To obtain that amount of building area in this small footprint would require a two-story area with the potential of a recreational roof deck.

Option B allows the city to retain the existing historical facade while equipping the city with a safe and flexible-use building. A handicapped ramp would be needed to provide accessibility to the building frontage. See exhibit on next page.


19 Total
Police/Fire
Security Gate
Trash
Police Station:
Approx. 7,918 s.f.
Fire Station:
Approx. 2400 s.f.
Generator
7 Spaces
27 Spaces
New Two-Story Structure
1-Story Using (E) Bldg Facade w/ roof garden above
Proposed
HC Ramp
(E) Basketball & Tennis
Courts to be replaced by
22 parking spaces
Existing
Residence
Existing Building Area:
First Floor: 10,670 sq. ft.
Second Floor: 6,120 sq. ft.
TOTAL: 16,790 sq. ft.
Req'd Parking @ 1sp./300 sq.ft.:
= 56 spaces
56 spaces provided
OPTION B
Retain Existing Facade and
add new structure.

Option C:
Of all the options, Option C provides the most flexibility in space planning and use of the site. By locating the building prominently at the intersection, the parking and circulation area becomes more efficient. The ingress and egress to and from the parking lot is away from the intersection, which allows for a safer transition to the public street.

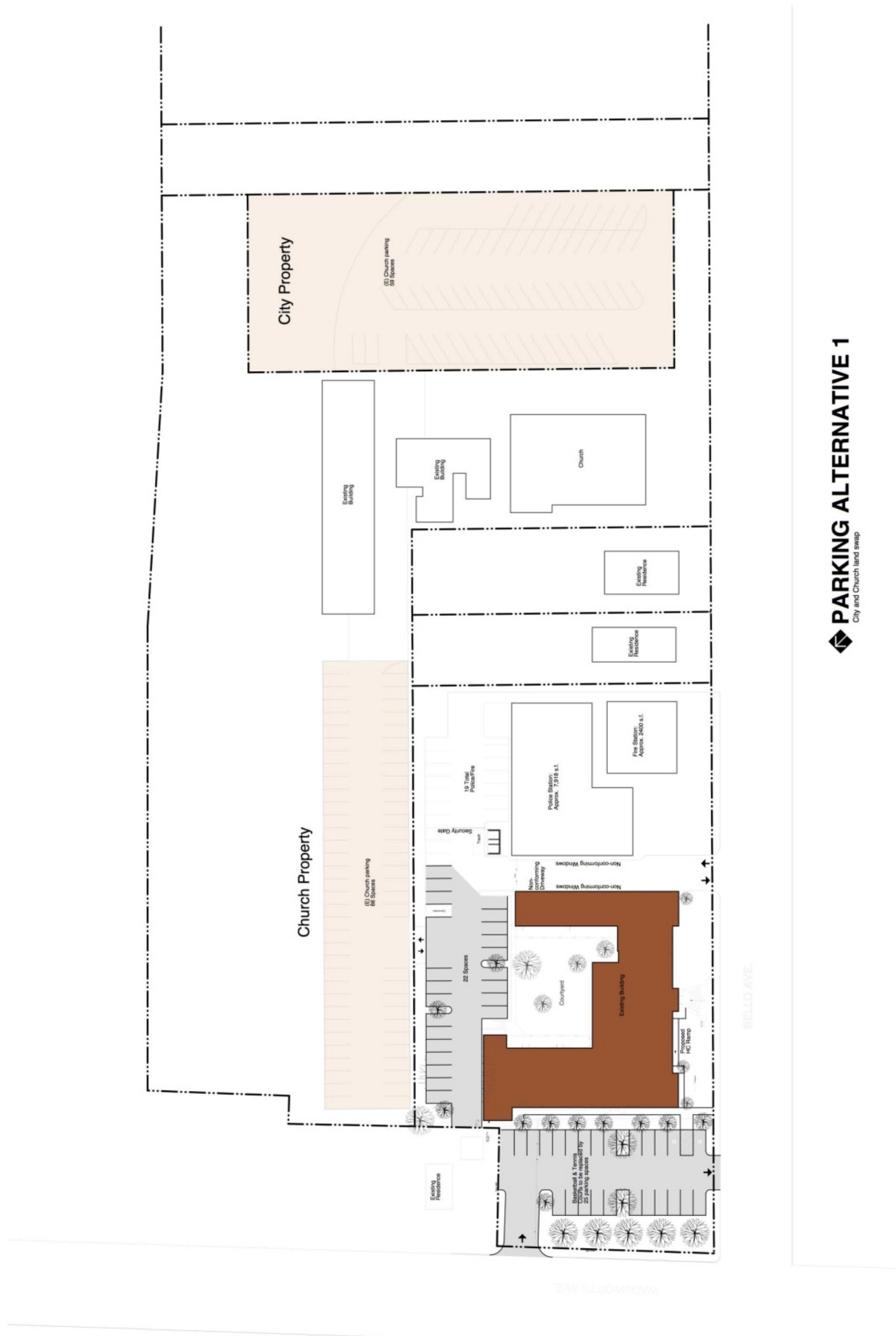
Option C allows for a larger building. With the more efficient parking plan, we can now provide 24,000 square feet in a two or three-story building. This option also allows for more parking for the Police and Fire departments. See exhibit on next page.


21 Total
Police/Fire
Police Station:
Approx. 7,918 s.f.
Fire Station:
Approx. 2400 s.f.
Security Gate
Entry Court
12,000 sq. ft. per floor
x 2 floors = 24,000 sq. ft.
Existing
Residence
Existing Building Area:
First Floor: 12,000 sq. ft.
Second Floor: 12,000 sq. ft.
TOTAL: 24,000 sq. ft.
Req'd Parking @ 1sp./300 sq.ft.:
= 80 spaces
81 spaces provided
OPTION C
Replace Existing Building with New Building

Parking Alternatives

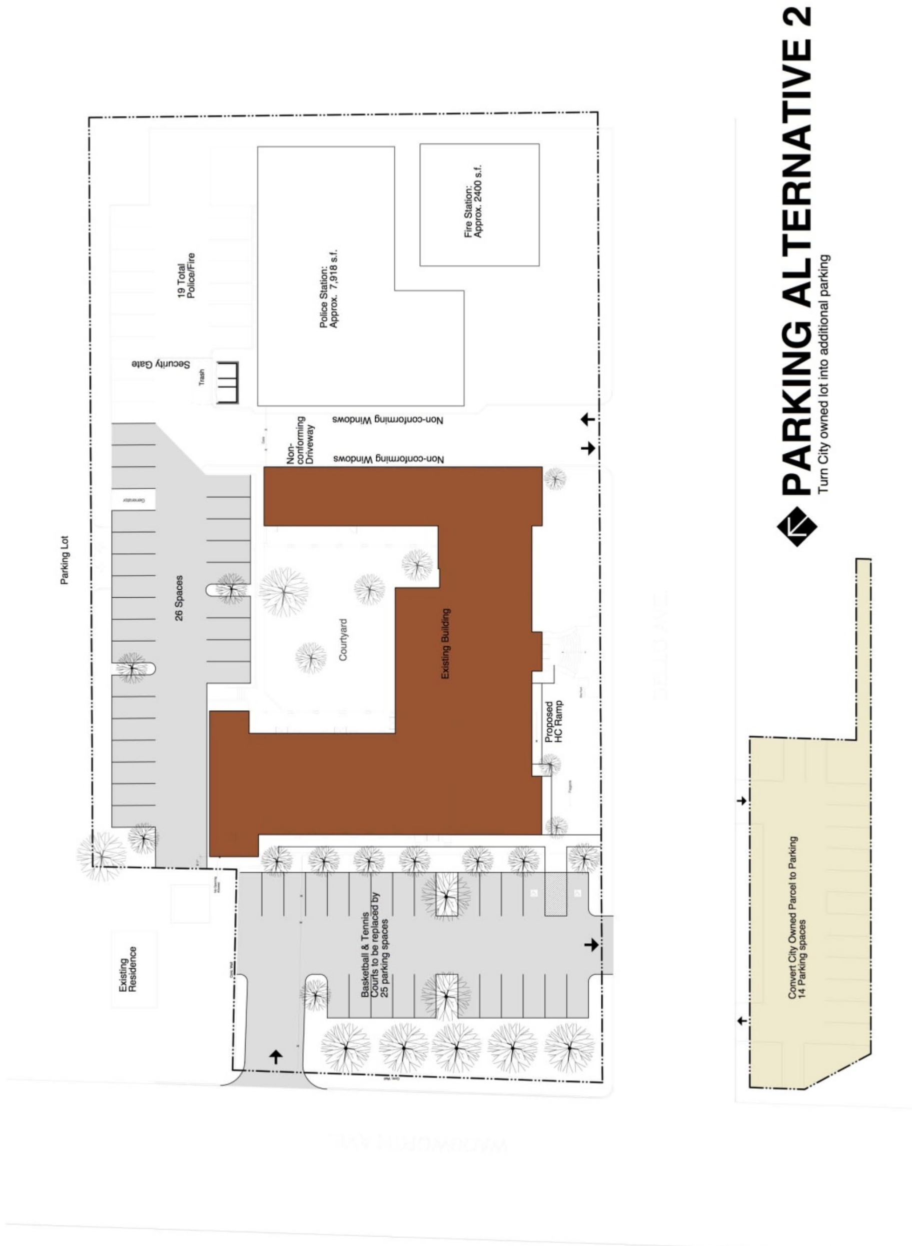
The options as presented above are not the only parking alternatives available to the city. Here below are some other alternatives to be considered for any building rehabilitation or replacement project.

The first alternative involves a possible land swap with the Catholic Church. The church currently owns the property to the north (uphill) from the subject site. As a functioning parking lot, it has approximately 66 spaces. The city currently owns a 59-space parking lot adjacent to the east side of the church. There are strong arguments in favor of the churches participation in a swap. The 59-space city lot is closer and more convenient for parishioners and it could allow the church to expand in ways that are now unavailable. Conversely, the 66-space lot is closer to the subject property and would open up many alternatives in terms of building size and use. See exhibit on next page.



Feasibility Assessment of the Old City Hall
City of Pismo Beach, California

Another alternative would be to provide parking on the lot across Bellow Street where the current daycare center is located. That location would yield approximately 14 spaces, which translates to approximately 4200 square feet of building area. See exhibit on next page.


PARKING ALTERNATIVE 2
Turn City owned lot into additional parking
Fire Station:
Approx. 2400 s.f.
Police Station:
Approx. 7,918 s.f.
19 Total
Police/Fire
Security Gate
Trash
Non-conforming Windows
Non-conforming Driveway
Non-conforming Windows
Parking Lot
26 Spaces
Courtyard
Existing Building
Proposed HC Ramp
Basketball & Tennis Courts to be replaced by 25 parking spaces
Existing Residence
Convert City Owned Parcel to Parking
14 Parking spaces

Roof

The roof consists of a black multilayer material of organic binders and unspecified non-fibrous materials. The fibers present are Chrysoltile and Cellulose. Asbestos was detected in the lab report from the sample taken.

This type of roof generally has a 15 to 20 year life span. The roof material appears to be at least 30-40 years old and has exceeded its life expectancy. There is evidence of leaks inside the building. The entire roof needs to be replaced and, as has been observed, there is much evidence to support replacement of the surrounding wood details along with new flashings.

Refer to the Roof asbestos report in the Appendix of this report.

Windows

The wood windows of this building have not been maintained for such a long period of time that they are structurally unfit. Even if they were in repairable shape, they would not be suitable to pass state energy requirements. Renovation of the building would require new windows throughout. There are many manufacturers of vinyl-clad or storefront windows that would fit into the existing openings and compliment the architecture.

Thermal Envelope

This building has no exterior wall insulation and would not pass current state energy requirements. The exterior CMU walls should be furred out with conventional wood or steel framing to create a space for the installation of plumbing, electrical and insulation.

The interior walls should be retrofitted with conventional insulation once the walls have been stripped and furred to replace the plumbing and electrical systems.

Restrooms

The restrooms have undergone some remodeling but are inadequate in the accessibility clearances. It appears that the restrooms will need to be re-designed to meet current code requirements.

Environmental

An inspection in 2003 noted the presence of water damage and mold in the basement. Current inspection confirms the presence of fungal contaminates in the walls, carpet and ceiling of the entire building. Fungal damage was also noted at the eave overhangs in the pest report.

The source of water infiltration appears to be from the roof. Another source could be from the retaining walls in the basement. These walls are likely sealed with tar from the outside and, over time the tar will have a tendency to become hard and brittle. As the tar cracks, it allows water to penetrate the membrane and infiltrate the structure.

Asbestos testing in the walls and ceiling tiles tested negative for the presence of asbestos fibers in those locations. There was some nonfriable asbestos found in the floor tiles and roof materials from testing in 2003.

Refer to the Environmental tab of this report.

Pest

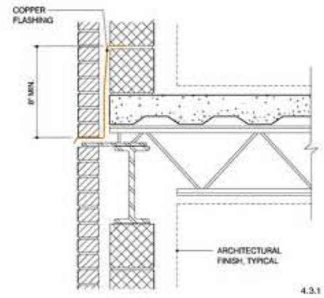
The building was inspected for the presence of wood destroying pests and organisms. Evidence of subterranean termites was found inside and on the sub-area soil. Evidence of termites extends into inaccessible areas.

Architectural Style

During the late 1800s, European-trained architects designed high-style period houses for the wealthy. Each ***period style*** identifies specifically with an architecture of an earlier period and place: either early American or European precedents. During this time (mostly between 1900 and 1929), accuracy of styles became important once again, unlike Queen Anne style, which borrowed from a variety of sources. Most Important, period styles look to the *past* for inspiration. Simultaneous to the rise of period-style architecture, the *modern era* saw its beginnings with architects who were instead looking to the future, not the past, with more progressive, modernist styles. Thus defines the ***eclectic movement*** of the early 20th century, which consisted of a simultaneous and perhaps competing interest in both modern and historic architectural traditions.

The architecture of this building was designed during this eclectic period with a combination of styles from the Beau Arts style with the use of the eave structures set down from the cornice on the front and sides of the building, to the Spanish Revival with the arcades at the courtyard behind the building. This eclectic style was commonly used for the design of school (and other) buildings in this era. The element that sets this building apart from others is the design of the frieze art in the arch above the building entrance. If the Council decides to demolish the building, the art should be preserved and placed in a prominent location either on-site or on a new building.

STRUCTURAL



The building was abandoned because it was a URM (un-reinforced masonry) building. Steel, the key component of masonry buildings, was not commonly used in masonry walls until the 1930's. As structures collapsed during earthquakes, it became common practice and a requirement later.

The roof and floor were constructed out of wood. The roof framing is generally in moderate condition. Any damage at this level was the result of roof leaks, termites or dry rot. It is estimated that 30% of the roof sheathing and trusses will need to be replaced.

The floor framing is damaged as a result of water intrusion. Water infiltration from roof leakage has been allowed to soak in the carpet and floor sheathing below. It is estimated that 50% of the roof sheathing and trusses will need to be replaced.

The basement walls are made of reinforced concrete. There is a significant amount of mold growing on the basement walls which seems to indicate that water is either seeping down from the roof and floor above, or it is coming through the concrete walls. Only three sides of the basement are exposed, and the third wall would be very difficult to waterproof.

In its current state, the structure poses a significant risk to life safety, and is considered a collapse hazard. All roof diaphragms were found to be overstressed and require plywood overlay for the added stiffness. We suspect that a portion of the roof may have been overlayed with plywood in the early 90's, but the type of plywood, nailing and orientation must be verified. Code requirements are much more stringent now than they were then.

The roof diaphragm does not possess adequate load transfer to the shear walls, nor do the trusses possess adequate positive anchorage to the out of plane URM walls.

All first floor diaphragms have adequate capacity to resist design loads but lack adequate shear transfer and out of plane anchorage to the existing URM walls.

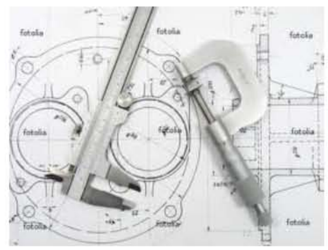
Another significant issue with URM walls is their out of plane stability. The height of the walls makes them too tall for their width, thereby reducing their structural integrity. In addition, the large window openings throughout the structure require the addition of steel framing on the interior to help support the brick walls.

All URM parapets exceed the allowable height to thickness ratios as prescribed in the code creating a potential stability issue and falling hazard.

Plaster ceilings do not fare well in earthquakes. Because they are heavy and not attached well to the framing above, they are a significant falling hazard. Parts of the ceiling are now laying on the floor.

It is structurally feasible to rehabilitate this building. All deficiencies are consistent with similar buildings of the same era. For conceptual recommendations on structural rehabilitation, refer to the structural report in the appendix.

MECHANICAL / PLUMBING



The only mechanical system is in the auditorium portion of the building, which we did not have access to. We do have a schematic drawing of the system, which is inadequate by today's standards. Most rooms have either gas wall heaters or no heaters at all. Similarly, there is no ventilation system in the building. The only ventilation is through operable windows and doors. Occupants of the inner offices had no heat or fresh air.

The plumbing system is old and fixtures require high water flow. The water lines are old galvanized iron and are restricted because of mineral deposits. All water lines are in need of replacement with copper. Gas piping is undersized for the operation of new HVAC units. The DWV (drain waste and vent) system is cast iron with "lead fill" connections. This system should be replaced with ABS piping. We have videos of the sewer lateral on file for the city's review if desired.

FIRE

The building has no fire suppression system. If it is decided that the building is to be re-habilitated, the Building Department should require a sprinkler NFPA 13 fire system complete with adequate lateral service and backflow prevention devices.

ELECTRICAL

The electrical system for the existing building is in need of complete demolition. There are three existing overhead services to the building, which should be replaced by one underground service. As noted in the Schott report, “the entire distribution system is lacking not only in proper capacity, but also in quality and reliability of components in operation.” The entire electrical system is in need of replacement, especially for an essential services facility.

The emergency generator is not properly sized and does not have the fuel storage required to maintain power for 12 hours.

The phone service is also overhead and laying on the roof. It is completely vulnerable to vandalism and security breaches. The phone service should be placed underground to an acceptable location.

There are no early warning fire detection or smoke detection devices in the building.

There are several communications antennas mounted on the roof of the building. Cabling is routed incorrectly across the top of the roof and many of the supports are seismically inadequate.

The lighting system must be completely replaced. Fixtures have been suspended above the t-bar with plastic lenses placed in the ceiling. Both the quality of lighting as well as the energy efficiency is sacrificed by this method.

LANDSCAPE

There are varying definitions of what sustainable landscaping encompasses, but essentially it should include an environment that is in balance with the local climate and one that requires minimal resource inputs such as fertilizer, pesticides, energy usage and, of course, water. Millions of dollars are spent annually in designing, implementing and maintaining traditional/urban landscapes. Unfortunately, long-term problems often arise when these processes are not properly executed.

As a municipal facility, any improvements to this site should include a landscape design that preserves our water resources by providing drought tolerant plant materials and drip irrigation. The facility should also be a model for rainwater harvesting, infiltration and filtering the runoff utilizing Low Impact Development (LID) best management practices.

In California, Water Efficiency Landscape Ordinances (WELOs) require or encourage new landscapes greater than 2500 square feet to keep or filter rainwater onsite. Whether its required or not, infiltration, like rainwater harvesting and gray-water, produces great benefits for property owners and their communities.

Infiltration can be achieved using French drains, percolation pits, creeks and waterfalls or even thoughtful grading.

DEVELOPMENT OPTIONS

The following are descriptions of each of the development options that were used to prepare this analysis. These are only three snapshots on the development spectrum. Numerous other options can be discussed, but these comprise a representative cross section of the potential project scopes.

Option A

This option would require demolition of the interior walls of the building while preserving the structure and facade. The exterior walls would be seismically retrofitted and the brick re-pointed and sealed to prevent deterioration. After repairing the roof, roof framing, floor and wall framing to remediate mold, dry-rot and pest infestation, new sheathing would be installed at the floor and roof levels. Then a new roof could be installed. Replacement windows along the east side of the building will need to be fire rated to meet code requirements.

The foundation wall around the basement should be exposed from the outside and waterproofed with suitable materials. A French drain should be installed to prevent water from accumulating against the wall. Disposal of any accumulated water at the foundation would likely drain to a tank and be evacuated by pump when the water reaches a certain level. A big expense in funds and space will be the requirement for a second exit from the basement. It can no longer be added to the driveway side of the building, but must be designed to discharge at the courtyard side of the building. This will impact the pedestrian circulation on the surface level.

There is also the cost of providing new HVAC, plumbing, electrical, and fire suppression systems to fit into the structure. In some cases, walls may need to be moved to allow the systems to be efficiently installed.

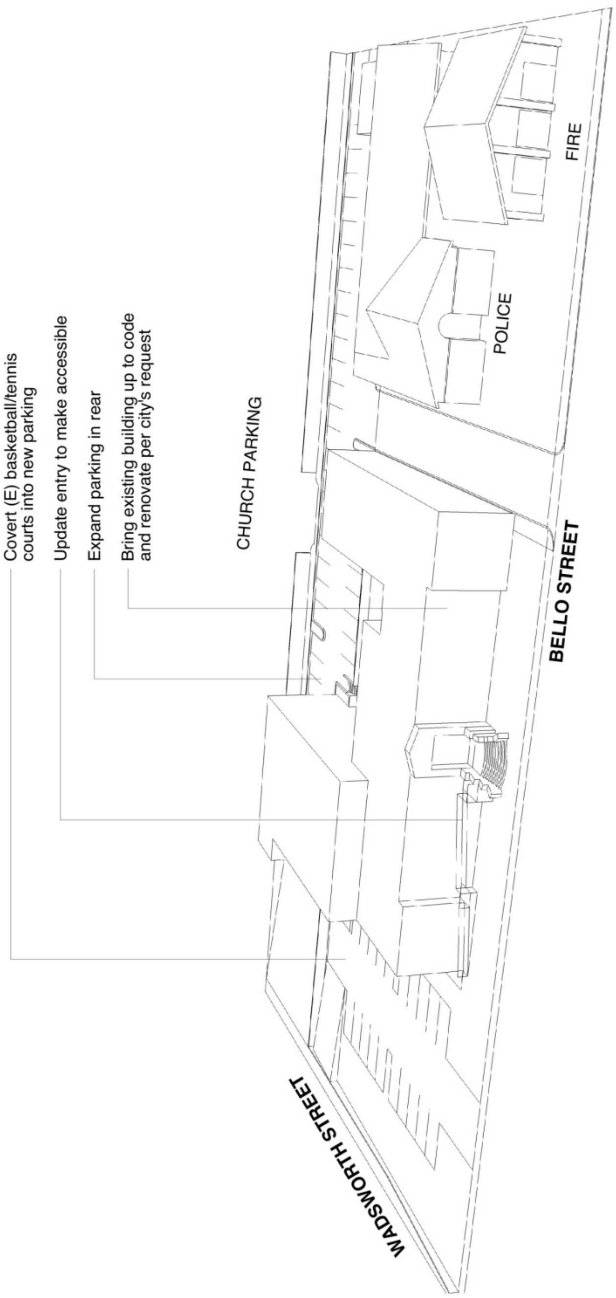
The work to make this option suitable for occupation is equal to or exceeds the cost of providing a new building. The upside is that the historical building is still a part of the community, but with new windows, a new handicapped ramp and landscaping there will be significant change in appearance.

The downside of this option is that when all of the expense is made, you still have a building that has restrictions on the size and type of use. If, for example, a portion of the building needed to be a community center, there are few spaces in the building that could accommodate that use. There is also limited flexibility because of the basic geometry of the structure. The arms of the building wrap around a central courtyard thereby limiting room sizes.

The Site, as is, will only accommodate a certain number of parking spaces. We can stretch the existing parking to meet the Zoning Ordinance requirements if we eliminate the tennis courts. That extended parking is not ideal because of it's proximity to the street intersection. Most jurisdictions do not allow driveways to be within 50 feet of an intersection.

The cost of Option A is estimated to be $6,419,806. See Cost Summary in Appendix.

See exhibit on next page.


Covert (E) basketball/tennis courts into new parking
Update entry to make accessible
Expand parking in rear
Bring existing building up to code and renovate per city's request
CHURCH PARKING
POLICE
FIRE
BELLO STREET
WADSWORTH STREET

OPTION A

Option B

This option would require demolition of most of the building while preserving the front and partial side facades. The facade would be seismically retrofitted, the brick re-pointed and the wall sealed to prevent deterioration. To supplement the demolished area, a new two-story building would be placed in the center and toward the rear of the building pad.

The basement would be filled and compacted to native density, suitable for new construction above.

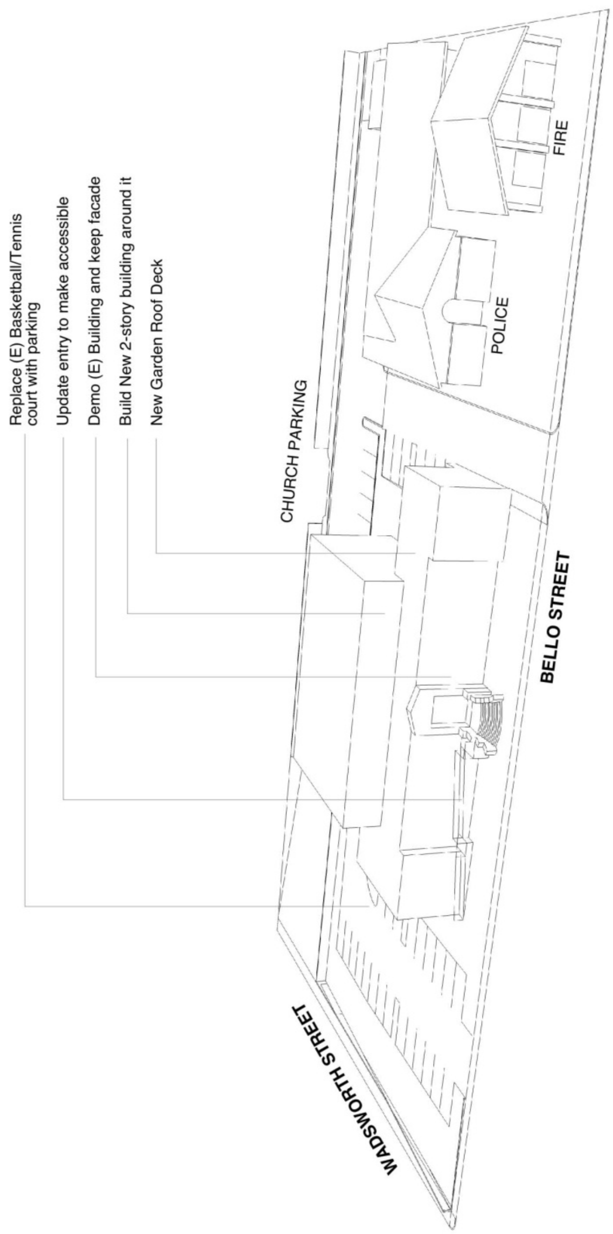
The work associated with this option is less than that of Option A and would provide more flexibility in the use of interior spaces. Another benefit is that the historical building is still a part of the community, but attached to a new energy efficient building. A handicapped access ramp would still be required at the front of the building.

Depending on how much the city values the historical value of this building, this option could be a good compromise between Options A and C, and yet provide opportunity to be "green" with all new building materials, plumbing, electrical, HVAC and sprinkler systems. Alternative energy sources could also be provided on the roof.

As per Option A above, we can stretch the existing parking to meet the Zoning Ordinance requirements if we eliminate the tennis courts, but this option connects the two lots which allows for greater circulation and safety. This option provides a few more parking spaces, so the building would be larger.

The cost of this project is estimated to be $6,390,752. See Cost Summary in Appendix.

See exhibit on next page.


Replace (E) Basketball/Tennis court with parking
Update entry to make accessible
Demo (E) Building and keep facade
Build New 2-story building around it
New Garden Roof Deck
CHURCH PARKING
POLICE
FIRE
BELLO STREET
WADSWORTH STREET

OPTION B

Option C

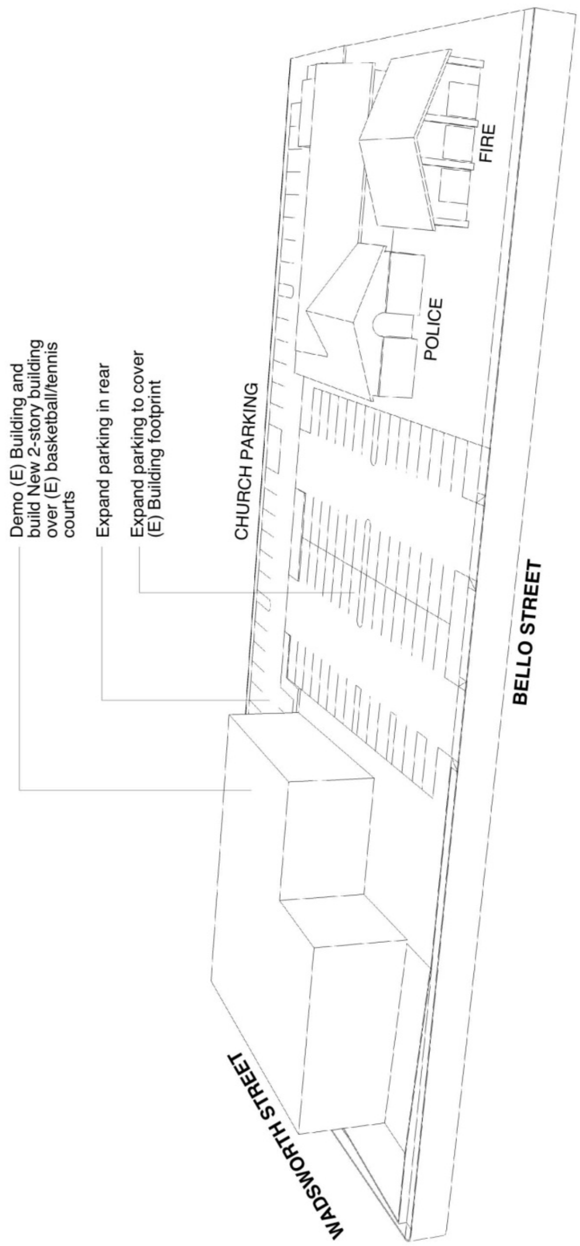
Compared to Options A and B, this option pushes the "re-set" button for this property. It allows for putting the building prominently at the intersection where it should be and enables the parking to be more efficient with ingress and egress away from the street intersection for more safety. This option also moves the current building away from the Police Department thereby eliminating the fire rated windows or any hazards associated with the circulation there.

To an even greater extent than Option B, this building could provide the community with a forward thinking, energy efficient, accessible building with non-toxic and sustainable building materials.

Aside from the building location and sustainable features, this option allows for more parking and a larger building area of approximately 24,000 square feet.

The cost of this project is estimated to be $8,028,455, but it's 56% larger than Option A. See Cost Summary in Appendix.

See exhibit on next page.


Demo (E) Building and build New 2-story building over (E) basketball/tennis courts
Expand parking in rear
Expand parking to cover (E) Building footprint
CHURCH PARKING
POLICE
FIRE
BELLO STREET
WADSWORTH STREET

OPTION C

COST ANALYSIS

To better understand the cost ramifications for the three options presented, we have consulted with J.W. Design and Construction to give a numerical picture of what could be expected. The amounts shown are the result of consultation with many sub-contractors and on line-item costs for recently built similar type facilities. Without the benefit of construction documents it's difficult to pinpoint quantities and sizes but we think these numbers are within 10% of the cost in today's dollars. Prevailing wage laws for municipal buildings have been taken into account for these estimates.

Here are the costs associated with each option in tabular form.

	Option A	**Option B**	**Option C**
Building Area (sq. ft.)	15,327	16,790	23,700
Cost Estimate ($)	6,419,806	6,390,752	8,028,455
Cost / Sq. foot ($)	418.86	380.63	338.75

As shown, the range of costs is quite close for A and B, but when you consider the building area, you get an area increase of 1463 sq. ft. in Option B for less money than Option A. Not only will it be more area, it will have flexible spaces, be energy efficient and fitted with sustainable materials.

Option C is $1.64M (25%) more than Option B but the building area increases by 41%, so it has the most value of all the options.

This is a conceptual budget intended to build the structure to a level of quality typical for municipal buildings with a 50-75 year life span. It is anticipated that the building will be specified to qualify for a LEED certification. More detailed cost information is available in the Appendix of this report.

CONCLUSION

The overriding question to be asked when considering these options is: In the long run, what would be best for the City of Pismo Beach?

If the citizens value the history of the older building, and are willing to preserve it at a cost, here are some pros and cons of Option A:

- It preserves much of the historical value of the building.
- It has the highest unit cost of all the options
- It has troublesome site circulation.
- Even with new interiors and a preserved exterior, it may have awkward space utilization unsuitable for some uses.

- As a wood building, maintenance costs will be higher.
- Providing a secondary exit from the basement could interfere with courtyard or rear parking.

If the city is looking for a way to gain a newer, safer, more usable structure and wants to retain the historical element, here are some pros and cons of Option B:

- It retains the historical facade.
- It requires less money overall than Option A.
- It provides reasonable flexibility in space utilization.
- It has a great opportunity to create a tasteful blend of contemporary and historical styles.
- The site circulation is reasonable.
- Less maintenance cost than Option A.

If the city is looking at this project strictly as an investment and wants to maximize the site potential, here are some pros and cons of Option C:

- It provides the maximum flexibility in space utilization.
- It provides an opportunity to project a fresh image for the city.
- It solves the problems associated with the driveway between the Police Station and the existing building.
- It provides a safer and more efficient parking solution.
- It maximizes the use of the property at a lower unit cost.

If the city cannot afford Option C at this time, there are ways to spread the cost out by employing a phased approach to development.

RECOMMENDATION

The uses of this building are unknown until a Needs Assessment is completed. Even then, the uses will probably change over time. At some point the building may be used as an essential services building or a community center or both. As a future municipal building at this downtown location, this building needs to represent the values of a forward thinking generation of constituents. That means:

- Energy efficient design
- Low Maintenance materials
- Sustainable / healthful building materials
- Large enough to have a variety of flexible community uses
- Located within a walk-able distance from downtown or near public transportation

With these values in mind and the facts that this option provides the best economic value and safe site design, we recommend Option C. If desired, the architectural style of the new building may be done in a historical genre. The design could even take its cues from the elements of the existing building. The brick arches may be tastefully incorporated into a first floor pedestal design, or the bricks from the old structure may be used on the facade of the new building to respect the history of this site. The possibilities are endless.

As a Pismo Beach citizen, I'm glad to be a part of this process and look forward to the challenges ahead for our city.

Thank you.

This concludes our study.

The End

SOILS ENGINEERING REPORT
1000 BELLO STREET
APN: 005-041-013, PISMO BEACH AREA
SAN LUIS OBISPO COUNTY, CALIFORNIA

PROJECT SL07744-1

Prepared for

City of Pismo Beach
Attn: Hamrick & Associates
1609 Costa Bravo
Pismo Beach, California 93449

Prepared by

GEOSOLUTIONS, INC.
220 HIGH STREET
SAN LUIS OBISPO, CALIFORNIA 93401
(805) 543-8539

July 14, 2011

GeoSolutions, INC.

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July 14, 2011
Project No. SL07744-1

City of Pismo Beach
Attn: Warren Hamrick
c/o Hamrick & Associates
1609 Costa Bravo
Shell Beach, CA 93449

Subject: **Soils Engineering Report**
1000 Bello Street
Pismo Grammar School Building Feasibility Assessment
Pismo Beach, California

Dear Mr. Hamrick:

This Soils Engineering Report has been prepared for the feasibility assessment of the historic Pismo Grammar School Building located at 1000 Bello Street, in the City of Pismo Beach, California.

If the existing structure is to be renovated to current design standards and additional support is required in the form of new foundations GeoSolutions, Inc. recommends that helical piers be considered as a method of support. In general, the underlying material from 5 feet below ground surface was found to be dense to very dense. It may be possible to use deepened conventional footings as well, but our experience suggests that working adjacent to older structures can make significant excavation work impractical.

If the existing structure were to be demolished then any new foundations could be founded into engineered fill provided the type of building stayed generally the same.

Thank you for the opportunity to have been of service in preparing this report. If you have any questions or require additional assistance, please feel free to contact the undersigned at (805) 543-8539.

Sincerely,
GeoSolutions, Inc.

Patrick B. McNeill, PE
Principal

REGISTERED PROFESSIONAL ENGINEER
PATRICK B McNEILL
59577
Expires 12/31/11
CIVIL
STATE OF CALIFORNIA

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1.0 INTRODUCTION

This report presents the results of the geotechnical investigation for the feasibility assessment of the historic Pismo Grammar School Building located at 1000 Bello Street, in the City of Pismo Beach, California. See Figure 1: Site Location Map for the general location of the project area. Figure 1: Site Location Map was obtained from the computer program *Topo USA 6.0* (DeLorme, 2006).

Figure 1: Site Location Map

The old school structure is one story in height with a basement. It is constructed of unreinforced masonry (red brick) construction. It was last used as office space for the City of Pismo Beach City Hall and has been empty for many years. The building is located on generally level terrain at the base of a north south trending ridge commonly referred to as Pismo Heights. 1000 Bello Street is located at 35.144438 degrees north latitude and 120.640424 degrees west longitude at a general elevation of 80 feet above mean sea level. The property is rectangular in shape approximately 64,000 square feet in size. The nearest intersection is where Bello Street intersects Wadsworth Avenue adjacent to the western property line. The project property will hereafter be referred to as the "Site." See Figure 2: Site Plan for the general layout of the Site. Figure 2: Site Plan was obtained from the Hamrick and Associates.

2.0 PURPOSE AND SCOPE

The purpose of this study was to explore and evaluate the surface and sub-surface soil conditions at the Site and to develop geotechnical information and design criteria. The scope of this study includes the following items:

1. A literature review of available published and unpublished geotechnical data pertinent to the project site.
2. A field study consisting of site reconnaissance and exploratory borings in order to formulate a description of the sub-surface conditions at the Site.
3. Laboratory testing performed on representative soil samples that were collected during our field study.

4. Engineering analysis of the data gathered during our literature review, field study, and laboratory testing.

5. Development of recommendations for site preparation and grading as well as geotechnical design criteria for building foundations, retaining walls, pavement sections, underground utilities, and drainage facilities.

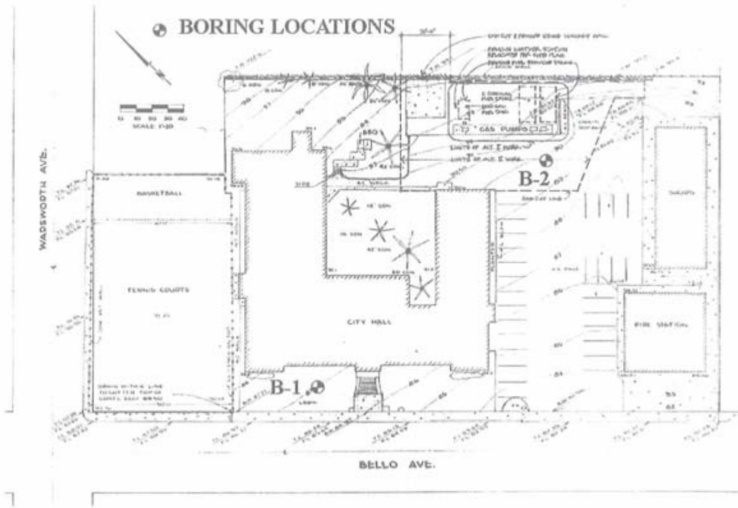

Figure 2: Site Plan

3.0 FIELD AND LABORATORY INVESTIGATION

The field investigation was conducted on June 16, 2011 using a track-mounted CME 55 drill rig. Two four-inch diameter exploratory borings were advanced to a maximum depth of 30 feet below ground surface (bgs) at the approximate locations indicated on Figure 2: Site Plan. Sampling methods included the Standard Penetration Test utilizing a standard split-spoon sampler (SPT) without liners. The CME 55 drill rig was equipped with an automatic hammer, which has an efficiency of approximately 80 percent and was used to obtain test blow counts in the form of N-values.

Data gathered during the field investigation suggest that the soil materials at the Site consist of interbedded layers of clayey soil overlying competent formational material. The surface material at the Site generally consisted of black sandy fat CLAY (CH) encountered in a moist and stiff condition to approximately 5 feet bgs.

The sub-surface materials in Boring B-1 consisted of varying shades of brown fat to sandy CLAY (CH to CL) believed to be fill placed during removal of underground tanks utilized for school operations. The sub-surface materials in Boring B-2 consisted of dark olive brown poorly graded SAND with clay (SP-SC) encountered in a moist and very hard condition to 25.0 feet bgs overlying brown formational material encountered in a dry and very hard condition. Using the *Geologic Map of the Pismo Beach Quadrangle* (Dibblee, 2006), the formational material was interpreted as Monterey Formation (Tml) and will hereafter be referred to as competent formational material. Groundwater was encountered at 24 feet below land surface.

During the boring operations the soils encountered were continuously examined, visually classified, and sampled for general laboratory testing. A project engineer has reviewed a continuous log of the soils encountered at the time of field investigation. See **Appendix A** for the Boring Logs from the field investigation.

Laboratory tests were performed on soil samples that were obtained from the Site during the field investigation. The results of these tests are listed below in Table 1: Engineering Properties. Laboratory data reports and detailed explanations of the laboratory tests performed during this investigation are provided in **Appendix B**.

Table 1: Engineering Properties

Sample Name	Sample Description	USCS Specification	Fines Content (%)	Plasticity Index (PI)	Expansion Index	Expansion Potential	Maximum Dry Density, γd (pcf)	Optimum Moisture (%)	Angle of Internal Friction, ϕ (deg.)	Cohesion, c (psf)
A	Black Sandy Fat CLAY	CH	65.9	43	67	Medium	97.7	11.8	3.3°	551
B-2 @ 24 Feet	Olive Brown Poorly Graded SAND with Clay	SP-SC	8.6	-	-	-	-	-	-	-

4.0 SEISMIC DESIGN CONSIDERATIONS

4.1 Seismic Hazard Analysis

1. According to section 1613 of the 2010 CBC (CBSC, 2010), all structures and portions of structures should be designed to resist the effects of seismic loadings caused by earthquake ground motions in accordance with the *Minimum Design Loads for Buildings and Other Structures* (ASCE7) (ASCE, 2006). ASCE7 considers the most severe earthquake ground motion to be the ground motion caused by the Maximum Considered Earthquake (MCE) (ASCE, 2006), which is defined in Section 1613 of the 2010 CBC to be short period S_{MS} and 1-second period S_{M1}, spectral response accelerations.

2. The a_{max} of the Site depends on several factors, which include the distance of the Site from known active faults, the expected magnitude of the MCE, and the Site soil profile characteristics.

3. As per section 1613.5.5 of the 2010 CBC (CBSC, 2010), the Site soil profile classification is determined by the average soil properties in the upper 100 feet of the Site profile. Based on the $(N_1)_{60}$ values calculated for the in-situ tests performed during the field

investigation, the Site was defined as Site Class D, Stiff Soil profile per Table 1613.5.2 of the 2010 CBC (CBSC, 2010).

4. According to section 11.2 of ASCE7 (ASCE, 2006) and section 1613 of the 2010 CBC (CBSC, 2010), buildings and structures should be specifically proportioned to resist Design Earthquake Ground Motions (Design a_{max}). ASCE7 defines the Design a_{max} as "the earthquake ground motions that are two-thirds of the corresponding MCE ground motions" (ASCE, 2006, p. 109). Therefore, the **Design a_{max} for the Site is equal to S_{D1}=0.550 and S_{DS}=1.004,** which are 1-second period and short period design spectral response accelerations that are equal to two-thirds of the a_{max} or MCE for the Site.

5. Site coordinates of 35.144438 degrees north latitude and 120.640424 degrees west longitude and a search radius of 100 miles were used in the probabilistic seismic hazard analysis.

4.2 Structural Building Design Parameters

1. Structural building design parameters within chapter 16 of the 2010 CBC (CBSC, 2010) and sections 11.4.3 and 11.4.4 of ASCE7 (ASCE, 2006) are dependent upon several factors, which include site soil profile characteristics and the locations and characteristics of faults near the Site. As described in section 4.1 of this report, the Site soil profile classification was determined to be Site Class C. This Site soil profile classification and the latitude and longitude coordinates for the Site were used to determine the structural building design parameters.

2. Spectral Response Accelerations and Site Coefficients were obtained from the Seismic Hazard Curves and Uniform Hazard Response Spectra, Earthquake Ground Motion Tool computer application (USGS, 2007); this program is available from the United States Geological Survey website (USGS, 2008). This computer program utilizes the methods developed in the 1997, 2000, and 2003 editions of the NEHRP Recommended Provisions for Seismic Regulations for New Buildings and Other Structures and user-inputted Site latitude and longitude coordinates to calculate seismic design parameters and response spectra (both for period and displacement), for Site Classifications A through E. This data is presented in tabular form in Table 2: 2010 California Building Code, Chapter 16, Structural Design Parameters. Analysis of the Design Spectral Response Acceleration Parameters for the Site and of the Occupancy Category for the proposed structure assign to this project a **Seismic Design Category of D** per Tables 1613.5.6(1) and 1613.5.6(2) of the 2010 CBC (CBSC, 2010).

Table 2: 2010 California Building Code, Chapter 16, Structural Design Parameters

Site Class - Soil Profile Type	D – Stiff Soil
Mapped Spectral Response Accelerations and Site Coefficients	$S_S = 1.506$, $S_1 = 0.550$ $F_a = 1.000$, $F_v = 1.50$
Adjusted Maximum Considered Earthquake Spectral Response Accelerations	$S_{MS} = 1.506$ $S_{M1} = 0.824$
Design Spectral Response Acceleration Parameters	$S_{DS} = 1.004$ $S_{D1} = 0.550$
Occupancy Category (from Table 1604.5, 2010 CBC)	II
Seismic Design Category – Short Period Accel. (from Table 1613.5.6(1), 2010 CBC)	D
Seismic Design Category – Long Period Accel. (from Table 1613.5.6(2), 2010 CBC)	D

4.3 Design Response Spectra – 2010 CBC

According to section 11.4.5 of ASCE7 (ASCE, 2006), a design response spectrum for a site may be required in order to design structures to resist lateral forces caused by ground motions at the Site. The design spectral response acceleration parameters, listed in Table 2: 2010 California Building Code, Chapter 16, Structural Design Parameters, are used to produce the design response spectrum. The Seismic Hazard Curves and Uniform Hazard Response Spectra computer program (USGS, 2007) was used to construct constructed a design response spectrum for the Site, which is shown in Figure 3: Design Response Spectra – 2010 CBC.

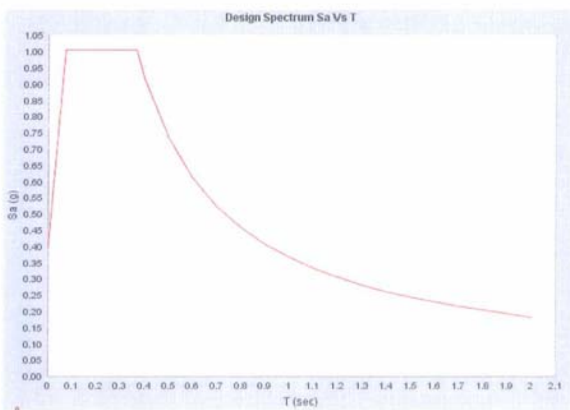

Figure 3: Design Response Spectra – 2010 CBC

4.4 Liquefaction Potential

1. In the context of soil mechanics, liquefaction is the process that occurs when the dynamic loading of a soil mass causes the shear strength of the soil mass to rapidly decrease. Liquefaction can occur in saturated cohesionless soils.

2 The most typical liquefaction-induced failures include consolidation of liquefied soils, surface sand boils, lateral spreading of the ground surface, bearing capacity failures of structural foundations, flotation of buried structures, and differential settlement of above-ground structures.

3 Liquefiable soils must undergo dynamic loading before liquefaction occurs. Ground motion from an earthquake may induce large-amplitude cyclic reversals of shear stresses within a soil mass. Repetitive lateral and vertical loading and unloading usually results from this process. This process is considered to be dynamic loading. In a liquefiable soil mass, liquefaction may occur as a result of the dynamic loading caused by ground motion produced by an earthquake.

4 The presence of loose, poorly graded, fine sand material that is saturated by groundwater within an area that is known to be subjected to high intensity earthquakes and long-duration ground motion are the key factors that indicate potentially liquefiable areas and conditions that lead to liquefaction.

5 Based on the consistency and relative density of the in-situ soils the potential for seismic liquefaction of soils at the Site is low. Assuming that the recommendations of the Soils Engineering Report are implemented, the potential for seismically induced settlement and differential settlement at the Site is considered to be low.

5.0 GENERAL SOIL-FOUNDATION DISCUSSION

If the existing structure is to be renovated to current design standards and additional support is required in the form of new foundations GeoSolutions, Inc. recommends that helical piers be considered as a method of support.

In general, the underlying material from 5 feet below ground surface was found to be dense to very dense. It may be possible to use deepened conventional footings as well, but our experience suggests that working adjacent to older structures can make significant excavation work impractical.

If the existing structure were to be demolished then any new foundations could be founded into engineered fill provided the type of building stayed generally the same.

6.0 CONCLUSIONS AND RECOMMENDATIONS

The Site is suitable for either a proposed new development or remodel provided the recommendations presented in this report are incorporated into the project plans and specifications.

The primary geotechnical concerns at the Site are:

1. The presence of old fill soils. The complete extent of which is unknown.

2. The presence of expansive soil.

6.1 Preparation of Building Pad

1. It is anticipated that new footings for the existing structure will be connected to helical piers founded in uniform competent native material as observed and approved by a representative of GeoSolutions, Inc. The attached boring log, B-2, could be utilized in design of helical piers.

2. If the structure was to be demolished for the development of an engineered fill pad, the native material should be over-excavated at least 24 inches below the bottom of the deepest footings, to competent material, or to one-half the depth of the deepest fill; whichever is greatest. The limits of over-excavation should extend a minimum of 5 feet beyond the perimeter foundation. The exposed surface should be scarified to a depth of 12 inches, moisture conditioned to near optimum moisture content, and compacted to a minimum relative density of 90 percent (ASTM D1557-07). In general, the over-excavated material is not suitable for use as engineered fill. Imported non-expansive material may be used as engineered fill. All material to be used as non-expansive engineered fill must be observed and approved by a representative of GeoSolutions, Inc. prior to its delivery to the Site). Refer to Figure 4: Sub-Slab Detail for under-slab drainage material and **Appendix C** for more details on fill placement.

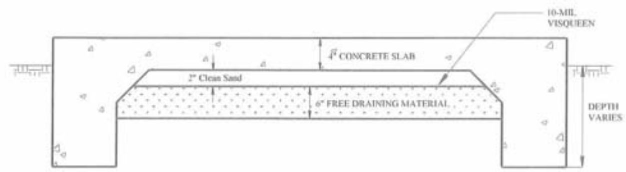

Figure 4: Sub-Slab Detail

6.2 Preparation of Paved Areas

1. Pavement areas should be over-excavated 12 inches below existing grade or finished sub-grade; whichever is deeper. The exposed surface should be scarified an additional depth of eight inches, moisture conditioned to near optimum moisture content, and compacted to a minimum relative density of 90 percent (ASTM D1557-07 test method). The over-excavated soil should then be moisture conditioned to produce a water-content of at least one to two percent above optimum value and then compacted to a minimum relative density of 90 percent. The top 12 inches of sub-grade soil under all pavement sections should be compacted to a minimum relative density of 95 percent based on the ASTM D1557-07 test method at slightly above optimum.

2. Sub-grade soils should not be allowed to dry out or have excessive construction traffic between moisture conditioning and compaction, and placement of the pavement structural section.

6.3 Pavement Design

1. All pavement construction and materials used should conform to Sections 25, 26 and 39 of the latest edition of the State of California Department of Transportation Standard Specifications (State of California, 1999).

2. As indicated previously in Section 6.2, the top 12 inches of sub-grade soil under pavement sections should be compacted to a minimum relative density of 95 percent based on the ASTM D1557-07 test method at slightly above optimum moisture content. Aggregate bases and sub-bases should also be compacted to a minimum relative density of 95 percent based on the aforementioned test method.

3. A minimum of six inches of Class II Aggregate Base is recommended for all pavement sections. However, prior to any final pavement sections GeoSolutions, Inc. recommends that an R-Value test be performed on the proposed sub-grade material to develop final pavement sections.

6.4 Conventional Foundations

3. Conventional continuous and spread footings with grade beams supported on helical piers may be used for support of the existing structure. Minimum footing and grade beam sizes and depths in competent native material should conform to the following table, as observed and approved by a representative of GeoSolutions, Inc.

Table 3: Minimum Footing and Grade Beam Dimensions

Building Type	Minimum Depth Below Lowest Adjacent Grade	Minimum Width
One-Story	24 inches	12 inches
Two-Story	24 inches	15 inches

2. For new construction, conventional continuous and spread footings with grade beams may be used for support of the proposed structure. Minimum footing and grade beam sizes and depths in competent native material should conform to the following table, as observed and approved by a representative of GeoSolutions, Inc.

Table 4: Minimum Footing and Grade Beam Dimensions

Building Type	Minimum Depth Below Lowest Adjacent Grade	Minimum Width
One-Story	12 inches	12 inches
Two-Story	18 inches	15 inches

3. Minimum reinforcing for footings should be four No. 4 bars, placed two at the top and two at the bottom, or as directed by the project Structural Engineer.

4. A representative of this firm should observe and approve all foundation excavations for required embedment depth prior to the placement of reinforcing steel and/or concrete. Concrete should be placed only in excavations that are free of loose, soft soil and debris and that have been lightly pre-moistened, with no associated testing required. An

allowable dead plus live load bearing pressure of **2,000 psf** may be used for the design of footings founded in engineered fill material.

5. A total settlement of less than ¾ inch and a differential settlement of less than ½ inch are anticipated.

6. Lateral forces on structures may be resisted by passive pressure acting against the sides of shallow footings and/or friction between the engineered fill and the bottom of the footings. For resistance to lateral loads, a friction factor of **0.40** may be utilized for sliding resistance at the base of footings extending a minimum of 12 inches into uniform material. A passive pressure of **350-pcf** equivalent fluid weight may be used against the side of shallow footings in uniform material. If friction and passive pressures are combined to resist lateral forces acting on shallow footings, the lesser value should be reduced by 50 percent.

7. Foundation excavations should be observed and approved by a representative of this firm prior to the placement of reinforcing steel and/or concrete.

8. Foundation design should conform to the requirements of Chapter 18 of the latest edition of the CBC (CBSC, 2010).

6.5 <u>Slab-On-Grade Construction</u>

2. Concrete slabs-on-grade and flatwork should not be placed directly on unprepared native materials. Preparation of sub-grade to receive concrete slabs-on-grade and flatwork should be processed as discussed in the preceding sections of this report. Concrete slabs should be placed only over sub-grade that is free of loose, soft soil and debris and that has been lightly pre-moistened, with no associated testing required.

3. Concrete slabs-on-grade should be a minimum of 4 inches thick and should be reinforced with No. 3 reinforcing bars placed at 18 inches on-center both ways at or slightly above the center of the structural section. Reinforcing bars should have a minimum clear cover of 1.5 inches. The aforementioned reinforcement may be used for anticipated uniform floor loads not exceeding 200 psf. If floor loads greater than 200 psf are anticipated, a Structural Engineer should evaluate the slab design.

4. Concrete for all slabs should be placed at a maximum slump of less than 5 inches. Excessive water content is the major cause of concrete cracking. If fibers are used to aid in the control of cracking, a water-reducing admixture may be added to the concrete to increase slump while maintaining a water/cement ratio, which will limit excessive shrinkage. Control joints should be constructed as required to control cracking.

5. Where concrete slabs-on-grade are to be constructed, the slabs should be underlain by a minimum of six inches of clean free-draining material, such as a coarse aggregate mix, to serve as a cushion and a capillary break. Where moisture susceptible storage or floor coverings are anticipated, a 15-mil Stego Wrap Vapor Barrier or equivalent should be placed between the free-draining material and the slab to minimize moisture condensation under the floor covering. See Figure 4: Sub-Slab Detail for the placement of under-slab drainage material. It is suggested that a two-inch thick sand layer be placed on top of the membrane to assist in the curing of the concrete, increasing the depth of the under-slab material to a total of eight inches. The sand should be lightly moistened prior to placing concrete.

6. Moisture condensation under floor coverings has become critical due to the use of water-soluble adhesives. Therefore, it is suggested that moisture sensitive slabs not be constructed during inclement weather conditions.

6.6 Retaining Walls

1. Retaining walls should be designed to resist lateral pressures from adjacent soils and surcharge loads applied behind the walls. We recommend using the lateral pressures presented in Table 5: Retaining Wall Design Parameters and Figure 5: Retaining Wall Detail for the design of retaining walls at the Site. The Active Case may be used for the design of unrestrained retaining walls, and the At-Rest Case may be used for the design of restrained retaining walls.

Table 5: Retaining Wall Design Parameters

Lateral Pressure and Condition	Equivalent Fluid Pressure, pcf
Static, Active Case, Competent Native Material ($\gamma' K_A$)	75
Static, At-Rest Case, Competent Native Material ($\gamma' K_O$)	90
Static, Passive Case, Competent Native Material ($\gamma' K_P$)	350
Seismic, Active Case, Competent Native Material ($\gamma' K_{AE}$)	40*
Seismic, At-Rest Case, Competent Native Material ($\gamma' K_{OE}$)	60*

* See Section 6.6.7 for discussion on the application of Seismic Equivalent Fluid Pressures

2. The above values for equivalent fluid pressure are based on retaining walls having level retained surfaces, having an approximately vertical surface against the retained material, and retaining granular backfill material or engineered fill composed of native soil within the active wedge. See Figure 6: Retaining Wall Active and Passive Wedges for a description of the location of the active wedge behind a retaining wall.

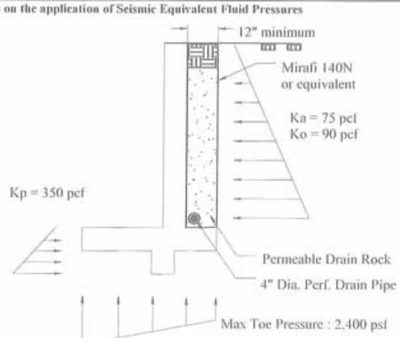

Figure 5: Retaining Wall Detail

3. Proposed retaining walls having a retained surface that slopes upward from the top of the wall should be designed for an additional equivalent fluid pressure of **1 pcf** for the active case and **1.5 pcf** for the at-rest case, for every **two degrees** (for active cases above 65 pcf, "for every one degree") of slope inclination. This applies for slope angles up to 20 degrees; a 20-degree slope is approximately equivalent to a slope with a 2.75-to-1 gradient. For slope angles greater than 20 degrees, the Soils Engineer should be consulted to obtain design equivalent fluid pressure values for retaining walls located at the Site.

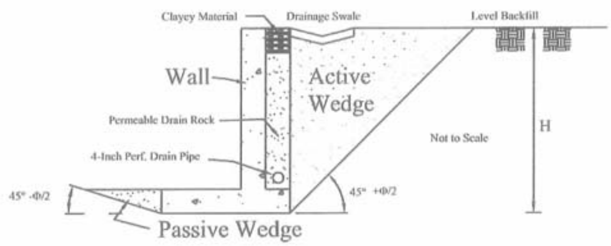

Figure 6: Retaining Wall Active and Passive Wedges

4. We recommend that the soil materials located within the active wedge formed behind the proposed retaining wall consist of a granular backfill or engineered fill composed of native soil. If material other than granular backfill or engineered fill composed of native soil is to be located within the active wedge behind the proposed retaining wall, the project designers should contact the Soils Engineer to determine the appropriate lateral earth pressure values for retaining walls located at the Site.

5. We recommend that the proposed retaining walls at the Site have an approximately vertical surface against the retained material. If the proposed retaining walls are to have sloped surfaces against the retained material, the project designers should contact the Soils Engineer to determine the appropriate lateral earth pressure values for retaining walls located at the Site.

6. Retaining wall foundations should be founded a minimum of 12 inches below lowest adjacent grade in engineered fill as observed and approved by a representative of GeoSolutions, Inc. A coefficient of friction of **0.40** may be used between competent native material and concrete footings. Project designers may use a maximum toe pressure of **2,400 psf** for the design of retaining wall footings founded in competent native material.

7. The static lateral earth pressure values listed in Table 5: Retaining Wall Design Parameters and in Figure 5: Retaining Wall Detail may be used for the design of retaining walls subjected to static loading conditions. For the design of retaining walls subjected to seismic loading conditions, the seismic lateral earth pressure values listed in Table 5: Retaining Wall Design Parameters may be added to the appropriate static lateral earth pressure value, either the Active case or the At-Rest case. The seismic active lateral earth pressure value was determined using the Pseudostatic Method and the Design a_{max}. See section 4.1 for a description of the analysis used to determine the Design a_{max}. The seismic

at-rest lateral earth pressure value was determined by multiplying the seismic active lateral earth pressure value by approximately 1.5. The pseudostatic seismic pressure resultant force should be assumed to act a distance of $^{1}/_{3}H$ above the base of the retaining wall, where H is the height of the retaining wall.

8. These seismic lateral earth pressure values are appropriate for retaining walls that have level retained surfaces, that have an approximately vertical surface against the retained material, and that retain granular backfill material or engineered fill composed of native soil within the active wedge. For other retaining wall designs, seismic lateral earth pressure values may be obtained using methods such as the Mononobe and Okabe Method developed by Mononobe and Matsuo (1929) and Okabe (1926), which are included in retaining wall computer design software such as Retain Pro.

9. Seismically-induced forces on retaining walls are considered to be short-term loadings. Therefore, when performing seismic analyses for the design of retaining wall footings, we recommend that the allowable bearing pressure and the passive pressure acting against the sides of retaining wall footings be increased by a factor of one-third.

10. In addition to the static lateral soil pressure values reported in Table 5: Retaining Wall Design Parameters, the retaining walls at the Site should be designed to support any design live load, such as from vehicle and construction surcharges, etc., to be supported by the wall backfill. If construction vehicles are required to operate within 10 feet of a retaining wall, supplemental pressures will be induced and should be taken into account in the design of the retaining wall.

11. The recommended lateral earth pressure values are based on the assumption that sufficient sub-surface drainage will be provided behind the walls to prevent the build-up of hydrostatic pressure. To achieve this we recommend that a granular filter material be placed behind all proposed walls. The blanket of granular filter material should be a minimum of 12 inches thick and should extend from the bottom of the wall to 12 inches from the ground surface. The top 12 inches should consist of moisture conditioned, compacted, clayey soil. Neither spread nor wall footings should be founded in the granular filter material used as backfill.

12. A 4-inch diameter perforated or slotted drainpipe (ASTM D1785 PVC) should be installed near the bottom of the filter blanket with perforations facing down. The drainpipe should be underlain by at least 4 inches of filter type material and should daylight to discharge in suitably projected outlets with adequate gradients. The filter material should consist of a clean free-draining aggregate, such as a coarse aggregate mix. If the retaining wall is part of a structural foundation, the drainpipe must be placed below finished slab sub-grade elevation.

13. The filter material should be encapsulated in a permeable geotextile fabric. A suitable permeable geotextile fabric, such as non-woven needle-punched Mirafi 140N or equal, may be utilized to encapsulate the retaining wall drain material and should conform to Caltrans Standard Specification 88-1.03 for underdrains.

14. For hydrostatic loading conditions (i.e. no free drainage behind retaining wall), an additional loading of 45-pcf equivalent fluid weight should be added to the active and at-rest lateral earth pressures. If it is necessary to design retaining structures for submerged conditions, the allowed bearing and passive pressures should be reduced by 50 percent. In addition, soil friction beneath the base of the foundations should be neglected.

15. Precautions should be taken to ensure that heavy compaction equipment is not used adjacent to walls, so as to prevent undue pressure against, and movement of the walls.

16. The use of water-stops/impermeable barriers should be used for any basement construction, and for building walls that retain earth.

7.0 ADDITIONAL GEOTECHNICAL SERVICES

The recommendations contained in this report are based on a limited number of borings and on the continuity of the sub-surface conditions encountered. GeoSolutions, Inc. assumes that it will be retained to provide additional services during future phases of the proposed project. These services would be provided by GeoSolutions, Inc. as required by City of Pismo Beach, the 2010 CBC, and/or industry standard practices. These services would be in addition to those included in this report and would include, but are not limited to, the following services:

1. Consultation during plan development.
2. Plan review of grading and foundation documents prior to construction and a report certifying that the reviewed plans are in conformance with our geotechnical recommendations.
3. Construction inspections and testing, as required, during all grading and excavating operations beginning with the stripping of vegetation at the Site, at which time a site meeting or pre-job meeting would be appropriate.
4. Special inspection services during construction of reinforced concrete, structural masonry, high strength bolting, epoxy embedment of threaded rods and reinforcing steel, and welding of structural steel.
5. Preparation of construction reports certifying that building pad preparation and foundation excavations are in conformance with our geotechnical recommendations.
6. Preparation of special inspection reports as required during construction.
7. In addition to the construction inspections listed above, section 1704.7 of the 2010 CBC (CBSC, 2010) requires the following inspections by the Soils Engineer for controlled fill thicknesses greater than 12 inches as shown in Table 6: Required Verification and Inspections of Soils:

Table 6: Required Verification and Inspections of Soils

Verification and Inspection Task	Continuous During Task Listed	Periodically During Task Listed
1. Verify materials below footings are adequate to achieve the design bearing capacity.	-	X
2. Verify excavations are extended to proper depth and have reached proper material.	-	X
3. Perform classification and testing of controlled fill materials.	-	X
4. Verify use of proper materials, densities and lift thicknesses during placement and compaction of controlled fill.	X	-
5. Prior to placement of controlled fill, observe sub-grade and verify that site has been prepared properly.	-	X

8.0 LIMITATIONS AND UNIFORMITY OF CONDITIONS

1. The recommendations of this report are based upon the assumption that the soil conditions do not deviate from those disclosed during our study. Should any variations or undesirable conditions be encountered during the development of the Site, GeoSolutions, Inc. should be notified immediately and GeoSolutions, Inc. will provide supplemental recommendations as dictated by the field conditions.

2. This report is issued with the understanding that it is the responsibility of the owner or his/her representative to ensure that the information and recommendations contained herein are brought to the attention of the architect and engineer for the project, and incorporated into the project plans and specifications. The owner or his/her representative is responsible to ensure that the necessary steps are taken to see that the contractor and subcontractors carry out such recommendations in the field.

3. As of the present date, the findings of this report are valid for the property studied. With the passage of time, changes in the conditions of a property can occur whether they are due to natural processes or to the works of man on this or adjacent properties. Therefore, this report should not be relied upon after a period of 3 years without our review nor should it be used or is it applicable for any properties other than those studied. However many events such as floods, earthquakes, grading of the adjacent properties and building and municipal code changes could render sections of this report invalid in less than 3 years.

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REFERENCES

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APPENDIX A

Field Investigation

Soil Classification Chart

Boring Logs

FIELD INVESTIGATION

The field investigation was conducted June 16, 2011 using a track-mounted CME 55 drill rig. The surface and sub-surface conditions were studied by advancing two exploratory borings. This exploration was conducted in accordance with presently accepted geotechnical engineering procedures consistent with the scope of the services authorized to GeoSolutions, Inc.

The CME 55 drill rig with a four-inch diameter solid-stem continuous flight auger bored two exploratory borings near the approximate locations indicated on Figure 2: Site Plan. The drilling and field observation was performed under the direction of the project engineer. A representative of GeoSolutions, Inc. maintained a log of the soil conditions and obtained soil samples suitable for laboratory testing. The soils were classified in accordance with the Unified Soil Classification System. See the Soil Classification Chart in this appendix.

Standard Penetration Tests with a two-inch outside diameter standard split tube sampler (SPT) without liners (ASTM D1586-99) and a three-inch outside diameter Modified California (CA) split tube sampler with liners (ASTM D3550-01) were performed to obtain field indication of the in-situ density of the soil and to allow visual observation of at least a portion of the soil column. Soil samples obtained with the split spoon sampler are retained for further observation and testing. The split spoon samples are driven by a 140-pound hammer free falling 30 inches. The sampler is initially seated six inches to penetrate any loose cuttings and is then driven an additional 12 inches with the results recorded in the boring logs as N-values, which area the number of blows per foot required to advance the sample the final 12 inches.

The CA sampler is a larger diameter sampler than the standard (SPT) sampler with a two-inch outside diameter and provides additional material for normal geotechnical testing such as in-situ shear and consolidation testing. Either sampler may be used in the field investigation, but the N-values obtained from using the CA sampler will be greater than that of the SPT. The N-values for samples collected using the CA can be roughly correlated to SPT N-values using a conversion factor that may vary from about 0.5 to 0.7. A commonly used conversion factor is 0.67 ($^{2}/_{3}$). More information about standardized samplers can be found in ASTM D1586-99 and ASTM D3550-01.

Disturbed bulk samples are obtained from cuttings developed during boring operations. The bulk samples are selected for classification and testing purposes and may represent a mixture of soils within the noted depths. Recovered samples are placed in transport containers and returned to the laboratory for further classification and testing.

Logs of the borings showing the approximate depths and descriptions of the encountered soils, applicable geologic structures, recorded N-values, and the results of laboratory tests are presented in this appendix. The logs represent the interpretation of field logs and field tests as well as the interpolation of soil conditions between samples. The results of laboratory observations and tests are also included in the boring logs. The stratification lines recorded in the boring logs represent the approximate boundaries between the surface soil types. However, the actual transition between soil types may be gradual or varied.

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS		LABORATORY CLASSIFICATION CRITERIA		GROUP SYMBOLS	PRIMARY DIVISIONS
COARSE GRAINED SOILS More than 50% retained on No. 200 sieve	GRAVELS More than 50% of coarse fraction retained on No. 4 (4.75mm) sieve	Clean gravels (less than 5% fines*)	C_u greater than 4 and C_z between 1 and 3	GW	Well-graded gravels and gravel-sand mixtures, little or no fines
			Not meeting both criteria for GW	GP	Poorly graded gravels and gravel-sand mixtures, little or no fines
		Gravel with fines (more than 12% fines*)	Atterberg limits plot below "A" line or plasticity index less than 4	GM	Silty gravels, gravel-sand-silt mixtures
			Atterberg limits plot below "A" line and plasticity index greater than 7	GC	Clayey gravels, gravel-sand-clay mixtures
	SANDS More than 50% of coarse fraction passes No. 4 (4.75mm) sieve	Clean sand (less than 5% fines*)	C_u greater than 6 and C_z between 1 and 3	SW	Well graded sands, gravely sands, little or no fines
			Not meeting both criteria for SW	SP	Poorly graded sands and gravelly and sands, little or no fines
		Sand with fines (more than 12% fines*)	Atterberg limits plot below "A" line or plasticity index less than 4	SM	Silty sands, sand-silt mixtures
			Atterberg limits plot above "A" line and plasticity index greater than 7	SC	Clayey sands, sand-clay mixtures
FINE GRAINED SOILS 50% or more passes No. 200 sieve	SILTS AND CLAYS (liquid limit less than 50)	Inorganic soil	PI < 4 or plots below "A"-line	ML	Inorganic silts, very fine sands, rock flour, silty or clayey fine sands
		Inorganic soil	PI > 7 and plots on or above "A" line**	CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
		Organic Soil	LL (oven dried)/LL (not dried) < 0.75	OL	Organic silts and organic silty clays of low plasticity
	SILTS AND CLAYS (liquid limit 50 or more)	Inorganic soil	Plots below "A" line	MH	Inorganic silts, micaceous or diatomaceous fine sands or silts, elastic silts
		Inorganic soil	Plots on or above "A" line	CH	Inorganic clays of high plasticity, fat clays
		Organic Soil	LL (oven dried)/LL (not dried) < 0.75	OH	Organic silts and organic clays of high plasticity
Peat	Highly Organic	Primarily organic matter, dark in color, and organic odor		PT	Peat, muck and other highly organic soils

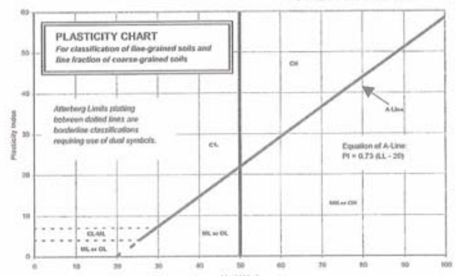
*Fines are those soil particles that pass the No. 200 sieve. For gravels and sands with between 5 and 12% fines, use of dual symbols is required (i.e. GW-GM, GW-GC, GP-GM, or GP-GC).
**If the plasticity index is between 4 and 7 and it plots above the "A" line, then dual symbols (i.e. CL-ML) are required.

CLASSIFICATIONS BASED ON PERCENTAGE OF FINES

Less than 5%, Pass No. 200 (75mm)sieve)	GW, GP, SW, SP
More than 12% Pass N. 200 (75 mm) sieve	GM, GC, SM, SC
5%-12% Pass No. 200 (75 mm) sieve	Borderline Classification requiring use of dual symbols

CONSISTENCY

CLAYS AND PLASTIC SILTS	STRENGTH TON/SQ. FT ++	BLOWS/ FOOT +
VERY SOFT	0 - 1/4	0 - 2
SOFT	1/4 - 1/2	2 - 4
FIRM	1/2 - 1	4 - 8
STIFF	1 - 2	8 - 16
VERY STIFF	2 - 4	16 - 32
HARD	Over 4	Over 32



RELATIVE DENSITY

SANDS, GRAVELS AND NON-PLASTIC SILTS	BLOWS/ FOOT +
VERY LOOSE	0 - 4
LOOSE	4 - 10
MEDIUM DENSE	10 - 30
DENSE	30 - 50
VERY DENSE	Over 50

\+ Number of blows of a 140-pound hammer falling 30-inches to drive a 2-inch O.D. (1-3/8-inch I.D.) split spoon (ASTM D1586).
++ Unconfined compressive strength in tons/sq.ft. as determined by laboratory testing or approximated by the standard penetration test (ASTM D1586), pocket penetrometer, torvane, or visual observation.

Drilling Notes:

1. Sampling and blow counts
   a. California Modified – number of blows per foot of a 140 pound hammer falling 30 inches
   b. Standard Penetration Test – number of blows per 12 inches of a 140 pound hammer falling 30 inches

Types of Samples:
X – In-Situ
SPT - Standard Penetration
CA - California Modified
N - Nuclear Gauge
PO – Pocket Penetrometer (tons/sq.ft.)

GeoSolutions, Inc.

220 High Street, San Luis Obispo, CA 93401
2370 Skyway Drive, Suite 104
Santa Maria, CA 93455

BORING LOG

BORING NO. **B-1**

JOB NO. **SL07744-1**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**1000 Bello Avenue**	DRILL RIG:	**CME 55**
DRILLING LOCATION:	**See Figure 2, Site Plan**	HOLE DIAMETER:	**4.0 inch**
DATE DRILLED:	**June 16, 2011**	SAMPLING METHOD:	**SPT**
LOGGED BY:	**BB**	HOLE ELEVATION:	**Not Recorded**

Depth of Groundwater: **Not Encountered** Boring Terminated At: **15.0 feet** Page 1 of 2

DEPTH	SOIL DESCRIPTION	USCS	LITHOLOGY	SAMPLE	BLOWS/ 12 IN	$(N_1)_{60}$	FRICTION ANGLE, (degrees)	COHESION, C (psf)	OPTIMUM WATER CONTENT (%)	MAXIMUM DRY DENSITY (pcf)	EXPANSION INDEX (EI)	FINES CONTENT (%)	PLASTICITY INDEX (PI)
0	SANDY FAT CLAY: Black, with gravel, moist	CH											
-5	FAT CLAY: Very dark bown, with gravel, moist, fill	CH		SPT	10	24							
-10	SANDY CLAY: Dark olive brown, slightly moist, fill	CL		SPT	41	72							
-15	SANDY CLAY: Dark olive brown, with up to 2" diameter, fill	CL		SPT	43	80							
-20													

Depth scale: 0, -1, -2, -3, -4, -5, -6, -7, -8, -9, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -20, -21, -22, -23, -24, -25, -26, -27, -28, -29, -30

GeoSolutions, Inc.

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BORING LOG

BORING NO. **B-2**

JOB NO. **7744-1**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**1000 Bello Avenue**	DRILL RIG:	**CME 55**
DRILLING LOCATION:	**See Figure 2, Site Plan**	HOLE DIAMETER:	**8 Inches**
DATE DRILLED:	**June 16, 2011**	SAMPLING METHOD:	**SPT**
LOGGED BY:	**BB**	HOLE ELEVATION:	**Not Recorded**

Depth of Groundwater: **Not Encountered** Boring Terminated At: **28.0 Feet**

DEPTH	SOIL DESCRIPTION	USCS	LITHOLOGY	SAMPLE	BLOWS/12 IN	$(N_1)_{60}$	FRICTION ANGLE, (degrees)	COHESION, C (psf)	OPTIMUM WATER CONTENT (%)	MAXIMUM DRY DENSITY (pcf)	EXPANSION INDEX (EI)	FINES CONTENT (%)	PLASTICITY INDEX (PI)
0	SANDY FAT CLAY: Black, sandy, with roots, moist	CH											
-2				A			3.3	551	11.8	97.7	67	65.9	43
-4	SAND: Dark olive brown, slightly moist,	SM		SPT	39	94							
-6	POORLY GRADED SAND: Olive brown, wth clay	SP-SC											
-9				SPT	31	54							
-14				SPT	75	140							
-19				SPT	50/2"	78							
-24				SPT	50/3"	167							
-26	FORMATIONAL MATERIAL: Obispo Formation												
-28				SPT		186							

Depth scale: 0, -1, -2, -3, -4, -5, -6, -7, -8, -9, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -20, -21, -22, -23, -24, -25, -26, -27, -28, -29, -30

APPENDIX B

Laboratory Testing

Soil Test Reports

LABORATORY TESTING

This appendix includes a discussion of the test procedures and the laboratory test results performed as part of this investigation. The purpose of the laboratory testing is to assess the engineering properties of the soil materials at the Site. The laboratory tests are performed using the currently accepted test methods, when applicable, of the American Society for Testing and Materials (ASTM).

Undisturbed and disturbed bulk samples used in the laboratory tests are obtained from various locations during the course of the field exploration, as discussed in **Appendix** A of this report. Each sample is identified by sample letter and depth. The Unified Soils Classification System is used to classify soils according to their engineering properties. The various laboratory tests performed are described below:

Expansion Index of Soils (ASTM D4829-08) is conducted in accordance with the ASTM test method and the California Building Code Standard, and are performed on representative bulk and undisturbed soil samples. The purpose of this test is to evaluate expansion potential of the site soils due to fluctuations in moisture content. The sample specimens are placed in a consolidometer, surcharged under a 144-psf vertical confining pressure, and then inundated with water. The amount of expansion is recorded over a 24-hour period with a dial indicator. The expansion index is calculated by determining the difference between final and initial height of the specimen divided by the initial height.

Laboratory Compaction Characteristics of Soil Using Modified Effort (ASTM D1557-07) is performed to determine the relationship between the moisture content and density of soils and soil-aggregate mixtures when compacted in a standard size mold with a 10-lbf hammer from a height of 18 inches. The test is performed on a representative bulk sample of bearing soil near the estimated footing depth. The procedure is repeated on the same soil sample at various moisture contents sufficient to establish a relationship between the maximum dry unit weight and the optimum water content for the soil. The data, when plotted, represents a curvilinear relationship known as the moisture density relations curve. The values of optimum water content and modified maximum dry unit weight can be determined from the plotted curve.

Liquid Limit, Plastic Limit, and Plasticity Index of Soils (ASTM D4318-05) are the water contents at certain limiting or critical stages in cohesive soil behavior. The liquid limit (LL or W_L) is the lower limit of viscous flow, the plastic limit (PL or W_P) is the lower limit of the plastic stage of clay and plastic index (PI or I_P) is a range of water content where the soil is plastic. The Atterberg Limits are performed on samples that have been screened to remove any material retained on a No. 40 sieve. The liquid limit is determined by performing trials in which a portion of the sample is spread in a brass cup, divided in two by a grooving tool, and then allowed to flow together from the shocks caused by repeatedly dropping the cup in a standard mechanical device. To determine the Plastic Limit a small portion of plastic soil is alternately pressed together and rolled into a 1/8-inch diameter thread. This process is continued until the water content of the sample is reduced to a point at which the thread crumbles and can no longer be pressed together and re-rolled. The water content of the soil at this point is reported as the plastic limit. The plasticity index is calculated as the difference between the liquid limit and the plastic limit.

Direct Shear Tests of Soils Under Consolidated Drained Conditions (ASTM D3080-04) is performed on undisturbed and remolded samples representative of the foundation material. The samples are loaded with a predetermined normal stress and submerged in water until saturation is achieved. The samples are then sheared horizontally at a controlled strain rate allowing partial drainage. The shear stress on the sample is recorded at regular strain intervals. This test determines the resistance to deformation, which is shear strength, inter-particle attraction or cohesion c, and resistance to interparticle slip called the angle of internal friction ϕ.

Particle Size Analysis of Soils (ASTM D422-63R07) is used to determine the particle-size distribution of fine and coarse aggregates. In the test method the sample is separated through a series of sieves of progressively smaller openings for determination of particle size distribution. The total percentage passing each sieve is reported and used to determine the distribution of fine and coarse aggregates in the sample.

GeoSolutions, Inc.	SOILS REPORT	(805) 543-8539

Project:	1000 Bello Street	Date Tested:	June 20, 2011
Client:		Project #:	SL07744-1
Sample:	A Depth:	Lab #:	14693
Location:	B-2	Sample Date:	June 16, 2011
		Sampled By:	BB

Soil Classification
ASTM D2487-06, D2488-06

Result:	Black Sandy Fat CLAY
Specification:	CH

Sieve Analysis
ASTM D422-63R02

Sieve Size	Percent Passing	Project Specifications
3"		
2"		
1 1/2"		
1"		
3/4"		
No. 4	98	
No. 8	96	
No. 16	94	
No. 30	91	
No. 50	77	
No. 100	69	
No. 200	65.9	

Sand Equivalent Cal 217 (11/1999)

1		SE
2		
3		
4		

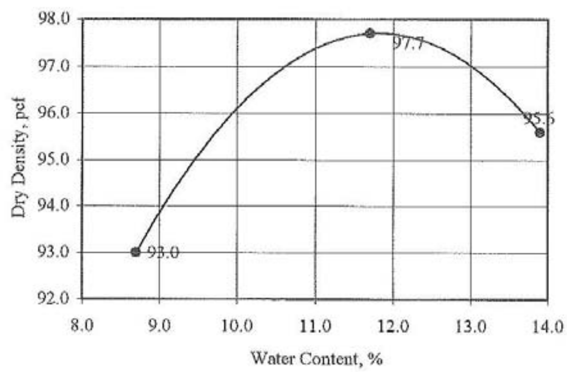
Plasticity Index
ASTM D4318-05

Liquid Limit:	61
Plastic Limit:	18
Plasticity Index:	**43**

Expansion Index
ASTM D4829-08

Expansion Index:	**67**
Expansion Potential:	Medium
Initial Saturation, %:	50

Laboratory Maximum Density
ASTM D1557-07



Mold ID	n/a	Mold Diameter, ins.	4.00
No. of Layers	5	Weight of Rammer, lbs.	10.00
No. of Blows	25		

Estimated Specific Gravity for 100% Saturation Curve = 1.95

Trial #	1	2	3	4
Water Content:	8.7	11.7	13.9	
Dry Density:	93.0	97.7	95.6	
Maximum Dry Density, pcf:		**97.7**		
Optimum Water Content, %:		**11.8**		

Moisture-Density ASTM D2937-04, ASTM D2216-05

Sample	Depth (ft)	Water Content (%)	Dry Density (pcf)	Relative Density	Sample Description

Report By: Aaron Eichman

B 1

GeoSolutions, Inc.

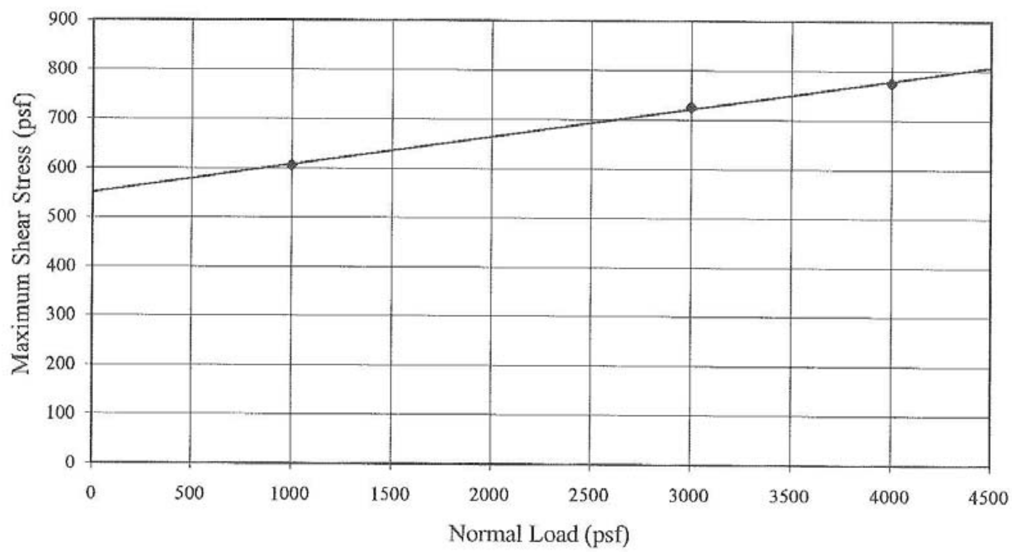
DIRECT SHEAR TEST REPORT
D3080-04

(805) 543-8539

Project:	1000 Bello Street	Date Tested:	June 21, 2011
Client:		Project #:	SL07744-1
Sample #:	A Depth:	Lab #:	14693
Location:	B-2	Sample Date:	June 16, 2011
Material:	Black Sandy Fat CLAY	Sampled By:	BB

Test Data

Specimen Number	Void Ratio	Saturation, %	Normal Load, psf	Max Shear Stress, psf	Water Content, %	Dry Density, pcf	Relative Density*,%
1	-	-	1000	606	40.3	86.6	90
2	-	-	3000	726	38.9	86.6	90
3	-	-	4000	775	38.3	86.6	90
4							
5							



*The test specimens were initially remolded at 90% of the maximum dry density (ASTM D1557) and at 2% above the optimum moisture content of the material.

Maximum Dry Density, pcf:	97.7	Optimum Moisture, %:	11.8

Angle of Internal Friction @ 90% Rel. Compaction, Phi:	3.3 °
Cohesion @ 90% Relative Compaction, C:	551 psf

Report By: Aaron Eichman

GeoSolutions, Inc.	SIEVE ANALYSIS REPORT ASTM D422-63R07	(805) 543-8539

Project:	1000 Bello Street	Date Tested:	June 20, 2011
Client:		Project #:	SL07744-1
Sample #:	B-2 @ 24' Depth: 24.0 Feet	Lab #:	14693
Location:	B-2	Sample Date:	June 16, 2011
Material:	Olive Brown Poorly Graded SAND with Clay	Sampled By:	BB

Soil Classification
ASTM D2487-06, D2488-06

Soil Description:	**Olive Brown Poorly Graded SAND with Clay**
Specification:	**SP-SC**

Sieve Analysis

U.S. Standard Sieve	Percent Passing TOTAL	Project Specifications	Remarks
3"			
2"			
1 1/2"			
1"			
3/4"			
3/8"			
No. 4	100		
No. 8	100		
No. 16	100		
No. 30	99		
No. 50	87		
No. 100	15		
No. 200	8.6		

Comments:

Report By: Aaron Eichman

B 3

APPENDIX C

Preliminary Grading Specifications

Key and Bench with Backdrain

PRELIMINARY GRADING SPECIFICATIONS

A. General

i. These preliminary specifications have been prepared for the subject site; GeoSolutions, Inc. should be consulted prior to the commencement of site work associated with site development to ensure compliance with these specifications.

ii. GeoSolutions, Inc. should be notified at least 72 hours prior to site clearing or grading operations on the property in order to observe the stripping of surface materials and to coordinate the work with the grading contractor in the field.

iii. These grading specifications may be modified and/or superseded by recommendations contained in the text of this report and/or subsequent reports.

iv. If disputes arise out of the interpretation of these grading specifications, the Soils Engineer shall provide the governing interpretation.

B. Obligation of Parties

i. The Soils Engineer should provide observation and testing services and should make evaluations to advise the client on geotechnical matters. The Soils Engineer should report the findings and recommendations to the client or the authorized representative.

ii. The client should be chiefly responsible for all aspects of the project. The client or authorized representative has the responsibility of reviewing the findings and recommendations of the Soils Engineer. During grading the client or the authorized representative should remain on-site or should remain reasonably accessible to all concerned parties in order to make decisions necessary to maintain the flow of the project.

iii. The contractor is responsible for the safety of the project and satisfactory completion of all grading and other operations on construction projects, including, but not limited to, earthwork in accordance with project plans, specifications, and controlling agency requirements.

C. Site Preparation

i. The client, prior to any site preparation or grading, should arrange and attend a meeting which includes the grading contractor, the design Structural Engineer, the Soils Engineer, representatives of the local building department, as well as any other concerned parties. All parties should be given at least 72 hours notice.

ii. All surface and sub-surface deleterious materials should be removed from the proposed building and pavement areas and disposed of off-site or as approved by the Soils Engineer. This includes, but is not limited to, any debris, organic materials, construction spoils, buried utility line, septic systems, building materials, and any other surface and subsurface structures within the proposed building areas. Trees designated for removal on the construction plans should be removed and their primary root systems grubbed under the observations of a representative of GeoSolutions, Inc. Voids left from site clearing should be cleaned and backfilled as recommended for structural fill.

iii. Once the Site has been cleared, the exposed ground surface should be stripped to remove surface vegetation and organic soil. A representative of GeoSolutions, Inc. should determine the required depth of stripping at the time of work being completed. Strippings may either be disposed of off-site or stockpiled for future use in landscape areas, if approved by the landscape architect.

D. Site Protection

i. Protection of the Site during the period of grading and construction should be the responsibility of the contractor.

ii. The contractor should be responsible for the stability of all temporary excavations.

iii. During periods of rainfall, plastic sheeting should be kept reasonably accessible to prevent unprotected slopes from becoming saturated. Where necessary during periods of rainfall, the contractor should install check-dams, de-silting basins, sand bags, or other devices or methods necessary to control erosion and provide safe conditions.

E. Excavations

i. Materials that are unsuitable should be excavated under the observation and recommendations of the Soils Engineer. Unsuitable materials include, but may not be limited to: 1) dry, loose, soft, wet, organic, or compressible natural soils; 2) fractured, weathered, or soft bedrock; 3) non-engineered fill; 4) other deleterious materials; and 5) materials identified by the Soils Engineer or Engineering Geologist.

ii. Unless otherwise recommended by the Soils Engineer and approved by the local building official, permanent cut slopes should not be steeper than 2:1 (horizontal to vertical). Final slope configurations should conform to section 1803 of the 2010 California Building Code unless specifically modified by the Soil Engineer/Engineering Geologist.

iii. The Soil Engineer/Engineer Geologist should review cut slopes during excavations. The contractor should notify the Soils Engineer/Engineer Geologist prior to beginning slope excavations.

F. Structural Fill

i. Structural fill should not contain rocks larger than 3 inches in greatest dimension, and should have no more than 15 percent larger than 2.5 inches in greatest dimension.

ii. Imported fill should be free of organic and other deleterious material and should have very low expansion potential, with a plasticity index of 12 or less. Before delivery to the Site, a sample of the proposed import should be tested in our laboratory to determine its suitability for use as structural fill.

G. Compacted Fill

i. Structural fill using approved import or native should be placed in horizontal layers, each approximately 8 inches in thickness before compaction. On-site inorganic soil or approved imported fill should be conditioned with water to produce a soil water content near optimum moisture and compacted to a minimum relative density of 90 percent based on ASTM D1557-07.

ii. Fill slopes should not be constructed at gradients greater than 2-to-1 (horizontal to vertical). The contractor should notify the Soils Engineer/Engineer Geologist prior to beginning slope excavations.

iii. If fill areas are constructed on slopes greater than 10-to-1 (horizontal to vertical), we recommend that benches be cut every 4 feet as fill is placed. Each bench shall be a minimum of 10 feet wide with a minimum of 2 percent gradient into the slope.

iv. If fill areas are constructed on slopes greater than 5-to-1, we recommend that the toe of all areas to receive fill be keyed a minimum of 24 inches into underlying dense material. Key depths are to be observed and approved by a representative of GeoSolutions, Inc. Sub-drains shall be placed in the keyway and benches as required. See Detail A: Key and Bench with Backdrain.

H. Drainage

i. During grading, a representative of GeoSolutions, Inc. should evaluate the need for a sub-drain or back-drain system. Areas of observed seepage should be provided with sub-surface drains to release the hydrostatic pressures. Sub-surface drainage facilities may include gravel blankets, rock filled trenches or Multi-Flow systems or equal. The drain system should discharge in a non-erosive manner into an approved drainage area.

ii. All final grades should be provided with a positive drainage gradient away from foundations. Final grades should provide for rapid removal of surface water runoff. Ponding of water should not be allowed on building pads or adjacent to foundations. Final grading should be the responsibility of the contractor, general Civil Engineer, or architect.

iii. Concentrated surface water runoff within or immediately adjacent to the Site should be conveyed in pipes or in lined channels to discharge areas that are relatively level or that are adequately protected against erosion.

iv. Water from roof downspouts should be conveyed in solid pipes that discharge in controlled drainage localities. Surface drainage gradients should be planned to prevent ponding and promote drainage of surface water away from building foundations, edges of pavements and sidewalks. For soil areas we recommend that a minimum of 2 percent gradient be maintained.

v. Attention should be paid by the contractor to erosion protection of soil surfaces adjacent to the edges of roads, curbs and sidewalks, and in other areas where hard edges of structures may cause concentrated flow of surface water runoff. Erosion resistant matting such as Miramat, or other similar products, may be considered for lining drainage channels.

vi. Sub-drains should be placed in established drainage courses and potential seepage areas. The location of sub-drains should be determined after a review of the grading plan. The sub-drain outlets should extend into suitable facilities or connect to the proposed storm drain system or existing drainage control facilities. The outlet pipe should consist of a non-perforated pipe the same diameter as the perforated pipe.

I. Maintenance

i. Maintenance of slopes is important to their long-term performance. Precautions that can be taken include planting with appropriate drought-resistant vegetation as recommended by a landscape architect, and not over-irrigating, a primary source of surficial failures.

ii. Property owners should be made aware that over-watering of slopes is detrimental to long term stability of slopes.

J. Underground Facilities Construction

i. The attention of contractors, particularly the underground contractors, should be drawn to the State of California Construction Safety Orders for "Excavations, Trenches, Earthwork." Trenches or excavations greater than 5 feet in depth should be shored or sloped back in accordance with OSHA Regulations prior to entry.

ii. Bedding is defined as material placed in a trench up to 1 foot above a utility pipe and backfill is all material placed in the trench above the bedding. Unless concrete bedding is required around utility pipes, free-draining sand should be used as bedding. Sand to be used as bedding should be tested in our laboratory to verify its suitability and to measure its compaction characteristics. Sand bedding should be compacted by mechanical means to achieve at least 90 percent relative density based on ASTM D1557-07.

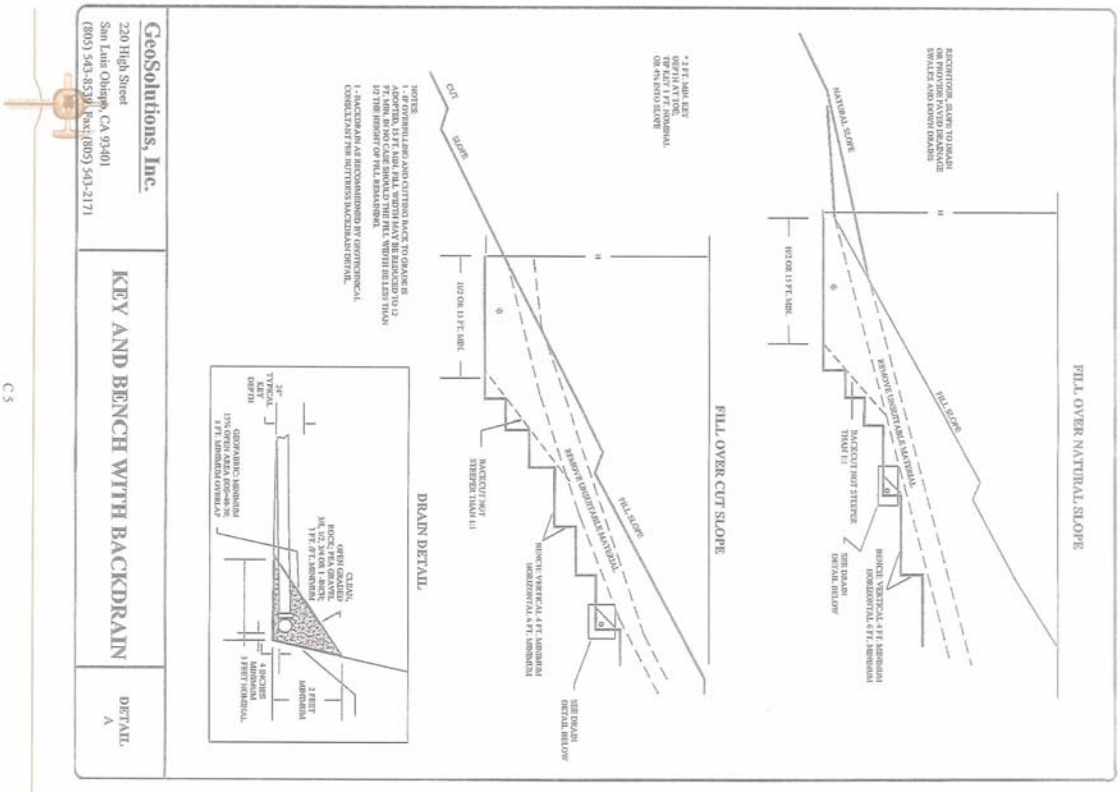
iii. On-site inorganic soils, or approved import, may be used as utility trench backfill. Proper compaction of trench backfill will be necessary under and adjacent to structural fill, building foundations, concrete slabs, and vehicle pavements. In these areas, backfill should be conditioned with water (or allowed to dry), to produce a soil water content of about 2 to 3 percent above the optimum value and placed in horizontal layers, each not exceeding 8 inches in thickness before compaction. Each layer should be compacted to at least 90 percent relative density based on ASTM D1557-07. The top lift of trench backfill under vehicle pavements should be compacted to the requirements given in report under Preparation of Paved Areas for vehicle pavement sub-grades. Trench walls must be kept moist prior to and during backfill placement.

K. Completion of Work

i. After the completion of work, a report should be prepared by the Soils Engineer retained to provide such services in accordance with section 1803.5 of the 2010 CBC. The report should including locations and elevations of field density tests, summaries of field and laboratory tests, other substantiating data, and comments on any changes made during grading and their effect on the recommendations made in the approved Soils Engineering Report.

ii. Soils Engineers shall submit a statement that, to the best of their knowledge, the work within their area of responsibilities is in accordance with the approved soils engineering report and applicable provisions within section 1803 of the 2010 CBC.

END OF TEXT


FILL OVER NATURAL SLOPE
FILL OVER CUT SLOPE
DRAIN DETAIL
GeoSolutions, Inc.
220 High Street
San Luis Obispo, CA 93401
(805) 543-8539 Fax: (805) 543-2171
KEY AND BENCH WITH BACKDRAIN
DETAIL A
C 5

City of Pismo Beach
Municipal Building
Civil Site Report

Project No. 11-011

Last Revised July 7, 2011

Prepared For:

Hamrick Associates, Inc.
1609 Costa Brava
Shell Beach, CA 93449

By:

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Introduction

The following report has been prepared to evaluate the existing conditions of grading, drainage, site accessibility, and availability of utilities for the Pismo Beach Municipal Building located at the southeast corner of Bello Avenue and Wadsworth Avenue in Pismo Beach, California. Exhibit EX-1, attached, depicts the location of the project with regard to surrounding streets. Exhibit EX-2 shows the location of the property on which the building is located per the San Luis Obispo County Assessor's maps. Two separate Assessor's numbers have been assigned to this property. Exhibit EX-3 is an aerial view of the building, tennis courts, parking area, and adjacent streets from a recent aerial photograph.

Existing Facilities - Observations

Site Accessibility

The Pismo Beach municipal building has limited pedestrian access due to steps, curbs, and thresholds that impede accessibility by the public. The following section describes accessibility to the building and the existing surfaces, slopes, and barriers observed. Exhibit EX-4, attached, depicts the current site conditions.

Sidewalk – Southerly side of Wadsworth Avenue from the northeasterly corner of the property to the intersection of Wadsworth and Bello Avenues
The longitudinal slope of this section of sidewalk ranges from 3.2% to 6.6% (east to west) with a cross slope of 2.3% to 2.6% (south to north, toward street). The walkway has a clear travel width of 48" and the surface is concrete in good shape. No trip hazards were observed.

Diagonal Curb Ramp – Easterly corner of Wadsworth Avenue and Bello Avenue
Slope of the concrete ramp was measured at 6.5% with little or no cross slope. Cross slope and clear width were difficult to measure as the flared sides blend into the travelled way of the ramp. No detectable warnings on this ramp; neither truncated domes nor grooved borders have been installed. There is no landing area above the ramp due to obstructions (retaining walls). A cross walk has been painted on both streets at 90° to the ramp and a clear space is provided at the bottom of the ramp, although a 2" lip between the street surface and the curb ramp was observed. Curbs have been painted red to prevent obstruction of the ramp by parked vehicles.

Sidewalk – Easterly side of Bello Avenue from the intersection of Wadsworth and Bello Avenues to the Police Station Driveway
The longitudinal slope of this section of sidewalk ranged from 0.7% to 1.9% (north to south) with a cross slope of 1.3% to 2.3% (east to west, toward street). The walkway has a clear travel width ranging from 69" to 72". An obstruction (stop sign) was observed near the corner of Wadsworth and Bello Avenues. The post was located in the 69" wide sidewalk with a clear travel width between the post and a retaining wall at the back of walk measured at 40". The sign is located approximately 72" above the sidewalk. The surface of this section of sidewalk is concrete in good shape and no trip hazards were observed.

Diagonal Curb Ramp – Easterly side of Bello Avenue at the Police Station Driveway
Slope of the concrete ramp was measured at 6.5% with an approximate 1.0% cross slope. The ramp shape is non-standard with a curb on one side and a flare on the other. There are no truncated domes on the travel surface, but a grooved border is provided at the top. A landing of approximately 48"" is provided above the ramp as well. The lip between the bottom of the ramp and the finished surface was measured at less than ½". Since the path of travel is across the police station driveway, no crosswalk has been painted.

Police Station Driveway
Vehicular access to the parking area at the rear (easterly side) of the project is provided by an asphalt driveway 21.0 feet in width. Slope of the driveway ranged from 2.1% to 2.5% longitudinally (east to west) with a 2.0% cross slope (north to south) to a 5.5 foot wide concrete "v" gutter adjacent to the police station building.

Parking Lot – Easterly side of Building
An asphalt parking lot is located on the easterly side of the building, at the rear of the property. Longitudinal slope of the parking lot (north to south) ranged from 2.4% to 5.0 %. Cross slope (east to west) measured 1.6% to 4.5%. A secondary, vehicular access ramp for emergency purposes is located on the easterly property line. The asphalt ramp surface was measured at 7.9% (east to west). All asphalt surfaces were in good shape. Striping has been provided for some parking spaces, but none were striped for accessible parking stalls or unloading areas. No accessible parking signage was observed for any stalls or at the entrance from the street.

Walkways between Parking Lot and Building
Two concrete walkways (one on the northerly end and one on the southerly end) provide access from the parking lot to the building. Neither is accessible due to 5" and 6" curbs, respectively. In addition to the curb, the northerly walk also has a set of steps to traverse the approximately 20" difference between the walk and building.

Walkway between Building and Tennis Courts
An asphalt walkway on the northerly side of the building provides access from both the building and Bello Avenue to the tennis courts on the northerly end of the property. The width of the walkway ranged from 54" to 60" with a longitudinal slope (east to west) ranging from 3.7% to 3.9%. Cross slope of the walk ranged from 1.2% to 1.4% (north to south, toward the building). The condition of the asphalt surface ranges from fair to poor in most locations.

Access to Building
The main entrance to the building is located on the westerly side of the structure, facing Bello Avenue. A concrete walkway with a longitudinal slope of 1.9% (east to west, toward the street) leads to the main set of stairs and entrance. Elevation difference between the walkway and the entrance is approximately 55" with no ramp or other accessible route to this entrance. This is the only entrance/exit on this side of the building.

On the northerly side of the building, access to the building is provided by a set of doors with a threshold of approximately 1.5" above a concrete landing. The landing slopes away from the door toward the tennis courts (northerly) at 1.1%.

On the easterly side of the building, access to the structure is available through several doors located under covered walkways around the central courtyard. All doorways appear to have thresholds located approximately 1.5" above the exterior concrete surface. All covered walkways are concrete surfaces in good condition with slopes of less than 2% in any direction.

There is no access to the building from the southerly side of the structure.

Access to Tennis Courts
Access to the tennis courts is shared with the access to the building on the northerly side of the structure. A concrete landing separates the two and drains toward the tennis courts at 1.1%. A 6" step was measured between the landing and the tennis court surface.

Site Utilities

Located in an urban setting, the Pismo Beach municipal building is served by several public utilities. Exhibit EX-5, attached, depicts the location of the various utility mains and service laterals to the building.

Sanitary Sewer Service

Sanitary sewer service for this building is provided by the City's sewer system. A 6" diameter vitrified clay sanitary sewer is located in Bello Avenue flowing east to west, down Hollister Avenue. The building is currently connected to the system by a PVC sewer lateral of unknown size. A cleanout is located in the driveway between the municipal building and the Police station. Condition of the sewer is unknown at this time. The temporary building on the easterly side of the project is connected to this service by a 4" PVC lateral under the building.

Potable Water Service

Potable water service is provided to this building by the City's water system. A 6" diameter asbestos cement water main is located in Bello Avenue on the westerly side of the street. A meter box for the existing 2" water service is located in the curb ramp on the southwesterly corner of the project. A separate water shutoff valve is located in the lawn. Condition of the water service is unknown at this time. The temporary building on the easterly side of the project is connected to the service by a 1-1/4" lateral under the building.

Gas service

Natural gas service for the building is provided by the Southern California Gas Company. The gas company maintains both a 2" normal pressure main and an 8" high pressure main in Bello Avenue located approximately 60" off the easterly curb in the street pavement. A gas meter was observed on the southerly side of the main entrance into the building on Bello Avenue. The temporary building on the easterly side of the project is connected to this service by a lateral under the building.

Electrical service

Electrical service is provided by PG&E from overhead poles on the westerly side of Bello Avenue. Three meters on the building are connected by overhead secondary services. Electrical service to the temporary building is provided from a 600 amp subpanel mounted on the municipal building on the westerly side of the courtyard.

Telecommunications service

Telephone service is provided by AT&T from overhead wires on the westerly side of Bello Avenue. Overhead service is provided to two existing locations on the building. One of the services is connected to the temporary building on the easterly side of the project.

Site Grading and Drainage

Exhibit EX-6 depicts the slopes and drainage patterns in the vicinity of the building.

Off-site Drainage Contributions

Located at the foot of a hill, the project receives off-site contributions from several areas directly above it. Exhibit EX-7 depicts the off-site area of contribution. All off-site contributions are intercepted at the easterly property line and directed from the back of the project to the "v" gutter in the driveway between the building and the police station, with eventual discharge to Bello Avenue. This water in effect, "bypasses" the project, having little or no affect on the buildings use. The overall watershed is approximately 2.0 acres and has a difference in elevation of approximately 71 feet from the highest point to the lowest point. The length of the longest flow path is approximately 675 feet. Since the size of the watershed is less than 200 acres, the Rational Method was utilized to estimate the peak runoff from the watershed. SLO County Standard Drawing H2 was utilized to estimate the time for storm runoff to concentrate and run to the point of discharge (T_C= 2.8 minutes). A minimum time of concentration of 10 minutes was used for this analysis, as recommended by the Rational Method.

Because there are different land uses in the watershed with different percentages of impermeability, a weighted average or composite constant (Manning's C factor) was established to represent the degree of impermeability. This weighted average is calculated as:

C_{AVG}= (0.027)(0.95)+(0.211)(0.95)+(1.772)(0.40) = 0.46

With an average annual rainfall of 18" (SLO County Standard Drawing H1), the rainfall intensity for typical storms with recurrence intervals between 2 and 100 years is estimated from SLO County standard drawing H-4, table 3:

Design Storm Intensity	Inches/Hour
I_2	1.70
I_5	2.30
I_{10}	2.80
I_{25}	3.20
I_{50}	3.70
I_{100}	4.00

Since the watershed is less than 200 acres (2.0 acres), runoff is estimated using the Rational Equation, Q=CiA. Therefore, runoff from this watershed is estimated as:

$Q_2 = (0.46)(1.70)(2.0) =$ 1.57 CFS
$Q_5 = (0.46)(2.30)(2.0) =$ 2.13 CFS
$Q_{10} = (0.46)(2.80)(2.0) =$ 2.59 CFS
$Q_{25} = (0.46)(3.20)(2.0) =$ 2.96 CFS
$Q_{50} = (0.46)(3.70)(2.0) =$ 3.42 CFS
$Q_{100} = (0.46)(4.00)(2.0) =$ 3.70 CFS

This runoff is conveyed with a portion of the onsite drainage to the street via the "v" gutter located in the driveway between the building and the police station.

On-site Drainage Contributions

Drainage contributions from on-site sources are collected and conveyed to the street from several different locations on the property. Exhibit EX-8 depicts the on-site drainage areas used in this analysis.

Grades adjacent to the building ranges from 0.0% to 3.0%, with the majority of the areas measured being less than 2.0%. Front lawn grades (subarea L1) ranged from approximately 1.3% to 3.0% away from the structure. Runoff off from the 4,255 square foot front lawns sheet flows across the sidewalk to the street gutter on the easterly side of Bello Avenue.

Grades in the courtyard area (subarea L2) are approximately 1.0% and it appears that runoff is directed toward the building foundations instead of away from them. No yard drains were observed in the 3,890 square foot courtyard, so it is assumed that runoff from the courtyard (and roof runoff deposited on the courtyard) infiltrates through the soil.

An open (undeveloped) area of 2,648 square feet in the northeasterly corner of the property has a grade of approximately 5.0% with runoff flowing toward the building and rear parking area. Runoff from this drainage area (subarea L3) combines with other sources and is conveyed by the "v" gutter in the driveway to Bello Avenue.

Curbing contains all water along the northerly and southerly sides of the building and conveys it to Bello Avenue, flowing over the sidewalk and curb. The 1,050 square foot drainage area on the northerly side of the building (subarea P2) and the smaller drainage area on the southerly side of the structure (subarea L4, 670 square feet) act as channels conveying part of the storm water runoff from the roof.

Runoff from the paved parking lot at the rear of the property (subarea P3) combines with off-site contributions discussed earlier and is conveyed to the "v" gutter running the length of the driveway on the southerly side of the project and from there to Bello Avenue. Slopes in the vicinity of the parking lot vary from 2.4% to 5.0% and the asphalt surface is in good condition.

Driveway grades ranged from 2.1% to 2.5% with a cross slope of 2.0% to 3.5% to a concrete "v" gutter. The asphalt paved surface, approximately 3,127 square feet (subarea P4), is in good condition. All runoff from this area is eventually discharged to Bello Avenue as well.

Grading for the approximately 13,490 square feet of tennis/basketball courts is minimal (less than 1.0%) reflecting the needs of the use. The paved surface (subarea P1) conveys storm water to a 6"x6" drop inlet in the southwesterly corner of the courts with eventual discharge to the street gutter by a 4" pipe under the sidewalk. Some evidence of localize ponding was observed on the court surface.

The roof of the building conveys storm water runoff to five distinct locations. A roof scupper in the northeasterly corner of the building conveys water from approximately 1,144 square feet of roof area to the north side of the building (subarea R4) where an approximately 4"x6" drain allows it to flow over the side of the roof. There is no downspout on this device to take runoff to the ground.

A second roof scupper on the northerly side of the building collects storm runoff from approximately 2,349 square feet (subarea R3) and conveys it to a 4"x6" drain with a down spout of the same size extending down the wall of the building. The downspout is connected with a 6" corrugated ABS pipe in poor condition to a 6" PVC storm drain that drops water directly onto the tennis court pavement.

A 4"x6" scupper collects runoff from the remainder of the roof on the northerly portion of the building as well as runoff from the front portion of the building (subarea R2) and drops it into the courtyard. Contributing roof area is approximately 7,285 square feet. No downspout was observed for this roof drain.

A 4"x6" scupper collects all roof runoff from the southerly portion of the building (subarea R1) and deposits it on the southerly side of the courtyard. Contributing area from this portion of the roof is approximately 3,809 square feet.

Runoff from the roof of the temporary building (subareas R5 and R6) discharges to the parking lot at the rear of the building, runs across the parking lot, and is eventually discharged to Bello Avenue by the "v" gutter in the driveway. Total roof area for the temporary building is approximately 1,444 square feet.

A Manning's Coefficient of 0.95 has been assumed for all impervious areas (roof, parking, driveway, sidewalks, and tennis court) and a coefficient of 0.40 for lawn areas (front lawn, courtyard, and rear open area). A coefficient of 0.50 was used for sub area L4 as this has a mostly compacted earth surface. The theoretical runoff from each on-site source is estimated using the Rational Formula (Q=CiA) with the rainfall intensities previously discussed, and with the Manning's Coefficients and contributing area for each of the on-site subareas:

Theoretical Runoff by On-site Subarea

Subarea	Q2 (cfs)	Q5 (cfs)	Q10 (cfs)	Q25 (cfs)	Q50 (cfs)	Q100 (cfs)
R1	0.141	0.191	0.233	0.266	0.307	0.332
R2	0.270	0.365	0.445	0.508	0.588	0.636
R3	0.087	0.118	0.143	0.164	0.190	0.205
R4	0.042	0.057	0.070	0.080	0.092	0.100
R5	0.027	0.036	0.044	0.050	0.058	0.063
R6	0.027	0.036	0.044	0.050	0.058	0.063
P1	0.500	0.677	0.824	0.941	1.089	1.177
P2	0.039	0.053	0.064	0.073	0.085	0.092
P3	0.262	0.355	0.432	0.494	0.571	0.618
P4	0.116	0.157	0.191	0.218	0.252	0.273
L1	0.066	0.090	0.109	0.125	0.145	0.156
L2	0.061	0.082	0.100	0.114	0.132	0.143
L3	0.041	0.056	0.068	0.078	0.090	0.097
L4	0.012	0.017	0.020	0.023	0.027	0.029

Combined Flow to Bello Avenue

Although some of the runoff sheet flows across the sidewalk to Bello Avenue, concentrated runoff is received from the tennis courts on the northerly side of the project and from the "v" gutter on the southerly side of the project. The combined flow (on-site and off-site contributions) to the street from these two sources for each of the design storms is estimated as follows:

Theoretical Runoff at each discharge point

Discharge Point	Rec. Flow From Subareas	Q2 (cfs)	Q5 (cfs)	Q10 (cfs)	Q25 (cfs)	Q50 (cfs)	Q100 (cfs)
Tennis Courts	R3+P1	0.587	0.794	0.967	1.105	1.278	1.382
Driveway "v" Gutter	P3+P4 +L3+Off-site	2.045	2.767	3.368	3.849	4.451	4.812

The concrete "v" gutter in the driveway between the building and the police station is approximately 5.5 feet wide with a depth of approximately 3" and a longitudinal slope of 2.1% to 2.5%. The capacity of the gutter is approximately 2.9 CFS when flowing full.

Retaining Walls

Existing retaining walls are utilized around the tennis/basketball courts to provide for a level play area on this sloping site. The retaining walls are also used to support fencing as well. These poured in place, concrete retaining walls are cracked in several places and show some sign of damage due to water intrusion.

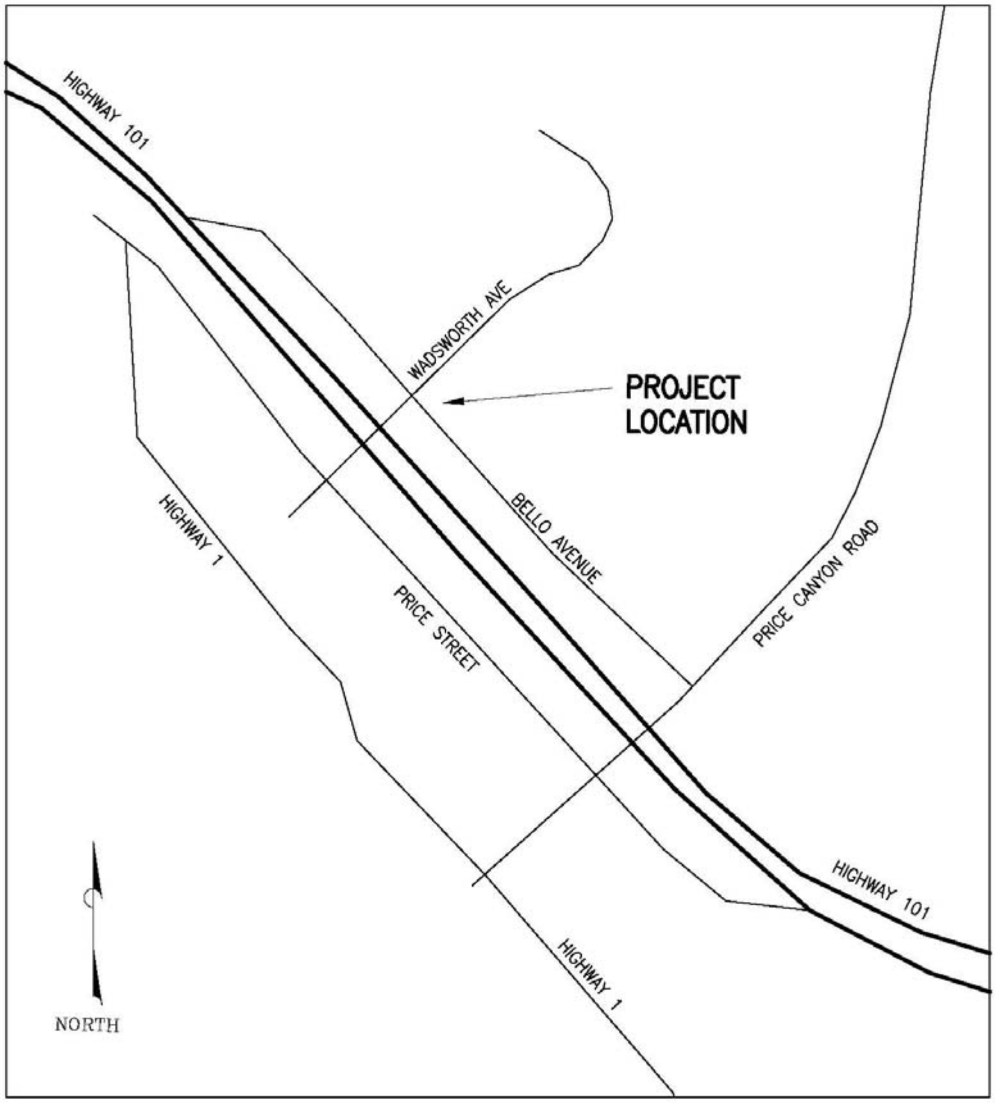
A stone retaining wall is located on the easterly boundary of the property, directly behind the building. Some minor cracking and separation of stone work was noted.

Recommendations

Accessibility
Any improvement, renovation, or reconstruction of the facility should address accessibility by the public. Access to the building should incorporate ramps, landings, handrails, doorways, and thresholds that meet the current accessibility codes for the path of travel from public walkways and parking areas. Sidewalks, especially curb ramps, should be brought up to current code as part of the project or as part of an overall sidewalk accessibility plan by the municipality. Access to the tennis court/basketball courts (if they are to remain) should be improved to eliminate vertical barriers as well.

Utilities
Sizing and condition of services should be reviewed based upon the intended future use of the facility and upgraded as necessary at the time of preliminary design of improvements. Utility mains appear to be adequately sized for typical loads from this building.

Grading and Drainage
Storm water from all impervious surfaces should be directed to facilities encouraging the infiltration of runoff utilizing Low Impact Development (LID) best management practices. Any new catch basins should include provisions for capturing incidental oil and sediments prior to discharging to municipal facilities or infiltration devices. Runoff should be directed away from foundations (if possible) by maintaining a minimum grade of 5% for 10 feet, or by providing hard surfaces at a minimum of 2% to approved drainage/collection systems. Off-site contributions (which collect runoff from paved parking areas) should be conveyed to a device to retain oils and sediments prior to flowing to Bello Avenue.



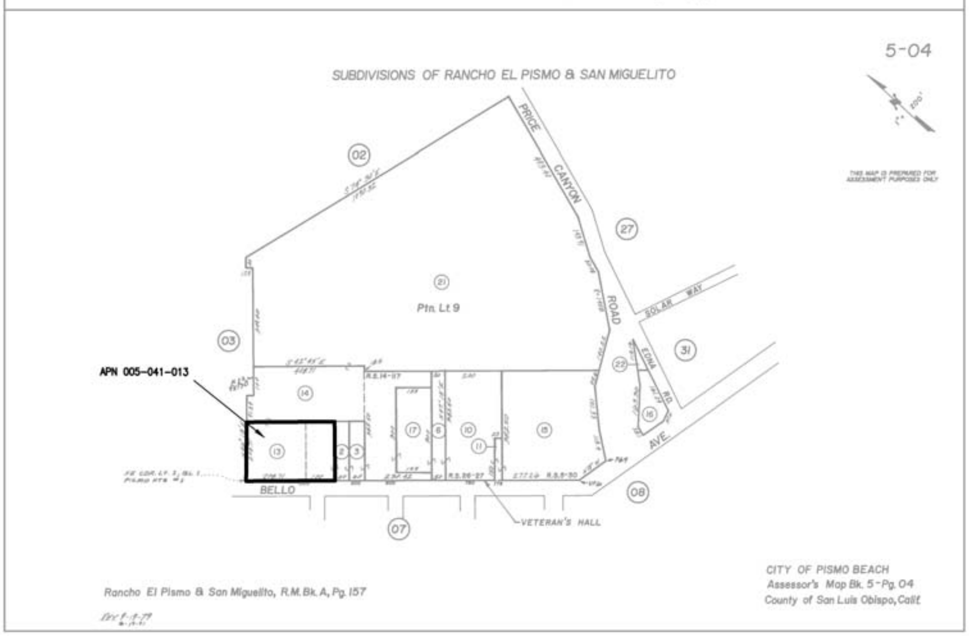
VICINITY MAP

NOT TO SCALE

JOSEPH A. CHOUINARD, P.E.
785 BRAHMA STREET
PASO ROBLES, CA 93446 (805) 226-8414 P/F

MUNICIPAL BUILDING PROJECT

DESIGN/DRAWN	PREPARED FOR:
JAC	CITY OF PISMO BEACH PISMO BEACH, CA
JOB NO. 11-011	JOSEPH A. CHOUINARD, P.E. RCE [illegible] — DATE
	SHEET EX-1



ASSESSOR'S PARCEL MAP

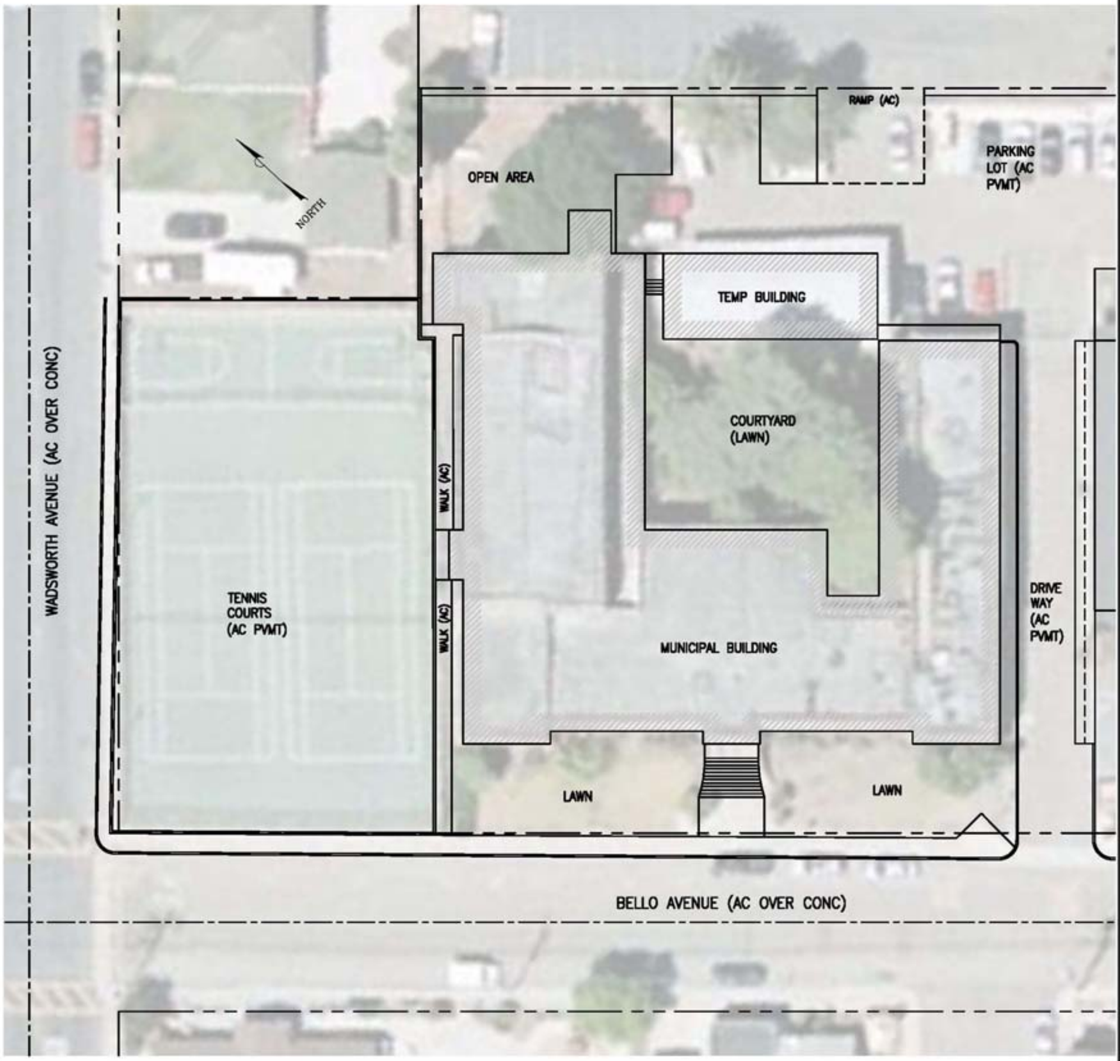
NOT TO SCALE

NOTE: PROJECT IS LOCATED ON TWO SEPARATE ASSESSOR'S PARCELS

JOSEPH A. CHOUINARD, P.E.
785 BRAHMA STREET
PASO ROBLES, CA 93446 (805) 226-8414 P/F

MUNICIPAL BUILDING PROJECT

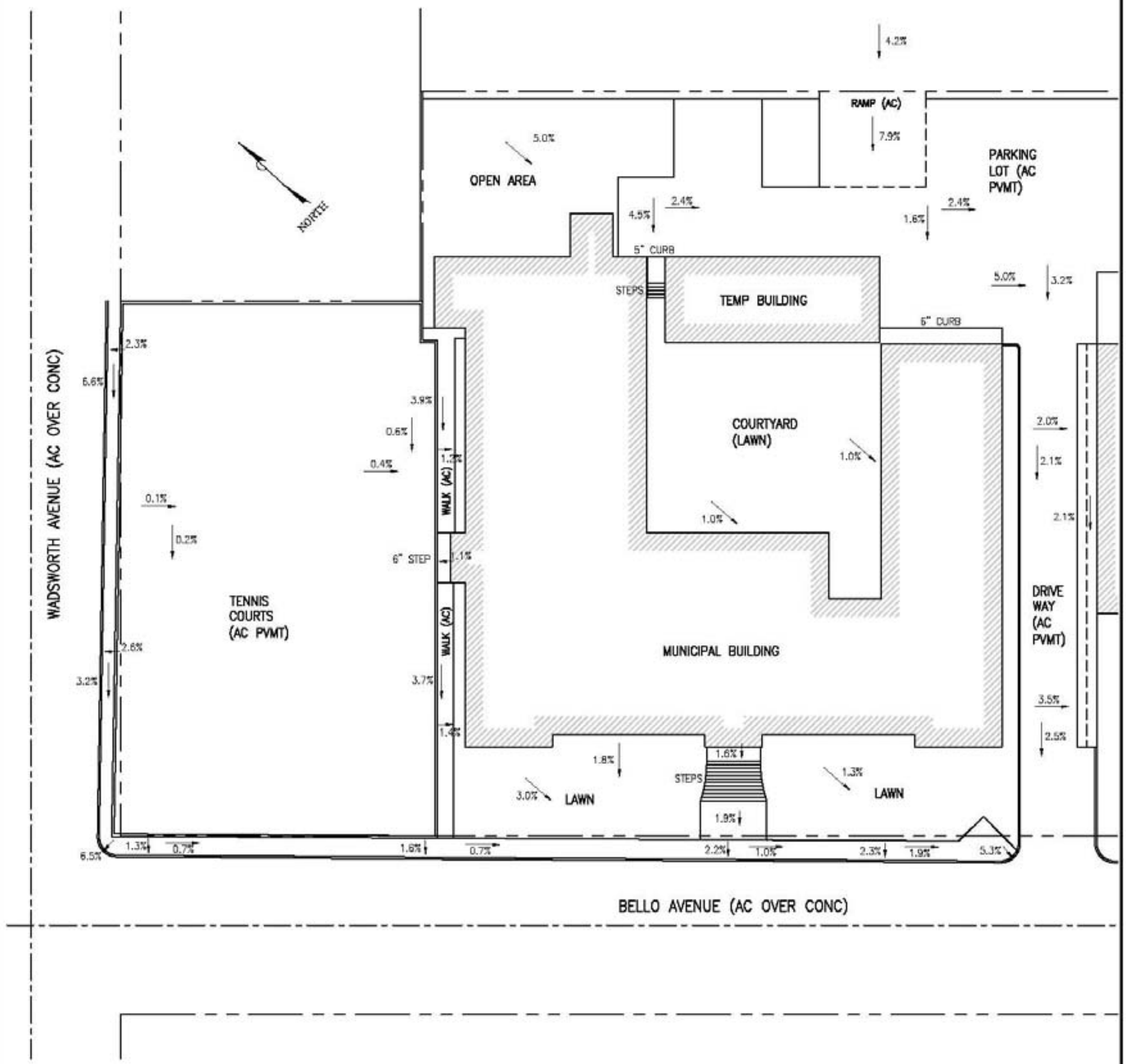
DESIGN/DRAWN: JAC	PREPARED FOR: CITY OF PISMO BEACH, PISMO BEACH, CA
JOB NO.: 11-011	JOSEPH A. CHOUINARD, P.E. RCE 58865 — DATE
	SHEET: EX-2



AERIAL PHOTO

NOT TO SCALE

JOSEPH A. CHOUINARD, P.E. 785 BRAHMA STREET PASO ROBLES, CA 93446 (805) 226-8414 P/F	
MUNICIPAL BUILDING PROJECT	
DESIGN/DRAWN JAC	PREPARED FOR: CITY OF PISMO BEACH PISMO BEACH, CA
JOB NO. 11-011	JOSEPH A. CHOUINARD, P.E. RCE 56865 — DATE
	SHEET EX-3



EXISTING SITE ACCESSIBILITY PLAN

NOT TO SCALE

JOSEPH A. CHOUINARD, P.E.
785 BRAHMA STREET
PASO ROBLES, CA 93446 (805) 226-8414 P/F

MUNICIPAL BUILDING PROJECT

DESIGN/DRAWN: JAC

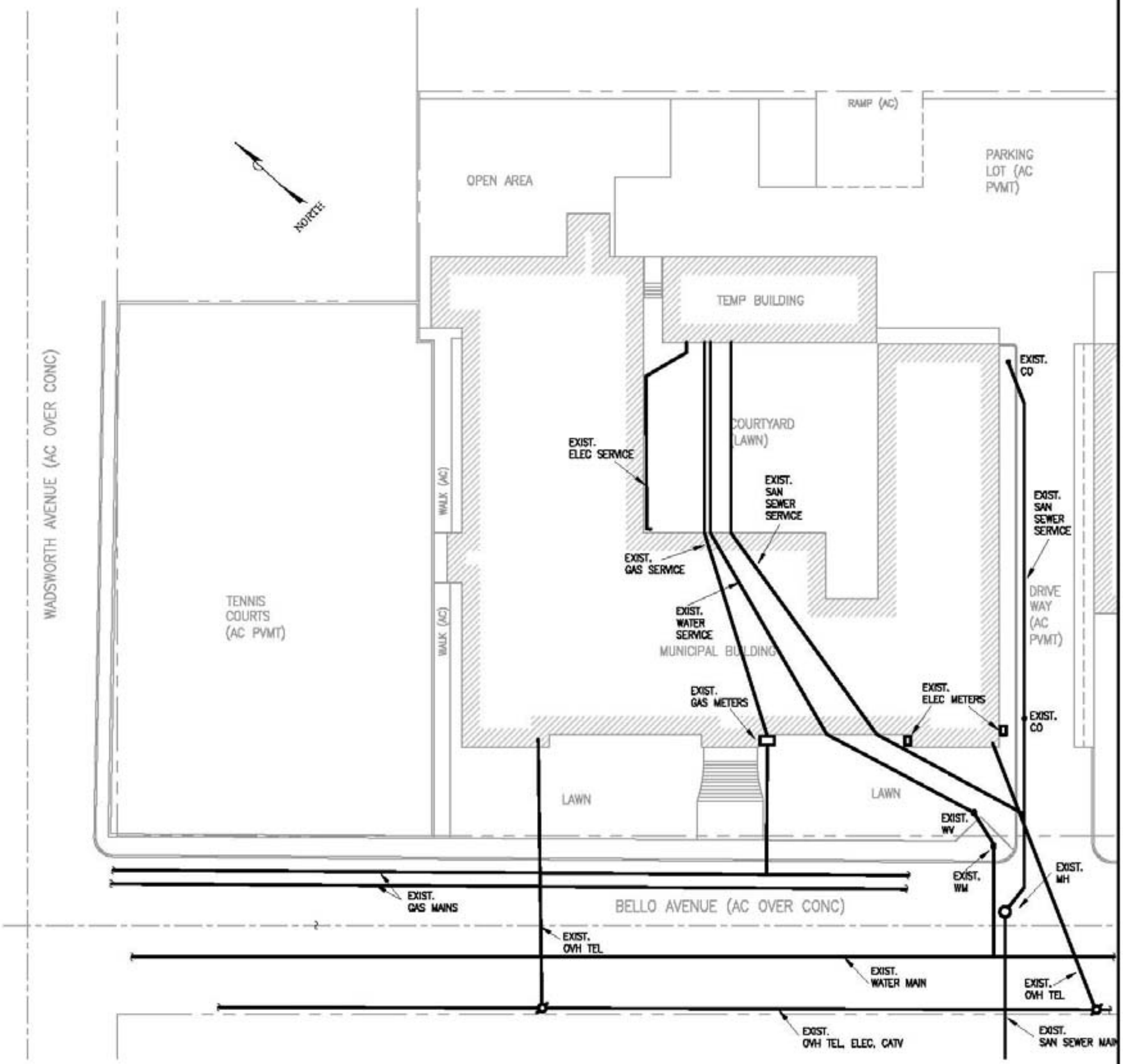
PREPARED FOR:
CITY OF PISMO BEACH
PISMO BEACH, CA

JOB NO. 11-011

JOSEPH A. CHOUINARD, P.E. RCE 58968

DATE

SHEET EX-4



EXISITNG SITE UTILITY PLAN

NOT TO SCALE

JOSEPH A. CHOUINARD, P.E.
785 BRAHMA STREET
PASO ROBLES, CA 93446 (805) 226-8414 P/F

MUNICIPAL BUILDING PROJECT

DESIGN/DRAWN: JAC

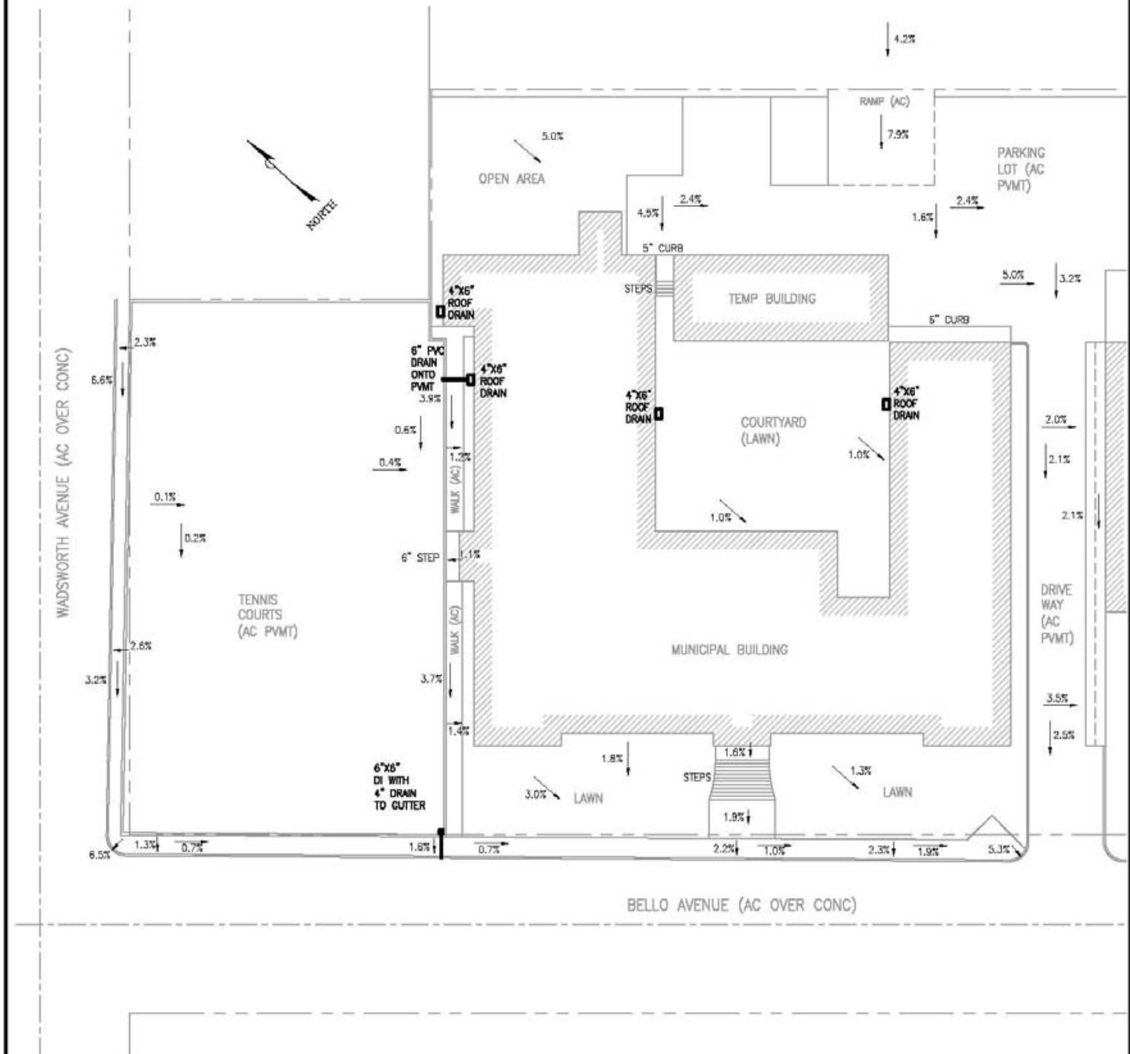
PREPARED FOR:
CITY OF PISMO BEACH
PISMO BEACH, CA

JOB NO. 11-011

JOSEPH A. CHOUINARD, P.E. RCE 58985

DATE

SHEET EX-5



EXISTING GRADING & DRAINAGE PLAN

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JOSEPH A. CHOUINARD, P.E. 785 BRAHMA STREET PASO ROBLES, CA 93446 (805) 226-8414 P/F	
MUNICIPAL BUILDING PROJECT	
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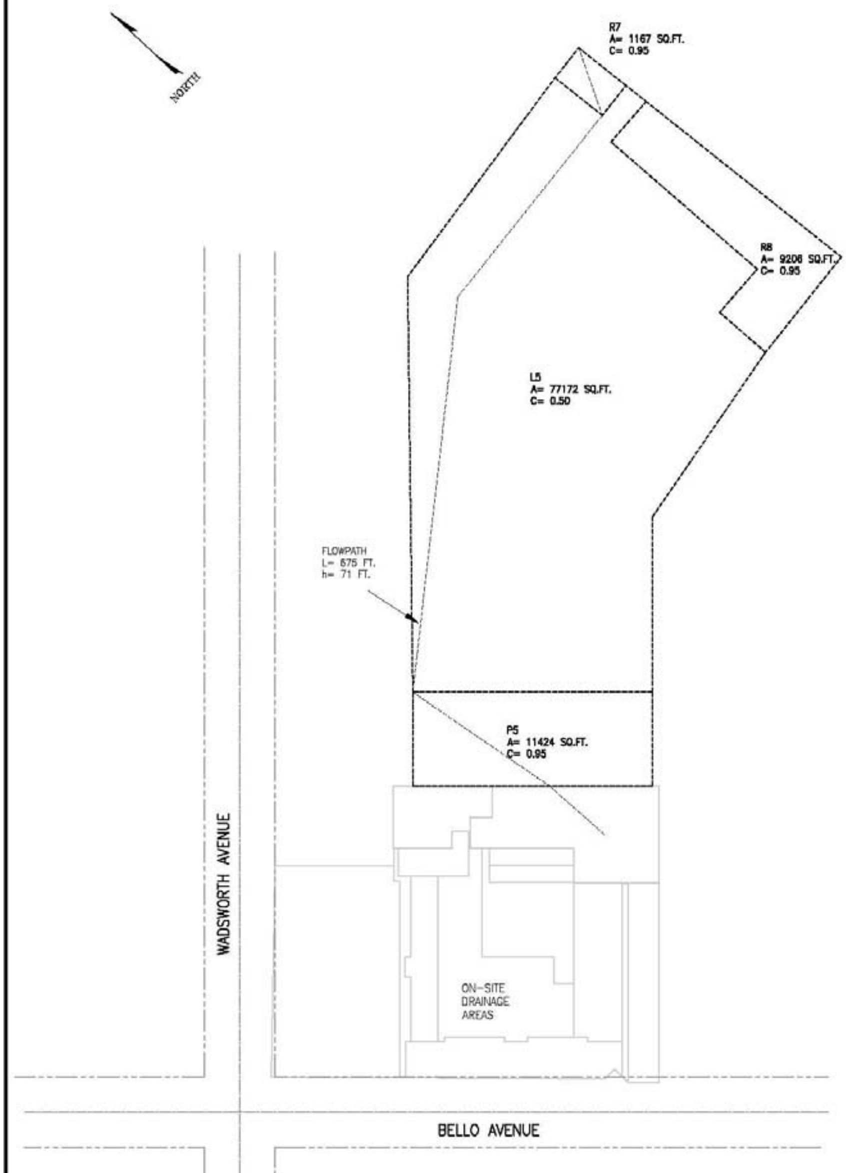
JOB NO. 11-011	JOSEPH A. CHOUINARD, P.E. RCE 58966 — DATE
	SHEET EX-6



OFF-SITE WATER SHED SUBAREAS

NOT TO SCALE

JOSEPH A. CHOUINARD, P.E.
785 BRAHMA STREET
PASO ROBLES, CA 93446 (805) 226-8414 P/F

MUNICIPAL BUILDING PROJECT

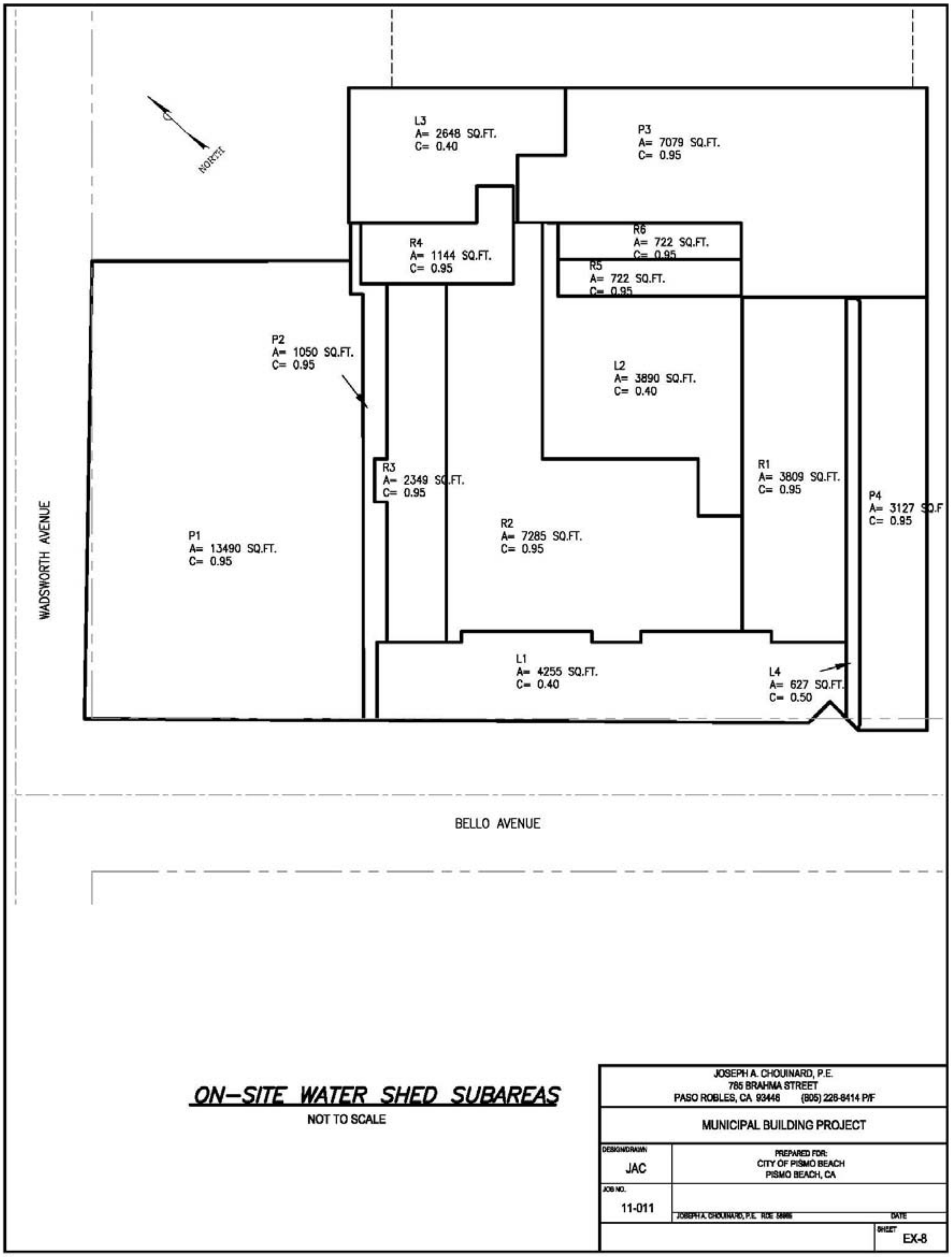
DESIGN/DRAWN: JAC

PREPARED FOR:
CITY OF PISMO BEACH
PISMO BEACH, CA

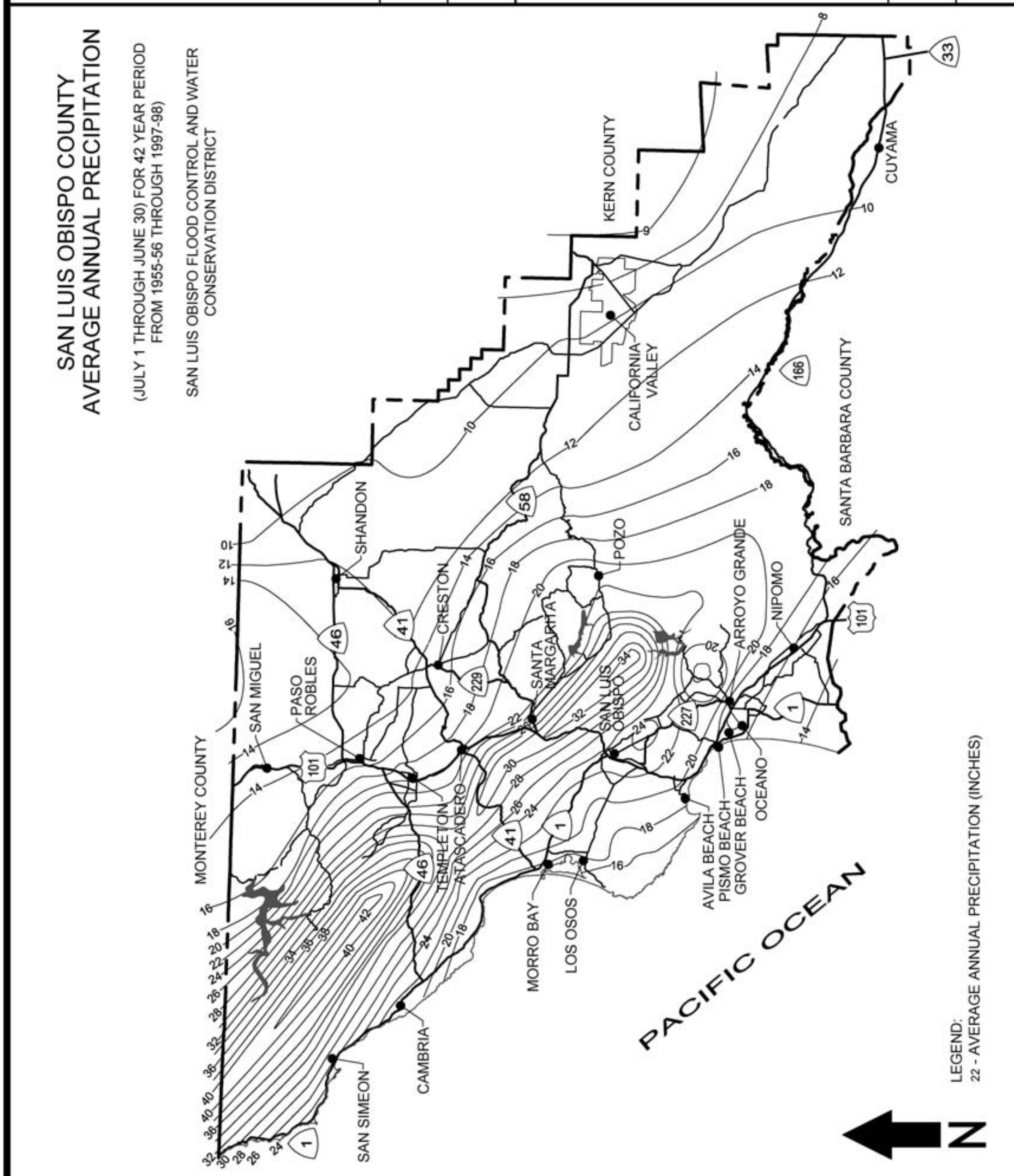
JOB NO. 11-011

JOSEPH A. CHOUINARD, P.E. RCE [illegible]   DATE

SHEET EX-7


NORTH
L3
A= 2648 SQ.FT.
C= 0.40
P3
A= 7079 SQ.FT.
C= 0.95
R4
A= 1144 SQ.FT.
C= 0.95
R6
A= 722 SQ.FT.
C= 0.95
R5
A= 722 SQ.FT.
C= 0.95
P2
A= 1050 SQ.FT.
C= 0.95
L2
A= 3890 SQ.FT.
C= 0.40
R3
A= 2349 SQ.FT.
C= 0.95
R1
A= 3809 SQ.FT.
C= 0.95
P4
A= 3127 SQ.FT.
C= 0.95
WADSWORTH AVENUE
P1
A= 13490 SQ.FT.
C= 0.95
R2
A= 7285 SQ.FT.
C= 0.95
L1
A= 4255 SQ.FT.
C= 0.40
L4
A= 627 SQ.FT.
C= 0.50
BELLO AVENUE
ON-SITE WATER SHED SUBAREAS
NOT TO SCALE
JOSEPH A. CHOUINARD, P.E.
785 BRAHMA STREET
PASO ROBLES, CA 93446 (805) 226-8414 P/F
MUNICIPAL BUILDING PROJECT
DESIGN/DRAWN
JAC
PREPARED FOR:
CITY OF PISMO BEACH
PISMO BEACH, CA
JOB NO.
11-011
DATE
SHEET
EX-8

Revisions					
Description	Approved	Date	Description	Approved	Date

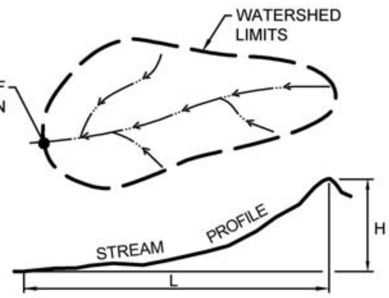


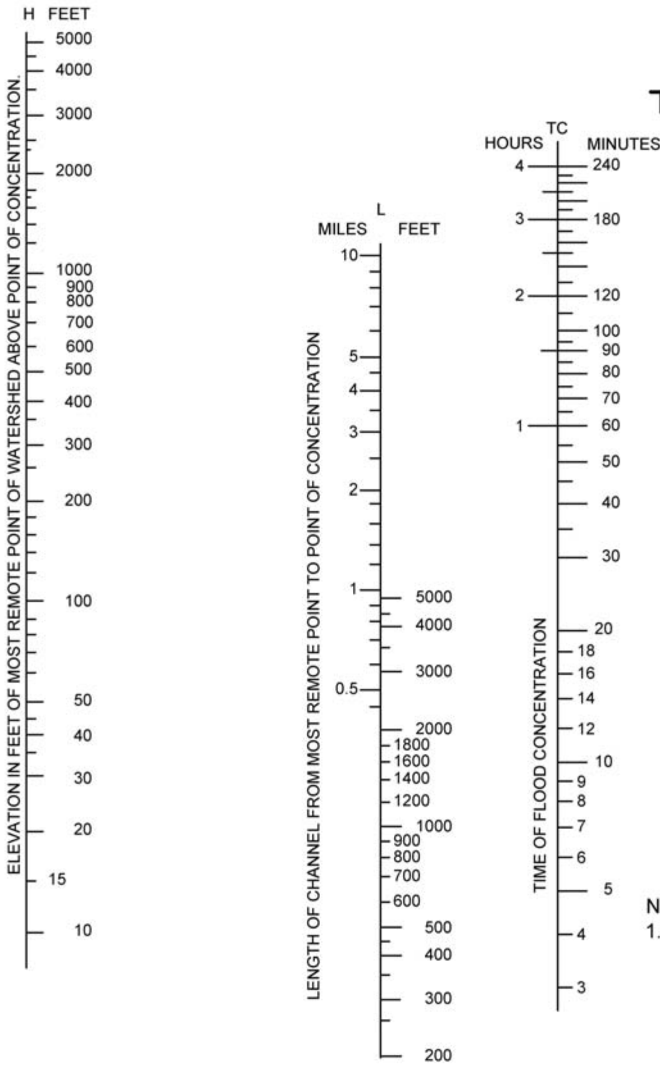
SAN LUIS OBISPO COUNTY DEPARTMENT OF PUBLIC WORKS

AVERAGE ANNUAL RAINFALL

Scale:	Issued:
NTS	Aug. 2006
Drawing No:	H-1
Sheet No:	1 OF 1

Revisions					
Description	Approved	Date	Description	Approved	Date





EQUATIONS FOR ESTIMATED "TIME OF CONCENTRATION"

$$Tc = \left(\frac{11.9L^3}{H}\right)^{0.385}$$

LEGEND:

Tc = TIME OF CONCENTRATION IN HOURS.

L = LENGTH OF CHANNEL IN MILES.

H = DIFFERENCE IN ELEVATION BETWEEN MOST REMOTE POINT AND THE POINT OF CONCENTRATION IN FEET.

NOTES:

1. THIS NOMOGRAPH IS TO BE LIMITED TO WATERSHED AREAS OF 200 ACRES OR LESS. FOR LARGER WATERSHEDS REFER TO THE DESIGN STANDARDS.

SAN LUIS OBISPO COUNTY DEPARTMENT OF PUBLIC WORKS

TIME OF CONCENTRATION

FOR WATERSHEDS LESS THAN 200 ACRES

Scale:	Issued: Aug. 2006
Drawing No: H-2	
Sheet No: 1 OF 1	

Revisions					
Description	Approved	Date	Description	Approved	Date

TABLE 1: RATIONAL METHOD STANDARD RUNOFF COEFFICIENTS FOR DEVELOPED AREAS

TYPE OF DEVELOPMENT	SOIL TYPE	SLOPE <2%	SLOPE 2% to 10%	SLOPE >10%	FOOT NOTE
RESIDENTIAL LOTS > 20,000 SF	C	0.35	0.40	0.50	1,2
	S	0.25	0.35	0.40	1,2
RESIDENTIAL LOTS 10,000 SF TO 19,999 SF	C	0.40	0.45	0.55	1,2
"	S	0.30	0.40	0.45	1,2
RESIDENTIAL LOTS 6,000 SF TO 9,999 SF	C	0.45	0.55	0.65	1,2
"	S	0.35	0.40	0.50	1,2
PLANNED DEVELOPMENTS (PUD)	C	0.65	0.70	0.75	1,2
"	S	0.60	0.65	0.70	1,2
APARTMENTS	C	0.50	0.60	0.70	2
"	S	0.40	0.50	0.60	2
INDUSTRIAL	C	0.55	0.65	0.75	2
"	S	0.45	0.55	0.65	2
COMMERCIAL	C	0.75	0.80	0.85	2
"	S	0.70	0.75	0.80	2

FOOT NOTES:

1. ESTIMATION OF COMPOSITE "C" VALUE USING ESTIMATED IMPERVIOUS AREAS AND STD. DWG. H-3a (TABLE 2) MAY BE REQUIRED BY THE DEPARTMENT. IMPERVIOUS AND PAVED AREAS SHALL USE C=0.95.
2, ALL VALUES SHOWN ARE INTENDED TO BE MINIMUMS. HIGHER VALUES MAY BE REQUIRED BY THE DEPARTMENT.

LEGEND:

C - CLAY, ADOBE, ROCK, OR IMPERVIOUS MATERIAL
S - SAND, GRAVEL, LOAM, OR PERVIOUS MATERIAL

NOTES:

1. COEFFICIENTS FOR RESIDENTIAL LOTS ASSUME TYPICAL SINGLE FAMILY RESIDENCE WITH ASSOCIATED GARAGE, DRIVEWAY, FLATWORK, AND LANDSCAPING. HIGHER DENSITY RESIDENTIAL DEVELOPMENTS MAY REQUIRE USING COMPOSITE COEFFICIENT EVALUATED BY THE DESIGN ENGINEER AND BASED ON PROPOSED DEVELOPMENT IMPERVIOUS AREAS.
2. FOR ALL TYPES OF DEVELOPMENT, COEFFICIENTS ARE INCLUSIVE OF ONLY THE LOT AREA OUTSIDE THE RIGHT-OF-WAY (NET LOT AREA). PAVED SURFACES BETWEEN ROAD CENTERLINE AND RIGHT-OF-WAY SHALL BE EVALUATED SEPARATELY AND INCLUDED TO DETERMINE A COMPOSITE "C" FACTOR.
3. ALL IMPERVIOUS AREAS AND PAVED AREAS SHALL USE C = 0.95.

SAN LUIS OBISPO COUNTY DEPARTMENT OF PUBLIC WORKS

RUNOFF COEFFICIENTS FOR DEVELOPED AREAS

Scale:

Issued: Aug. 2006

Drawing No: H-3

Sheet No: 1 OF 2

Revisions					
Description	Approved	Date	Description	Approved	Date

TABLE 2: RATIONAL METHOD STANDARD RUNOFF COEFFICIENTS FOR UNDEVELOPED AREAS

	EXTREME	HIGH	NORMAL	LOW
RELIEF	0.28 TO 0.35 STEEP, RUGGED TERRAIN WITH AVERAGE SLOPES ABOVE 30%	0.20 TO 0.28 HILLY, WITH AVERAGE SLOPES OF 10% TO 30%	0.14 TO 0.20 ROLLING, WITH AVERAGE SLOPE OF 5% TO 10%	0.08 TO 0.14 RELATIVELY FLAT LAND, WITH AVERAGE SLOPES OF 0% TO 5%
SOIL INFILTRATION	0.12 TO 0.16 NO EFFECTIVE SOIL COVER, EITHER ROCK OR THIN MANTLE OF NEGLIGIBLE INFILTRATION CAPACITY	0.08 TO 0.12 SLOW TO TAKE UP WATER, CLAY OR SHALLOW LOAM SOILS OF LOW INFILTRATION CAPACITY, IMPERFECTLY OR POORLY DRAINED	0.06 TO 0.08 NORMAL; WELL DRAINED LIGHT OR MEDIUM TEXTURED SOILS, SANDY LOAMS, SILT AND SILT LOAMS	0.04 TO 0.06 HIGH; DEEP SAND OR OTHER SOILS THAT TAKES UP WATER READILY, VERY LIGHT WELL DRAINED SOILS
VEGETAL COVER	0.12 TO 0.16 NO EFFECTIVE PLANT COVER, BARE OR VERY SPARSE COVER	0.08 TO 0.12 POOR TO FAIR; CULTIVATION CROPS, OR POOR NATURAL COVER, LESS THAN 20% OF DRAINAGE AREA OVER GOOD COVER	0.06 TO 0.08 FAIR TO GOOD; ABOUT 50% OF AREA IN GOOD GRASSLAND OR WOODLAND, NOT MORE THAN 50% OF AREA IN CULTIVATED CROPS	0.04 TO 0.06 GOOD TO EXCELLENT; ABOUT 90% OF DRAINAGE AREA IN GOOD GRASSLAND, WOODLAND, OR EQUIVALENT COVER
SURFACE STORAGE	0.10 TO 0.12 NEGLIGIBLE SURFACE DEPRESSIONS FEW AND SHALLOW, DRAINAGE WAYS STEEP AND SMALL, NO MARSHES	0.08 TO 0.10 LOW; WELL DEFINED SYSTEM OF SMALL DRAINAGE WAYS, NO PONDS OR MARSHES	0.06 TO 0.08 NORMAL; CONSIDERABLE SURFACE STORAGE, LAKES AND POND MARSHES	0.04 TO 0.06 HIGH; SURFACE STORAGE, HIGH DRAINAGE SYSTEM NOT SHARPLY DEFINED, LARGE FLOOD PLAIN STORAGE OR LARGE NUMBER OF PONDS OR MARSHES

(REFERENCES FIGURE 819.2A OF HIGHWAY DESIGN MANUAL)

EXAMPLE:

GIVEN: AN UNDEVELOPED WATERSHED CONSISTING OF:
1. ROLLING TERRAIN WITH AVERAGE SLOPES OF 5%
2. CLAY SOILS
3. GOOD GRASSLAND AREA
4. NORMAL SURFACE DEPRESSIONS

FIND: THE RUNOFF COEFFICIENT FOR THE ABOVE WATERSHED

SOLUTION:
1. RELIEF = 0.14
2. SOIL INFILTRATION = 0.08
3. VEGETAL COVER = 0.04
4. SURFACE STORAGE = 0.06

ANSWER: THE RUNOFF COEFFICIENT, C = 0.32

SAN LUIS OBISPO COUNTY DEPARTMENT OF PUBLIC WORKS

RUNOFF COEFFICIENTS FOR UNDEVELOPED AREAS

Scale:
Issued: Aug. 2006
Drawing No: H-3a
Sheet No: 2 OF 2

Revisions					
Description	Approved	Date	Description	Approved	Date

TABLE 1: ANNUAL RAINFALL < 14":

Recurrence Interval (Years)	Duration							
	10 Min	15 Min	30 Min	1 Hr	2 Hr	3 Hr	6 Hr	10 Hr
2	1.00	0.90	0.60	0.40	0.26	0.22	0.18	0.14
5	1.40	1.20	0.80	0.50	0.37	0.32	0.25	0.20
10	1.70	1.40	1.00	0.60	0.44	0.38	0.30	0.23
25	2.00	1.70	1.10	0.70	0.54	0.47	0.37	0.28
50	2.20	1.90	1.30	0.80	0.60	0.53	0.44	0.34
100	2.40	2.10	1.40	0.90	0.65	0.59	0.48	0.36

TABLE 2: ANNUAL RAINFALL 14" TO 17":

Recurrence Interval (Years)	Duration							
	10 Min	15 Min	30 Min	1 Hr	2 Hr	3 Hr	6 Hr	10 Hr
2	1.30	1.10	0.80	0.50	0.35	0.30	0.23	0.18
5	1.90	1.60	1.10	0.70	0.49	0.42	0.33	0.26
10	2.30	1.90	1.30	0.80	0.60	0.51	0.40	0.30
25	2.60	2.20	1.50	1.00	0.71	0.63	0.50	0.38
50	3.00	2.50	1.70	1.10	0.81	0.74	0.60	0.47
100	3.20	2.70	1.90	1.20	0.90	0.80	0.65	0.49

TABLE 3: ANNUAL RAINFALL 18" TO 21":

Recurrence Interval (Years)	Duration							
	10 Min	15 Min	30 Min	1 Hr	2 Hr	3 Hr	6 Hr	10 Hr
2	1.70	1.40	1.00	0.65	0.44	0.37	0.29	0.22
5	2.30	1.90	1.30	0.85	0.60	0.52	0.41	0.33
10	2.80	2.40	1.60	1.03	0.74	0.64	0.50	0.38
25	3.20	2.70	1.90	1.20	0.92	0.80	0.64	0.50
50	3.70	3.10	2.10	1.40	1.05	0.92	0.74	0.58
100	4.00	3.40	2.30	1.50	1.13	1.00	0.80	0.62

TABLE 4: ANNUAL RAINFALL 22" TO 28":

Recurrence Interval (Years)	Duration							
	10 Min	15 Min	30 Min	1 Hr	2 Hr	3 Hr	6 Hr	10 Hr
2	2.10	1.80	1.20	0.77	0.55	0.47	0.36	0.28
5	2.80	2.50	1.70	1.05	0.76	0.64	0.52	0.42
10	3.60	3.00	2.10	1.30	0.92	0.81	0.64	0.48
25	3.90	3.50	2.40	1.50	1.10	0.98	0.78	0.60
50	4.50	3.90	2.60	1.70	1.28	1.15	0.94	0.72
100	5.00	4.30	2.90	1.85	1.40	1.25	0.98	0.76

SAN LUIS OBISPO COUNTY DEPARTMENT OF PUBLIC WORKS

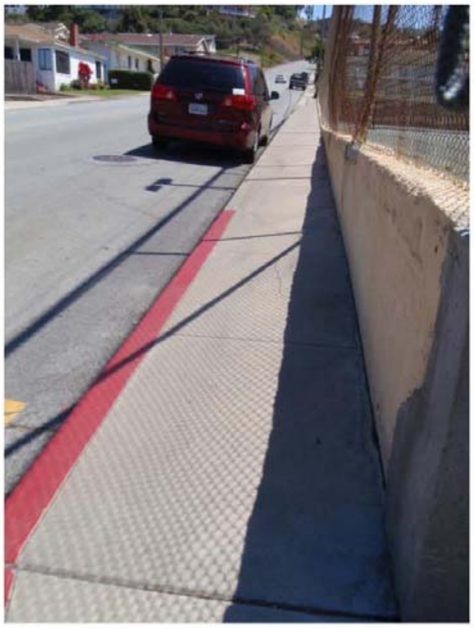
RAINFALL INTENSITY DATA

Scale:

Issued: Aug. 2006

Drawing No: H-4

Sheet No: 1 OF 1



Sidewalk on southerly side of Wadsworth Ave. adjacent to tennis courts

Curb ramp at Wadsworth and Bello Avenues

Sidewalk on easterly side of Bello Avenue

Curb ramp at police station driveway

Police station driveway looking west toward Bello Avenue

Asphalt ramp and temporary building at rear of project

Downspout on northerly side of building

Retaining wall at rear of property

MACS Lab, Inc.
431 Crown Point Cir Ste 120
Grass Valley, CA 95945-9531

530-274-1470 or 1-800-MACS LAB

Bulk Asbestos Analysis

Report

Method: EPA-600/M4-82-020

Quaglino Roofing
815 Fiero Lane

San Luis Obispo CA 93401

Person to contact: Stephen Quaglino
Contact phone: 805-543-0560
FAX phone: 805-543-0679
Sampled by: Stephen Quaglino
Sampled on: June 28, 2011
Analyzed on: June 30, 2011 at: 07:08
Corresponding invoice number: 218966

Analyst: DD (signature)

Laboratory manager: (signature)

Job Number: 1

Job Description: City Hall 1000 Bello St Pismo Beach

Lab Sample Number	Client Sample Number and Description	Asbestos detected?	Fibers present	Remarks
L218966-1 Roofing Felt	1	**Yes**	5% Chrysotile* 10% Cellulose	Black multilayer roofing. Balance of sample is organic binders and unspecified non-fibrous material.

* Chrysotile, Amosite, Crocidolite, Tremolite, Actinolite, and Anthophyllite are asbestos fibers. N.D.=None Detected PC =Point Counted

NVLAP Lab Code 101948-0

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MACS Lab Incorporated
Material Analysis and Characterization Service

W218966

Analytical and Environmental Services

Chain of Custody Record

For All Types Of Analysis

Page ___ of ___

Customer Code

BILLED TO		PROJECT INFORMATION	
Name:	Quaglino Roofing	Sampled By: Stephen Quaglino	Date Sampled: 6/28/11
Address:	815 Fiero LN	Project Name: City Hall	Job #: 1
City:	San Luis Obispo	Site Address: 1000 Bello St	
State: Ca	Zip: 93401	City, State, Zip: Pismo Beach	
Phone No:	805 543 0560	Site Contact: —	
Fax No:	805 543 0679	Phone No: —	Fax No:
Cell No:		Comments: —	
Email:		Samples Preserved: Yes / No	Received Cold: Yes / No

Analysis Required: PCM (Air) - NIOSH 7400; PLM (Bulk) - 40 CFR - Chap. 1, Part 763, Subpart F Appendix A or current EPA method; Lead (Wipes, Air, Paint, Soil); TEM (Air, Bulk) - AHERA/Yamate Level II; Drinking Water Asbestos/Lead; Mold - Viable / Non Viable Air / Bulk; Metals (TCLP, Cam17, STLC)

Required Turn Around Time: 4 Hour ___; 8 Hour ___; 24 Hour X; 2 Days/48 Hour ___; 3 Days/72 Hour ___; 5+ Days/120 Hour ___

DISPOSAL: ☐ Customer; ☒ MACS; ☐ OTHER (Explain)

Sample #	Sample Description / Type of Work	Time On	Time Off	Total Time	Flow Rates Start	Flow Rates Stop	PCM (Air) - NIOSH 7400	PLM (Bulk)	Lead (Wipes, Air, Paint, Soil)	TEM (Air, Bulk)	Drinking Water Asbestos/Lead	Mold - Viable / Non Viable Air / Bulk	Metals (TCLP, Cam17, STLC)		Comments/Area Social Security #
1	Roofing Felt							✓							

Relinquished By: Stephen Quaglino Date: 6/28/11 Time: 3:30

Accepted By: [illegible] Date: 6/28/11 Time: 9:54

Lab Report Number(s):

Delivery Type: Drop Off FedEx Mail (circled) Other

431 Crown Point Cir Ste 120 • Grass Valley CA 95945-9531 (530) 274-1470 • fax (530) 274-1636
http://www.macslab.com email: info@macslab.com

Environmental *Services*
beyond expectations

Water Damage • Mold Contamination • Fire Damage • Biohazard - Residential • Commercial • Industrial • Medical • Government

July 12, 2011

Warren Hamrick
1000 Bello Street
Pismo Beach, CA 93449

Re: Lead Analysis for 1000 Bello Street Pismo Beach, CA 93449

Dear Warren Hamrick,

Environmental Services, Inc. was retained to perform asbestos testing (presence or absence) at the property located at 1000 Bello Street Pismo Beach, CA 93449 to determine the presence of accessible friable and non-friable asbestos containing building materials (ACBMs) in a suspect area of the property. **Two (2)** samples were collected at the above referenced property.

Friable materials are materials that can be reduced to powder with hand pressure such as fireproofing, sprayed-on acoustic ceilings, ceiling tile, pipe insulation, and other thermal systems insulation. All other materials such as floor tile, adhesives, plaster, stucco, and sheet rock mudding compounds are considered non-friable materials. Because friable materials are more likely to release asbestos fibers into the air when disturbed than non-friable materials, friable materials are considered a greater health concern.

Asbestos was **not** detected or assumed in the following materials:

Sample #	Sample Location	% Fibrous Material	% Asbestos Fibers
Sample #1	Front right office- ceiling tile	60% Cellulose 30% Fiberglass	0% Asbestos
Sample #2	Entry left wall- drywall	5% Cellulose	0% Asbestos

No asbestos fibers were identified on the sample taken at the time of our inspection. No action is recommended in regards to asbestos abatement based on the above results.

Environmental Services, Inc. would like to thank-you for retaining us for this inspection. Please feel free to contact us with any questions or concerns.

Sincerely,

Environmental Services, Inc.
Industrial Hygienists
Certified Microbial Consultants
Remediation & Restoration Project Management

705-2 East Bidwell Street, Suite #118, Folsom, California 95630
(877) 800-9714 • Fax (888) 390-7502 • Email: info@envirosvs.com • Website: www.envirosvs.com

Mold Inspection Report

Microbial Investigation

Date of Inspection:
July 5, 2011

Property Address:
1000 Bello St.
Pismo Beach, CA 93449

Prepared For:
Warren Hamrick
805-773-9377
warren@hamrickassociates.com

Prepared By:
Environmental Services
705 E Bidwell Street, #118, Folsom, CA 95630
info@envirosvs.com
1-877-800-9714

Inspector Name:
Matt Wood

Contents

Thank you for choosing Environmental Services. It is our mission to provide industry leading assessment services to you and your property.

Your mold inspection report is designed to help evaluate the indoor areas of your property for potential mold growth. The laboratory analysis is based on samples taken at the subject property and submitted to Nation Laboratories. The overall assessment is a result of the laboratory data and the visible conditions that were present at the time of the inspection.

The report contained herein is confidential, and given solely for the use and benefit of the client. It is not intended for the benefit of or to be relied upon by a third party. Do not duplicate this report without permission of its owner.

Please read the entire report to fully understand the results of this inspection and laboratory interpretation of testing performed.

The contents of this report include:

1. **Inspection Summary** – A detailed summary and explanation of the laboratory data resulting from the samples taken on-site and inspection conducted at the property.
2. **Inspection Details** – Details from the onsite findings of the inspector in terms of visual and equipment assessments performed at the time of the inspection.
3. **Laboratory Analysis Results** – See attached documents.
4. **Guidelines for Understanding Laboratory Results** – Information on interpreting laboratory results and other report information.
5. **Mold Information** – Information about mold, how it grows, how it enters a building and the potential health effects of exposure.
6. **Health Classification of Mold** – Information on how mold is classified by its affects on the human body.
7. **Glossary of Terms** – Definitions of frequently used industry terms that appear throughout the report.
8. **Common Types of Mold** – Information about the most common types of mold found indoors.
9. **Scope and Limitations** – Important information regarding the scope of this report.
10. **Resources** – Literature and website link recommendations that can provide more in-depth information about mold and indoor air quality.

Inspection Summary

Below is a summary of the inspection taken at the property referenced above. This summary was produced based off of laboratory analysis of the samples taken at the property along with the inspector's findings. This is a summary and not the complete report. Please read through the entire report and it's attachments to see the complete results and understand what the results mean before taking any action.

Surface Sample Analysis Summary

Based on the analysis of the surface samples taken at the property, the following observations have been made:

- Fungal contaminates were found on the samples taken at the time of inspection.
- Some types of molds have species associated with an indoor environment are considered to be toxic and may cause serious health risks. If mold growth is in fact present, it should be remediated using appropriate controls and precautions by a trained professional and any associated water source that led to the problem should also be corrected.
- Please see the attached results for further details and recommendations.

Moisture Content Analysis Summary

Based on the analysis of the equipment readings taken at the property, the following observations have been made:

- Elevated levels of moisture were identified in the following areas:
  - Basement/Cellar
- The presence of moisture in porous building materials for more than 48 hours allows sufficient time and ideal circumstances for mold growth to begin. All building materials with elevated moisture need to be removed under proper remediation standards to prevent continuous mold growth and further contamination to the area(s) of concern.

Inspection Details

General Property Information

Property Type:	Office	**Property Use:**	Government
Floors:	2	**Year Built:**	Unknown
Square Footage:	13,000	**Occupancy:**	Vacant-Furnished

Heating & Air Systems

A/C System:	Unknown	**Heating System:**	Unknown
No. of A/C Units:	Unknown	**No. of Heater Units:**	Unknown
Filter Status:	Unknown	**No. of Filters**	Unknown

Exterior Environmental Variables

Exterior Relative Humidity:	30%	**Exterior Temperature:**	68 ° F

Property Notes

Location #1 - Basement/Cellar – far right room

General Information

Area of Concern:	Walls, carpet, ceiling tiles		
Level:	1	**Room Furnished?**	Yes
Wall Type:	Drywall/Sheetrock	**Flooring Type:**	Carpet
Ceiling Type:	Acoustic Tiles	**Sub-Floor Type:**	Concrete Slab
Ceiling Height:	8 feet	**Window Type:**	Sliding
No. of Windows:	1	**Window Frame:**	Wood

Interior Environmental Variables

Relative Humidity:	85 %	**Temperature:**	65° F
Moisture Detected:	Elevated; 20-25%		
Source of Elevated Moisture:	Roof Leak	**Elevated Moisture Source Repaired?**	No
Damage Duration:	2+ Years	**Musty Odor?**	Yes

Visible Mold? Yes – If yes, where: ☒Wall(s) ☒Ceiling ☐Floor ☐Window ☐Other

Visible Staining? Yes – If yes, where: ☒Wall(s) ☒Ceiling ☒Floor ☐Window ☐Other

Describe Problem Area

The roof is leaking from the main floor down into the basement. The one interior wall has visible mold along the drywall. All other walls are cement. The ceiling tiles and carpet flooring have water damage and some suspect mold growth as well. Most of the contents in the room has suspect mold growing on it. This building has been vacant for 10 years.

Location #1 - Photographs

Photo #1 Caption: Basement – far right room (cement walls, ceiling tiles, plaste ceiling

Photo #2 Caption: Interior wall with suspect mold and carpet

Location #2 - Basement/Cellar – far left room

General Information

Area of Concern:	Ceiling, carpet		
Level:	1	**Room Furnished?**	Yes
Wall Type:	Cement/Cinder Block	**Flooring Type:**	Carpet
Ceiling Type:	Drywall/Sheetrock	**Sub-Floor Type:**	Concrete Slab
Ceiling Height:	9 feet	**Window Type:**	Sliding
No. of Windows:	1	**Window Frame:**	Wood

Interior Environmental Variables

Relative Humidity:	80 %	**Temperature:**	66° F
Moisture Detected:	Elevated; 20-25%		
Source of Elevated Moisture:	Roof Leak	**Elevated Moisture Source Repaired?**	No
Damage Duration:	2+ Years	**Musty Odor?**	Yes

Visible Mold? Yes – If yes, where: ☐ Wall(s) ☒ Ceiling ☐ Floor ☐ Window ☐ Other

Visible Staining? Yes – If yes, where: ☒ Wall(s) ☒ Ceiling ☒ Floor ☐ Window ☐ Other

Describe Problem Area

The room on the main floor is leaking down to the basement. There is visible mold on the ceiling. Major water damage to the ceiling and carpet.

Location #2 - Photographs

Photo #1 Caption: Basement – far left room

Photo #2 Caption: Basement – far left room - ceiling

Guidelines for Understanding Laboratory Results

Provided by Nation Laboratories

Air Testing Result Interpretation

Air testing is one of the most common and grounded method for analyzing indoor air quality for the presence of contaminants that could adversely affect the health of a building's occupants. Specially calibrated air testing equipment is used to sample the air. Spore traps are the media used with this testing equipment to rapidly capture airborne particles on an adhesive slide. Air is sucked through a device using a vacuum pump; fungal spores, as well as other airborne particulates, gather on the adhesive slide.

The slides are then analyzed for total spore counts under a direct light microscope at 600X magnification, which does not entail culturing or growing the fungi. The entire (100%) slide is analyzed for particles unless specified otherwise. Some fungal groups produce similar spore types that cannot be distinguished by direct microscopic examination alone, such as Penicillium/Aspergillus. Other spore types lack distinguishing features that aid in their identification and are therefore grouped into larger categories such as Ascospores or Basidiospores.

Air samples are evaluated by means of fungal type identification and by comparing indoor and outdoor concentrations. Typically, indoor spore counts should be at or below outdoor spore counts. Higher levels of overall spore counts and/or a specific spore generally indicate independent mold growth in the indoor environment. It is important to note that airborne spore counts are largely influenced by location, season and biotic/abiotic outside conditions; meaning outdoor – and in turn indoor – airborne spore counts will fluctuate from day to day.

It's important to note that rain washes the air clean of many spore types while it assists in the dispersion of others. Sampling on rainy, foggy, or very humid days may result in outdoor counts which are low or have a significantly different distribution of spore types. Generally, rainy day microflora differs from dry, sunny microflora in that levels of ascospores and basidiospores may be increased (sometimes greatly increased). Non-viable methods will reflect this directly with increased counts of ascospores and basidiospores. Culturable (Andersen) sampling may result in increased counts of "non-sporulating" colonies since many ascospores and basidiospores will not sporulate in culture. Sampling on days when there are strong winds also creates problems. Outside counts may be significantly higher than on non-windy days. High outdoor counts may mask small to moderate indoor mold problems since the interpretation is made on the basis of a ratio of indoor/outdoor spore counts.

Raw Count – The physical count of the mold spores present on the air sample slide.

Spores Per Cubic Meter (cts/m3) – is determined by: Total Spore Count x (1000/(sampling rate)x(sampling time))

Background Debris – This consists of particulate debris, skin fragments and pollen; is an indication of visibility for the analyst and can resultant difficulty reading the slide. High background debris may obscure small spores such as *Penicillium/Aspergillus*. The chart below quantifies the scale of background debris used for both air and surface samples.

Background Debris Interpretation Chart

Non-Microbial Particulate Debris	Description	Interpretation
None Found (0)	No particles detected.	No particulates on slide.
Rare	Minimal particulate debris, skin fragments or pollen.	Reported values are not affected by debris.
1+	Up to 25% of the slide occluded with particulate debris, skin fragments or pollen.	Non-microbial particulates can mask the presence of fungal spores. As a result, actual values could be higher than the numbers reported. Higher debris ratings increase the probability of this bias.
2+	Up to 50% of the slide occluded with particulate debris, skin fragments or pollen.	
3+	Up to 75% of the slide occluded with particulate debris, skin fragments or pollen.	
4+	Over 75% of the slide occluded with particulate debris, skin fragments or pollen.	Sample could not be read due to excessive debris.

Direct (Surface) Testing Result Interpretation

Surface samples are taken directly, either by tape, swab or bulk sampling and analyzed directly via light microscope at 600X magnification. Some fungal groups produce similar spore types that cannot be distinguished by direct microscopic examination alone, such as *Penicillium/Aspergillus*. Other spore types lack distinguishing features that aid in their identification and are therefore grouped into larger categories such as *Ascospores* or *Basidiospores*.

Mold spores on surface samples are reported on a rare to 4+ scale based on the percentage of the slide each individual spore type covers. Review the chart below for specification.

Surface Sample Laboratory Result Interpretation Chart

Fungal Spore Result	Description	Interpretation
Rare	Minimal mycelial and/or sporulating structures were identified on the sample.	Fungal spores below contamination levels were identified.
1+	Up to 25% of the slide occluded with mycelial and/or sporulating structures.	Any reading 1+ or above indicates mold growth/contamination and will require professional mold remediation.
2+	Up to 50% of the slide occluded with mycelial and/or sporulating structures.	
3+	Up to 75% of the slide occluded with mycelial and/or sporulating structures.	
4+	Over 75% of the slide occluded with mycelial and/or sporulating structures.	

Background Debris – Particulate debris, skin fragments and pollen are all considered background debris that can be found when taking surface samples. Background debris is an indication of the amount of non-biological particulate matter present on the sample. This background material is also an indication of visibility for the analyst and resultant difficulty reading the slide. For example, high background debris may obscure the small spores such as the Penicillium/Aspergillus group. Counts from areas with 4+ background debris are mostly reported as inconclusive due to the limited to zero visibility of fungal structures (if present). Review chart 1-a above for further explanation.

Mold Information

Mold and mold spores are found both indoors and outdoors in the air and on surfaces. They are decomposers of organic matter such as wood, plants, fabric and animals. Where there is decaying organic matter you will find greater concentrations of mold spores.

Outdoor mold spores commonly can enter a building through the air or by becoming attached to people, animals, or other materials that are moved into a building. Mold spores are very small and cannot be seen with the naked eye. A spore is a mold colony's "seed" and is released natural into the environment to colonize. Spores are resilient and are built to with stand extreme environments so the spread of colonization reaches a larger area. Once the mold spores settle on to a viable substrate they will grow into a mold colony. A visible mold colony can house millions of spores. This is more than enough to potentially spread across the interior of a property and cause mold growth where conditions are ideal.

Moisture (water) is the key to mold growth. Moisture in homes is usually caused by high humidity, plumbing problems, flooding or building envelope failures (leaks in the roof, windows and walls). Several other factors, including building design, the local climate, ground moisture, lifestyle of the occupants and the number of occupants, can affect it as well.

Preventing water damage, high humidity and condensation will prevent mold growth. Water damage that is present between 24-48 hours can begin to grow mold. Once severe growth or growth of potentially harmful mold has started, professional removal of the affected materials is recommended to property remediate the property of mold and prevent cross contamination. If materials are improperly removed, or an area is simply wiped clean or painted over on the surface, the spores often will become airborne causing further contamination and become a health for those occupying the property.

Health Concerns in Regards to Mold Exposure

Everyone is exposed to some mold on a daily basis without evident harm. Whether or not symptoms develop in people exposed to mold depends on the nature of the mold (allergenic, toxigenic or infectious), the exposure level, and the susceptibility of exposed persons. Mold spores primarily cause health problems when they enter the air and are inhaled in large numbers. People can also be exposed to mold through skin contact or ingestion. Susceptibility varies with the genetic predisposition (allergies), age, pre-existing medical conditions, use of immunosuppressive drugs and degree of exposure. The following groups are among those with a higher risk for adverse health effects of mold:

- Infants
- Children
- Elderly
- Pregnant women

- Those with allergies
- Individuals with existing respiratory problems (chemical sensitivity, asthma and others)
- Immune-compromised individuals (those with cancer, AIDS, and other illnesses)
- Individuals recovering from surgery

Common symptoms associated with mold exposure:

- Coughing and Wheezing
- Shortness of Breath/Breathing Difficulties
- Scratchy, Sore or Itchy Throat
- Nasal Congestion
- Runny Nose
- Sneezing
- Asthma Flares
- Itchy, Burning or Watery Eyes
- Headaches
- Sensitive or Itchy Skin
- Skin Rash
- Aches and Pains
- Psychological – Memory Loss/Changes in Mood.

Toxigenic/Hazardous Molds

Certain types of molds can produce toxins, called mycotoxins that the mold uses to inhibit or prevent the growth of other organisms. Mycotoxins are found in both living and dead mold spores. Common genera of mold considered to be a mycotoxin is Stachybotrys, Penicillium and Aspergillus. Materials permeated with mold need to be removed, per industry standards. Allergic and toxic effects can remain in dead spores. Exposure to mycotoxins may present a greater hazard than that of allergenic or irrigative molds. Mycotoxins have been found in homes, agricultural settings, food and office buildings. Usually mycotoxins are found on water damaged building materials that have been neglected or have existed over a prolonged period of time.

Read more about the health classification of mold in the following section.

Health Classification of Mold

When it comes to human health, mold is often classified by the commons affects a particular mold has on the health of humans exposed to it. These categories are: Allergenic, Toxigenic and Infectious. Some mold fall into more than one category.

Allergenic - Is the most common effect and can range from hay fever and asthma all the way to very particular reactions and diseases in certain organs or tissues. Hay fever like symptoms are probably the most common health effects attributed to mold in indoor environments.

Major indoor allergenic mold include: *Cladosporium, Alternaria, Ulocladium*

Toxigenic – Mold in this category can manifest themselves in a very wide variety of ways. Most research up to now has been directed at effects that have to do with ingestion (such as by eating contaminated grain), and comparatively little has been studied about inhaled effects. A particular species of *Stachybotrys* (*S. chartarum*) produces a toxin that has been linked to bleeding lung deaths of ten infants in Cleveland. A host of other severe health effects has since been attributed to this toxin, and currently this and very similar toxins produced by other molds (*Memnoniella* and *Trichoderma*) are where much interest has been directed in terms of inhaled toxins.

Major indoor toxin producing mold: *Stachybotrys, Memnoniella, Trichoderma, Aspergillus, Penicillium, Fusarium*

Infectious - Are potentially the most dangerous and deadly of mold health effects, but mold in general has an inherently difficult time infecting an uncompromised immune system. Many molds won't even grow at normal body temperature. While these infections are rare, infections in compromised individuals are much more common and can be very dangerous and problematic do to the lack of treatment options. Compromised individuals include those whose immune system systems are weakened such as (but not limited to) those with AIDS, certain cancers, the very old, the very young, and those undergoing certain drug therapies.

Major infectious indoor mold: *Aspergillus, Fusarium, Zygomycetes* (includes *Mucor* / *Rhizopus*)

Notes on Identification and Classification

Certain molds, particularly *Chaetomium* and *Arthrinium* (and to a lesser degree *Pithomyces, Stemphyllium, Torula*, and *Ulocladium*), are important as warning markers. These molds can grow under the same conditions as *Stachybotrys*, and when they are detected in amplified quantities in the indoor air it might be a sign that conditions exist conducive to *Stachybotrys* growth.

Large classes of molds that are reported such as "*Ascospores*" and "*Myxomycetes* / *Rust* / *Smut*" are generally used to indicate common "outdoor" or plant molds that are currently believed to have little effect on human health. "*Basidiospores*" are similar, but they are of a little more concern when observed indoors (due to more frequent allergenic properties and as an indicator of water damage or an overly humid environment).

Disclaimer: Diagnosis of a particular health effect should be left to a medical professional. Health effects of mold, in general, are not thoroughly studied, and dosage, exposure, and sensitivity thresholds are not well known and can van depending on various conditions and on the health and body of particular individuals. Effects will also vary from species to species within a particular mold genus. Many of the negative effects of mold that have been observed recently are the result of modern building design and its lacking adequate ventilation (which can vary from room to room).

Glossary of Terms

When describing situations involving mold indoor air quality we often use terms that can seem technical or industry-specific. To help you better understand some of the terms we use, please refer to the glossary below. Please note, this glossary is intended to provide general information about commonly occurring molds, and is not intended to be a complete source. If you require any further assistance in interpreting your laboratory report, please e-mail scooper@envirocsm.com or call 1-877-466-5215.

Air Sampling – Also known as "indoor air quality (IAQ) testing", "air testing", "mold testing" or similar, refers to the process of collecting samples of ambient air and its contents from a selected indoor area of a property. The most commonly accepted method of open-area air sampling involves a specially calibrated air pump machine that regulates air flow across special sampling media that captures (collects) contents from the air. Inner-wall air sampling is another method and involves drilling small holes into a wall. A tube can then be inserted into the wall cavity for the purpose of drawing out air so that its contents can be collected on the sampling media. The sampling media is then analyzed by a laboratory to determine the type of and concentrations of any contents (biological or non-biological) present in the air taken from that area of the property.

Allergen – Any substance that induces an allergy and/or causes hypersensitivity: common allergens include pollen, grasses, dust, and some medications.

Air Testing – See *Air Sampling*

Anti-Fungal – Also group into anti-microbial, anti-fungal refers to the prevention of the growth and spreading of fungi (mold) and its spores. This often involves the use of solvents or chemicals applied to building materials for the prevention of such growth.

Background Debris – Material(s) found on the air sample other than mold spore(s) or mycelia. Examples include skin cells, insect parts, and fibers.

Conidiophore – complex structure that some types of mold spores grow out from. It is somewhat analogous to a flower in plants where the spores would be analogous to seeds. Differentiation between *Aspergillus* and *Penicillium* requires the presence of their conidiophores.

Contaminant – Something that is present in the area that can make an environment or substance impure, unclean or uninhabitable.

Cross-Contamination – Is the transfer of a contamination from one area to another area through either physical contact or air exchange. Cross-contamination involving mold can occur when it is on a surface or airborne. Surface cross-contamination occurs when the mold directly touches a person or object that then transfers to a different area of the property. Air cross-contamination occurs when the air in an area contaminated with airborne mold spores exchanges with an area of low or no airborne mold spores. Once occupying a new area, the cross-contaminated mold may come into contact with the resources it needs to begin new growth (a new colony) or a person who could suffer from adverse health effects.

Fibers – Fibers from non-biological sources such as carpets or clothing.

Fungi – Also known as "fungus" or "mold", fungi is a diverse group of single-celled organisms that also include mushroom, smuts, rusts and yeasts. They are decomposers of organic matter such as wood, plants, fabric and animals and can be found both indoors and outdoors. To survive, fungi basically need organic nutrients, moisture and oxygen.

HVAC – Heating, Ventilation, and Air Conditioning (HVAC) systems are possible reservoirs for mold growth.

Hyphal-like fragments (*high-full*) - filamentous, branched structures with cell walls. Hyphae are somewhat analogous to roots or stems in plants whereas the spores would be analogous to the seeds. (A conidiophore would be somewhat analogous to the flower).

IAQ – See *Indoor Air Quality*

Immunocompromised – Individuals whose immune systems are weakened and susceptible to opportunistic pathogens, including but not limited to those with AIDS, certain cancers, the very old, the very young, or those undergoing immunosuppressive drug therapy.

Indoor Air Quality – Or IAQ, refers to the air quality within (and sometimes around) a building or enclosed structure, as it relates to the health, safety and comfort to the building's occupants. Having poor indoor air quality is also referred to having indoor air pollution. Air that is unclean or contains contaminants that are allergenic, pathogenic, carcinogenic or toxigenic are known to reduce the quality of air when they become airborne. The most common of these contaminants include mold, dust and dust mites, pollens and other plant matter, asbestos fibers, lead particles, radon gas, carbon monoxide gas and volatile organic compounds. There are a variety of causes for poor indoor air quality, some being building materials used for a property, building design and age, environmental factors such as temperature and humidity that can breed mold or other biological contaminants, geographic location, outside pollution, poor ventilation and lack of building cleanliness.

Indoor Air Quality Testing – See *Air Sampling*

Industrial Hygienist – A professional who monitors exposure to environmental factors that can affect human health. Examples of environmental factors include chemicals, heat, asbestos, noise, radiation, and biological hazards.

Infrared Thermal Imaging – The use of specialized digital infrared imaging equipment to detect variances in the infrared light spectrum that can indicate the presence of moisture, mold or water damaged building material.

Marker Spores/Mold - Mold types, such as *Chaetomium* and *Stachybotrys*, that when found indoors, even in moderate numbers are an indication of indoor mold growth.

Mold Remediation – The process of removing, cleaning and treating fungi (mold) that has grown on building material and/or furniture inside of a property. This process often involves the use of special anti-fungal solutions and commercial-grade equipment. To learn more about mold remediation, visit our Mold Remediation Services Page.

Mold Testing – See *Air Sampling* or *Surface/Direct Sampling*

Morphology – identification characteristics based only on form and appearance such as "clear and round." When a better identification is not possible, morphology can sometimes place a spore into a certain broader category while excluding it from others. For example, "Brown, round" tends to point to the *Myxomycetes* / *Smut* / *Periconia* group of spores while excluding it from various other important groups like *Stachybotrys* and *Aspergillus/Penicillium*. In the same respect, *Aspergillus* and *Penicillium* spores generally have the same morphology and can only be distinguished by the morphology of the conidiophore (when it is present).

Mycosis – disease caused by fungus.

Non-sporulating colonies – colonies that do not produce spores.

Opportunistic Pathogen – causes infections only when the weak or injured condition of the person gives the agent opportunity to infect; rarely infect patients who are otherwise healthy.

Pathogen – disease causing.

Skin – The natural external covering of the human body. Skin cells are a source of food for dust mites (an allergen).

Surface/Direct Sampling – Also known as "source sampling", involves taking a sample from a surface using a swab, microscope slide, tape, bulk or equivalent for analysis by a microbiologist to determine the presence and concentration of dusts, allergens, mold and other particulates. This method is often combined with an air testing method to obtain an accurate assessment of a mold or allergen situation within a property.

Toxic Mold – Also known as "black mold" or "toxic black mold", are popular terms used to describe dark or black colored mold that may or may not produce toxic byproducts. These terms became highly publicized in the late 1990s and early 2000s when the potentially toxic and black colored species of mold called *Stachybotrys* was found at a number of properties with the occupants experiencing associated health problems. In actuality, there are only a few species of mold that are potentially harmful in the toxic sense. It's important to note that while any mold is potentially harmful to those with allergies or who have weakened immune systems, not all mold is toxic and not all toxic mold is black. *Stachybotrys* is a type of mold that is considered toxic. There are also other types of molds that secrete mycotoxins that do not have a dark or “black” appearance.

Common Types of Mold

Below is a list of the most common types of mold found in the United States. This is not a complete list of mold species, nor all of the types that are present in the US. They are the most dominant types found in nature and in properties.

Beauveria (*bow-vary-uh*) – contaminant, known to be pathogenic in animals and insects. Rarely involved in human infection.

Botrytis (*bow-try-tus*) – contaminant, parasitic on plants and fruits. Rarely involved in human infection, but it is reported to be allergenic.

Chaetomium (*k-toe-me-um*) – contaminant, rarely involved in systemic and cutaneous disease and sometimes reported to be allergenic. Some species can produce toxins, and there is some research interest on whether these toxins can cause cancer. Primary IAQ importance is currently related to that it will grow in the same conditions as Stachybotrys (wet cellulose) and amplified amounts in indoor air could be a warning that conditions do exist for Stachybotrys growth. Many times on damp sheetrock paper, colonies of Chaetomium and Stachybotrys will be growing on top of one another or side by side (this can also be an important consideration when doing tape lifts of sheetrock because most of the time the colonies are not distinguishable by the naked eye – the small area that is sampled might be a pure colony of just Chaetomium even though numerous colonies of Stachybotrys might exist.)

Chrysonilia (*kris -o-nil-ee-a*) – contaminant, brightly colored, fast growing mold, which spreads easily through contamination. Health effects are not yet known. It is found in soil, breads, and contaminated laboratory cultures.

Cladosporium (*clad-oh-spore-ee-um*) – common allergen / contaminant / very rarely pathogenic, found everywhere, many times the most common and numerous mold found in outdoor air. Indoor concentrations are usually not as high, but it is an important airborne allergen and common agent for hay fever, asthma, and other allergy related symptoms. Chronic cases may develop emphysema. It can thrive in various indoor environments, appearing light green to black.

Curvularia (*curve-you-lair'-ee-uh*) – contaminant / opportunistic pathogen, found in air, soil and textiles. Reported to be allergenic. Rare infections of corneas, nails, and sinuses, primarily in immunocompromised individuals.

Dematiaceous mold (*dim-ah-tie-ay-shush*) – a very generic morphological description used for various brown molds (mainly on tape-lifts) that cannot be identified because of undistinguishable spores \ structures or because of too much environmental damage to the mold structures. This identification generally excludes many of the common toxic and more infectious molds found indoors, but on some occasions when the mold is very weathered or damaged, this category could potentially include mold from Alternaria, Epicoccum, Ulocladium or others.

Drechslera (*dresh-lair'-uh*) **/ Bipolaris** (*by-pole-air'-us*) – contaminant/opportunistic pathogen, found in soil. Allergenic and the most common agent for allergic fungal sinusitis. Various but uncommon infections of the eye, nose, lungs and skin.

Epicoccum (*epp-ee-cock'-um*) – contaminant / opportunistic pathogen, found in soil, air, water and rotting vegetation and can be commonly found in outdoor air. It is a common allergen, and rarely it can cause an infection in the skin.

Exophiala (*ex-oh-fy'-all-uh*) – contaminant / opportunistic pathogen. Commonly found in soil, decaying wood, and various other wet materials because it thrives in water laden environments. Indoors it can be found in air conditioning systems, humidifiers, and other surfaces in frequent contact with moisture. Some species linked to occasional skin infections and various other subcutaneous lesions. Allergenic effects and toxicity are not well studied.

Fusarium (*few-sarh-ee-um*) – contaminant / opportunistic pathogen, found on fruit, grains and is common in soil. Indoors it sometimes contaminates humidifiers. Associated with as eye and various other infections in immunocompromised individuals and particularly burn patients. Produces a variety of toxins mainly important when ingested, particularly thru contaminated grain products.

Geotrichum (*gee-oh-trick-um*) – contaminant, commonly found in dairy products and found as a normal part of human flora. There are some reports of infection in compromised hosts, but most of these are not well documented.

Gliocladium (*glee-oh-clay'-dee-um*) – contaminant, found widespread in soil and decaying vegetation. Similar to Pencillium, but there are no reports of infections in humans or animal. There are some reports of allergies.

Memnoniella (*mem-non-ee-el-la*) – contaminant, found most often with Stachybotrys on wet cellulose. Forms in chains, but it is very similar to Stachybotrys and sometimes is considered to be in the Stachybotrys family. Certain species do produce toxins very similar to the ones produced by Stachybotrys chartarum and many consider the IAQ importance of Memnoniella to be on par with Stachybotrys. Allergenic and infectious properties are not well studied.

Mucor (*mhew'core*) – contaminant / opportunistic pathogen, found in soil, decaying vegetation, and animal dung. It is common to find some spores in normal house dust. It's a minor allergen and can cause Zygomycoses and lung infections in compromised individuals.

Myxomycete (*mix-oh'-my-seat*) **/ Rust / Smut** – general category for commonly found genera usually associated with living and decaying plants as well as decaying wood. Sometimes can be found indoors. Some allergenic properties reported, but generally pose no health concerns to humans or animals.

Paecilomyces (*pay-sill-oh-my-sees*) – contaminant / opportunistic pathogen, found worldwide in soil and decaying vegetation, associated with pulmonary and sinus infections in those who had organ transplants, as well as inflammation of the cornea. Some reports of allergies, humidifier associated illnesses, and pneumonia.

Penicillium (*pen-uh-sill'-ee-um*) – contaminant / opportunistic pathogen, one of the most common genera found worldwide in soil and decaying vegetation and indoors in dust, food, and various building materials. Common bread mold is a species of Penicillium. Spores usually cannot be distinguished from Aspergillus on non-cultured samples (like tape-lifts and air-o-cells). It is reported to be allergenic, to cause certain infections in compromised individuals, and some species do produce toxins unhealthy to humans.

Phoma (*fo'-mah*) – contaminant / opportunistic pathogen, found on plant material and soil. Reported to be a common allergen found indoors on painted walls (including the shower) and on a variety of other surfaces including cement, rubber, and butter. Some believe its effect on indoor air is not that significant because its spores do not travel well via air currents. Some species are linked to occasional eye, skin, and subcutaneous infections.

Pithomyces (*pith-oh-my-sees*) – contaminant, found on decaying plants, especially leaves and grasses. Rarely found indoors, but it can grow on paper. No reports of allergies or infections, but some species produce a toxin that causes facial eczema in sheep.

Rhizopus (*rye-zo-puss*) – contaminant / opportunistic pathogen, found in soil, decaying vegetation, and animal dung. It is reported to be allergenic, and some consider it a major allergen often linked to occupational allergy. It can cause Zygomycoses and other infections in compromised individuals.

Scopulariopsis (*scope-you-lair-ee-op'-siss*) – contaminant / opportunistic pathogen, found world wide in soil and decaying vegetation and often be found indoors on various materials. Usually is only a contaminant but some reports of allergies and an as agent for certain types of nail infections.

Stachybotrys (*stack-ee-bought-ris*) – contaminant, found indoors primarily on wet cellulose containing materials. It is the "toxic black mold" that has garnered much media attention. Stachybotrys is sometimes difficult to detect indoors because many times it will grow unseen on the back of walls or in the wall cavity with little disturbance that would cause it to be detected. This is potentially also when it is of most health concern: when it covers entire wall areas and constantly produces toxins undetected. Areas with relative humidity of 55% that are subject to temperature fluctuations are ideal for toxin production. Individuals with chronic exposure to the toxin produced by this fungus reported cold and flu symptoms including sore throats, diarrhea, headaches, fatigue, dermatitis, intermittent hair loss and generalized malaise. Exposure to the toxin may also exacerbate allergic type symptoms, especially in persons who have a history of hypersensitivity diseases such as asthma, pneumonitis and severe sinusitis. Allergic rhinitis and conjunctivitis may be other conditions exhibited. The toxin produced by this fungus may suppress the immune system. Species of Stachybotrys earned considerable notoriety in recent years due to their production of potent toxins in indoor environments. They have been linked to some cases of infant deaths in moldy buildings. A host of other toxic reactions in humans are also linked to it. Symptoms usually disappear after all contaminated materials are removed. This mold is rarely pathogenic for humans. Ref: Jong and Davis, 1976.

Stemphylium (*stem-fill-ee-um*) – contaminant, reported to be an allergen. Rarely grows indoors, but can grow on cellulose materials like paper.

Syncephalastrum (*sin-sef-al-os-trum*) – primarily a contaminant, often found in the soil of warm, moist climates. Very rarely involved in infections.

Taeniolella (*tan-o-ee-el-la*) – contaminant, little is known concerning allergenic properties or toxicity. Primarily grows on wood.

Trichoderma (*trick-oh-derm-uh*) – contaminant / opportunistic pathogen, found in soil. Can be found indoors on cellulose materials like paper and in kitchens on various ceramic items. Human infections are rare but some have been reported in immune suppressed patients. It is reported to be allergenic though some report these effects to be rare. It can produce toxins very similar to those produced by Stachybotrys chartarum, and because of this it is considered an important mold in IAQ investigations.

Torula (*tore-you-law*) – primarily a contaminant, but it is reported to be allergenic. Can be found indoors on cellulose containing material.

Ulocladium (*you-low-clay-dee-um*) - contaminant, found everywhere. Can grow indoors on various materials including paper, but requires more water than some other molds. It is reported to be a major allergen.

Verticillium (*ver-ti-sill-ee-um*) – primarily a contaminant found in soil and decaying plants. Health effects are not well studied. A few sources report it as a very rare cause of cornea infections.

Zygomycetes (*zy-go-my-seets*) – large class of genera that includes Mucor and Rhizopus. Some species may cause infections and zygomycosis in compromised individuals, and some species may be major allergens. The category Zygomycete on reports is a morphological identification when the particular genus cannot be identified. Particularly on non-cultured samples such as tape-lifts and air-o-cells, many Zygomycete spores and even other clear round spores are indistinguishable by genus.

Scope and Limitations

The report is intended to provide you with information concerning the condition of the property at the time of inspection. Please read the report carefully. If any item is unclear, please request clarification. It is recommended that you obtain as much history as is available concerning this property when drawing conclusions about the meaning this report. This historical information may include copies of any seller's disclosures, previous inspection engineering reports, reports performed for or by relocation companies, municipal inspection departments, lenders, insurers, and appraisers. You should attempt to determine whether repairs, renovation, remodeling, additions or other such activities have taken place at this property.

Property conditions change with time and use. Since this report is provided for the specific benefit of the client(s), secondary readers of this information should hire a licensed inspector or technician to perform tests or inspections to meet their specific needs and obtain current information concerning this property. All information contained within this report is presented as in based upon the observations of the inspector and subsequent laboratory analysis.

This report is not intended to provide medical advice or advice concerning the relative safety of an indoor environment. An experienced occupational or environmental health professional should be consulted for any medical advice concerning mold and your health.

Resources

www.cdc.gov/mold/faqs.htm
Center for Disease Control and Prevention (CDC) – Mold resources

www.calepa.ca.gov
California Environmental Protection Agency – California IAQ resources

www.indoorea.com
Indoor Environmental Association (IEA) – Industry guidelines and IAQ information

www.health.state.ny.us
New York State Department of Health – New York IAQ resources

www.nih.gov
National Institutes of Health – Information regarding environmental health issues, including IAQ

www.indoorrestore.com/resources/renters-rights/
Renter's Rights with Mold – Articles on the rights of tenants with mold issues

WOOD DESTROYING PESTS AND ORGANISMS INSPECTION REPORT

Building No.	Street	City	Zip	Date of Inspection	Number of Pages
1000	Bello St	Pismo Beach	93449-4305	07/06/2011	1 of 5

Brezden Pest Control Inc.
3261 S Higuera Ste #100
San Luis Obispo, CA 93401
Tel 805-544-9446 Fax 805-544-2807
Registration #: OPR6313

A LICENSED PEST CONTROL OPERATOR IS AN EXPERT IN HIS/HER FIELD. QUESTIONS RELATIVE TO THIS REPORT SHOULD BE REFERRED TO HIM/HER.

Report #: 9611

Ordered by:	Property Owner and/or Party of Interest:	Report sent to:
Hamrick & Associates Warren Hamrick 1609 Costa Brava Pismo Beach, CA 93449-3324	Pismo Beach Grammer School 1000 Bello St Pismo Beach, CA 93449-4305	Hamrick & Associates Warren Hamrick 1609 Costa Brava Pismo Beach, CA 93449-3324

COMPLETE REPORT ☒ LIMITED REPORT ☐ SUPPLEMENTAL REPORT ☐ REINSPECTION REPORT ☐ CORRECTED REPORT ☐

General Description: School, brick exterior

Inspection Tag Posted: Exterior

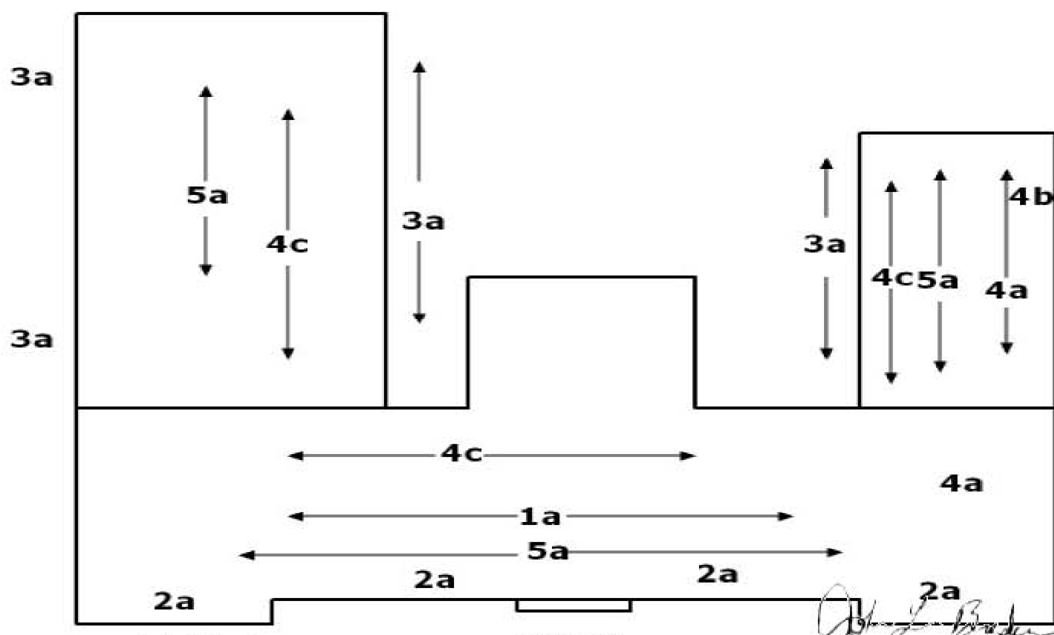
Other Tags Posted:

An inspection has been made of the structure(s) shown on the diagram in accordance with the Structural Pest Control Act. Detached porches, detached steps, detached decks and any other structures not on the diagram were not inspected.

Subterranean Termites ☒ Drywood Termites ☒ Fungus/Dryrot ☒ Other Findings ☒ Further Inspection ☒

If any of the above boxes are checked, it indicates that there were visible problems in accessible areas. Read the report for details on checked items.

Key: 1 = Subterranean Termites 2 = Drywood Termites 3 = Fungus/Dryrot 4 = Other Findings 5 = Unknown Further Inspection



Inspected By: John L Brezden License No.: OPR11895 Signature:

You are entitled to obtain copies of all reports and completion notices on this property reported to the Structural Pest Control Board during the preceding two years. To obtain copies contact: Structural Pest Control Board, 2005 Evergreen Street, Suite 1500, Sacramento, CA, 95815-3831

NOTE: Questions or problems concerning the above report should be directed to the manager of the company. Unresolved questions or problems with services performed may be directed to the Structural Pest Control Board at (916) 561-8708, (800) 737-8188 or www.pestboard.ca.gov. 43M-41 (REV. 10/01)

WOOD DESTROYING PESTS AND ORGANISMS INSPECTION REPORT

Building No.	Street	City	Zip	Date of Inspection	Number of Pages
1000	Bello St	Pismo Beach	93449-4305	07/06/2011	2 of 5

General Comments

This is a "Wood Destroying Pests and Organisms Report". This is not a "Pest Control Report" that includes such common non-wood destroying pests such as ants, earwigs, cockroaches, silverfish, fleas, rodent, bats, etc. If you would like this property inspected for non-destroying pests, Brezden Pest Control Inc. will perform the inspection at your request at an additional charge. "This Wood Destroying Pests and Organisms Report does not include mold or any mold like condition. No reference will be made to mold or mold like condition. Mold is not a Wood Destroying Organism and is outside the scope of this report as defined by the Structural Pest Control Act. If you wish your property to be inspected for mold or mold like conditions, please contact the appropriate mold professional."

A Wood Destroying Pests and Organisms Report contains findings as to the absence or presence of evidence of wood destroying pests and organisms in the visible and accessible areas and contains recommendations for correcting any infestations or infections found. The Structural Pest Control Act, Rules and Regulations govern the contents of a Wood Destroying Pest & Organism Inspection Reports. Some structures do not comply with the building code requirements or may have structural, plumbing, electrical, heating, air conditioning or other defects that do not pertain to wood destroying organisms. This Report will not contain information on such defects, if any, as they are not within the scope of the licenses of either the inspector or Brezden Pest Control Inc. Recommendations in this report are designed to eliminate damage as a result of wood destroying pests, organisms and adverse conditions that lead to same. This inspection report is not designed to bring structure(s) into existing local code compliance. The Structural Pest Control Act requires inspection of these areas that are visible and accessible at the time of inspection. Some areas of the structure are not accessible to inspection, such as interior of hollow walls, spaces between floors, areas concealed by carpeting, and/or other types of floor coverings, insulation, built-in appliances, or cabinet work. Infestations, infections and conditions that may lead to same, may be active in these areas without visible and accessible evidence. Areas not inspected are noted in the report. If you desire information about the areas that were not inspected, a further inspection will be performed upon request and at an additional cost. We cannot guarantee work done by the owner, his agent or other trades. We make no guarantee against future infestations, infections, adverse conditions or conditions present but not evident at the time of our inspection.

After four months from an original inspection, all inspections shall be original inspections and not reinspections. (8516, 13). "This company will reinspect repairs done by others within four months of the Original inspection. A charge, if any, can be no greater than the Original inspection fee for each reinspection. The reinspection must be done within ten (10) working days of request. The reinspection is a visual inspection and if inspection of concealed areas is desired, inspection of work in progress will be necessary. Any guarantee must be received from parties performing repairs (1991.1)."

NOTICE: Reports on this structure prepared by various registered companies should list the same findings, (i.e. termite infestations, termite damage, fungus damage, etc.). However, recommendations to correct these findings may vary from company to company. You have a right to seek a second opinion from another company.
The exterior surface of the roof will not be inspected. If you want water tightness of the roof determined, you should contact a roofing contractor who is licensed by the Contractors' State Licensed Board.
NOTICE: The charge for service that this company subcontracts to another registered company may include the company's charges for arranging and administering such services that are in addition to the direct costs associated with paying the subcontractor. You may accept Brezden Pest Control Inc.'s bid or you may contract directly with another registered company licensed to perform the work. If you choose to contract directly with another registered company, Brezden Pest Control Inc. will not be responsible for any act or omission in the performance of work that you directly contract with another to perform.

Areas not inspected: Areas were found to be inaccessible for inspection. These included but are not limited to, stucco columns, plumbing access voids, areas concealed by plant growth, the areas inside finished walls, boxes eaves and ceilings, areas behind and under cabinets, fixed furniture and appliances, areas under surface coverings, spaces between a floor or porch or deck and the ceiling or soffit below. We do not move furniture during our inspection. Routine inspection does not include opening windows, opening all exterior doors or inspecting interior of cabinets. Due to height and safety reason, surfaces higher than 10 feet from the ground level are visually inspected only. Surfaces above 10 feet are not picked or pry tested. Infestation, infection and conditions that may lead to the same may develop in areas where plumbing pipes and cold joints or cracks exist where concealed by concrete, walls, ceilings and insulation. This firm assumes no responsibility for infestation, infection, or conditions that may lead to the same, not evident or visible at the time of this inspection. Upon request and at an additional charge, Brezden Pest Control Inc. will perform further inspection to areas not inspected.

CAUTION: PESTICIDES ARE TOXIC CHEMICALS. Structural Pest Control companies are registered and regulated by the Structural Pest Control Board and apply pesticides which are registered and approved for use by the California Department of Pesticide Regulation and the United States Environmental Agency. Registration is granted when the state finds that based on existing scientific evidence there are no appreciable risks if proper use conditions are followed or that the risks are outweighed by the benefits. The degree of risk depends upon the degree of exposure, so exposure should be minimized. If within 24 hours following application you experience symptoms similar to common seasonal illness comparable to the flu, contact your physician or poison control center and your pest control operator immediately. For further information contact, any of the following: Brezden Pest Control 805-544-9446-Poison Control Center 800-662-9886-Structural Pest Control Board 916-263-2540-San Luis Obispo Co. Agricultural Commissioner 805-781-5910 and Health Dept. 805-781-5500-Santa Barbara Co. Agricultural Commissioner 805-681-5600 and Health Dept 805-681-5488-Monterey Co. Agricultural Commissioner 831-647-7629 and Health Dept. 831-647-7650

When evidence of wood-destroying pests extend into an inaccessible area(s), our primary recommendation is to enclose the structure and perfrom an all encompassing treatment such as fumigation. A Local treatment is not intended to be an entire structure treatment method. If infestations of wood-destroying pests extend or exist beyond the area(s) of local treatment, they may not be exterminated. Local treatments are performed at the Owners/agent request.

This is a separated report which is defined as Section I/Section II conditions evident on the date of the inspection. Section I contains items where there is visible evidence of active infestation, infection or conditions that have resulted in or from infestation of infection. Section II items are conditions deemed likely to lead to infestation or infection but where no visible evidence of such was found. Further inspection items are defined as recommendations to inspect area(s) which during the original inspection did not allow the inspector access to complete the inspection and cannot be defined as Section I or Section II.

SECTION: I

Description of Findings

SUBTERRANEAN TERMITES

Finding: 1A — Cellulose debris in the form of wood scraps with evidence of Subterranean Termites found on the subarea soil.

Recommendation: Remove and dispose of all loose cellulose debris from under the dwelling of such a size that will not pass through an ordinary garden rake. Treat the subarea soil with the termiticide Premise (Imidacloprid) and/or Termidor (active ingredient Fipronil). This treatment is guaranteed for a period of 2 years for the date of completion.
PLEASE NOTE: Due to Termiticide label requirements and noise levels produced by some of our equipment, we ask that prior to treating the interior, attic or subarea, that you leave the premises and return after the material has dried, which is approximately 3-6 hours. Animals need to be out of the treatment area.

DRYWOOD TERMITES

Finding: 2A — Drywood Termite infestation found on the interior and in the subarea. Evidence of infestation extends into inaccessible areas.

Recommendation: Vacate the premises for a minimum of 4 days and 3 nights. Fumigate with Vikane (Sulfuryl Fluoride). Chloropicrin will be used as a warning agent. Fumigation is guaranteed for 5 years from the date of completion. Upon completion of the fumigation and upon request, remove and/or mask the accessible pellets.

FUNGUS/DRYROT

Finding: 3A — Fungus damage and infection noted to the eave overhang.

Recommendation: Remove and replace damaged wood members. When applicable our firm will apply one coat of primer paint to all appropriate wood members installed. Additional painting will be performed upon request at an additional cost.

OTHER FINDINGS

Finding: 4B — An excessive moisture condition due to active leak from bathroom plumbing. Leakage has contributed to the fungus damage and infection to the adjacent floors/walls.

Recommendation: Owner/agent to contact a qualified tradesman to inspect and make any necessary repairs to correct this finding.

SECTION: II

OTHER FINDINGS

Building No.	Street	City	Zip	Date of Inspection	Number of Pages
1000	Bello St	Pismo Beach	93449-4305	07/06/2011	4 of 5

Finding: 4A — An excessive moisture condition noted due to possible moisture intrusion (bottom floor) and roof leakage (upper floor).

Recommendation: Owner/agent to contact a qualified tradesman to inspect and make any necessary repairs to correct this finding.

Finding: 4C — An excessive moisture condition noted due to roof leakage at various areas.

Recommendation: Owner/agent to contact a qualified tradesman to inspect and make any necessary repairs to correct this finding.

UNKNOWN FURTHER INSPECTION

FURTHER INSPECTIONS

Finding: 5A — Portion(s) of the interior were inaccessible for inspection due to stored items.

Recommendation: Owner/agent to relocate storage to allow for further inspection. Upon request, Brezden Pest Control will return to further inspect the inaccessible area(s). A Supplemental Report outlining our findings will be made at this time.

Building No.	Street	City	Zip	Date of Inspection	Number of Pages
1000	Bello St	Pismo Beach	93449-4305	07/06/2011	5 of 5

Important, Please Note

Our firm has been informed by www.Zillow.com that the structure(s) inspected, the subject(s) of this report, was/were constructed in 19. If this is incorrect please notify us immediately. It is very important that we have accurate information on the date of construction to properly evaluate the needed repair procedures.

Pre 1978 buildings. Homes and other buildings constructed prior to 1978 are presumed to have lead paint that may cause serious health issues if disturbed during repairs. Special procedures are required by the US EPA in repairing painted areas where more than 6 square feet in the interior or 20 square feet on the exterior are disturbed. Local and state requirements may be more restrictive. Those doing the repairs are required by the EPA to be licensed Lead Renovators and must follow strict testing, containment, repair, clean up and debris disposal practices. The penalties for violations of the EPA regulations are severe. You will be provided with the EPA pamphlet entitled "Renovate Right - Important Lead Hazard Information for Families..." prior to the start of repairs. You will be notified of the additional costs of compliance. If you have any questions, please contact us.

REPAIR POLICY: Prices for structural repair include replacement of damaged wood members visible at the time of this inspection. Structural improvements required to upgrade construction to current building code or corrections of hidden conditions exposed during repairs will be completed at additional expense. This company assumes no liability for improper or noncompliant structure(s) on which we complete repairs. Parties in interest should contact the city/county building department and/or qualified home inspector concerning the structure compliance with building code. The property owner is responsible to obtain and pay for all costs associated with building permits and engineering fees needed. During the removal of damaged, infested, infected material(s) or scraping of wood members to remove Surface Fungus, areas will be exposed that were not visible and/or accessible during our Original inspection. If damage, infestation, infection, and/or conditions that may lead to same are found during the course of our repairs, that were not visible and/or accessible during our previous inspection(s), a Supplemental Report outlining our findings, recommendations and additional costs will be issued.

When repairs are recommended there may be health related issues associated with the structural repairs reflected in this inspection report. These health issues include but are not limited to the possible release of mold spores during the course of repairs. Brezden Pest Control is not qualified to and does not render any opinion concerning such health issues or any special precautions. Any questions concerning health issues or any special precautions to be taken prior to or during the course of such repairs should be directed to a Certified Industrial Hygienist before any such repairs are undertaken.

SECTION 1 CERTIFICATION POLICY AND REPAIRS BY OTHERS

When others perform work/repairs for escrow purposes, our firm requires that Owner/Agent request a Reinspection once damage and infection is removed but before the new material is installed. If new material is in place during our Reinspection, our firm will not be responsible for any infestation, and infection or damage concealed. A Reinspection Report will be issued for each reinspection and the charge will not exceed the cost of the original report. A $75.00 minimum charge per visit occurs for on-sight consultation to assist others performing repairs/work. Our firm does not guarantee work or quality of work completed by others or chemical or fungicide applications performed by anyone other than a Brezden Pest Control Inc. employee. NOTE: FINDINGS MAY HAVE OR MAY NOT HAVE BEEN PHYSICALLY MARKED BY OUR INSPECTOR.

MINIMUM JOB FEE
Our minimum job fee is $125.00. If work ordered is less than this amount, the minimum job fee of $125.00 will be charged. When applicable, one coat of prime paint will be applied to all new wood material. Does not included window units, varnish or staining. All repair work completed by our firm is guaranteed one year and material 90 days from the date of completion, unless otherwise stated.

Stork, Wolfe, & Associates

SWA

Structural Engineers

PISMO GRAMMAR SCHOOL BUILDING FEASIBILITY ASSESSMENT

1000 Bello Street
Pismo Beach, California

STORK, WOLFE & ASSOCIATES
1124 NIPOMO STREET, SUITE B
SAN LUIS OBISPO, CA 93401
(805) 548-8600

September 8, 2011

INDEX

INTRODUCTION

The City of Pismo Beach wishes to study the feasibility of salvaging all, or a portion of, the existing building located at 1000 Bello Street. Included in this portion of the feasibility study is an overall condition assessment of the existing structural elements, as well as a seismic analysis of the existing lateral-force resisting system.

The original one-story Center Wing was constructed in the early 1900's. This portion of the building served as the Pismo Grammar School. The walls are of unreinforced masonry (URM), while the roof and raised floor are of wood framing similar to other structures of the same era. Between 1926 and 1937, the East Wing, Council Chambers, and Auditorium areas were added, with the East Wing and Council Chambers providing extra classroom space. With the addition of a new school building in the 1950's the Pismo Grammar School building was converted to the Pismo Beach City Hall. The structure remained home to the City Hall until the 1990's, when a new City Hall building was constructed. At that time, the original Pismo Grammar School building was used for storage, and eventually abandoned.

Because of the abandonment of the existing building, the structure has experienced significant damage due to water intrusion and dry rot. This report will discuss the impact this damage has had on the structural integrity, and will also study the general overall seismic safety of the building as it relates to the current building code.

Our work involved the following tasks:

1. Review the 1991 structural report and drawings prepared by Fred H. Schott & Associates (FHSA).
2. Perform site visits to conduct a visual assessment of the condition of key structural elements.
3. Assist Geosolutions, Inc., a local materials testing agency, to determine the condition and strength of the existing brick and mortar.
4. Create a mathematical model of the existing structural elements in order to analyze structural performance under gravity and lateral loads.
5. Prepare a report including a general description of the proposed structural retrofit work.

CONDITION ASSESSMENT

Any building left abandoned to the elements will experience a much higher rate of deterioration than a building that is continuously in use. In the case of the Pismo Grammar School building, the biggest detriment to the structure has been the water intrusion. The water intrusion is most likely caused by a combination of leaks in the roofing and moisture from the basement level, and has been exacerbated by neglect. This has caused severe structural damage at both the roof and the floor levels. In addition to the water intrusion, signs of termite damage and dry rot have also been found, although the damage is much less extensive than that due to the water. It is important to note that although similar structures have been successfully retrofit in the past, the higher cost of this project is going to be heavily influenced by the required replacement of a significant portion of the existing water-damaged structure.

Roof Framing

In general, the roof framing appeared to be in moderate condition. Most of the focus of the condition assessment of the roof structure was at the areas where the presence of roof leaks was suspected. At these locations, there were several areas where water stains were found in the 1x straight sheathing and on the wood truss members. In most of these cases, rot was discovered in both the sheathing and the existing top chords of the trusses (See Figure 1). It is anticipated that up to 30% of the roof sheathing and roof trusses will be found structurally unsound due to water damage, and will require being removed and replaced.

Floor Framing

The majority of the damaged structure can be found at the first floor level, where the water has pooled, and the carpet flooring left in a permanent moist condition (See Figure 2). Although access to the floor sheathing and floor joists was limited, it is anticipated that upon removal of the flooring, a significant portion of the 1x diagonal sheathing (possibly up to 50%) will be found to be damaged and unsalvageable. After this sheathing is removed, it is anticipated that a comparable portion of floor joists will need to be replaced as well.

Basement Structure

The partial basement structure below the East Wing is composed of reinforced concrete retaining walls, and a reinforced concrete slab-on-grade. The significant amount of mold growing on the basement walls shows that there is a major water intrusion problem. Although it seems that much of the water could be entering through leaks in roof and seeping down to the basement through the first floor, the problem appears to stem back to before the building was left unoccupied. This means that there is a possibility that moisture from ground water is entering the structure through the basement walls. Despite the moisture in the basement, no major spalling of the concrete was encountered due to rebar corrosion. The basement structure in general appears to be adequate, provided the moisture issue is resolved.

URM Walls

The unreinforced masonry (URM) walls are 9" double wythe walls everywhere except for around the Auditorium, where the walls are 13" triple wythe walls. All exterior walls were found to be in very good condition considering the age of the structure. In-situ brick and mortar joint shear testing resulted in average bed joint shear strengths in excess of 100 psi. It is apparent that at some point in the history of the structure that the brick walls have been repointed, thus preserving the structural integrity of the walls. There are areas of the wall where soft mortar has been encountered (See Figure 3), however these areas are not widespread, totaling no more than 3% to 5% of the total surface area of the structure. Because it is unknown as to the date or extent of the previous repointing work, it is recommended that the entire structure be repointed to preserve the structural integrity of the brick walls.

Almost no cracking was encountered at the URM walls, with the exception of a possible settlement crack near the southwest corner of the structure at the Council Chambers (See Figure 5). This crack poses very little concern regarding the structure as a whole, and can be easily repaired. The only area of major deterioration encountered of the walls is at the reinforced concrete cornice at the top of the parapet. The concrete reinforcing steel has corroded, spalling the concrete and exposing the steel (See Figure 4). The deterioration of the cornice has created a falling hazard, requiring the cornice to be removed and rebuilt.

Foundations

The foundations below the structure consist of URM perimeter stem walls supported by continuous concrete wall footings. The interior portions of the floor structure are supported by wood posts on concrete pad footings. Despite the fact that the Geotechnical Report, prepared by GeoSolutions, Inc., shows the presence of moderately expansive soils, there are few signs that significant differential settlement has occurred. In the 1991 structural report by Fred H. Schott & Associates, it was reported that damage to the northeast portion of the rear exterior URM covered walkway was likely caused by differential settlement at the foundation. Although a localized repair to the foundation was recommended at that time, it appears that instead, the damaged portion of the URM arch was removed, preventing a potential falling hazard (See Figure 6). The other area where possible excessive settlement has occurred is near the southwest corner of the building as discussed in the "URM Walls" section above. Here, a large crack extends from the base of the first floor windows and continues down through the foundation. This area can be stabilized locally from below, and the crack repaired, without having to disturb the foundation of the rest of the structure.

STRUCTURAL ANALYSIS

Unreinforced masonry (URM) structures have typically not performed well in earthquakes. Most cities in high seismic regions have ordinances requiring all URM structures to be analyzed and either retrofit or demolished. The Pismo Grammar School building has had at least one structural analysis performed in the recent past, however it has yet to be strengthened. In its current state, the structure poses a significant risk to life safety, and is considered a collapse hazard.

The results of the previous structural analysis mentioned above can be found in the 1991 structural report and drawings prepared by Fred H. Schott & Associates (FHSA). Between 1991 and 2011, the analysis procedure of URM structures has not changed significantly. However, as more and more earthquake studies have been completed, the new information has led to higher estimated peak ground accelerations in the area. This higher estimated potential ground movement has resulted in higher seismic design forces in the newer building codes. We are in general agreement with the deficiencies and recommendations that can be found in the 1991 seismic study, and we have restated these throughout our current report. The deficiencies outlined in the 1991 study are typical for URM structures, regardless of seismic demand. Although the strengthening recommendations in the previous report were designed to 1991-level seismic forces, in general these improvements were conservative, and will still meet current code-level force demands with occasional minor revisions.

Methodology

The current structural analysis of the Pismo Grammar School building was performed in accordance with the requirements of the 2010 California Existing Building Code, Appendix Chapter A1, titled *Seismic Strengthening Provisions for Unreinforced Masonry Bearing Wall Buildings*. This code establishes a minimum standard for the protection of life-safety and is not intended to create a structure that is "earthquake proof." The intent of the code is to help significantly reduce the risk of a structural collapse in the event of large earthquake, although the structure potentially could be left damaged beyond repair.

The lateral-load resisting system of this building, including its deficiencies, is consistent with similar structures of the same era. Out-of-plane movement of the URM walls is resisted by the wood-framed roof and floor. The roof and floor act as structural diaphragms, transferring the loads horizontally to URM shear walls. The shear walls transfer all lateral loads down to the foundation. If any one of these components or its connections does not meet the design requirements, a structural deficiency is encountered. The adequacy each structural component of the lateral load resisting system has been evaluated and summarized below.

Roof Diaphragms

All roof diaphragms are 1x straight sheathing applied directly to the wood roof trusses. Straight-sheathed diaphragms are very flexible and rarely have the strength to resist design level seismic loads. All roof diaphragms were found to be overstressed, and require a plywood overlay for added strength and stiffness. It has been reported that the existing roof has been overlain with plywood sheathing during a previous re-roofing project. If this is the case, the presence of plywood must be verified, and the adequacy of the plywood orientation and nailing verified. Additionally, a strengthened East Wing roof diaphragm will also require two intermediate first floor wood shear walls in order to decrease the diaphragm span.

Lastly, the roof diaphragm does not possess adequate load transfer to the shear walls, nor do the roof trusses possess adequate positive anchorage to the out-of-plane URM walls. Separation of the roof from the bearing walls is a common cause for partial or total building collapse in URM buildings.

Floor Diaphragms

All floor diaphragms are constructed of 1x diagonal sheathing over 2x wood joists. Diagonal sheathing is typically much stiffer and stronger than the straight sheathing found at the roof level. All first floor diaphragms have the capacity to resist all design loads, however all floor diaphragms lack adequate shear transfer and out-of-plane anchorage to the existing URM walls.

URM Shear Walls

As noted in the Condition Assessment, the URM walls are in very good condition, with in-situ shear tests resulting in average shear strengths in excess of 100 psi. All URM shear wall have the capacity to resist design level in-plane seismic loads. However, as discussed in the "Roof Diaphragms" section of the analysis, the URM walls lack adequate positive anchorage to the roof diaphragm.

Another significant issue with URM walls is their out-of-plane stability. In order to minimize loss of stability for out-of-plane loading, all URM walls must meet height-to-thickness (h/t) ratios as prescribed in the code. Where movement at the top of the existing brick walls are resisted by the bottom chords of the wood trusses, the resulting height-to-thickness ratio is sufficient. However, for walls parallel to the trusses, the walls are braced at the roof diaphragm, thus creating a condition where the walls are too tall and slender to span from the floor to the roof without losing their structural integrity. In addition, there are several large window openings throughout the exterior of the structure, requiring the addition of steel framing on the interior to help support the brick for out-of-plan loads.

URM Parapets

All URM parapets exceed the allowable height-to-thickness (h/t) ratios as prescribed in the building code, creating a potential lateral stability issue and falling hazard.

Plaster Ceilings

Existing plaster ceilings have typically not performed well in large seismic events. Because of their heavy weight and poor attachment detailing, they have been known to create a significant falling hazard. Because the water intrusion to the existing ceilings is extensive enough, what remains intact will need to be completely removed, rather than strengthened.

RECOMMENDATIONS

Per the condition assessment and structural analysis summarized in this report, it is structurally feasible to rehabilitate the Pismo Grammar School. All deficiencies that have been noted are not only consistent with similar buildings of the same era, but have also been mitigated on similar projects in order to preserve the historic quality of various communities. In order to properly retrofit the structure and reduce the risk to life-safety, the following repairs will be required.

Roof Diaphragms

After the existing roofing material is removed, the presence of a plywood overlay shall be verified. If the plywood is oriented properly, additional nailing must be installed. The plywood should also be inspected for water damage caused by roof leaks. Where water stains are present on the plywood, each panel shall be removed so that the existing 1x sheathing can be inspected. Damaged 1x sheathing shall be also be removed, and the existing roof framing inspected for additional damage. All water damage at the roof level shall be repaired with new materials. It is anticipated that up to 30% of the roof sheathing and roof trusses will require being removed and replaced due to water damage.

In addition to these repairs, the perimeter of all wood diaphragms will need to be opened up to expose the wall-to-roof connection. New wood ledgers are required to be epoxy-bolted to existing URM walls. These ledgers will provide the diaphragm shear transfer to the URM shear walls after the plywood roof is reinstalled. A similar detail can be found on the 1991 FHSA drawings. Details A & B/S3 convey the requirements for strengthening this connection, however a new steel angle ledger is shown rather than wood. Either option is acceptable.

Lastly, the diaphragm requires positive attachment to each perpendicular wall. Where wood trusses frame into the URM walls, each bottom chord must be anchored to the wall with a holdown connected to an epoxied anchor. Where the trusses are parallel to the wall, blocking will be required at the roof diaphragm at approximately 4'-0" o.c., and attached to the existing URM wall with holdowns connected to epoxied anchors. In addition, as mentioned in the 1991 FHSA report, the connections of the existing roof trusses will require additional nails or wood screws in order to transfer the existing seismic loads up to the roof diaphragm.

Floor Diaphragms

After the flooring materials are removed, the 1x diagonal sheathing shall be inspected for water damage. Where water damage has occurred, the diagonal sheathing shall be removed so that the floor joists can be inspected for additional damage. It is anticipated that up to 50% of the diagonally sheathing and floor joists will show signs of water damage. All water damaged structural elements at the floor level shall be repaired with new materials.

In addition to these repairs, the perimeter of all wood floor diaphragms will need to be positively anchored to the URM stem wall below. This can likely be done from above and/or below, without having to open up the floor around the perimeter. The floor joists will likely require anchorage to the stem walls as well. This can be done with holdowns at approximately 4'-0" o.c. connected to the joists, and anchored to the wall with epoxied anchors, similar to what is recommended at the roof level.

URM Shear Walls

Because of the very good quality of the existing brick and mortar, no in-plane strengthening (i.e. door/window infills, shotcrete overlay, etc.) is expected. However, because of the amount of large openings, and the presence of slender walls, strong backs will be required to strengthen the walls for out-of-plane loads. The strong backs will be either steel tube, channel, or wide flange sections, epoxy bolted to the walls at approximately 24" o.c. along their height. The strong backs will be anchored to the 1st floor at their base, and the roof framing at their top. The required spacing of the strong backs will be approximately 8'-0" o.c. on walls parallel to the roof trusses, and a frame will be required around large window openings in all URM walls. It is also recommended that the entire exterior portion of the structure be repointed to maintain the structural integrity of the building.

URM Parapets

All URM parapets will require lateral bracing from the top of the parapet to the wood roof framing. Because the concrete cornice is also required to be removed and replaced, the cornice can be utilized has a horizontal beam, supporting the top of the parapet for out-of-plane loads by spanning horizontally between braces. The braces will be steel angles and be required every 8 to 10 feet on center. Typical parapet bracing details can be found in Details B & D/S4 of the 1991 FHSA drawings.

Plaster Ceilings

Plaster ceiling shall be removed and replaced with a lighter-weight gypsum board or suspended ceiling. If new plaster ceilings will be installed, proper connections must be designed to ensure seismic safety.

Exterior Covered Walkways

Similar to the main roof diaphragms, the exterior covered walkway roof shall be sheathed with a plywood overlay, and the roof members anchored to the URM walls and arches on each end with holdowns and epoxy anchors.

Adjacent Tennis Courts

Separate from the Pismo Grammar School building, but laying adjacent to west of the structure, are public tennis courts. Dividing the tennis courts from the surrounding sidewalk is a concrete retaining wall. This retaining wall shows significant cracks that are beyond repair (See Figure 7). No reinforcing steel could be seen in the cracked areas. It is recommended that this retaining wall be completely demolished and rebuilt if the tennis courts are to remain in public use.

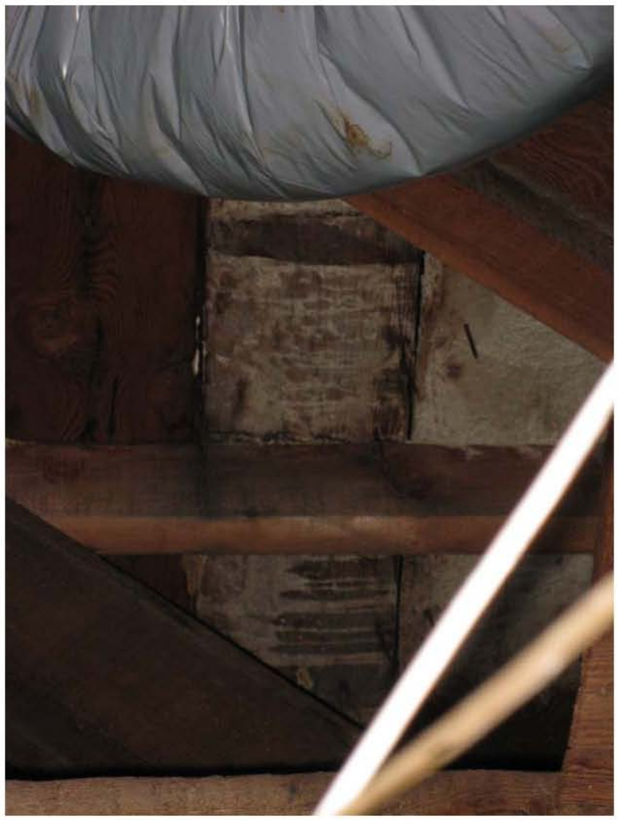


Figure 1 – Mold and Dry Rot at Roof Framing

Figure 2 – Saturated Carpet

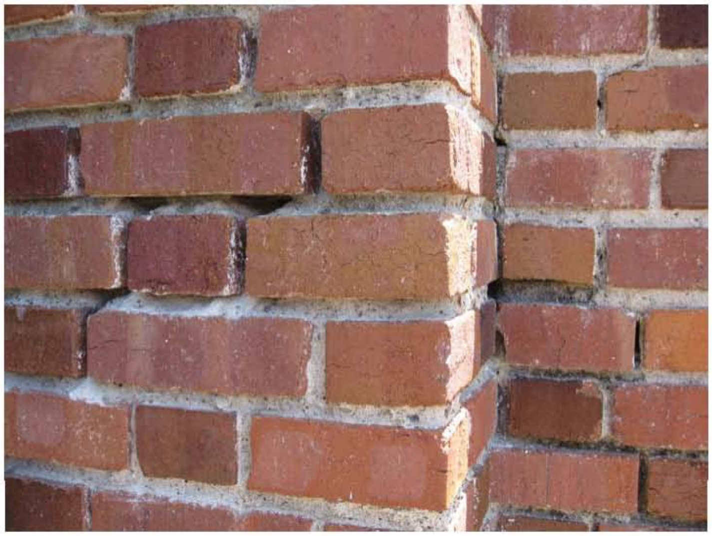


Figure 3 – Deterioration in Mortar

Figure 4 – Spalling Concrete and Exposed Rebar at Cornice

Figure 5 – Crack Near Southwest Corner

Figure 6 – Location of Previously Removed Damaged Arch

Figure 7 – Cracks in Tennis Court Wall

STORK WOLFE & ASSOCIATES	PROJECT: Pismo Grammar School	SHEET NO. A1
		CALC. BY: Gus — DATE: 9/8/11

LOAD TABLES:

ROOF FRAMING:

(N) SINGLE PLY ROOFING	=	3.00 PSF	
(N) 1/2" PLYWOOD SHT'G	=	3.00 PSF	
(E) 1X STRAIGHT SHT'G	=	2.50 PSF	
(E) WOOD TRUSSES @ 32" O.C.	=	3.00 PSF	
(N) INSULATION	=	1.00 PSF	
(N) GYP. CEILING	=	3.10 PSF	
MISC. (DUCTS, ELECT., ETC.)	=	2.40 PSF	
TOTAL ROOF DL	=	18.00 PSF	
TOTAL ROOF LL	=	20.00 PSF	

FLOOR FRAMING:

(N) FLOORING	=	2.00 PSF	
(E) 1X DIAG. SHT'G	=	2.50 PSF	
(E) 2X8 FLOOR JOISTS @ 16" O.C.	=	2.10 PSF	
(N) INSULATION	=	1.00 PSF	
(N) GYP. CEILING	=	3.10 PSF	
MISC. (DUCTS, ELECT., ETC.)	=	1.30 PSF	
TOTAL WALL DL	=	12.00 PSF	
TOTAL FLOOR LL	=	50.00 PSF	OFFICE
	=	100.00 PSF	EXIT WAYS

EXTERIOR WALLS

9" URM	=	90.00 PSF
13" URM	=	130.00 PSF

INTERIOR PARTITIONS

GYP. SHEATHING	=	3.10 PSF
2X4 STUDS @ 24" O.C.	=	1.00 PSF
GYP. SHEATHING	=	3.10 PSF
MISC. (DUCTS, ELECT., ETC.)	=	0.80 PSF
TOTAL WALL DL	=	8.00 PSF

STORK WOLFE & ASSOCIATES	PROJECT	SHEET NO. A2 / CALC. BY / DATE

2010 CBC SEISMIC CRITERIA (BASED ON THE REQ'TS OF THE 2010 CALIFORNIA EXISTING BUILDING CODE)

2010 CBC SECTION 1613 EARTHQUAKE LOADS

- SITE PARAMETERS:

SITE CLASS:	D		ASSUME
LATITUDE =	35.144 DEG N		GOOGLE EARTH
LONGITUDE =	120.641 DEG W		GOOGLE EARTH
S_S =	1.505 g		USGS SEISMIC HAZARD CURVES
S_1 =	0.549 g		USGS SEISMIC HAZARD CURVES
OCCUPANCY CATEGORY:	II		TABLE 1604.5
SEISMIC DESIGN CATEGORY:	D		1613.5.6
F_a =	1.0		TABLE 1613.5.3(1)
F_v =	1.5		TABLE 1613.5.3(2)
S_{MS} =	F_aS_S =	1.51 g	(16-36)
S_{M1} =	F_vS_1 =	0.82 g	(16-37)
S_{DS} =	2/3 x S_{MS}	1.00 g	(16-38)
S_{D1} =	2/3 x S_{M1}	0.55 g	(16-39)

2010 CEBC SECTION A110.1 MINIMUM DESIGN LATERAL FORCES

- STRUCTURAL PARAMETERS:

S_{DS} =	1.00 g	SEE ABOVE
R =	1.5 ORDINARY PLAIN MASONRY SHEAR WALLS	ASCE 7-05 TABLE 12.2-1

- SIESMIC BASE SHEAR:

$V = 0.75 S_{DS} W / R$ (A1-7)

= 0.50 W

STORK WOLFE & ASSOCIATES	PROJECT	SHEET NO. A3
		CALC. BY / DATE

SEISMIC WEIGHTS:

TOP OF PARAPET	20.5 FT +/-
ROOF ELEVATION	18.5 FT +/-
1ST FLOOR ELEVATION	4 FT +/-
BASEMENT ELEVATION	-4 FT +/-

EAST WING ROOF

ROOF. . .

w = 18 PSF
A = 2,799 SF

W = 50,384 LB

NORTH & SOUTH URM WALLS. . .

w = 90 PSF
L = 49 FT
h_{trib} = 9.3 FT

W = 48,493 LB

NORTH & SOUTH INT. PARTITIANS. . .

w = 8 PSF
L = 175 FT
h = 5.5 FT

EAST & WEST URM WALLS. . .

w = 90 PSF
L = 229 FT
h = 9.3 FT

W = 195,506 LB

EAST & WEST INT. PARTITIANS. . .

w = 8 PSF
L = 120 FT
h = 5.5 FT

W_{ER} =	294,383 LB	TOTAL WT. TRIB. TO UPPER ROOF
=	98,877 LB	SEISMIC WEIGHT IN N/S DIRECTION
=	245,891 LB	SEISMIC WEIGHT IN E/W DIRECTION

STORK WOLFE & ASSOCIATES	PROJECT	SHEET NO. A4
		CALC. BY / DATE

East Wing 1st Floor

1st Floor. . .

w = 12 psf
A = 2,799 sf

W = 33,590 lb

North & South URM Walls. . .

w = 90 psf
L = 49 ft
h_{trib} = 11.3 ft

W = 62,913 lb

North & South Int. Partitians. . .

w = 8 psf
L = 175 ft
h = 9.5 ft

East & West URM Walls. . .

w = 90 psf
L = 229 ft
h = 11.3 ft

W = 240,476 lb

East & West Int. Partitians. . .

w = 8 psf
L = 120 ft
h = 9.5 ft

W_{E1} =	336,978 lb	Total Wt. Trib. To Upper Roof
=	96,502 lb	Seismic Weight in N/S Direction
=	274,066 lb	Seismic Weight in E/W Direction

Center Wing Roof

Roof. . .

w = 18 psf
A = 4,600 sf

W = 82,800 lb

North & South URM Walls. . .

w = 90 psf
L = 208 ft
h_{trib} = 9.3 ft

W = 184,160 lb

North & South Int. Partitians. . .

w = 8 psf
L = 250 ft
h = 5.5 ft

East & West URM Walls. . .

w = 90 psf
L = 114 ft
h = 9.3 ft

W = 103,705 lb

East & West Int. Partitians. . .

w = 8 psf
L = 200 ft
h = 5.5 ft

W_{CR} =	370,665 lb	Total Wt. Trib. To Upper Roof
=	266,960 lb	Seismic Weight in N/S Direction
=	186,505 lb	Seismic Weight in E/W Direction

STORK WOLFE & ASSOCIATES	PROJECT	SHEET NO. A5
		CALC. BY / DATE

CENTER WING 1ST FLOOR

1ST FLOOR. . .

w = 12 PSF
A = 4,600 SF
W = 55,200 LB

NORTH & SOUTH URM WALLS. . .

w = 90 PSF
L = 208 FT
h_{trib} = 9.3 FT
W = 184,160 LB

NORTH & SOUTH INT. PARTITIANS. . .

w = 8 PSF
L = 250 FT
h = 5.5 FT

EAST & WEST URM WALLS. . .

w = 90 PSF
L = 114 FT
h = 9.3 FT
W = 103,705 LB

EAST & WEST INT. PARTITIANS. . .

w = 8 PSF
L = 200 FT
h = 5.5 FT

W_{C1} =	343,065 LB	TOTAL WT. TRIB. TO UPPER ROOF
=	239,360 LB	SEISMIC WEIGHT IN N/S DIRECTION
=	158,905 LB	SEISMIC WEIGHT IN E/W DIRECTION

COUNCIL CHAMBERS ROOF

ROOF. . .

w = 18 PSF
A = 900 SF
W = 16,200 LB

NORTH & SOUTH URM WALLS. . .

w = 90 PSF
L = 49 FT
h_{trib} = 9.3 FT
W = 40,793 LB

NORTH & SOUTH INT. PARTITIANS. . .

w = 8 PSF
L = 0 FT
h = 5.5 FT

EAST & WEST URM WALLS. . .

w = 90 PSF
L = 73 FT
h = 9.3 FT
W = 60,773 LB

EAST & WEST INT. PARTITIANS. . .

w = 8 PSF
L = 0 FT
h = 5.5 FT

W_{CCR} =	117,765 LB	TOTAL WT. TRIB. TO UPPER ROOF
=	56,993 LB	SEISMIC WEIGHT IN N/S DIRECTION
=	76,973 LB	SEISMIC WEIGHT IN E/W DIRECTION

COUNCIL CHAMBERS 1ST FLOOR

1ST FLOOR. . .

w = 12 PSF
A = 900 SF
W = 10,800 LB

NORTH & SOUTH URM WALLS. . .

w = 90 PSF
L = 49 FT
h_{trib} = 9.3 FT
W = 40,793 LB

NORTH & SOUTH INT. PARTITIANS. . .

w = 8 PSF
L = 0 FT
h = 5.5 FT

EAST & WEST URM WALLS. . .

w = 90 PSF
L = 73 FT
h = 9.3 FT
W = 60,773 LB

EAST & WEST INT. PARTITIANS. . .

w = 8 PSF
L = 0 FT
h = 5.5 FT

W_{CC1} =	112,365 LB	TOTAL WT. TRIB. TO UPPER ROOF
=	51,593 LB	SEISMIC WEIGHT IN N/S DIRECTION
=	71,573 LB	SEISMIC WEIGHT IN E/W DIRECTION

AUDITORIUM & STAGE ROOF

ROOF. . .

w = 18 PSF
A = 4,200 SF
W = 75,600 LB

NORTH & SOUTH URM WALLS. . .

w = 130 PSF
L = 126 FT
h_{trib} = 9.3 FT
W = 152,615 LB

NORTH & SOUTH INT. PARTITIANS. . .

w = 8 PSF
L = 25 FT
h = 5.5 FT

EAST & WEST URM WALLS. . .

w = 130 PSF
L = 200 FT
h = 9.3 FT
W = 241,820 LB

EAST & WEST INT. PARTITIANS. . .

w = 8 PSF
L = 30 FT
h = 5.5 FT

W_{AR} =	470,035 LB	TOTAL WT. TRIB. TO UPPER ROOF
=	228,215 LB	SEISMIC WEIGHT IN N/S DIRECTION
=	317,420 LB	SEISMIC WEIGHT IN E/W DIRECTION

STORK WOLFE & ASSOCIATES	PROJECT	SHEET NO. A7
		CALC. BY / DATE

AUDITORIUM & STAGE 1ST FLOOR

1ST FLOOR. . .

w = 12 PSF
A = 4,200 SF

W = 50,400 LB

NORTH & SOUTH URM WALLS. . .

w = 130 PSF
L = 126 FT
h_{trib} = 9.3 FT

W = 152,615 LB

NORTH & SOUTH INT. PARTITIANS. . .

w = 8 PSF
L = 25 FT
h = 5.5 FT

EAST & WEST URM WALLS. . .

w = 130 PSF
L = 200 FT
h = 9.3 FT

W = 241,820 LB

EAST & WEST INT. PARTITIANS. . .

w = 8 PSF
L = 30 FT
h = 5.5 FT

W_{A1} =	444,835 LB	TOTAL WT. TRIB. TO UPPER ROOF
=	203,015 LB	SEISMIC WEIGHT IN N/S DIRECTION
=	292,220 LB	SEISMIC WEIGHT IN E/W DIRECTION

2010 CEBC SECTION AIII.4 WOOD DIAPHRAGMS

$DCR = 2.1S_{D1}W_d/\Sigma v_u D$ FOR DIAPHRAGM W/O QUALIFYING CROSSWALLS (AI-9)

S_{D1} = 0.55 g

CALCS PG. A2

v_u = DIAPHRAGM CAPACITY PER TABLE BELOW

DIAPHRAGM TYPE	EDGE NAILING	CAPACITY, v_u	REFERENCE
1X STRAIGHT SHT'G	-	300 PLF	TABLE AI-D
1X DIAGONAL SHT'G	-	750 PLF	"
1/2" PLYWOOD OVERLAY	10d @ 6" O.C.	675 PLF	TABLE AI-E

DIAPHRAGM	DIRECTION	L (FT)	W_d (LB)	V_u (PLF)	D (FT)	$\Sigma v_u D$ (LB)	DCR	h/t REGION
EAST WING	N/S	24.5	98,877	675	114.25	154,238	0.74	3
ROOF	E/W	57	122,945	675	24.50	33,075	4.29	2
EAST WING	N/S	24.5	96,502	750	114.25	171,375	0.65	3
1ST FLOOR	E/W	35	84,143	750	24.50	36,750	2.64	2
CENTER WING	N/S	52	177,973	675	34.58	46,683	4.40	2
ROOF (E TO H)	E/W	-	-	-	-	-	-	-
CENTER WING	N/S	52	159,573	750	34.58	51,870	3.55	2
FLOOR (E TO H)	E/W	-	-	-	-	-	-	-
CENTER WING	N/S	25.5	44,493	675	32.50	43,875	1.17	3
ROOF (H TO K)	E/W	-	-	-	-	-	-	-
CENTER WING	N/S	25.5	39,893	750	32.50	48,750	0.94	3
FLOOR (H TO K)	E/W	-	-	-	-	-	-	-
CENTER WING	N/S	-	-	-	-	-	-	-
ROOF (9 TO 11)	E/W	32.5	200,220	675	51.00	68,850	3.35	2
CENTER WING	N/S	-	-	-	-	-	-	-
FLOOR (9 TO 11)	E/W	32.5	179,520	750	51.00	76,500	2.71	2
CENTER WING	N/S	-	-	-	-	-	-	-
ROOF (6 TO 9)	E/W	24.58	66,740	675	51.00	68,850	1.12	3
CENTER WING	N/S	-	-	-	-	-	-	-
FLOOR (6 TO 9)	E/W	24.58	59,840	750	51.00	76,500	0.90	3
COUNCIL CHAMBERS	N/S	24.5	56,993	675	36.67	49,505	1.33	3
ROOF	E/W	36.67	76,973	675	24.50	33,075	2.68	2
COUNCIL CHAMBERS	N/S	24.5	51,593	750	36.67	55,005	1.08	3
1ST FLOOR	E/W	36.67	71,573	750	24.50	36,750	2.25	2
AUDITORIUM &	N/S	42	228,215	675	100.75	136,013	1.93	3
STAGE ROOF	E/W	77	242,594	675	42.00	56,700	4.93	N.G.
AUDITORIUM &	N/S	42	203,015	750	100.75	151,125	1.55	3
STAGE FLOOR	E/W	77	223,334	750	42.00	63,000	4.09	2

NOTES:

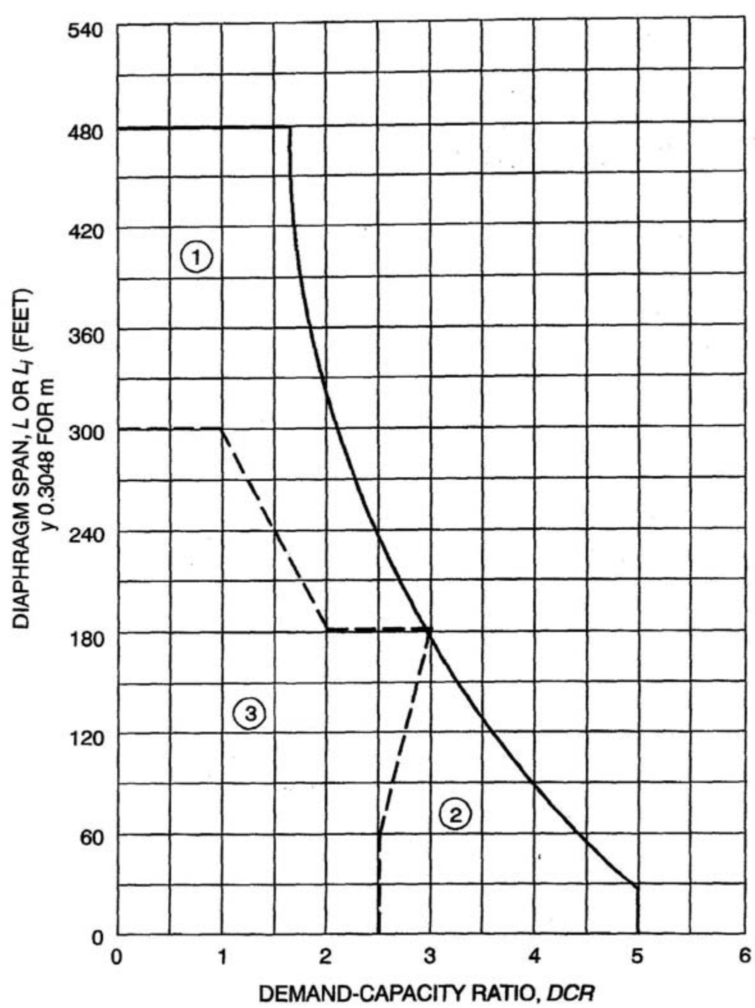
L = DIAPHRAGM SPAN

W_d = WEIGHT TRIBUTARY TO DIAPHRAGM SPAN "L"

D = DIAPHRAGM DEPTH

h/t REGION = ALLOWABLE URM WALL HEIGHT-TO-THICKNESS PARAMETER PER SECTION AIII.7.1 AND FIGURE AI-1 (NEXT PG.)

A9



1. Region of demand-capacity ratios where crosswalls may be used to increase *h/t* ratios.
2. Region of demand-capacity ratios where *h/t* ratios of "buildings with crosswalls" may be used, whether or not crosswalls are present.
3. Region of demand-capacity ratios where *h/t* ratios of "all other buildings" shall be used, whether or not crosswalls are present.

FIGURE A1-1
ACCEPTABLE DIAPHRAGM SPAN

Stork, Wolfe, & Associates

SWA

Structural Engineers

Project: PISMO GRAMMAR SCHOOL

Job #: 11019 Date: 9/7/11 Page: A10

IN-SITU MORTAR SHEAR STRENGTH

v_t = VALUE IN PSI THAT IS EXCEEDED BY 80% OF THE MORTAR SHEAR TEST VALUES

= 98.06 PSI — GEOSOLUTION REPORT

$$v_m = 0.56\, v_t + \frac{0.75\, P_D}{A} \quad \text{(A1-4)}$$

ASSUME "0" FOR INITIAL ANALYSIS [CONSERVATIVE]

$= 0.56\,(98.06)$

$= 55$ PSI

STORK WOLFE & ASSOCIATES	PROJECT	SHEET NO. A11
		CALC. BY / DATE

2010 CEBC Section A112.2 Existing Unreinforced Masonry Walls

S_{D1} = 0.55 g — Calcs Pg. A2

v_m = URM shear strength 55 psi — Calcs Pg. A10

F_{wx} = wall story force
= $0.8S_{D1}(W_{wx} + W_d/2)$ (Equation A1-15)

V_a = pier shear capacity
= $v_mA / 1.5$ (Equation A1-20)

V_r = pier rocking capacity
= $0.9P_DD / H$ (Equation A1-21)

Line	W_{wx} (K)	W_d (K)	F_{wx} (K)	Pier	t (in)	L (ft)	h (ft)	A (in²)	P_D (lb)	V_a (lb)	V_r (lb)	V/R	D/H	V_p (lb)	D/C
M	169	99	96	A	9	5.50	8.00	594	34,051	21,780	21,069	ROCKING	0.69	14,955	0.71
				B	9	6.00	8.00	648	37,146	23,760	25,074	SHEAR	0.75	16,315	0.69
				C	9	6.00	8.00	648	37,146	23,760	25,074	SHEAR	0.75	16,315	0.69
				D	9	6.00	8.00	648	37,146	23,760	25,074	SHEAR	0.75	16,315	0.69
				E	9	6.00	8.00	648	37,146	23,760	25,074	SHEAR	0.75	16,315	0.69
				F	9	5.83	8.00	630	36,094	23,087	23,673	SHEAR	0.73	15,852	0.69
K	OKAY BY INSPECTION														
H	37	218	64	A	9	6.58	8.00	711	56,623	26,057	41,915	SHEAR	0.82	24,869	0.95
				B	9	4.08	8.00	441	35,136	16,169	16,139	ROCKING	0.51	15,432	0.96
				C	9	6.33	8.00	684	54,472	25,067	38,791	SHEAR	0.79	23,924	0.95
E	OKAY BY INSPECTION														
D	OKAY BY INSPECTION														
C	OKAY BY INSPECTION														
B_{cc}	56	57	37	A	9	4.92	8.00	531	40,100	19,483	22,195	SHEAR	0.62	17,612	0.90
				B	9	5.50	8.00	594	44,827	21,780	27,737	SHEAR	0.69	19,688	0.90
B_A	149	228	115	A	9	4.50	8.00	486	19,165	17,820	9,702	ROCKING	0.56	8,417	0.87
				B	9	9.92	8.00	1,071	42,249	39,283	47,150	SHEAR	1.24	18,556	0.47
				C	9	7.83	8.00	846	33,348	31,007	29,375	ROCKING	0.98	14,646	0.50
				D	9	7.83	8.00	846	33,348	31,007	29,375	ROCKING	0.98	14,646	0.50
				E	9	7.83	8.00	846	33,348	31,007	29,375	ROCKING	0.98	14,646	0.50
				F	9	17.00	8.00	1,836	72,402	67,320	138,469	SHEAR	2.13	31,799	0.47
				G	9	6.75	8.00	729	28,748	26,730	21,830	ROCKING	0.84	12,626	0.58
12	OKAY BY INSPECTION														
11	154	142	99	A	9	6.00	8.00	648	36,889	23,760	24,900	SHEAR	0.75	16,202	0.68
				B	9	7.83	8.00	846	48,140	31,007	42,406	SHEAR	0.98	21,143	0.68
				C	9	4.50	8.00	486	27,667	17,820	14,006	ROCKING	0.56	12,151	0.87
				D	9	4.50	8.00	486	27,667	17,820	14,006	ROCKING	0.56	12,151	0.87
				E	9	7.83	8.00	846	48,140	31,007	42,406	SHEAR	0.98	21,143	0.68
				F	9	6.00	8.00	648	36,889	23,760	24,900	SHEAR	0.75	16,202	0.68
9	OKAY BY INSPECTION														
6	OKAY BY INSPECTION														
4	90	317	109	A	13	10.00	12.00	1,560	54,117	57,200	40,588	ROCKING	0.83	54,636	1.35
				B	13	10.00	12.00	1,560	54,117	57,200	40,588	ROCKING	0.83	54,636	1.35
3	OKAY BY INSPECTION														
1	OKAY BY INSPECTION														

Stork, Wolfe, & Associates
SWA Structural Engineers

Project: PISMO GRAMMAR SCHOOL
Job #: 11019 Date: 9/7/11 Page: A12

h/t RATIOS

ELEMENT	h TO SUPPORT	t	h/t	h/t_{ALLOW}
WALL PERP. TO TRUSSES	11'-0"	9"	14.7	16 @ ZONE 2 13 @ ZONE 3
WALLS PARALLEL TO TRUSSES	14'-6"	9"	19.3	16 @ ZONE 2 13 @ ZONE 3
PARAPETS	2'-0"	9"	2.7	1.5

DIAPHRAGM ZONE PER FIG. A1-1

∴ BRACE ALL WALLS PARALLEL TO TRUSSES & ALL WALLS PERP. TO TRUSSES IN DIAPHRAGM ZONE 3. ALSO BRACE ALL PARAPETS

A13

TABLE A1-A—ELEMENTS REGULATED BY THIS CHAPTER

BUILDING ELEMENTS	S_{D1}			
	≥ 0.067_g < 0.133_g	³ 0.133_g < 0.20_g	≥ 0.20_g < 0.30_g	> 0.30_g
Parapets	X	X	X	X
Walls, anchorage	X	X	X	X
Walls, *h/t* ratios		X	X	X
Walls, in-plane shear		X	X	X
Diaphragms[a]			X	X
Diaphragms, shear transfer[b]		X	X	X
Diaphragms, demand-capacity ratios[b]			X	X

a. Applies only to buildings designed according to the general procedures of Section A110.
b. Applies only to buildings designed according to the special procedures of Section A111.

TABLE A1-B—ALLOWABLE VALUE OF HEIGHT-TO-THICKNESS RATIO OF UNREINFORCED MASONRY WALLS

WALL TYPES	$0.13_g \le S_{D1} < 0.25_g$	$0.25_g \le S_{D1} < 0.4_g$	$S_{D1} \ge 0.4_g$ BUILDINGS WITH CROSSWALLS[a]	$S_{D1} > 0.4_g$ ALL OTHER BUILDINGS
Walls of one-story buildings	20	16	16[b,c]	13
First-story wall of multistory building	20	18	16	15
Walls in top story of multistory building	14	14	14[b,c]	9
All other walls	20	16	16	13

a. Applies to the special procedures of Section A111 only. See Section A111.7 for other restrictions.
b. This value of height-to-thickness ratio may be used only where mortar shear tests establish a tested mortar shear strength, v_t, of not less than 100 pounds per square inch (690 kPa). This value may also be used where the tested mortar shear strength is not less than 60 pounds per square inch (414 kPa), and where a visual examination of the collar joint indicates not less than 50-percent mortar coverage.
c. Where a visual examination of the collar joint indicates not less than 50-percent mortar coverage, and the tested mortar shear strength, v_t, is greater than 30 pounds per square inch (207 kPa) but less than 60 pounds per square inch (414 kPa), the allowable height-to-thickness ratio may be determined by linear interpolation between the larger and smaller ratios in direct proportion to the tested mortar shear strength.

TABLE A1-C—HORIZONTAL FORCE FACTOR, C_p

CONFIGURATION OF MATERIALS	C_p
Roofs with straight or diagonal sheathing and roofing applied directly to the sheathing, or floors with straight tongue-and-groove sheathing.	0.50
Diaphragms with double or mulitple layers of boards with edges offset, and blocked plywood systems.	0.75
Diaphragms of metal deck without topping:	
Minimal welding or mechanical attachment.	0.6
Welded or mechanically attached for seismic resistance.	0.68

GeoSolutions, INC.

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(805)543-8539, (805)543-2171 fax
info@geosolutions.net

July 14, 2011
Project No. SL07744-1

City of Pismo Beach
Attn: Warren Hamrick
c/o Hamrick & Associates
1609 Costa Bravo
Shell Beach, CA 93449

Subject: **Field Testing Report of Existing In Situ Masonry Wall**
1000 Bello Street
Pismo Grammar School Building Feasibility Assessment
Pismo Beach, California

Dear Mr. Hamrick:

This letter has been prepared to provide results of the in-situ brick and mortar joint testing performed on the exterior masonry walls of the existing historic Pismo Grammar School Building located at 1000 Bello Street, in the City of Pismo Beach, California. As requested, representatives of GeoSolutions, Inc. provided testing of in-situ shear stress tests and in-situ measurements of masonry mortar joint deformability properties using the Flatjack Method.

1.0 In-Situ Measurement of Masonry Mortar Joint Shear Strength (ASTM C1531-09, Method C)

GeoSolutions, Inc. performed masonry mortar joint shear testing of in-situ brick and mortar joints of the existing masonry walls, (ASTM C1531-09, Method C), using the Flatjack Method. Tests were conducted on June 16, and June 17, 2011 at five locations with varying elevations along the outside perimeter walls of the existing historic school building (See Figure 1: Shear Test Locations and Table 1: In-Situ Shear Test) for shear test locations and test area dimensions.

Mortar joints were removed from either side to the brick to be tested (See Figure 2: Prepared Test Area). Flatjacks (See Appendix A for Flatjack Specifications) were inserted into the cleared joint on one side of the brick and then connected to a hydraulic pump (See Figure 3: Flatjack Shear Testing). Hydraulic fluid was pumped into the flatjack to a maximum flatjack operating pressure of 1000 psi and mortar joints were inspected for deformations. Test location number 5 showed a hairline vertical crack along the bottom mortar joint but did not cause the brick to break away from the bedded mortar. No physical deformations were observed in the bedded mortar for all other tests.

Utilizing the gross area (A_j) of the upper and lower joints of the tested brick area, the area of the flatjack (A_f), the flatjack batch calibration factor (K_m), and the applied flatjack pressure, the average bedded joint shear strength was calculated. Refer to Table 1: In-Situ Shear Tests for summary of the in-situ shear testing results.

A15

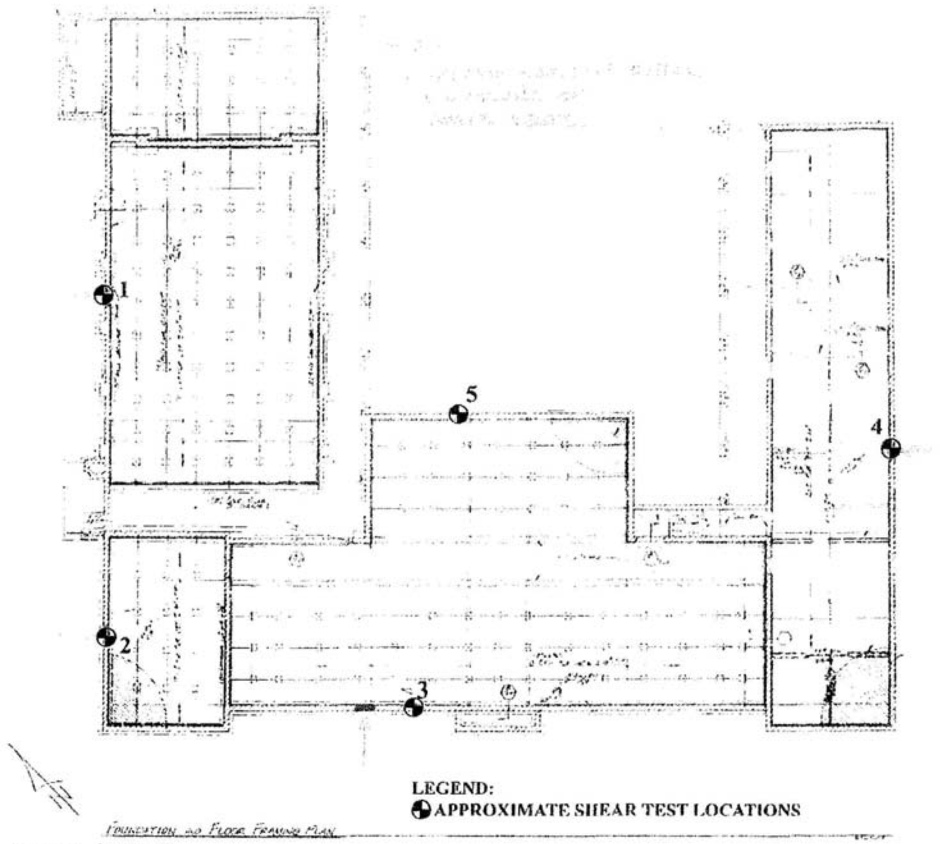

Figure 1: Site Plan

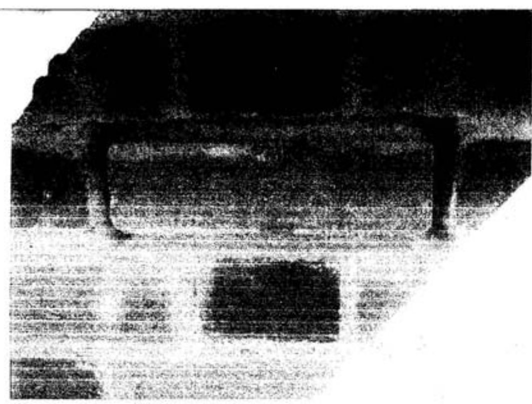

Figure 2: Prepared Test Area

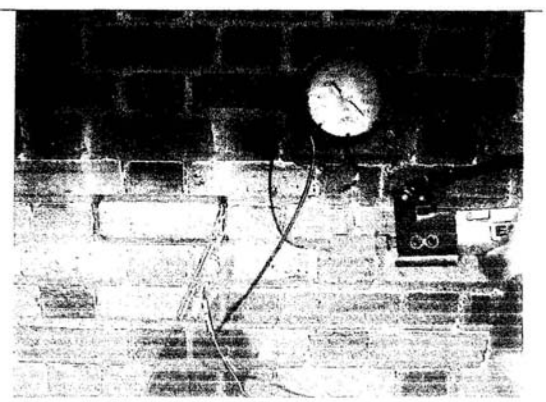

Figure 3: Flatjack Shear Testing

In-situ shear strength values were calculated by the following equations:

$\tau = P_h/A_j$

Where;

τ = average bed joint shear strength

P_h = maximum horizontal force resisted by test unit

A_j = gross area of upper and lower bed joints in the case of solid-unit masonry

$P_h = K_m \cdot A_f \cdot p$

Where;

K_m = batch calibration pressure = 0.65

A_f = area of flatjack = 9.50 in^2

p = flatjack pressure at crack initiation or slip = 1000 psi

Table 1: In-Situ Shear Tests

Test No.	Test Date 2011	Distance Above Adjacent Grade (Inch)	Length of Horizontal Bed Joints (Inches)		Depth of Bed Joints (Inches)	Gross Area of Top and Bottom Mortar Joints (A_j) (Sq. Inch)	Total Applied Load, (psi)	Average Bed Joint Shear Strength τ, (psi)
			Top	Bottom				
1	17-June	54.00	8.125	8.125	3.50	56.875	1000	108.57
2	17-June	52.75	8.250	8.250	2.75	45.375	1000	136.09
3	17-June	168.25	8.125	8.125	3.50	56.875	1000	108.57
4	17-June	147.00	8.125	8.125	3.50	56.875	1000	108.57
5	17-June	72.75	8.125	8.125	3.875	62.969	1000	98.06

Thank you for the opportunity to have been of service. If you have any questions or require additional assistance, please contact the undersigned at 543-8539.

Sincerely,

GeoSolutions, Inc.

Patrick B. McNeill, PE

Principal

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July 14, 2011
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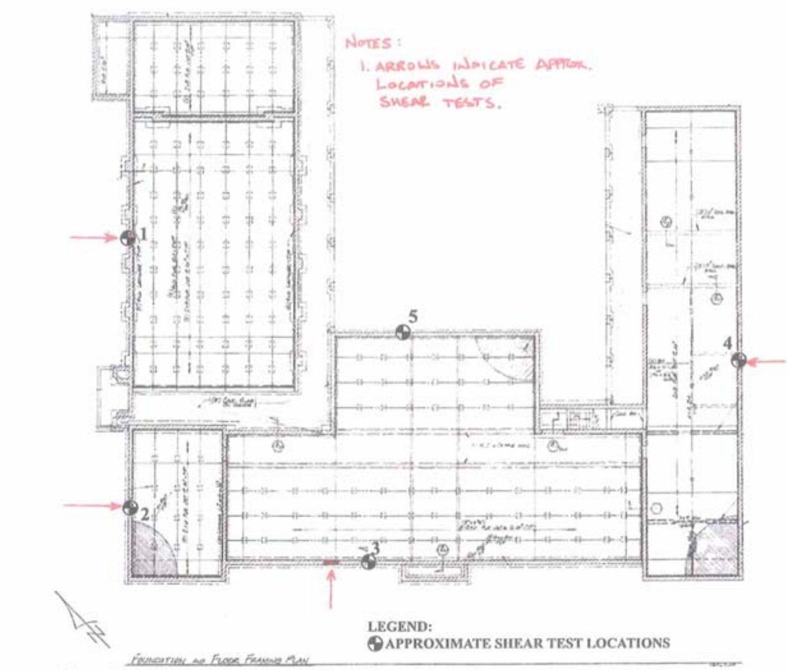

Figure 1: Site Plan

Figure 2: Prepared Test Area

Figure 3: Flatjack Shear Testing

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Thank you for the opportunity to have been of service. If you have any questions or require additional assistance, please contact the undersigned at 543-8539.

Sincerely,

GeoSolutions, Inc.

REGISTERED PROFESSIONAL ENGINEER PATRICK B McNEILL 59577 Expires 12/31/11 CIVIL STATE OF CALIFORNIA

Patrick B. McNeill, PE

Principal

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APPENDIX A

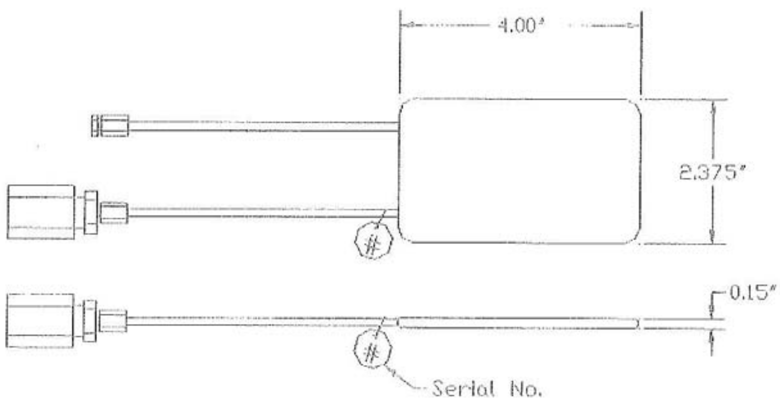
ASTM STANDARDS
Designation: C1531 – 09

Standard Test Method for In Situ Measurement of
Masonry Mortar Joint Shear Strength Index

Flatjack Specifications

FLATJACK SPECIFICATIONS

Shearjack



Area: 9.50 in ^{2} Batch Serial Numbers: 09053, 09052 Batch Calibration Factor (K_m): 0.65 Maximum Operating Pressure: • 1000 psi Leak Test Pressure: • 1200 psi Hydraulic Fluid: • Enerpac Hydraulic Fluid	Fittings: • Inlet Port: Swagelok cap with 3/8" male NPT fitting • Bleed Port: Swagelok cap Construction Material: • Stainless Steel Usage: • Slots formed by stitch drilling • Suitable for In Situ Measurement of Mortar Joint Shear Strength Test (ASTM C 1531)

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Boulder, CO 80302 USA
1-800-735-3629
(303) 444-3620 FAX (303) 444-3239

Standard Test Methods for In Situ Measurement Of Masonry Mortar Joint Shear Strength Index[1]

This standard is issued under the fixed designation C1531; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope*

1.1 These test methods cover procedures for the determination of the average in situ mortar joint shear strength index in existing unreinforced solid-unit and ungrouted hollow-unit masonry built with clay or concrete units. Three methods are provided:

1.1.1 *Method A (with Flatjacks Controlling Normal Compressive Stress)*—For determining mortar joint shear strength index when the state of normal compressive stress at the test site is controlled during the test using the flatjack method described in Test Method C1197. Horizontal displacement of the test unit is monitored throughout the test. The test setup for Method A is shown in Fig. 1.

1.1.2 *Method B (without Flatjacks Controlling Normal Compressive Stress)*—For determining mortar joint shear strength index when using an estimate of the normal compressive stress at the location of the test site. Horizontal displacement of the test unit is not monitored during this procedure. The test set up for Method B is shown in Fig. 2.

1.1.3 *Method C (with Flatjack Applying Horizontal Load)*—For determining mortar joint shear strength index using an estimate of the normal compressive stress at the location of the test site, as shown in Fig. 3. Horizontal displacement of the test unit is generally not measured during this procedure.

1.2 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

1.3 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

C1180 Terminology of Mortar and Grout for Unit Masonry

C1196 Test Method for In Situ Compressive Stress Within Solid Unit Masonry Estimated Using Flatjack Measurements

C1197 Test Method for In Situ Measurement of Masonry Deformability Properties Using the Flatjack Method

C1232 Terminology of Masonry

E4 Practices for Force Verification of Testing Machines

2.2 *Other Document:*

Uniform Code for Building Conservation (Appendix Chapter 1, Earthquake Hazard Reduction in Existing Unreinforced Masonry Buildings), International Conference of Building Officials, Whittier, CA, 1997

3. Terminology

3.1 Terminology defined in Terminologies C1180 and C1232 shall apply for these test methods.

4. Summary of Test Method

4.1 The in-place shear test is used to provide an index of the in situ, horizontal shear resistance of mortar joints in unreinforced masonry. For Method A, a single masonry unit is removed from opposite ends of the chosen test unit as shown in Fig. 1. For Method B, a single masonry unit and a head joint are removed from opposite ends of the chosen test unit, as shown in Fig. 2. For Method C, head joints on both ends of the tested unit are removed as shown in Fig. 3. Ensure that the bed joints are not disturbed in the unit to be tested. The test unit is then displaced horizontally relative to the surrounding masonry using a hydraulic jack or specialized flatjacks. The horizontal force required to cause first movement of the test unit provides a measured index of the mortar joint shear strength.

[1] These test methods are under the jurisdiction of ASTM Committee C15 on Manufactured Masonry Units and are the direct responsibility of Subcommittee C15.04 on Research.

Current edition approved June 1, 2009. Published June 2009. Originally approved in 2002. Last previous edition approved in 2003 as C1531 – 03. DOI: 10.1520/C1531-09.

[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

*A Summary of Changes section appears at the end of this standard.

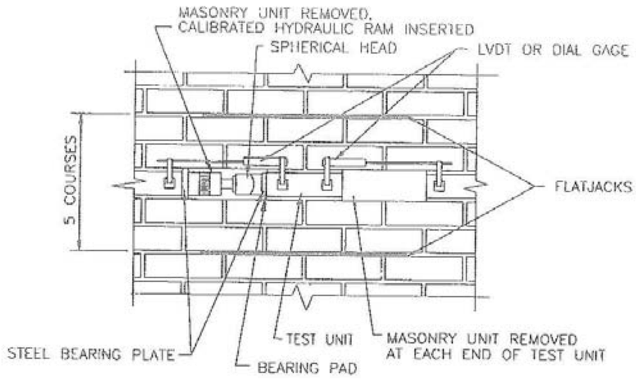

FIG. 1 Test Setup—Method A

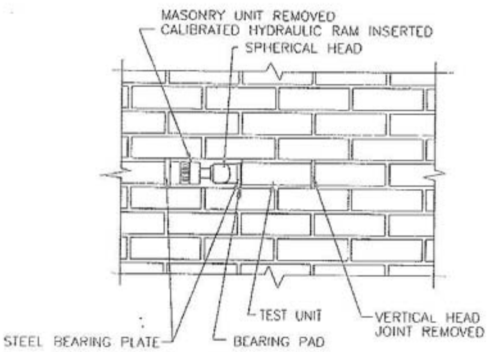

FIG. 2 Test Setup—Method B

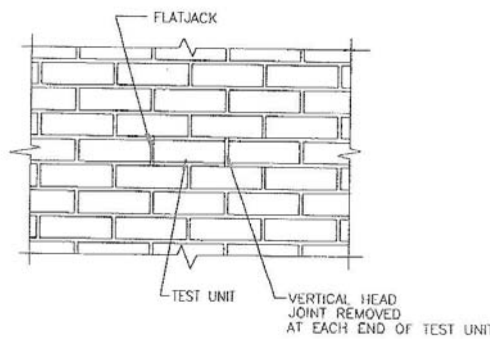

FIG. 3 Test Setup—Method C

5. Significance and Use

5.1 The masonry mortar joint shear strength index obtained by this test method is related to the masonry wall shear strength by a relationship contained within Appendix Chapter 1 of the Uniform Code for Building Conservation. The user of this standard is cautioned that the shear strength relationship contained within the Uniform Code for Building Conservation is an empirical relationship based on tests of early 20th-century unreinforced brick masonry. The relationship assumes that wall shear strength is limited by shear of the mortar joints rather than shear through the units.

5.2 For hollow ungrouted or solid unit masonry construction the shear strength index is measured only for the mortar bed joints vertically adjacent to the unit being tested. When testing hollow ungrouted masonry construction, the shear strength index is based on the horizontal interface between the mortar and the test unit and the masonry above and below the test unit. In the case of multi-wythe construction, the measured mortar joint shear strength index is applicable only to the wythe in which the test unit is located; no headers shall exist immediately above or below the test unit. The contribution of any existing collar joint mortar to the measured shear strength index is neglected, and this may lead to an overestimate of the shear strength index.

5.3 The test procedure listed for Method A may be conducted as an extension of Test Method C1197. The two-flatjack test, conducted in accordance with Test Method C1197, provides half of the required test setup for Method A. At the completion of the Method A test, one would know the measured normal compressive stress, the deformability of the masonry at the test, and the relationship between the expected joint shear strength index and the normal compressive stress.

6. Apparatus

6.1 The following equipment is required for both Method A and Method B:

6.1.1 Equipment to measure load; two options exist: (*1*) A hydraulic jack with an appropriate working pressure range to load the test unit. The force output of the jack throughout its working pressure range shall be known, to facilitate conversion between hydraulic pressure and force applied to the masonry; (*2*) For more precision, use a load cell to measure the force applied by the hydraulic jack. Verify load in accordance with Practices E4. Place the load cell between the spherical seat and the bearing plate nearest the test unit.

6.1.2 Steel bearing plates shall be provided at each end of the test jack to distribute the load uniformly across the ends of the test unit and the reaction unit as shown in Fig. 1. The bearing plates shall have a minimum thickness equal to ⅛ the vertical dimension of the bearing plate. The bearing plates shall have a vertical dimension that is ⅛ in. (3.2 mm) less than the height of the unit; the plate shall be centered vertically on the end of the unit. The bearing plate shall have a horizontal dimension that equals or exceeds the thickness of the unit. The bearing plate surface in contact with the loaded unit shall be faced with a neoprene pad 1⁄16 in. (1.6 mm) thick; the pad shall have a durometer hardness in the range of 50 to 60.

6.1.3 An electrically or manually operated hydraulic pump with hydraulic hoses to pressurize the loading jack. Measure pressure using gauges calibrated to a traceable standard having both an accuracy of 1 % of full hydraulic scale and an appropriate operating range. The pressure gage shall have a peak hold feature to indicate the maximum hydraulic pressure attained during specimen loading. The hydraulic system shall be capable of maintaining constant pressure within 1 % of full scale for at least 5 min.

6.2 The following additional apparatus is required for Method A:

6.2.1 Flatjacks and associated equipment to measure the state of compressive stress as described in Test Method C1196. Test Method C1197 describes apparatus necessary to apply a known state of normal compressive stress to the masonry at the test site using flatjacks.

6.2.2 Use mechanical extensometers or electronic devices to measure horizontal displacement of the unit. The method or device used to measure deformation shall be capable of deformation measurements up to ¼ in. (6 mm). Deformation measurements shall have an accuracy of at least 0.005 % of gage length. Fasten brackets or other attachment devices securely to the surface of the masonry using a rigid adhesive.

6.3 The following equipment is required for Method C:

6.3.1 A small rectangular flatjack that is sized to fit in the head joint on one side of the test unit. The flatjack dimensions must not exceed the dimensions of the end of the tested unit to prevent load application to the mortar joints.

6.3.2 If load-deformation data are required, use instrumentation as described in 6.2.2.

7. State of Normal Compressive Stress

7.1 The magnitude of normal compressive stress will have a direct effect on the measured joint shear strength index and must be determined beforehand.

7.2 *Method A (with Flatjacks Controlling Normal Compressive Stress)*—Apply normal compressive stress using flatjacks. Place an upper flatjack two courses above and centered over the test unit to within a tolerance of ±⅛ in. (3 mm). Place a lower flatjack five courses below the upper flatjack, centered under the test unit to within a tolerance of ±⅛ in. (3 mm). A single masonry unit, located on the centerline midway between the two flatjacks, is the unit to be tested for measurement of joint shear strength. The slots and flatjack installation shall be in accordance with Test Method C1197.

7.3 *Method B (without Flatjacks Controlling Normal Compressive Stress)*—Estimate and record the average normal compressive stress on the unit based upon the location of the test unit in the structure and the estimated dead and acting live loads.

7.4 *Method C (with Flatjack Applying Horizontal Load)*—Estimate the average normal compressive stress using the method described in 7.3.

8. Preparation of Test Site

8.1 The location at which the joint shear strength index is measured is dictated by engineering objectives. Avoid areas in which the mortar joints appear to be nonparallel. The unit to be tested must be in the stretcher orientation. Locate the test site far enough from wall openings or ends so that the loading jack bears against enough masonry to resist forces generated during loading of the test unit. The basic arrangement is illustrated in Fig. 1 for Method A, in Fig. 2 for Method B, and in Fig. 3 for Method C. At the desired location the following steps must be taken to prepare the site for testing:

8.1.1 For Method A or Method B, provide a space for the loading jack by removing a unit on one end of the test unit. Do not remove a unit for Method C.

8.1.2 For Method A, if the joint shear strength index in opposite directions is to be determined, remove the unit at both ends of the test unit to isolate the joints being investigated. Otherwise, follow the procedure of 8.1.3. The mortar in the joints above and below the test specimen shall not extend beyond the vertical ends of the unit being tested.

8.1.3 For Method B, remove a masonry unit on one side of the test unit and the head joint on the opposite end of the test unit. The mortar in the joints above and below the test specimen shall not extend beyond the vertical ends of the unit being tested.

8.1.4 For Method C, remove the head joints on both ends of the test unit. The mortar in the joints above and below the test unit shall not extend beyond the vertical ends of the unit being tested.

8.2 For solid unit and solid grouted masonry construction, measure the width and length at the top and bottom of the test unit to an accuracy of 1⁄32 in. (0.8 mm). For hollow ungrouted masonry construction, measure the length at mid-height of each face to an accuracy of 1⁄32 in. (0.8 mm) and measure the minimum thickness of each face shell at a point ½ in. (12.7 mm) above the mortar-bed plane to an accuracy of 1⁄32 in. (0.8 mm).

9. Procedure

9.1 *Method A (with Flatjacks Controlling Normal Compressive Stress)*:

9.1.1 Instrument the test unit by attaching a dial gage or electronic displacement transducer as shown in Fig. 1. Place the loading jack, spherical seat, and bearing plates with bearing pads into the space next to the test unit. Shim the jack to provide a centered horizontal force on the test unit.

9.1.2 Set the pressure in the two flatjacks equal to 10 psi (0.07 MPa) or less and close the valve. Increase pressure in the horizontal loading jack gradually, such that failure of the joint occurs between 30 s and 2 min after initial loading, recording displacement of the unit at small increments of horizontal load. Monitor the flatjack pressure during loading and adjust the internal pressure, if necessary, to provide a constant normal compressive stress. When the bond between the unit and mortar joints is broken, the unit will begin to displace continuously under constant horizontal load. This represents the maximum horizontal load for this level of normal compressive stress.

9.1.3 Increase the pressure in the flatjacks to induce the next desired level of normal compressive stress and repeat the process of horizontal loading until the maximum horizontal load for this level of normal compressive stress is reached. Repeat the sequence in this manner to determine the bed joint shear stress at various levels of normal compressive stress.

9.1.4 To investigate the effect of shear force reversal on the in situ shear strength, if desired, the horizontal jack may be transferred to the opening on the opposite side of the test unit, the displacement instrumentation reversed, and the test sequence repeated in the opposite direction.

9.1.5 Release pressure in the horizontal jack after the final displacement measurement has been taken and remove the loading jack. Release pressure in the flatjacks and remove the flatjacks and displacement measurement devices. Any voids or slots created during site preparation are permitted to be filled using the original or similar units and a mortar or other suitable material of a color and strength similar to the original mortar.

9.2 *Method B (without Flatjacks Controlling Normal Compressive Stress)*:

9.2.1 Place the loading jack, spherical seat (if used), and bearing plates into the space next to the test unit. Shim the jack to provide a centered horizontal force on the test unit. Increase pressure in the hydraulic jack gradually until the test unit begins to displace continually under a constant level of horizontal load. Record the maximum load indicated by the pressure gage or load cell.

9.2.2 Release the pressure from the loading jack and remove the jack. Any voids or slots created during site preparation are permitted to be filled using the original or similar units and a mortar or other suitable material of a color and strength similar to the original mortar.

9.3 *Method C (with Flatjack Applying Horizontal Load)*:

9.3.1 Insert the small flatjack into the head joint at one end of the test unit. Apply a small amount of pressure sufficient to seat the flatjack in the head joint using the hydraulic pump. Check the alignment of the flatjack in the head joint. Ensure that the flatjack is centered on the test unit (top to bottom and front to back) and is square with the test unit.

9.3.2 Increase pressure on the flatjack gradually until a crack appears or slip occurs. Record the maximum pressure as indicated by the pressure gauge.

9.3.3 Release the pressure from the flatjack and remove the jack. Any voids or slots created during site preparation are permitted to be filled using the original or similar units and a mortar or other suitable material of a color and strength similar to the original mortar.

10. Calculation

10.1 *Method A (with Flatjack Controlling Normal Compressive Stress)*—Calculate the average mortar joint shear strength index τ_i for each level of normal compressive stress, σ_v, as:

$$\tau_i = \frac{P_{hi}}{A_j}$$

where:

P_{hi} = maximum horizontal force resisted by the test unit at the ith level of normal compressive stress, and

A_j = gross area of upper and lower bed joints in the case of solid-unit masonry or the net mortar bedded area for the case of hollow-unit masonry.

Prepare a plot of joint shear strength index versus normal compressive stress, σ_v. The coefficient of friction of the masonry, μ, is calculated as the slope of the best-fit straight line through these points. The joint shear strength index at zero nominal compressive stress or adhesion stress, τ_o, is calculated as the intersection of the best fit line to the vertical axis. Estimates of joint shear strength index at other levels of vertical compressive stress are calculated using the relation

$$\tau = \tau_o + \mu(\sigma_v)$$

where:

τ_o = joint shear strength index at zero normal compressive stress, or adhesion stress.

NOTE 1—Determination of normal (vertical) compressive stress on the test unit, as applied by flatjacks, is discussed in Appendix X1.

10.2 *Method B (without Flatjack Controlling Normal Compressive Stress)*—Calculate the average bed joint shear strength index, τ, as:

$$\tau = \frac{P_h}{A_j}$$

where:

P_h = maximum horizontal force resisted by the test unit, and

A_j = gross area of upper and lower bed joints in the case of solid-unit masonry or the net mortar bedded area for the case of hollow-unit masonry.

The shear strength index from the test, τ, is reduced to the value that would have been obtained under zero axial load τ_o, using the relation

$$\tau_o = \tau - \mu(\sigma_v)$$

where:

μ = coefficient of friction for the masonry, and

σ_v = estimated normal compressive stress at the test unit.

NOTE 2—Method A determines the friction coefficient μ; whereas in Method B the value of μ is not measured but taken from available data. Laboratory studies have shown that the coefficient of friction between masonry units and mortar, μ, varies from 0.3 to 1.6, with a mean value of 1.0 and coefficient of variation of approximately 30 %.

10.3 *Method C (with Flatjack Applying Horizontal Load)*—Calculate the average bed joint shear strength index, τ, using the methods described in 10.2 except that the horizontal force is calculated as follows:

$$P_h = K_m \cdot A_f \cdot p$$

where:

K_m = dimensionless constant that reflects the geometrical and stiffness properties of the flatjack. Determined in accordance with Test Method C1197,

A_f = area of the flatjack, and

p = flatjack pressure at crack initiation or slip.

11. Report

11.1 Report each in situ bed joint shear strength index along with the following information:

11.1.1 Description of the testing conditions, such as site, geographical location, environmental conditions, temperature, building identification, date of construction (if available), and name of the engineer/technician conducting the test. Include details of the type and quality of construction, including an estimate of the percentage of mortar or grout in the collar joint, if applicable.

11.1.2 Identity and description of the specific test location in the structure and on an elevation drawing.

11.1.3 Description and sources (if possible) of the masonry materials at the test location.

11.1.4 Method used to determine joint shear strength index, a diagram of the test unit, adjacent masonry, and location of the loading jack, including all pertinent dimensions.

11.1.5 Description and source of instrumentation, hydraulic system, and other pertinent information.

11.1.6 Magnitude of normal compressive stress, σ_v, and method used for determination, including calculations.

11.1.7 Magnitude of measured bed joint shear strength index, τ; shear strength index calculated for zero vertical stress, τ_o; and coefficient of friction, μ, used for calculations.

11.1.8 Other observations.

11.2 Additional information is required if Method A has been used, including all pertinent information regarding flatjack usage as required by Test Methods C1196 and C1197, description of deformation measuring devices used including locations, data sheets containing deformation measurements, joint shear strength index for each level of vertical compressive stress, test data, and calculations for determination of coefficient of friction, μ.

12. Precision and Bias

12.1 Insufficient data exists to correlate the joint shear strength index measured with the in situ test to the actual shear strength index of the masonry. In situ measurement of bed joint shear strength and coefficient of friction may be affected by workmanship, the quality of the collar joint, and inaccuracies in determining normal compressive stress, whether estimated or controlled during testing using flatjacks.

12.2 Laboratory studies have shown that the in situ bed joint shear strength index test will generally overestimate the actual shear strength index of a wall panel; however, insufficient data currently exist to provide a reliable bias statement.

13. Keywords

13.1 coefficient of friction; flatjack; in situ; masonry; mortar joint; nondestructive evaluation; shear strength

APPENDIX

(Nonmandatory Information)

X1. MAGNITUDE OF NORMAL COMPRESSIVE STRESS APPLIED BY FLATJACKS

X1.1 The Method A procedure, described above, is intended to allow the magnitude of normal compressive stress on the test unit to be controlled during testing. Past practice has been to assume that the normal stress on the test unit is equivalent to the uniform stress imposed upon the masonry by the flatjacks, however, recent analyses have shown the actual stress distribution on the test unit to be significantly different.

X1.2 *Calculation of Normal Stress on Test Unit:*

X1.2.1 It is necessary to modify the normal stress applied to the test unit by a factor j in order to convert the flatjack stress to normal stress on the test unit, using the following calculation:

$$\sigma_n = j(\sigma_{fj})$$

where:

σ_n = normal stress on the test unit,
j = modification factor, and
σ_{fj} = stress applied by the flatjacks to the masonry, computed in accordance with Test Method C1197.

X1.3 Analytical models in the form of two- and three-dimensional finite element models have been developed for the shear test described in Method A to determine the normal stress distribution on the test joints. Analysis of an in situ shear test on a two-wythe brick masonry wall, set up as shown in Fig. X1.1, has shown that the distribution of normal stress on the test unit is nonuniform, with the average stress equivalent to 1.7 times the applied flatjack stress. Hence, the modification factor j is equal to 1.7 for this case.

X1.4 The value of j is unique for this particular configuration. It is reasonable to assume, however, that this factor may be applied in cases where the test configuration is proportional to that in Fig. 3. The angle α shown in Fig. X1.1 may be used to compare different test configurations. For the analysis described above, α equals approximately 45°. Hence, the modification factor j = 1.7 may be used if the angle is equal to about 45°. Further analysis would have to be conducted to determine the actual state of normal stress acting on the test unit for other geometries and test configurations.

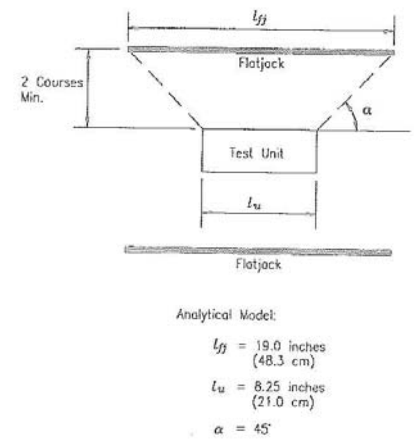

FIG. X1.1 Geometrical Configuration of Analytical Model

REFERENCES

(1) ABK. A Joint Venture, "Methodology for Mitigation of Seismic Hazards in Existing Unreinforced Masonry Buildings: Diaphragm Testing," Topical Report 08, Dec. 1981.

(2) Abrams, D. P., Epperson, G. S., "Evaluation of Shear Strength of Unreinforced Brick Walls Based on Nondestructive Measurements," *Proceedings of the 5th Canadian Masonry Symposium*, June 1989.

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(4) Epperson, G. S., and Abrams, D. P., "Nondestructive Evaluation of Masonry Buildings," Advanced Construction Technology Center Document No. 89-26-03, University of Illinois at Urbana, 1989.

(5) Kariotis, J. C., Ewing, R. D. Johnson, A. W., "Strength Determination and Shear Failure Modes of Unreinforced Masonry with Low Strength Mortar," *Proceedings of the 7th International Brick Masonry Conference*, Melbourne, Australia, February 1985.

(6) Noland, J. L., Atkinson, R. H., Kingsley, G. R., Schuller, M. P., "Nondestructive Evaluation of Masonry Structures," Atkinson-Noland & Associates Report to the National Science Foundation, January 1990.

(7) Schmid, B. L., Kariotis, J. C., Schwartz, E., "Tentative Los Angeles Ordinance and Testing Program for Unreinforced Masonry Buildings," Department of Building and Safety, City of Los Angeles, 1973.

(8) Schmid, B. L., "Significant Research on Old Unreinforced Masonry Buildings, Parts I and II," Masonry Industry, January and February 1979.

SUMMARY OF CHANGES

Committee C15 has identified the location of selected changes to this standard since the last issue (C1531 – 03) that may impact the use of this standard. (Approved June 1, 2009.)

(1) Revised 10.1 to consistently refer to 'compressive stress' instead of 'compression stress.'

MECHANICAL ENGINEERING
James Van De Vanter, P.E. & Associates
1023 Nipomo Street, Suite 200
San Luis Obispo, Ca 93401
(P) 805.543.3190

August 18th, 2011

Warren Hamrick Associates, Inc.
805.773.9377

Project:
Pismo Beach Grammar School Building Assessment
1000 Bello Street, Pismo Beach CA

Warren,
Resulting from my field inspection of existing mechanical/plumbing systems, please note the following:

MECHANICAL:
Corridors have no heating or ventilation
Restrooms have no heating or ventilation
Some offices have heating provided by wall furnaces with no ventilation
Some offices have no heating or ventilation

What little mechanical equipment I found was old, obsolete, and most likely not functioning.
It is my opinion new HVAC systems should be provided in all occupied spaces.

PLUMBING:
Fixtures are old and require high water flow
Gas piping is undersized for new HVAC systems
Water piping is galvanized iron, not copper
Waste/drain piping is cast iron with 'lead fill' connections, not 'no hub'

It is my opinion that all plumbing systems should be upgraded to low flow fixtures, copper water piping, and cast iron waste/drain with 'no hub' connections or ABS/PVC piping.

In reference to "mechanical/plumbing systems report" by ANA January 15th, 1991:
I agree with the reports building evaluation however, I disagree with the conclusion that split electric heat pumps are the desired HVAC systems.
I recommend roof mounted packaged air conditioners with gas fired heating and economizers.
These systems are less expensive to install and operate.

Sincerely,
Jim Van De Vanter, PE

Thorpe Design, Inc.
FIRE SPRINKLER SYSTEMS
BBB ACCREDITED BUSINESS
TOLL FREE (877) 977-FIRE (3473) WWW.THORPEDESIGN.COM C16 #541016 Since 1986

Automatic Fire Sprinkler System Design-Build Proposal July 2 2, 2011
Revised July 28, 2011

To: **Hamrick Associates, Inc.**
Atten: Warren Hamrick

Project: **Old City Hall - Pismo Beach**
1000 Bello Street
Pismo Beach, CA

We are pleased to offer our quotation for the overhead design/build NFPA 13 compliant, wet fire sprinkler system project in the following amounts:

- Main Building..**$ 81,480.00**
- Underground fire line & backflow preventer... **$ 19,800.00**

Alternate Add #1 – Provide sprinkler coverage for interstitial space between plaster ceiling at bottom of roof trusses and t-bar ceiling if space is deemed combustible due to exposed wood structure ....**Add $21,130.00**

We have included all necessary engineering, labor, materials, sales tax, workmen's compensation, public liability and property damage insurance. Bid is based on Architectural Existing Floor plans, Structural Evaluation Plans by Fred Schott & Associates (3/91) and Site Plans by RMO Architects AIA (April 8, 1986) as provided by Hamrick Associates, Inc. Changes to building design may change fire sprinkler system price.

Fire Sprinkler System specifications were not issued with plans or project specifications. No terms, conditions or provisions in specifications are included in this proposal unless outlined below.

The completed installation shall merit the acceptance of the Cal Fire / Pismo Beach Fire Department for a full NFPA #13 commercial fire sprinkler system consistent with NFPA #13, 2010 ed. Fire Department comments during the plan review process could change system parameters and therefore price. Structure shall be capable of supporting the fire sprinkler system and shall be evaluated by others. Structural evaluation not included in this proposal. Access to all areas is to be provided prior to start of work.

Scope of work:

1. Install new overhead fire sprinkler system within existing building per NFPA 13 (2010 Edition). Work to begin at point of connection at flange provided for new riser above grade just outside building or within building. Wet piping system to include riser with control valve check valve, water flow switch, pressure gauges, drain.
   Fire department connection assumed to be installed on backflow preventer provided by others.
2. Design parameters used in estimate - Light Hazard Classification per NFPA 13 for Offices & Assembly
3. Underground fire line including backflow preventer from city main to building

Northern California: P.O. Box 1149 410 Beatrice Ct., Suite A Brentwood, CA 94513 (925) 634-5758 Direct (925) 634-5975 Fax
Central California: 3940-7 Broad St., Suite 360 San Luis Obispo, CA 93401 (805) 594-1008 Direct (805) 594-1090 Fax
Southern California: 31878 Del Obispo St., Suite 118 San Juan Capistrano, CA 92675 (949) 337-9791 Direct (949) 496-4025 Fax

Note: Prevailing wage scales were used in figuring this estimate.

Head types to be as follows:

- Standard brass sprinkler heads throughout attic and other concealed spaces.
- All Offices, Assembly Areas and other occupied spaces with ceilings – Recessed style pendents. (Standard finishes of white or chrome to be selected by owner or architect)
- Basement – Horizontal Sidewall sprinklers on exposed piping along walls. (Standard finishes of white or chrome to be selected by owner or architect)
- Covered walkways – Standard brass upright or sidewall sprinklers on exposed piping.

Permit fees and FPE review fees are ***not*** included in this proposal.

Specifically NOT included are the following:

1. Access panels (if required)
2. Permit fees or review fees
3. Painting/paint preparation/Soffiting/cutting or patching
4. Fire alarm system/Smoke detectors
5. Insulation of any pipe/freeze protection
6. Freeze protection systems (dry pipe, anti-freeze, etc.)
7. Overtime labor
8. Fire extinguishers
9. Zone Monitoring
10. Electrical wiring/conduits
11. Stand pipes, temporary standpipes, temporary water supplies
12. Fire hose racks/cabinets
13. Interior bell, horn/strobes
14. Rack sprinklers/exposure sprinklers/special hazard systems/foam system
15. Sleeves/core drilling/sealing penetrations
16. Bonding of any kind
17. Drilling of any major structural members where required for routing of pipe
18. Drilling of, or disturbing in any way, existing ceiling that may contain asbestos. This work to be done by others if required for the completion of our work.
19. Survey & soils testing & report.
20. Fire hydrants.

Clarifications:

1. This proposal assumes that the interstitial space between the dropped t-bar ceiling and the plaster ceiling will be free of combustible material and will not require sprinkler coverage. Sprinkler coverage includes attic spaces and all occupied spaces. See Alternate Add # 1 (above) for this coverage.
2. All areas of work shall be free of harmful or toxic materials.
3. Adequate access shall be provided to attic space for installation of pipe.
4. Work will be performed during normal working hours.

Northern California:
P.O. Box 1149 410 Beatrice Ct., Suite A
Brentwood, CA 94513
(925) 634-5758 Direct (925) 634-5975 Fax

Central California:
3940-7 Broad St., Suite 360
San Luis Obispo, CA 93401
(805) 594-1008 Direct (805) 594-1090 Fax

Southern California:
31878 Del Obispo St., Suite 118
San Juan Capistrano, CA 92675
(949) 337-9791 Direct (949) 496-4025 Fax

Payment
Upon delivery of approved fire sprinkler system design, a fee of $7,200.00 will be required to cover engineering costs. In order to insure that approved fire sprinkler system plans are available according to builder's schedule, all plans will be submitted at the start of the project. Renewal costs of any expired permits caused by the pace of construction will be the builder's responsibility.

Payment is due upon completion of approved plans. For installation, billing will be incremental coinciding with work completed. Terms are net 30 days. A 1.5% late fee per month will apply on outstanding invoices after net 45 days.

Thank you for the opportunity to submit this quotation. We guarantee our price for thirty (30) days.

Sincerely,

Kevin Hooper
Central Coast Regional Manager
Thorpe Design, Inc.
(805) 801-5678 cell

ACCEPTANCE:
You are hereby authorized to proceed with the work as described in the above proposal, for which undersigned agrees to pay the amounts stated in said proposal.

Accepted by ____ Date ______________________

Northern California:	Central California:	Southern California:
P.O. Box 1149 410 Beatrice Ct., Suite A	3940-7 Broad St., Suite 360	31878 Del Obispo St., Suite 118
Brentwood, CA 94513	San Luis Obispo, CA 93401	San Juan Capistrano, CA 92675
(925) 634-5758 Direct (925) 634-5975 Fax	(805) 594-1008 Direct (805) 594-1090 Fax	(949) 337-9791 Direct (949) 496-4025 Fax

ELECTRICAL INSPECTION REPORT

FOR

1000 BELLO STREET

PISMO BEACH, CALIFORNIA 93449

Prepared by: Steven H. Dittmann P.E.
Dittmann Associates, Inc
Electrical Engineers
2665 Shell Beach Road
Shell Beach California 93449
T-805-773-3346
F-805-773-0993
steve@dittmannassociates.com

References:

A. Reference is made to the Seismic report prepared by Fred Schott and Associates dated March 28, 1991.

Findings:

After walking through the building and reviewing the Seismic report prepare by Fred Schott and associates it is very clear that the current electrical system requires complete replacement. The Seismic report contains and in depth electrical review, by Bill Thoma of Thoma Electric, in San Luis Obispo.

The picture attached depicts to two small existing electric services, with the third in the background; exhibit A.

What ever re-use of this building may be considered; I would demolish and rebuild the current electrical system. It is currently supporting the Office trailer in the rear for Cal Fire.

Exhibit A

Pismo Beach City Hall, Option A
Conceptual layout by Hamrick and Assoc.
Drawings Dated
15,327 sf & 0.493 Acres
9/9/11

J.W. Design & Construction, Inc.
PO Box 1154
San Luis Obispo, CA 93401
Office 805.544.3130 Fax 805.781.3970
License 554910

Option A Retrofit Existing, Summary

DIV	DESCRIPTION	PROJECT TOTALS	ON SITE	SHELL	TI
(01000)	**GENERAL REQUIREMENTS**	**$ 210,960.45**			
01010	Total Gen Conditions				
01011	Temp Water				
01012	Field Office				
01015	First Aid/Fire Ext				
01016	Sanitation				
01017	Phone/Fax/Cell/Modem				
01018	Waste Disposal				
01019	Storage Container				
01021	Equipment Rental				
01022	Small Tools				
01023	Supervision				
01024	Direct Labor				
01025	Special Inspection				
01026	Permits / Fees				
01027	Plan Reproduction				
01028	Project Signage				
01029	Final Cleaning				
02-000	**Sitework**	**$ 293,105.07**			
02-010	Demo				
02-050	SWPPP				
02-100	Clear & Grub				
02-340	Rough/Finish Grade				
02-350	Export				
02-450	Over Ex Recompact				
02-670	Asphalt Paving/ Base				
02-780	Striping				
02-781	Parking Lot Signage				
02-890	Landscape/ Irrigation				
02-1440	Temp Fencing				
02-1550	Traffic Control				
02-1660	Survey				
02-1770	Fine Grading				
02-2100	Water/Fire System				
02-2320	Sanitary Sewer				
02-2431	Storm Drain				
02-2432	Site Electric				
02-2433	Monument Signage				
02-500	Gas Trench				
02-2650	Dry Utilities PG &E, SBC, CATV				
03-000	**Concrete**	**$ 150,389.51**			
03-300	Building Concrete				
03-317	Curb & Gutter				
03-318	A-Curb				
03-335	Trash Enclosures				
03-336	Handicap Ramps				
03-337	Truncated Domes				
03-338	5' Grey Sidewalks				
03-339	Retaining Wall Footing				
03-344	Light Pole Bases				
04-000	**Masonry**	**$ 479,640.00**			
04-101	CMU Trash Enclosures				
04-102	Retaining Wall				
04-103	Refurbishing Repointing brick				
05-000	**Metals**	**$ 1,407,543.50**			
05-050	Structural Steel				
05-053	Framing Panel Embeds				
05-100	Site Bollards				
05-202	Roof Access Ladders				
05-203	Steel Trellis				
05-204	Trash Gate				

Pismo Beach City Hall, Option A
Conceptual layout by Hamrick and Assoc.
Drawings Dated
15,327 sf & 0.493 Acres
9/9/11

J.W. Design & Construction, Inc.
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Option A Retrofit Existing, Summary

DIV	DESCRIPTION	PROJECT TOTALS	ON SITE	SHELL	TI
05-205	Seismic Retrofit				
05-206	Misc Steel				
06-000	**Woods & Plastics**	**$ 226,199.38**			
06-100	Framing				
06-102	Carpentry, Cornices, Millwork				
07-000	**Thermal/Moisture**	**$ 187,755.75**			
07-200	Building Insulation				
07-300	Built Up Roofing				
07-351	Caulking & Sealants				
07-352	Gutters & Downspouts				
07-353	Flashing & Sheet Metal				
08-000	**Doors & Windows**	**$ 310,371.75**			
08-100	Doors				
08-500	Storefront/ Glazing/Windows				
09-000	**Finishes**	**$ 629,949.06**			
09-509	Metal Stud Framing				
09-510	Drywall Tape/Texture				
09-511	Acoustical Ceiling Tile				
09-517	Wall Tile				
09-518	Flooring				
09-518	Paint				
10-000	**Specialties**	**$ 141,588.78**			
10-400	ADA Signage				
10-425	Bath Accessories				
10-450	Addresses				
10-600	Knox Box				
15-000	**Mechanical**	**$ 1,212,672.24**			
15-300	Fire Sprinkler				
15-350	Plumbing				
15-600	HVAC				
16-000	**Electrical**	**$ 586,012.50**			
16-100	Electrical				
16-400	Fire Alarm				
	Subtotal	$ 5,836,187.98	$ 468,697.58	$ 3,390,315.48	$ 1,977,174.93
	JWDCI	$ 583,618.80	$ 46,869.76	$ 339,031.55	$ 197,717.49
	Total	**$ 6,419,806.78**	**$ 515,567.33**	**$ 3,729,347.03**	**$ 2,174,892.42**
	$/SF Site and Shell	$ 418.86			
	$/Acre Sitework (0.493 ac)		1,045,775.53		
	$/ SF Shell			243.32	141.90

Pismo Beach City Hall, Option B
Conceptual layout by Hamrick and Assoc.
Drawings Dated
16,790 SF & 0.926 Acres
9/9/11

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Option B, Existing Facade, Summary

DIV	DESCRIPTION	PROJECT TOTALS	ON SITE	SHELL	TI
(01000)	**GENERAL REQUIREMENTS**	**$ 212,672.50**			
01-010	Total Gen Conditions				
01-011	Temp Water				
01-012	Field Office				
01-013	First Aid/Fire Ext				
01-014	Sanitation				
01-015	Phone/Fax/Cell/Modem				
01-016	Waste Disposal				
01-017	Storage Container				
01-018	Equipment Rental				
01-019	Small Tools				
01-020	Supervision				
01-021	Direct Labor				
01-022	Special Inspection				
01-023	Permits / Fees				
01-024	Plan Reproduction				
01-025	Project Signage				
01-026	Final Cleaning				
02-000	**Sitework**	**$ 455,014.03**			
02-010	Demo				
02-050	SWPPP				
02-100	Clear & Grub				
02-340	Rough/Finish Grade				
02-350	Export				
02-450	Over Ex Recompact				
02-670	Asphalt Paving/ Base				
02-780	Striping				
02-781	Parking Lot Signage				
02-890	Landscape/ Irrigation				
02-1440	Temp Fencing				
02-1550	Traffic Control				
02-1660	Survey				
02-1770	Fine Grading				
02-2100	Water/Fire System				
02-2320	Sanitary Sewer				
02-2431	Storm Drain				
02-2432	Site Electric				
02-2433	Monument Signage				
02-500	Gas Trench				
02-2650	Dry Utilities PG &E, SBC, CATV				
03-000	**Concrete**	**$ 300,389.01**			
03-300	Building Concrete				
03-317	Curb & Gutter				
03-318	A-Curb				
03-335	Trash Enclosures				
03-336	Handicap Ramps				
03-337	Lightweight Concrete				
03-338	5' Grey Sidewalks				
03-339	Decorative Concrete				
03-344	Light Pole Bases				
04-000	**Masonry**	**$ 179,798.65**			
04-101	Precast, veneers, etc				
04-101	CMU Trash Enclosures				
04-102	Retaining Wall				
05-000	**Metals**	**$ 878,321.90**			
05-050	Structural Steel				
05-051	Steel Joists				
05-052	Steel Joist Panel Embeds				
05-053	Framing Panel Embeds				
05-054	Guard Rail				
05-100	Site Bollards				
05-202	Roof Access Ladders				

Pismo Beach City Hall, Option B
Conceptual layout by Hamrick and Assoc.
Drawings Dated
16,790 SF & 0.926 Acres
9/9/11

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Option B, Existing Facade, Summary

DIV	DESCRIPTION	PROJECT TOTALS	ON SITE	SHELL	TI
05-203	Steel Trellis				
05-204	Trash Gate				
05-600	Misc Steel				
06-000	**Woods & Plastics**	**$ 169,998.75**			
06-100	Rough Carpentry				
06-102	Carpentry, Cornices, Millwork				
07-000	**Thermal/Moisture**	**$ 134,965.00**			
07-200	Building Insulation				
07-300	Single Ply Roofing				
07-351	Caulking & Sealants				
07-352	Gutters & Downspouts				
07-353	Flashing & Sheet Metal				
08-000	**Doors & Windows**	**$ 363,083.75**			
08-100	Doors				
08-500	Storefront/ Glazing/Windows				
09-000	**Finishes**	**$ 915,785.53**			
09-509	Metal Stud Framing				
09-510	Drywall Tape/Texture				
09-511	Lath & Plaster				
09-515	Acoustic Ceiling Tile				
09-517	Ceramic Tile				
09-518	Flooring				
09-518	Paint				
10-000	**Specialties**	**$ 153,449.50**			
10-400	ADA Signage				
10-425	Bath Accessories				
10-450	Addresses				
10-600	Knox Box				
11-000	**Conveying Systems**	**$ 77,500.00**			
11-100	Elevator				
15-000	**Mechanical**	**$ 1,327,921.10**			
15-300	Fire Sprinkler				
15-350	Plumbing				
15-600	HVAC				
16-000	**Electrical**	**$ 640,875.00**			
16-100	Electrical				
16-400	Fire Alarm				
	Subtotal	$ 5,809,774.72	675,145.09	3,008,206.88	2,126,422.75
	JWDCI	$ 580,977.47	67,514.51	300,820.69	212,642.28
	TOTAL*	**$ 6,390,752.19**	**742,659.60**	**3,309,027.56**	**2,339,065.03**
	$/SF Site and Shell	$ 380.63			
	$/Acre Sitework (.926)		802,008.21		
	$/ SF Shell			197.08	139.31

Note: 10% Contingency is recommended and not provided in this budget.

Pismo Beach City Hall, Option C
Conceptual layout by Hamrick and Assoc.
Drawings Dated
23,700 sf & 1.37 Acres
9/9/11

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Option C, Summary

DIV	DESCRIPTION	PROJECT TOTALS	ON SITE	SHELL	TI
(0-1000)	**General Requirements**	**$ 215,091.00**			
01-010	Total Gen Conditions				
01-011	Temp Water				
01-012	Field Office				
01-013	First Aid/Fire Ext				
01-014	Sanitation				
01-015	Phone/Fax/Cell/Modem				
01-016	Waste Disposal				
01-017	Storage Container				
01-018	Equipment Rental				
01-019	Small Tools				
01-020	Supervision				
01-021	Direct Labor				
01-022	Special Inspection				
01-023	Permits / Fees				
01-024	Plan Reproduction				
01-025	Project Signage				
01-026	Final Cleaning				
02-000	**Sitework**	**$ 481,874.79**			
02-010	Demo				
02-050	SWPPP				
02-100	Clear & Grub				
02-340	Rough/Finish Grade				
02-350	Export				
02-450	Over Ex Recompact				
02-670	Asphalt Paving/ Base				
02-780	Striping				
02-781	Parking Lot Signage				
02-890	Landscape/ Irrigation				
02-1440	Temp Fencing				
02-1550	Traffic Control				
02-1660	Survey				
02-1770	Fine Grading				
02-2100	Water/Fire System				
02-2320	Sanitary Sewer				
02-2431	Storm Drain				
02-2432	Site Electric				
02-2433	Monument Signage				
02-500	Gas Trench				
02-2650	Dry Utilities PG &E, SBC, CATV				
03-000	**Concrete**	**$ 392,844.43**			
03-300	Building Concrete				
03-317	Curb & Gutter				
03-318	A-Curb				
03-335	Trash Enclosures				
03-336	Handicap Ramps				
03-337	Lightweight Concrete				
03-338	5' Grey Sidewalks				
03-339	Retaining Wall Footings				
03-344	Light Pole Bases				
04-000	**Masonry**	**$ 249,813.50**			
04-101	Bldg Precast, veneers, etc				
04-150	Site Retaining Walls				
04-175	CMU Trash Enclosures				
05-000	**Metals**	**$ 707,863.50**			
05-050	Structural Steel				
05-051	Steel Stairs				
05-053	Framing Panel Embeds				
05-054	Guard Rail				
05-100	Site Bollards				

Pismo Beach City Hall, Option C
Conceptual layout by Hamrick and Assoc.
Drawings Dated
23,700 sf & 1.37 Acres
9/9/11

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Option C, Summary

DIV	DESCRIPTION	PROJECT TOTALS	ON SITE	SHELL	TI
05-202	Roof Access Ladders				
05-203	Steel Trellis				
05-214	Trash Gates				
05-600	Misc Steel				
06-000	**Woods & Plastics**	**$ 370,312.50**			
06-100	Rough Carpentry				
06-102	Interior Millwork				
07-000	**Thermal/Moisture**	**$ 165,637.50**			
07-200	Building Insulation				
07-300	Single Ply Roofing				
07-351	Caulking & Sealants				
07-352	Gutters & Downspouts				
07-353	Flashing & Sheet Metal				
08-000	**Doors & Windows**	**$ 468,075.00**			
08-100	Doors				
08-500	Storefront/ Glazing				
09-000	**Finishes**	**$ 1,217,065.75**			
09-509	Metal Stud Framing				
09-510	Drywall Tape/Texture				
09-511	Lath & Plaster				
09-517	Ceramic Tile				
09-518	Flooring				
09-518	Paint				
10-000	**Specialties**	**$ 213,138.00**			
10-400	Signage				
10-425	Bath Accessories				
10-450	Addresses, Misc Specialties				
10-600	Knox Box				
11-000	**Conveying Systems**	**$ 77,500.00**			
11-100	Elevator				
15-000	**Mechanical**	**$ 1,839,379.80**			
15-300	Fire Sprinkler				
15-350	Plumbing				
15-600	HVAC				
16-000	**Electrical**	**$ 900,000.00**			
16-100	Electrical				
16-400	Fire Alarm				
	Subtotal	$ 7,298,595.77	881,827.22	3,605,796.15	2,947,836.40
	JWDCI	$ 729,859.58	88,182.72	360,579.62	294,783.64
	TOTAL*	**$ 8,028,455.34**	**970,009.94**	**3,966,375.77**	**3,242,620.04**
	$/SF Site and Shell	$ 338.75			
	$/Acre Sitework (1.37 ac)		708,036.45		
	$/ SF Shell			167.36	136.82

Note: 10% Contingency is recommended and not provided in this budget.

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Pismo Beach Public Safety Building

Qualifications to Conceptual Budget 9/9/11

DIVISION (01000) GENERAL REQUIREMENTS

1. This budget includes 3 options, A, B, & C as shown on preliminary site plans drawn by Hamrick Associates, Inc. Option A is a retrofit of the existing building. Option B leaves the front wall/facade of the existing building in place and supports it with a new structural steel building frame with metal stud infill. Option C is an entirely new building with a structural steel frame and metal stud infill.
2. This is a conceptual budget based on historical cost data and subcontractor input. It is recommended that the project carry a 10-15% contingency which is not included in this budget.
3. The budget is intended to build the structure to a level of quality typical for municipal buildings with a 50 to 75 year life span.
4. We are anticipating constructing the building to a specification that would enable it to qualify for LEEDS certification, but have not included the administrative and processing costs to do so.
5. This budget includes 11 months of general conditions costs for onsite costs incurred by JWD during construction including temporary facilities, full time supervision, clean up, etc. If the duration of the project is extended by unknown conditions, changes to the scope of work, weather, hazardous materials or archeological issues, general conditions would be adjusted accordingly.
6. Soft costs such as building permits, encroachment permits, city, county or state fees, utility company fees, drawing reproduction costs, and shipping costs for documents are not included in this proposal.
7. The cost of bonding by J.W. Design & Construction Inc. is not included in the budget.
8. Testing and special inspection costs are not included, but will be coordinated and scheduled by JWD.
9. This budget includes onsite labor at prevailing wage rates.
10. All work is to be performed during "normal" working hours, based on 40 hour work weeks.

DIVISION (02000) SITE CONSTRUCTION

1. Site construction includes temporary fencing of the site.
2. This does not include costs for offsite infrastructure such as roads, utilities, etc.
3. Costs for erosion control and S.W.P.P.P installation and maintenance are included for normal winter conditions.
4. Costs for hidden conditions such as subsurface water, hard rock, or buried structures are not included.
5. The site budget includes onsite demolition, cut, fill, export, rough grading, curbs, sidewalks, retaining walls, utility extensions to within 5' of the building, base, pave, retaining walls, site lighting, and landscaping. It is based on the information available and our best estimate for quantities.
6. The quantities for cut, fill, export, retaining walls etc vary for each option. Please see the individual spread sheets for specific quantities used.
7. Dry utility trenching, conduit, vaults, and transformer pads are included. Conductors, transformers, etc. are to be provided by the utility companies.

DIVISION (03000) CONCRETE

1. Option A includes a budget for reinforcing the foundation included in the seismic retro fit and saw-cutting and repair of the existing slab on grade for new plumbing trenches.
2. New foundations and slabs on grade are included for options B and C.
3. Building slabs will be placed at 4" thick.
4. Reinforcing and slab dowels are included. Control joints shall be "soft cut".

DIVISION (04000) MASONRY

1. Option A includes a budget to restore the existing exposed, exterior brick building walls.
2. Option B includes costs to restore the front wall/façade facing Bello St.

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3. Trash enclosures, site walls, retaining walls are included per the specific detailed cost break downs for each option.

DIVISION (05000) METALS

1. Option A includes structural steel necessary to complete a seismic retrofit of the existing building.
2. Option B includes bracing the existing front façade during construction and supporting it by connecting it to a new 2 story structural steel building frame behind it.
3. Option C includes building a new building with a 2 story structural steel frame.
4. All structural steel is to have one coat of shop primer unless noted otherwise.

DIVISION (06000) WOODS/PLASTICS

1. Option A includes a budget to repair wood framing, and under the seismic category to strap and shear the roof.
2. A and B include costs to rebuild the exterior wood cornices.
3. Materials for framing to be standard green lumber.
4. Building sheathing is based on using OSB or plywood at contractor's discretion.

DIVISION (07000) THERMAL MOISTURE

1. On all 3 options a new single ply roof is included as 60 mil, TPO, to qualify as a "cool roof".
2. Building envelope insulation is included with all 3 options.

DIVISION (08000) DOORS/WINDOWS

1. New hollow metal doors and frames, interior and exterior are included for all 3 options where appropriate with commercial quality hardware.
2. Windows are to be replaced in Option A.
3. Option B and C includes new storefront with painted frames.
4. All options include a limited amount of interior glazing at office partitions/doors.

DIVISION (09000) FINISHES

1. Option A includes clean up and point and tuck of exterior brick.
2. Option B includes clean up and point and tuck of front facade with some exposed stucco and some brick veneer on the other exterior walls.
3. Option C includes stucco with brick veneer combo as above.
4. Exterior paint and sealer is included.
5. The interior finishes are budgeted to a specification that would be appropriate for a public building.

DIVISION (10000) SPECIALTIES

1. A certain amount of specialty items such a projector screens, shades, etc are included in the budget.
2. Standard items such as bath accessories, toilet partitions, building address, Knox box, and fire extinguishers are included.

DIVISION (15000) MECHANICAL

1. A VAV HVAC system is included for all three options.
2. A standard fire protection system for the building shell and TI is included.
3. Plumbing is included based on historical cost data for similar sized and use buildings.

DIVISION (16000) ELECTRICAL

1. Electrical is included based on historical cost data for similar sized and use buildings.
2. A Fire Alarm system is included in this proposal, security alarms are not part of this proposal.

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