Cupertino City Hall
Essential Services Facility Analysis

Final Report, Revision 1
March 27, 2012

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2.0 Executive Summary

This scope of this project is an analysis of the Cupertino City Hall building and its compliance with current codes related to Essential Services Facility requirements. The objective of this study is to identify both deficiencies and potential improvements to the building necessary to achieve essential facility status by current codes.

Four alternative approaches were identified by the City of Cupertino representatives and the design team for the renovation of the existing City Hall facility. These approaches, described below, differ in their scope and anticipated construction cost. More detail for each item can be found in the body of the report.

Alt #1 No Upgrade: This alternate proposes no modifications to the existing City Hall building and a relocation of the existing Emergency Operations Center (EOC) to another facility.

Alt #2 Minimum Seismic Upgrade: This alternate proposes modifications to the building structure only to bring the facility to a code compliant Essential Services Facility status. No proposed plan changes are proposed in this alternate in order to maintain the ability to "grandfather in" the existing EOC in its current configuration. Only structural items triggered by I-factor improvements and maintenance are intended to be modified. Accessibility upgrade improvements may be triggered in this alternate.

Alt #3 Moderate Upgrade: This alternate proposes that all Alternate #2 items as well as additional plan modifications to address life safety code updates be implemented. Accessibility upgrade improvements would be triggered in this alternate.

Alt #4 Replacement – This alternate proposes a new City Hall building that aligns with ideas being proposed in the Civic Center Master Plan Study currently in process by Perkins + Will. This new facility would meet all current codes, incorporate sustainable features, and include Essential Services Facility requirements while at the same time address the specific needs and desires of the building occupants.

Following the completion of this report, the City of Cupertino and the design team will meet with a cost estimator designated by the city to identify order of magnitude costs for each alternative. After this process has been completed and an alternative is selected, the city may authorize the design team to proceed with the design and documentation of the selected alternative.

3.0 Structural Analysis (by AKH)

3.1 Scope

The scope of this section includes recommendations for mitigating structural deficiencies discovered in our assessment report dated November 11, 2011. The report has indicated that the heavy roof tile is a major factor in the deficiencies of the structure. The following recommendations are based on the assumption that the heavy tile roofing will be replaced by a lighter roofing material, and possibly with solar panels over some of the sloped roof areas.

3.2 Applicable Codes

The structure was recently assessed using seismic forces required in the 1985 Uniform Building Code (UBC), as this was the Code to which the 1986 alterations were designed. Recommendations within this report are based on seismic forces as dictated by the current 2010 California Building Code (CBC).

3.3 Deficiencies Identified

- Roof Diaphragm Shear Capacity
- Roof Diaphragm Collector Splice Capacity
- Anchor Bolt Connections at top of Shear Walls
- Upper Concrete Shear Wall Flexural Capacity
- Upper Concrete Shear Wall Boundary Members
- Upper Concrete Shear Wall Second Layer of Reinforcing
- Concrete Column Reinforcement for Confinement
- Equipment Anchorage Capacities Unknown

3.4 General Recommendations

This structure consists of concrete shear walls with heavy clay roof tiles on the sloped roof areas and heavy gravel ballast in the central area bounded by the upper mansard/screen wall. The roof tiles represent a significant portion of the building's mass at the upper level. The design seismic forces on a structure are based directly on a fraction or percentage of the total mass (weight) of the building. Thus, the roof tiles represent a significant amount of the seismic forces that the building's lateral force-resisting systems must resist. Our recommendations, therefore, include the replacement of the heavy tile roofing with a lighter material. This would also allow for the opportunity to install photovoltaic (PV) solar panels on the roof surface. As the weight of typical PV panels is small relative to the weight of the existing clay roof tiles, future improvements could include the addition of these PV panels while still reducing the building's mass and resulting seismic design forces.

Also, the upper story of this structure relies on two relatively narrow concrete shear walls on each of the four sides of the building. These shear walls comprise the building's entire lateral force resistance at the upper level, as the structure does not have any interior walls or structural frames that resist lateral forces. While the shear walls occur on each of the building's four sides, the walls are relatively narrow compared to their height, resulting in high in-plane shear stresses when resisting the seismic design forces, as well as relatively high tension and compression forces at the ends of the walls. Finally, the use of only two primary force-resisting elements on each side of the structure provides

only minimal redundancy. Overall, the smaller number and length of walls result in a structural configuration that has historically performed less than optimally in resisting lateral, seismic forces in moderate and major earthquakes. Therefore we recommend that additional shear walls be added on each side of the structure. The included key plan of the building indicates where concrete walls can be added to the building, utilizing portions of existing solid exterior wall. These proposed locations would affect the building's current aesthetics and function to only a limited degree, if at all. See Fig. 3.A.

In general, if the clay roof tiles are replaced with lighter roofing materials (even including PV panels), the building's seismic mass would be reduced substantially, and the magnitude of most of the structure's noted deficiencies are reduced to levels that are more readily addressed.

3.5 Specific Recommendations

In addition to the general recommendations above, following are our specific recommendations for each of the deficiencies noted in the Section 3.3 above:

3.5.1 Roof Diaphragm Shear Capacity

The existing roof diaphragm is comprised of plywood sheathing with specific nailing along its panel edges to common framing members. Its shear capacity is affected by the type and thickness of plywood used, and the size and spacing of nailing used. The existing roof diaphragm shear capacity is exceeded even if the existing roof tile were to be removed and replaced with a lighter roofing material. The roof diaphragm forces would be reduced significantly with the replacement of the heavy clay roof tiles, although the calculated diaphragm shears would still exceed the diaphragm near the building's perimeter, which is where the diaphragm shear forces are highest. The plywood diaphragm can be strengthened as needed with added panel edge nailing near the perimeter of the building. This added nailing would be installed while the roofing is being replaced. See Figures 3.B and 3.G.

3.5.2 Roof Diaphragm Collector Splice Capacity

The existing roof diaphragm collectors consist of steel roof beams around the perimeter of the structure, and are aligned parallel to and above the upper-level concrete shear walls. These elements collect the seismic forces within the roof diaphragm and deliver the forces to the shear walls. Where splices occur in the lines of steel beams at approximately ten (10) locations, the connectors are currently not adequate to transfer the required seismic collector forces. Our recommendation to address this deficiency would be to provide welding around the splice plates to the beams at the splice connections. See Fig. 3.F.

3.5.3 Anchor Bolt Connections at top of Shear Walls

The collector beams mentioned in the previous section are connected to the top of the concrete shear walls with anchor bolts embedded in the walls and extending through the steel beam flange. This is the means through which the seismic forces are transferred from the roof to the shear walls. The current anchor bolts are insufficient to transfer the prescribed forces to the shear walls, even with added shear walls. Our recommendation is to provide adequate anchor bolts to any new walls and provide additional anchor bolts through the existing beams, between the existing anchor bolts, to strengthen the shear-transfer connections sufficiently. See Fig. 3.F.

3.5.4 Concrete Shear Wall In-Plane Flexural Capacity

In-plane flexure results from the shear walls bending when resisting seismic loads at their tops, tending to rotate and bend the wall over, causing tension and compression at wall ends. With the addition of upper-level new shear walls as recommended above, this flexural deficiency likely would no longer exist in the existing walls, as the forces resisted by the existing walls would be reduced, as well as the induced flexural forces. The added shear walls would be designed to have sufficient reinforcing to resist bending in the plane of the wall.

3.5.5 Concrete Shear Wall Boundary Members

Boundary members are required where the in-plane flexural forces generate high compressive forces at the wall ends. These compressive forces, when at a certain level, must be resisted by stronger column-type elements, containing internal confinement of the vertical wall reinforcing near the wall ends. The existing walls would require added boundary confinement to resist current Code-level forces. With the removal of the heavy roof tile and gravel, and depending on the lengths and locations of added shear walls as noted above, the compressive flexural forces would be reduced to a level where only the current Code's prescriptive requirements would be applicable. This could be accomplished in one of two possible means. First, a short length of reinforced wall could be added to the existing, which would move the highest compressive forces away from the existing bars, and would contain new bars and confinement complying with Code requirements. Second, if the wall length cannot be increased, a column element that is wider than the wall could be introduced, containing the required confining reinforcement.

3.5.6 Concrete Shear Wall Second Layer of Reinforcing

When calculated in-plane shear stresses within shear walls exceed a certain threshold, those walls must have two layers of internal reinforcing. The shear walls currently have one layer of reinforcing, comprised of vertical and horizontal rebar. With the removal of the heavy roof tile and addition of new perimeter shear walls as noted above, the shear stresses

within the walls will likely be reduced to levels such that the second layer is not required.

3.5.7 Concrete Column Reinforcement for Confinement

The existing concrete columns throughout the structure, at both levels, contain longitudinal reinforcement running vertically and transverse, confining tie reinforcement around the longitudinal bars. The ties are of a specific size and occur at a specific spacing. In extreme cases, such as in moderate and major earthquakes, the lateral drift of the structure, combined with the axial forces from the supported structure, can induce extremely high compressive forces in the longitudinal (vertical) column bars. If not confined adequately by ties of sufficient size, at spacing that is close enough, the vertical bars can buckle outward, causing damage to the column, loss of support and possible collapse. Regardless of the calculated forces in the existing columns, the existing column ties do not conform to the current Building Code's prescriptive requirements for minimum confinement. Thus, supplemental confinement needs to be added for conformance to the current Code. This added confinement may be required only near the ends of some columns, or for the full height of the columns, depending on the calculated column loads. Where additional confinement is required, it is recommended that the columns be wrapped with designed layers of carbon fiber and resin. The total build-up of carbon fiber layers is relatively thin, and would not adversely affect the spaces where the columns occur.

As indicated in these descriptions, and in general, the noted deficiencies can be addressed and resolved only with a sufficient reduction of the building's mass through the removal of the heavy clay tile roofing, and with the addition of some lengths of new upper-level concrete shear walls. The recommended alterations combine to reduce the seismic forces acting on the structure, increase the strength and capacities of the load-resisting elements, including the shear walls and collector members. The following key building plan indicates the recommended locations for the proposed added shear walls, which would likely affect the building's aesthetics and functionality to only a minimal degree.

3.5.8 Equipment Anchorage Capacities Unknown

The capacity of the anchorage of the equipment throughout the building is unknown and warrants a survey of existing on-site conditions, as well as any drawings available that address the methods of anchorage and lateral bracing. The current Building Code excludes some equipment below certain weight limits from requiring anchorage, if the Component Importance Factor (Ip) for determining the anchorage design forces is no higher than 1.0. However, since the entire subject structure is considered an Essential Facility, housing the EOC, the Importance Factor for the overall building's seismic design, as well as the seismic Component Importance factor, Ip, is 1.50. Thus, the seismic anchorage of all

significant equipment anchorage is governed by the Code. Equipment that should be considered, in particular, includes the following:

- Emergency Generator, including isolators
- Emergency Generator flexible connections for conduit, fuel and coolant piping
- Rooftop HVAC Equipment
- Elevator Equipment
- Electrical Transformers, Panels, Switchgear, Cabinets, etc.
- Suspended Light Fixtures
- Ductwork and Piping Supports and Bracing
- Electrical Conduits, Trapezes, Banks and Trays
- Fire Sprinkler Piping

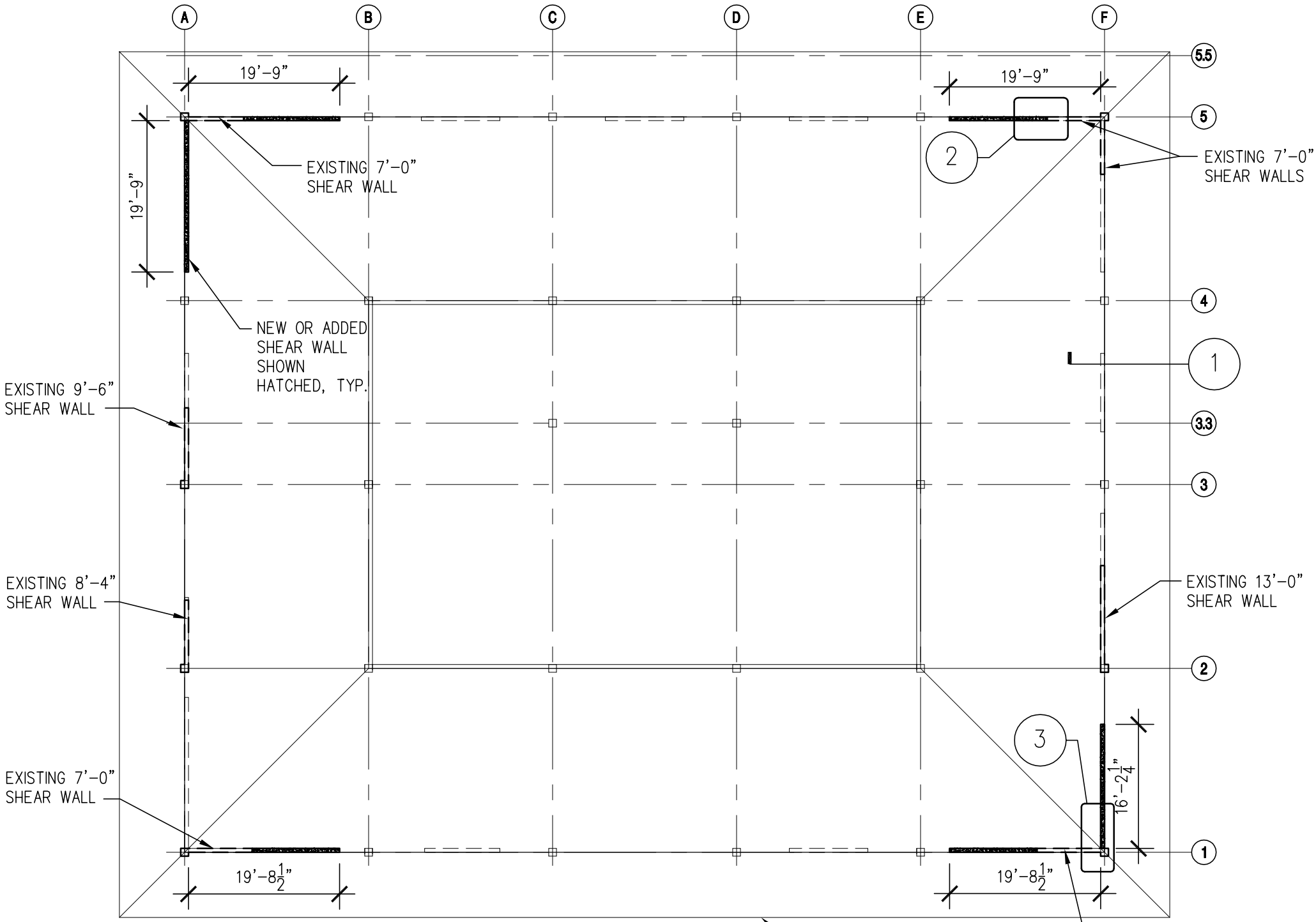

Figure 3.A: KEY STRUCTURAL BUILDING PLAN

(MAIN FLOOR WALLS SHOWN DASHED)

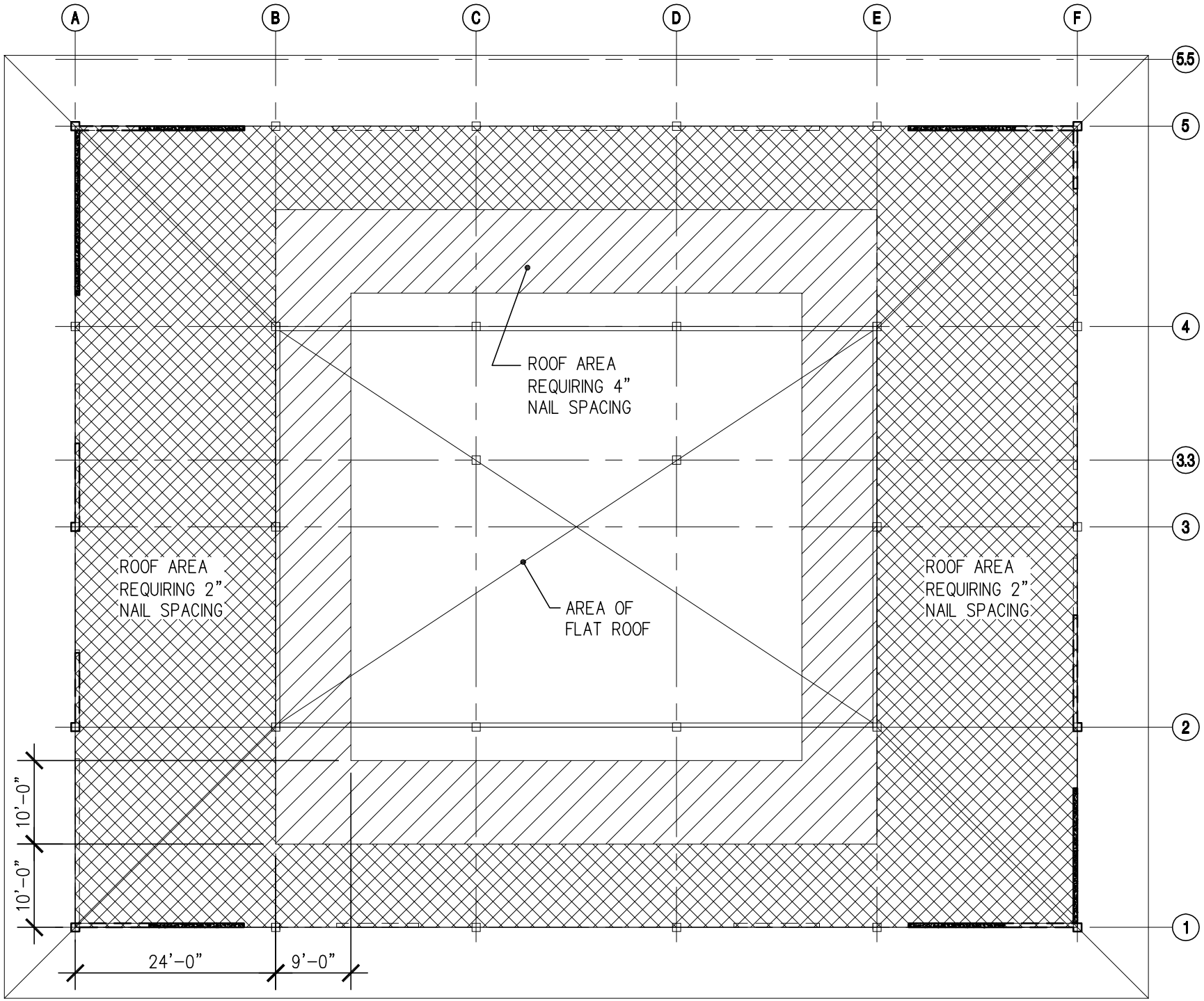

Figure 3.B: KEY ROOF PLAN

(MAIN FLOOR WALLS SHOWN DASHED)

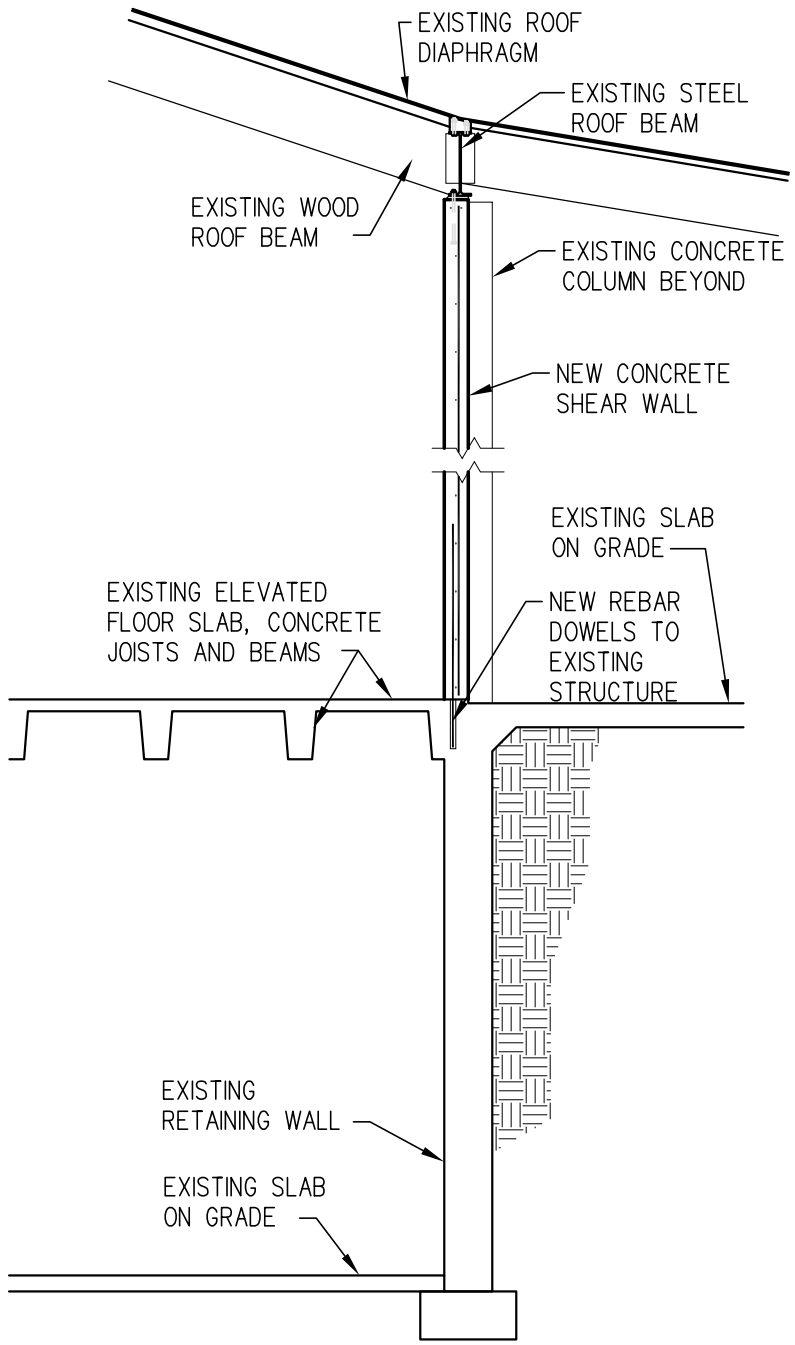

Figure 3.C: SECTION AT NEW SHEAR WALL

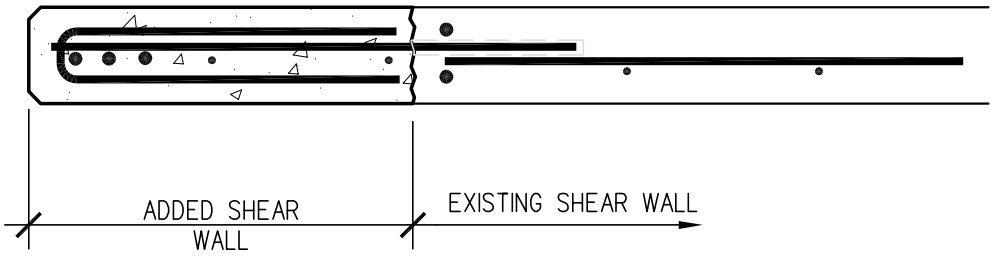

Figure 3.D: NEW SHEAR WALL AT EXIST. WALL

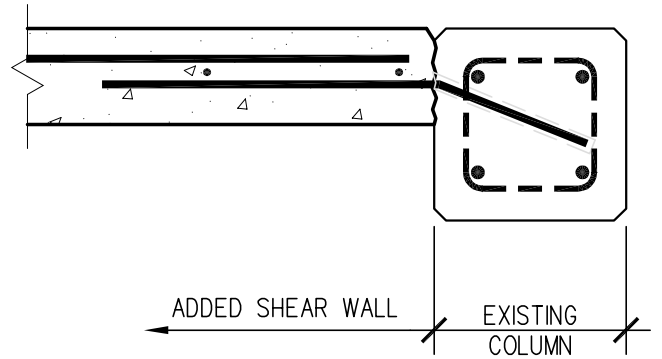

Figure 3.E: NEW SHEAR WALL AT EXIST. COL.

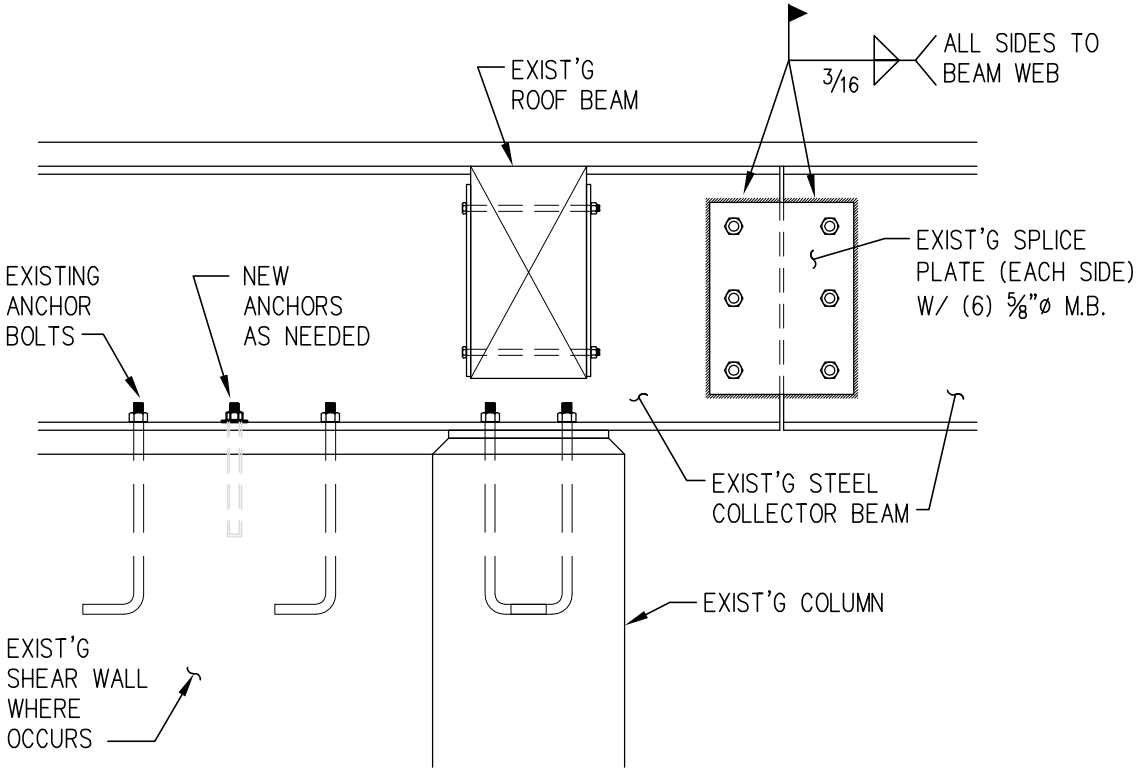

Figure 3.F: ELEVATION: EXISTING STEEL BEAM AT COLUMN AND SHEAR WALL

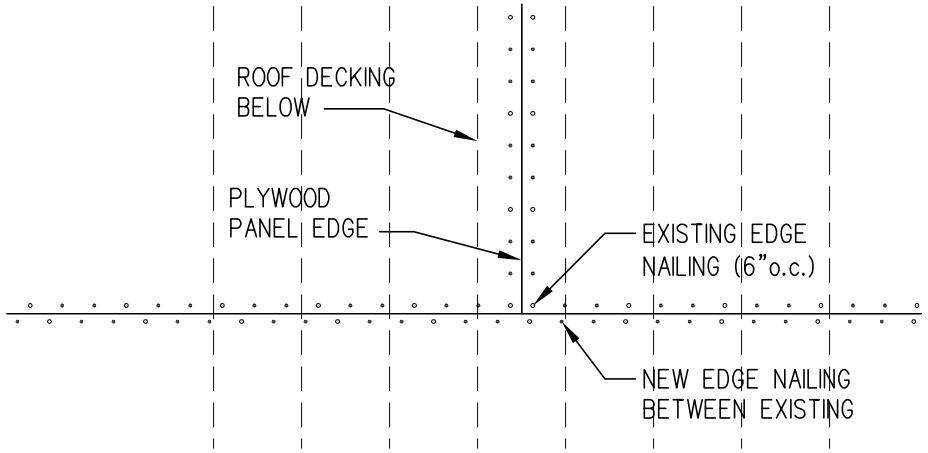

Figure 3.G: PLAN OF PLYWOOD PANEL EDGE NAILING

4.0 Architectural Analysis

4.1 Scope

The existing Cupertino City Hall building is a two-story structure containing city administrative and building department services as well as the City of Cupertino's Emergency Operations Center (EOC.) The original building was built completed in 1965 and later renovated in 1986.

This study is based on record documents listed below and received electronically from the city as well as a facility site walk on Feb 14, 2012.

- 1965 Drawings for Original Construction
- 1986 Drawings for Renovation (except single line Electrical plans)
- Current Exiting Diagram included the latest floor layout modifications

The architectural analysis primarily focuses on fire and life safety issues and includes a detailed code compliancy review of the existing City Hall building as an Essential Service Facility. The recommendations follow the analysis and include four alternatives outlined by city representatives and the design team.

The current code, the 2010 California Building Code (CBC), and the 1985 Uniform Building Code used for the renovation exhibit significant differences in all chapters. The first step of this analysis was to review the existing building against the 2010 CBC. Exhibit 4A provides the analysis in detail. Exhibits 4C and 4D show occupancy load calculations, exit occupancy calculations, and required rated wall locations.

The required scope of accessibility modifications for the existing building is also summarized to define the extent of potential renovation work. Exhibit 4B lists scope requirements from the 2010 CBC Chapter 11B.

4.2 Applicable Codes

The 2010 CBC was used to review code compliancy. The 2010 California Green Building Code (Cal Green) was not used for the analysis of the existing building. Currently, the City of Cupertino does not enforce the Cal Green for the remodel of existing buildings.
The requirements of 2010 ADA Standards for Accessible Design is applicable for local government facilities and was also used to review for compliancy.

4.3 Key Fire and Life Safety Issues

The key issues below are extracted from Exhibit 4A - Code Analysis Worksheet.

- **Occupancy Classification**
  The existing Council Room is approximately 1,300 sf (over 10% of the total floor area of the first floor) with an Occupancy Load of 86. The room cannot be considered an incidental accessory occupancy because it is too large. It needs to be considered an A3 Occupancy, a separate occupancy from rest of the building, which is a B Occupancy.

- **Type of Construction**
  The type of construction is Type VB with an automatic sprinkler system throughout.

- **Fire Resistive Separations**

  Interior Walls:
  A 1-hour Fire Barrier separation is required between A and B occupancies. The existing wall is shown as a 1-hour partition in the 1986 drawings. The wall construction above the ceiling needs to be further investigated. The doors in the 1-hour Fire Barrier need to have a 45-minute fire resistance rating. The existing two doors are labeled with 20-minute ratings. The label of the third door was covered by finish material and not legible. It will need to be replaced if it cannot be confirmed as compliant. See section 4.5.1 of the 2010 CBC.

  Although the 1-hour separation requirement of an incidental use area is exempted because the existing building is equipped with a sprinkler system, the Mechanical Room and Storage Rooms (over 100 sf) require smoke partitions. The 1986 drawings indicate the existing Mechanical Room is enclosed by a 1-hour partition. See section 4.5.2 of the 2010 CBC.

  Elevator Shaft Enclosure:
  The existing elevator shaft may be deficient. The drawing A2.1 (1986 Renovation) indicates "Carry shaft wall to underside of lobby ceiling". Fire Barriers need to extend to the underside of the roof sheathing per 707.5 or enclosed at the top with the same fire resistance rating per 708.12. See section 4.5.3 of the 2010 CBC.

  Exit Stair Enclosure:
  The exit stair enclosure wall needs to be a 1-hour Fire Barrier with a 1-hour rated opening. The existing door on the first floor is labeled as 60-minute. The rating of the door on the basement was not legible and will need to be replaced if it cannot be confirmed as complaint. See section 4.5.4 of the 2010CBC.

- **Corridors**
  The building's corridors are not required to be separated by fire or smoke partitions because the existing building is A and B Occupancies and equipped with a sprinkler system. The existing corridors open to the public area are rated per the 1986 drawings. The existing openings between the west corridor and the office area are allowed per the current code.

- **Interior Finishes**

  Wall and Ceiling:
  Corridors serving the egress of the EOC, West Corridor, Lobby, and South Corridor require Class B finishes on the walls and ceiling. The existing finish materials need to be further examined to confirm that they meet the ASTM E-84 Class B frame spread rating and the ASTM C 635 or C636 for suspended acoustical ceiling. See section 4.5.6 of the 2010 CBC.

  Floor:
  A Class I or II interior floor finish is required in all exit routes. The existing finishes need to be further reviewed and replaced if they cannot be confirmed as compliant. See section 4.5.6 of the 2010 CBC.

- **Means of Egress**

  Occupant Load:
  The Occupant Load of the existing building is calculated based upon the area under consideration divided by an occupant load factor per section 1004.1.1 of the 2010 CBC. See Exhibit 4A.

  Egress Width:
  All existing doors and corridors currently provide more than the required egress width. Exiting occupancies at the exit discharge are:

Basement Terrace	98
Main entrance	57 (113 / 2 exits)
South Corridor Door	35
North Door	29

  Accessible Means of Egress:
  Accessible means of egress are not required in alterations to existing buildings per section 1007.1 Exception 1 of the 2010 CBC.

  Panic Hardware:
  Mechanical Room and Transformer Room doors need panic hardware or fire exit hardware per section 1008.1.10 of the 2010 CBC. The existing doors do not have the required hardware.

  Vertical Exit Enclosures–Lobby Open Stairs to Basement:
  The analysis of the exiting occupancy revealed that the basement floor egress is not code compliant without using the open stairs as means of egress. The 2010 CBC allows for vertical openings in a stairway only if it is not part of means of egress per 708.2 Exceptions; therefore, in order to meet the requirements of the code the stair will require the installation of draft curtains and closely spaced sprinklers. These upgrades based on the interpretation above are believed to be more economical than

converting the open stairway to an enclosed exit stair. See section 3.5.7 of the 2010 CBC.

- **Roof Assembly and Rooftop Structure**

  A roof assembly is required to meet Class A fire test exposure in accordance with the city ordinances. The existing roof equipment shows an incomplete attachment mechanism to the roof deck. See section 3.5.8 of the 2010 CBC.

4.4 Other Issues

4.4.1 Accessibility

The extent of the specific accessibility upgrades will require further study as well as design solutions after a solution is selected. Exhibit 4B describes accessibility requirements for existing buildings.

The 2010 CBC requires that accessibility upgrades apply only to the area of specific alteration. The 2010 ADA Standards (Chapter 2, 202) state "each altered element or space shall comply with the applicable requirements".

The 2010 CBC also outlines construction cost thresholds for specific levels of accessibility upgrades. For a project where the construction cost does not exceed $50,000, it requires accessibility compliance only in the area of the actual work and not in supporting areas. For a project where the construction cost does not exceed $128,410.86, it allows accessibility compliance to be limited to 20% of the cost of the project. Priority must be given to the accessible elements in the following order.

- sanitary facilities
- drinking fountains
- signs
- public telephone
- additional accessible elements such as parking, storage, and alarms

For a project where the construction cost exceeds $128,410.86, the facility must be made fully accessible.

4.4.2 OSHA

Access to all areas for building maintenance will need to meet Cal-OSHA standards. The metal ladder to the roof requires a safety upgrade.

4.4.3 Sustainability

A comprehensive sustainable strategy and specific sustainable solutions are not identified in this report; however, as the project moves to the next phase we would recommend incorporating a sustainable approach into the solution selected.

4.4.4 Architectural & Planning

Several architectural and planning issues were identified by the building representatives and design team during the Feb 14, 2012 site walk. These items

were captured in the Meeting Minutes, item 2012-02-14.07, and should be addressed if Alternate #3 or Alternate#4 is selected for implementation.

4.5 Recommendations

Four alternative approaches were identified by the City of Cupertino representatives and the design team for the renovation of the existing City Hall facility. These approaches, described below, differ in their scope and anticipated construction cost.

Alt #1 No Upgrade: This alternate proposes no modifications to the existing City Hall building and a relocation of the existing EOC to another facility.

Alt #2 Minimum Seismic Upgrade: This alternate proposes modifications to the building structure only to bring the facility to a code compliant Essential Service Facility status. No proposed plan changes are proposed in this alternate in order to maintain the ability to "grandfather in" the existing EOC in its current configuration. Only structural items triggered by I-factor improvements and maintenance are intended to be modified. Accessibility upgrade improvements may be triggered in this alternate. The modifications include:

- Replacement of roof tile – as maintenance
- Possible adjustment of roof profile and equipment screen
- Connection of collector beam and concrete shear wall
- Additional concrete wall to the main level, if required. (The modification should not affect floor plan and egress)
- Ducts and equipment seismic support
- Accessibility upgrade for 20% of construction cost if required

Alt #3 Moderate Upgrade: This alternate proposes that all Alternate #2 items as well as additional plan modifications to address life safety code updates be implemented. Accessibility upgrade improvements would be triggered in this alternate. The modifications include:

- All Alt #2 items
- Fire and Life Safety upgrade to meet 2010 CBC
- MEP upgrades to meet operation requirements as Essential Services Facilities including replacement of HVAC equipment/control, water heater/plumbing pipe, adjustments of sprinkler system, and upgrade of the electrical system after testing and verifications.
- Minimum energy efficiency to meet performance of the existing building
- Accessibility upgrade

Alt #4 Replacement – This alternate proposes a new City Hall building that aligns with ideas being proposed in the Civic Center Master Plan Study currently in process with Perkins + Will. This new facility would meet all current codes, incorporate sustainable features, and include Essential Service Facility requirements while at the same time address the specific needs and desires of the building occupants.

These recommendations are based on the findings from the available drawings and observations of the accessible areas during the site walk. As highlighted above, some areas of the existing building have unknown conditions and will require further investigation after an alternate is selected:

- penetrations thru partitions
- above-ceiling conditions
- actual construction of the interior partitions
- storage rooms created during the recent renovation around the EOC
- renovated areas in locations where the record drawings were not available

Specific recommendations for the correction of items identified in the code analysis are outlined below. If Alternative #3 or Alternative #4 described above is chosen, all architectural code deficiencies must be integrated into the solution.

4.5.1 1-hour Fire Barrier at Council Room

The existing doors to the Council room need to be replaced with at least 45-minute fire resistance rated doors. The partition may need to be repaired or re-built to meet 1-hour Fire Barrier requirements. The existing rated partition enclosing Council room should be further field investigated.

4.5.2 Smoke Partitions to Mechanical Room and Storage Room

The existing doors to the Mechanical Room and Transformer Room need to be replaced with panic hardware. The existing wall and doors enclosing the Mechanical Room need to be rebuilt or repaired to meet smoke partition requirements.

Mechanical Room work space clearances and clear path of travel require further investigation near the 1600 Amp electrical panel. The room requires either 2 exits with panic hardware or 1 exit door with panic hardware and a clear unobstructed path from panel to exit door, or a single exit door with panic hardware and double the required working space around the panel.

Storage Rooms (areas exceeding 100sf) need to be enclosed by smoke partitions. The Storage Rooms north of Council Room that were recent additions/modifications exceed 100sf. These walls and doors need to be rebuilt or repaired to meet smoke partition requirements.

4.5.3 Elevator Shaft Enclosure

The construction of the existing elevator shaft enclosure needs further field investigation to verify if it meets the 1-hour Fire Barrier requirements. The shaft enclosure may either need to extend to the roof sheathing or be enclosed at the top of the shaft with 1-hour fire resistance rated assembly.

4.5.4 60-Minute Door to the Exit Stair at Basement

The exit access door to the existing exit stair should be confirmed as a 60 minute door or replaced with a 60 minute door. The construction of the existing exit stair shaft enclosure needs further field investigation to verify if it meets the 1 hour Fire Barrier requirements.

4.5.5 Interior Finishes

The finishes of West Corridor, Lobby, and South Corridor need further field investigation to confirm if they meet the current code classifications. The finishes may need to be replaced to meet the requirements.

4.5.6 Lobby Open Stairs to Basement

The existing open stairs from Lobby to the basement should be designated as non-exit stairs. In addition, the draft curtains and closely-spaced sprinklers per NFPA 13 need to be installed. The exit sign should be rearranged accordingly.

4.5.7 Roof Assembly and Rooftop Equipment

The attachment of the roof equipment to the roof deck must be secured following the I factor requirements for the Essential Services Facilities. Reroofing assembly is required to meet Class C roofing.

4.5.8 Replacement of Roof Tile (This item is for Alt #2)

As described in the Structural Section 3.4 General Recommendations, the heavy tile roofing should be replaced with a lighter material such as standing seam metal roofing system. A system can be selected to match the appearance of the adjoining buildings in the Civic Center. As the project proceeds an option to integrate photovoltaic panels or film at the roof should be investigated.

Exhibit 4A - Code Analysis Worksheet

This exhibit is prepared to review the code compliancy of the existing City Hall under 2010 California Building Code.

	Subject	CBC Reference	Notes
1.	**Building Description**		
	• 1 above grade story with 1 below grade basement	Table 503 See 7	OK
2.	**Building Height**		
	• Height to highest occupancy Story: 1.8 ft above finish grade (224.9 FG, 226.7 FF)		
	• Height to top of roof: 20'-11 ½" @ top of beam, 26' @ top of parapet	Table 503 See 7	OK
3.	**Building Separations**		
	• East: 174 ft		
	• West: 60+ ft (60 ft to PRW)		
	• North: 60+ ft (60 ft to PRW)		
	• South: 103 ft (to 1964 PL)		
	All exceeds 30' in Table 602 fire Separation distance	Table 602	OK
4.	**Occupancy**		
	Building Area / Occupancy First Floor: B (Except Concil room: A3, 1,300sf) Basement: B Note: EOC Room (former Council Room) will be separated Occupancy from the rest of the building because the area sqft of 1,300sf exceeds 10% of the building area of the floor (508.2.1). The occupant load of the EOC Room is 1,300/15 = 86. The two occupancies need to be separated by 1hr fire barrier (Table 508.4)	508.4	
5.	**Approximate Building Area**		
	Level 1: 11,520 sf Basement: 11,520 sf Total: 23,040 sf		
6.	**Type of construction**		
	Type V-B (fully sprinklered)		
7.	**Allowable Area and Height** – Type V-B (fully-sprinklered)		
	B occupancy / A-3 Occupancy Allowable / Built / Allowable / Built Story (above grade): 2 / 1 / 1 / 1 Height: 40ft / 26 ft / 40ft / 26 ft Floor Area / Story: 18,000sf / 11,520sf / 12,000sf / 1,300sf Per 508.4.2 11520/18000 + 1300/12000 = 0.748 < 1.00	Table 503 508.4.2	OK
8.	**Fire Resistive Requirements** – Type V (fully-sprinklered)		

	Subject	CBC Reference	Notes
	• Structural Frame: 0 hrs • Bearing Walls o Exterior: 0 hrs o Interior: 0 hrs • Non-bearing Walls o Exterior: 0 hrs o Interior: 0 hrs • Floors: 0 hrs 3" concrete floor • Roof: 0 hrs 6x6 beam, 2x6 T&G Deck, 5/16" Plywood	Table 601 & 602 603.1 & 717.5	OK
9.	**Fire Resistive Separations**		
	• 1-hr Fire Barrier separations between B and A1 occupancy	508.4	
	• Incidental Use Areas o Mech / Boiler Room (031 & 032) – o Storage over 100 sf (036, 038, New storage north of Council) 1-hr separation or provide automatic fire extinguishing system – OK w/ Fully sprinklered bldg Smoke Partition (711; Full ht solid walls w/self-closing solid drs) is still required	508.2 508.2.5.2	OK
10.	**Exterior Walls**		
	• Opening Allowed in exterior walls		
	• Max area of exterior wall openings allowed: No Limit Fire Separation distance is > 30'	Table 705.8	OK
	• Parapets: not required – exterior wall is not required to be rated	705.11	OK
11.	**Interior Walls**		
	• Fire Barriers – separating B & A3 occupancy around fmr. Council Room	707	
	o Extend from the top of the floor 0 ceiling assembly below to the underside of the floor or roof sheathing. o Openings are limited to 25 % of length of wall o Openings are not limited to 156sf if fully-sprinklered o Opening protection <u>Wall Type</u> <u>Opening Rating</u> 1-hr shaft / exit enclosures 1 hour 1-hr fire barrier 45 min.	707.5 707.6 707.6 exc 1 Table 715	dr & glazing need upgrade to 45 min assembly
	• Shaft Enclosures – exit stairs, elevator hoist way	708	
	o Enclosures to have fire barrier with 1-hr fire resistance rating o Openings limits are not applicable for for exit enclosures o Opening protection – see above	708.4 707.6	Visually inaccessible, Need further investigation of shaft termination above ceiling
	• Corridors – Not req'd to be separated by fire or smoke partitions in A and B occupancy if fully sprinklered.	Table 1018.1	OK
	• Enclosed Elevator Lobby		

	Subject	CBC Reference	Notes
	o not required not mre than 3 stories in Group B	708.14.1	OK
	o not required for A where the building is fully-sprinklered	708.14.1 Ex 4	OK
12.	**Penetrations**		
	• Thru penetration fire stop systems protecting wall penetrations shall have an F rating equal to the rated wall	713.3.1.2	Visually inaccessible, Need further investigation
	• Thru penetration fire stop systems protecting rated horizontal assemblies shall have an F and a T rating of 1 hour or equal to the rated assembly	712.4.1.1.2	Visually inaccessible, Need further investigation
13.	Interior Finish	803.1	
	• Wall and ceiling finishes per ASTM E-84, Class A, B & C / NFPA 286		
	• Flame spread Req Area Served — Rating Exit Enclosures — B Corridors Serving A Occupancy — B Other rooms & corridors — C	Table 803.9	
	• Suspended acoustical ceilings per ASTM C 635 or C636	808.1.1.1	?
	• Class I or Class II interior floor finish req'd in all exit route	804.4.1	?
14.	**Automatic Sprinkler system** – per MEP analysis	903.2.1.3	OK
15	**Means of Egress**		
	• Occupant load Is established in Figure 1 based upon the area under consideration divided by an occupant load factor	Table 1004.1.1	OK
	• Egress width	1004	
	o Considered for floors individually	1004.4	OK
	o Stairways – factor .3 in o Other egress component – factor .2 in	1005.1	OK
	• Lighting	1006.2	Noted in Elect Section
	o 1 fc –at walking surfaces f exit access, exits, and exit discharge		
	o 10 fc – at walking surface of stairs during use		
	o Emergency power 90min min	1006.4	
	• Accessible means of egress	1007.1	
	o Accessible means of egress are not required in alterations to existing buildings	1007.1 Ex 1	OK
	• Doors		
	o Shall have a clear width of at least 32 in and no door leaf shall be greater than 48 in – all egress doors exceed required width	1008.1.1	OK
	o With limitations, egress doors may include:	1008.1.4	OK

	Subject	CBC Reference	Notes
	▪ Revolving doors ▪ Power-operated doors ▪ Access-controlled doors		
	o Panic hardware is required on exit doors from ▪ A occupancies ▪ Elect rooms rated over 1200 A – check with Electrical.	1008.1.10	OK
	• Stairways		
	o Min width is 44 in unless serving fewer than 50 people, except accessible egress stairs o Handrails may extend 4 ½" from stair wall into req'd clear width	1003.3.3 1012.7	OK
	o At accessible egress stairs, the stairs are req'd to have a min clear width between handrails of 48 in min width is 44 in unless serving fewer than 50 people, except accessible egress stairs	7.2.12.2.3	n/a per 1007.1 Ex. OK
	o Min headroom clearance is 80 in	1009.2	OK
	o Riser height ▪ Min 4 in, Max 7 in	1009.3	OK
	o Ramps (for exiting) o Max slope – 1:12 o Max cross slope – 1:48 o Max vert rise – 30 in o Ramps with rise greater than 6 in shall have handrails on both sides	 1010.3 1010.4 1010.8	 n/a OK
	• Handrails and guards		
	o Shall be provided on both sides of stairs and ramps with risers grater than 6 in	1009.10	Need further review
	o Intermediate handrails to be provided so that all parts of egress capacity on stairs and ramps area within 30 in of a handrail	1012.8	
	o Guards required on elevated surfaces with an adjacent droop more than 30 in	1013.1	
	o Guards to be 42 in high min	1013.2	
	o Not allow a 4 in diameter sphere to pass	1013.3	
	• Exit Signs		
	o Not required in rooms or areas requiring only one exit	1011.1	OK
	o Required at exit and exit access doors and other areas so that no place in a corridor is more than 100 ft from an exit sign	1011.1	OK
	o Exit sign may be either internally or externally illuminated	1011.2	OK
	o Illumination required to be on emergency power with 90 min duration	1011.5	OK
	• Exit Access		
	o Egress shall not pass through adjoining rooms except where such rooms are accessory to the area served, are not high-hazard, and provide a discernible path to an exit	1014.2	OK
	o When two or more exits are required, they shall be separated by one third the diagonal dimension of the space ▪ fmr Council – 2 exits provided ▪ Mech room – 2 exits provided	1015.1 1015.1 1015.3	 OK
	• Travel Distance		
	o Max allowable travel distance from any location to an exit		
	A3: 250 ft (w/ fully-sprinklered)	Table	OK

	Subject	CBC Reference	Notes
	B: 300 ft (w/ fully-sprinklered)	1016.1	
	• Common path of travel distance		
	o The max allowable common path of travel distance from any location to a point where occupants have a choice between two separate exit paths is limited to 100 feet for Group B and S	1014.3	OK
	• Corridors in sprinkler protected B or S may be non-rated	Table 1018.1	OK
	o Corridor width to be OL x 0.2 but not less than 44” o 36” with a required occupant capacity of less than 50	1005, 1018.2 1018.2 Ex	OK
	o Dead ends may not exceed 50 feet in B		
	• Min number of exits		
	o OL 1-500 – 2 exits required	1021	OK
	• Vertical Exit Enclosures		
	o Required rating – 1-hr o A max of 50% of exit capacity is permitted to egress through areas in the level of discharge w/ three conditions check (1.2 floor rating of 3” conc) o Stairs to the building permit counter should not be used for egress, to be “communicating stair”	1022.1 1027.1 Ex	Adjust exit sign accordingly
	• Exterior Exit Stairs and Ramps		
	o Exterior exit stairways can be used in a means of egress o Must be open at one side o Not required to have separation per exceptions	1026.2 1026.3 1026.6 Ex.	OK OK OK
	• Exit Discharge		
	o A max of 50% of exit capacity is permitted to egress through areas in the level of discharge w/ three conditions check	1027.1 Ex	OK
16	Roof Assembly and Rooftop Structures		
	• Roofing Classifications – Class A is required per City of Cupertino Ordinances	Table 1505.1	Classification of (E) roof assembly is unknown.
	• Existing roof replacement – more than 50% of the total roof area is replaced within any one-year period, the entire roof covering of every new structure, and any roof covering applied in the alteration, repair, or replacement of the roof of every existing structure shall be a fire–retardant roof covering that is at least Class C	1505.1.3	To be Class A per City of Cupertino Ordinances

Exhibit 4B - Accessibility for Existing Buildings

This Exhibit is prepared to summarize the required accessibility upgrade for the existing buildings per 2010 CBC.

	Subject	CBC Reference	Notes
1.	**Accessibility for Existing Buildings**	1134B	

	• Provisions apply to renovation, structural repair, alteration and addition to existing buildings
	• No decreased accessibility of existing buildings
	• Requirements shall apply only to the area of specific alteration structural repair of addition
	  o Primary entrance to the building
	  o Primary path of travel to the specific area of alteration, structural repair or addition
	  o Followings that serves the area of alteration, structural repair or addition
	  ▪ Sanitary facilities
	  ▪ Drinking fountains
	  ▪ Signs
	  ▪ Public telephone
		1134B.1
		
		1134B.2	

	Exceptions #1
	• Total construction cost does not exceed $128,410.86 (Jan 2010)
	• Unreasonable hardship is where exceeds 20% of the cost of the project without these features (disproportionate cost)
	• Access shall be provided to the extent that it can be within 20% of the cost of project
	• Priority is to these elements that will provide the greatest access following order
	  o An accessible entrance
	  o An accessible route to the altered area
	  o At least one accessible restroom for each sex
	  o Accessible telephones
	  o Accessible drinking fountains
	  o When possible, additional accessible elements; parking storage and alarms
	• 3 years duration of accumulated cost when there are many small work
	• Alterations after Jan 1992 shall be considered in determining if the cost of providing a accessible path of total is disproportionate
	Exceptions #2
	• n/a - Re: privately funded project
	Exceptions #3
	• Accessibility improvement work itself is limited to the actual work of the project
	Exceptions #4
	• Work limited to
	  o HVAC
	  o Re-roofing
	  o Electrical (not included switches and receptacles)
	  o Cosmetic work
		1134.2.1 Ex.	

	• Alternative uni-sex per floor will be permitted if technically infeasible	1134B.2.2	

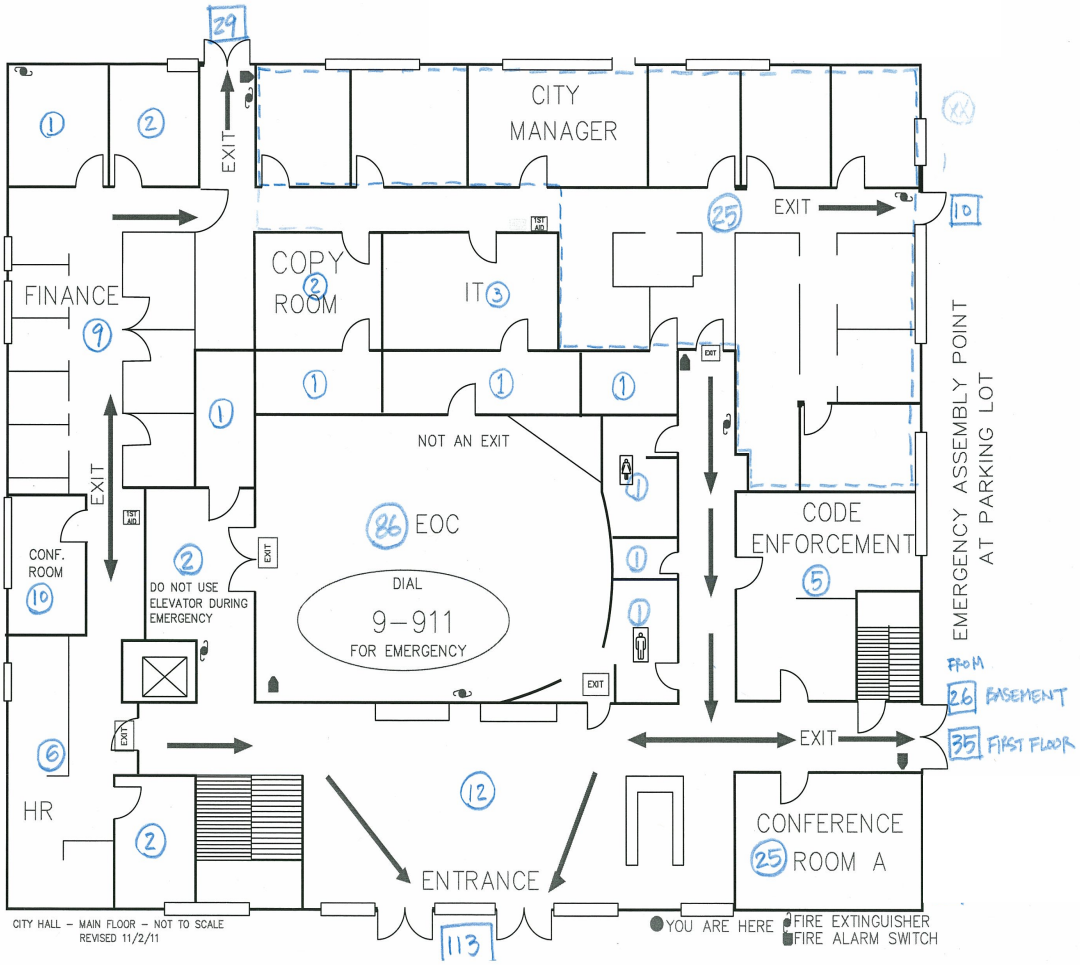

Exhibit 4C First Floor Occupancy Load and Exit Diagram

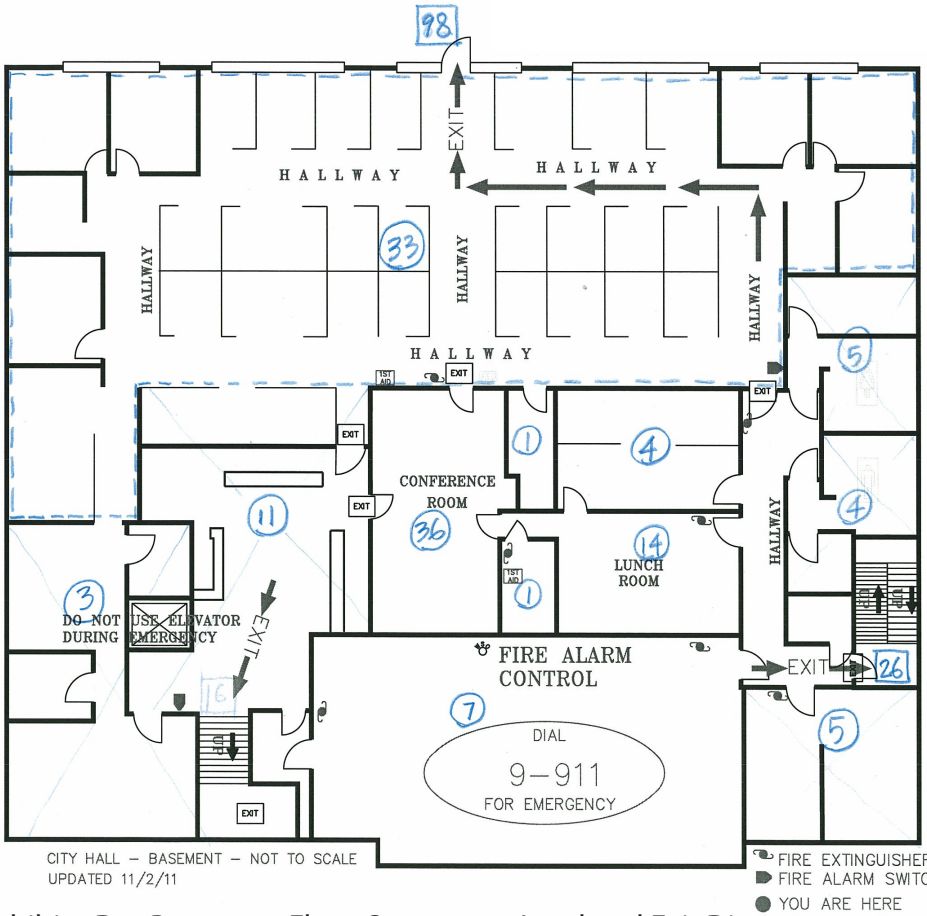

Exhibit 4D Basement Floor Occupancy Load and Exit Diagram

5.0 Mechanical, Electrical, Plumbing, Fire Protection Analysis

5.1 Scope

The main goal of this report is to evaluate the MEP equipment and infrastructure serving the Cupertino City Hall and the EOC. The evaluation of the existing MEP systems is being performed according to the following overall facility improvement alternatives:

- Alt #1 No Upgrade - Relocation of EOC
- Alt #2 Min Seismic Upgrade – Duct, pipe, and equipment seismic support (per I factor change)
- Alt #3 Moderate Upgrade - Alt #2 items, Fire & Life Safety upgrade to meet 2010 CBC, MEP upgrade to meet operation requirements as Essential Services Facilities, Energy efficiency to meet performance of the existing building
- Alt #4 Replacement – New Building

5.2 Applicable Codes and Standards

Codes:

State of California Code of Regulations (CCR).

2010 California Building Code.

2010 California Electrical Code.

2010 California Mechanical Code.

2010 California Plumbing Code.

2010 California Fire Code.

2010 California Energy Code, Title 24 – 2008

2010 California Green Code, CALGreen

City of Cuppertino Municipal Code

Standards:

ASHRAE Standard 62.1-2010 – Ventilation

ASHRAE Standard 55-2010 – Thermal Comfort

ASHRAE Standard 90.1-2010: Energy Standard for Buildings except Low-Rise Residential Buildings

AMCA – Air Movement and Control Association International, Inc.

ANSI – American National Standards Institute.

ARI – Air Conditioning and Refrigeration Institute.

SMACNA – Fire and Smoke Damper Installation Guide.

SMACNA – Guidelines for Seismic Restraints of Mechanical Systems.

SMACNA – Standards for Duct Construction.

NEMA – National Electrical Manufacturer's Association.

NEMA - National Electrical Manufacturers Association.

NECA - National Electrical Contractors Association.

IEEE - Institute of Electrical and Electronic Engineers.

UL – Underwriters Laboratories.

NFPA - National Fire Protection Association.

NFPA 90A – Air Conditioning and Ventilating Systems.

NFPA 101 – Life Safety Code.

NFPA 13 – Standard for the Installation of Sprinkler Systems.

5.3 Mechanical HVAC Systems

5.3.1 Heating and Cooling Systems

The HVAC system for the Cupertino City Hall consists of a water-cooled chiller plant (70 Ton) with the cooling tower located on the roof and the chiller located on the lower level. A gas fired non-condensing boiler generates heating hot water. The boiler is from the 1965 original building construction and is well past its life time. Both of these systems provide chilled and heating hot water to the Air Handling Units (AHU's) located at the lower level that heat and cool the building through a VAV reheat design. All equipment was installed in ~1986 and is now 26 years old and at the end of its useful life. While the equipment appears to be well maintained, and the AHU's have been retrofitted with VFD's, the building operates inefficiently at a rate of $3.63/SF-Year and 106 kBTU/SF-Year (based on 2009 utility bills). A modern, energy efficient office building operates at $1.50/SF-Year and 50 kBTU/SF-Year.

The Cupertino City Hall has a small server room that is cooled by split system AC units, with air-cooled condensers located on the roof. The AC units for the server room appear to have been installed more recently that the rest of the HVAC equipment.

Figure 5A (Closed-Circuit 70 Ton Cooling Tower)

Figure 5B (Water-cooled 70 Ton Chiller)

In the lower level mechanical room, maintenance clearances and an exit pathway may not exist throughout the space. In addition, the combination of chiller, gas boiler, electrical gear, and generator equipment do not meet today's code

requirement to have separate rooms for each of these pieces of equipment. The room is also not equipped with a refrigerant detection and exhaust systems currently required for chiller rooms, and the combustion air ducts in the boiler room need to be routed to an outdoor location.

Figure 5C (Gas Fired Boiler)

Figure 5D (Server room AC unit (1 of 2))

Recommendations

Alt #1 No Upgrade: No work.

Alt #2 Min Seismic Upgrade: Upgrade all duct, pipe, and equipment anchorage and seismic attachments to building structure. Replace duct and pipe connections with flexible joints where required.

Alt #3 Moderate Upgrade: Replace existing HVAC equipment with smaller, more efficient, better comfort equipment design.

Alt #4 Replacement: New HVAC systems for new building.

5.3.2 Ventilation

The existing AHU's air intake is located in an airwell that does not provide good air quality air for building occupants. The amount of fresh air brought into the building is not enough by today's standards and codes, and should be increased and improved.

Recommendations

Alt #1 No Upgrade: No work.

Alt #2 Min Seismic Upgrade: No work.

Alt #3 Moderate Upgrade: Obtain fresh air from a different location (i.e. roof louvers) and increase amount of fresh air.

Alt #4 Replacement: New HVAC systems for new building.

5.3.3 Controls

The existing control system is and outdated pneumatic system that does not allow for remote monitoring or the implementation of common energy efficiency strategies in modern buildings. In addition the pneumatic controls system requires more maintenance to upkeep the compressor, air filter, and other mechanical systems required to run the system.

Recommendations

Alt #1 No Upgrade: No work.

Alt #2 Min Seismic Upgrade: No work.

Alt #3 Moderate Upgrade: Replace existing system with modern DDC controls system.

Alt #4 Replacement: New HVAC systems for new building.

5.4 Plumbing Systems

5.4.1 Plumbing Fixtures

The existing plumbing fixtures are functioning and meet current code.

Recommendations

Alt #1 No Upgrade: No work.

Alt #2 Min Seismic Upgrade: No work.

Alt #3 Moderate Upgrade: No work.

Alt #4 Replacement: New plumbing systems and fixtures for new building.

5.4.2 Domestic Water System

The domestic water piping appears to be copper. An AO Smith boiler gas fires water heater provide domestic hot water to all building plumbing fixtures. The water heater appears to have been installed with the last 5 years.

Recommendations

Alt #1 No Upgrade: No work.

Alt #2 Min Seismic Upgrade: Upgrade all plumbing pipe and equipment anchorage and seismic attachments to building structure.

Alt #3 Moderate Upgrade: Replace existing plumbing pipe (cold and hot water). Replace existing water heater with a high efficiency heat pump water heater.

Alt #4 Replacement: New plumbing systems and fixtures for new building.

5.5 Fire Protection Systems

5.5.1 Fire Sprinkler system

The bulling is fully sprinklered and testing station appears to be in proper operating condition given the test log dates.

Recommendations

Alt #1 No Upgrade: No work.

Alt #2 Min Seismic Upgrade: Upgrade all fire protection pipe and equipment anchorage and seismic attachments to building structure.

Alt #3 Moderate Upgrade: Replace existing pipe and sprinkler heads inside building to match renovation intent.

Alt #4 Replacement: New fire protection system for new building.

5.6 ELECTRICAL

5.6.1 Electrical Systems Summary

This report is an evaluation of the Cupertino Essential Services building electrical systems, located at Rodrigues and Torre Avenue, in Cupertino, California. The data used to develop this report was collected during one site visit conducted on February 15, 2012, as well as interviews of the staff working at the building. During the field visit, we observed the site conditions and systems exposed to visual observation. No testing or destructive investigation was performed.

Additional information about the building's power distribution system was gathered by reviewing the building plan sets made available in PDF format. The walk through was intended to evaluate the effectiveness of the existing Electrical systems.

This report provides an overview of existing conditions of the electrical system, identification of potential weaknesses in the systems and suggested improvements to the systems.

All major electrical equipment appear to be original and in working condition. The main distribution equipment is nearly 47 years old and has past its expected useful life. The generator is nearly 34 years old and has passed its useful life.

The existing light fixtures are in serviceable condition. As a possible energy saving project, the building management may want to consider replacing the existing lights with more energy efficient T5, T8, LED, and compact fluorescent fixtures. Another energy saving technique would be to upgrade the lighting control system and incorporate occupancy sensors and/or daylight sensors in addition to using time clock controls.

The main service to the City Hall space is a rated at 1000A at 208V, 3-phase system and provides power for a load density of approximately 12.5 W (or 15.5 VA, using 0.8 power factor) per square foot for the entire building, which is adequate for the current loads.

5.6.2 Assessment of Existing Conditions

Normal Power

Utility Transformer

The building is fed from a utility transformer (PG&E) located outside the building.

Figure 1E (PG&E Transformer)

The secondary power from the transformer to the main switchboard is provided via (4) sets of 4" underground conduits.

The main switchboard is rated 1600A, 208/120V, 3-phase, 4-wire and is located inside the main electrical room.

General Condition

The transformer belongs to PG&E and was recently upgraded. It appears to be in good working condition.

Code Issues

No code issues.

Recommendation:

Alt #1 No Upgrade: No work.

Alt #2 Min Seismic Upgrade: Confirm with PG&E if the new transformer meets current Seismic code

Alt #3 Upgrade: No work. Transformer was recently upgraded.

Alt #4 Replacement: Transformer was recently upgraded.

Main Switchboard

The Main Switchboard is rated at 2000A, 120/208V, 3 phase, 4 wire with a 1600A main breaker manufactured by Industrial Electric Manufacturing, Inc. The main switchboard is feeding a distribution panel via a 1,000Amp breaker. This switchboard serves the City Hall.

The table below summarizes the load on each panel.

Table 5.1 (Panel Load)

Name	Size	Load Serving
MSB	2000A Section	Library, Future Public Safety Building, ATS for Generator
Panel DP	1000A Section	PANEL F, PANEL C, PANEL A, PANEL E, PANEL B, PANEL D, PANEL G (MCC) CHILLER, Future E.O.C. Panel
G (MCC)	600A	Pump 1, 2, 3, 4, 5, 6, Cooling Tower Fan A/C Fan Basement A/C Fan 1st Floor A/C Fan 1st Floor Remote Radiator Fuel Pump

Figure 5F (Main Switchboard)

General Condition

The main switchboard appears to be of the original construction and in working condition, although past its useful life. In general, the switchboard is adequately sized to support the existing loads.

Code Issues

Maintenance clearances and exit pathway are required to be investigated around the 1600 Amp electrical panel. Electrical panel is over 1200 Amps, thus requiring either (A) 2 exits with panic hardware, or (B) 1 exit door with panic hardware but a clear and unobstructed path from Panel to exit door, or (C) a single exit door with panic hardware but double the required working space around the Panel.

Recommendation

Alt #1 No Upgrade: No work.

Alt #2 Min Seismic Upgrade: Provide adequate support suitable for the seismic and earthquake condition.

Alt #3 Upgrade: The existing main distribution switchboard shall have regular preventative maintenance procedure per NETA (National Electrical Testing Association) standards.

Megger test existing feeders.

Test overcurrent protective devices in the switchboard for proper operation.

Alt #4 Replacement: In order to ensure reliable power distribution to the building and reduce service needs in the future, we recommend the main switchboard be replaced with a new model.

5.6.3 Emergency Power

The emergency power system consists of a generator rated at 125KW, 208/120V and is located inside the main electrical room. The fuel tank, with 1000 gallon capacity, is located outside the room. In the event of a power outage, the generator provides power to the panel DP via a 400A automatic transfer switch (ATS) located in the main electrical room. The generator also provides power to the Chiller but the pump must be "jump" to move chilled water. The generator does not serve the existing elevator. or the chiller, as confirmed by discussions with facility personnel.

Figure 5G (Indoor Generator)

General Condition

The generator was installed in 1978, making it nearly 34 years old, which has exceeded its useful life. It appears to be operational, as confirmed by facility personnel.

Code Issues

No code issues

Recommendation

Alt #1 No Upgrade: No work.

Alt #2 Min Seismic Upgrade: Provide adequate support suitable for the seismic and earthquake condition.

Alt #3 Upgrade: The generator should at the minimum be tested per manufacturer's recommendation to confirm its operation, and the batteries tested to confirm capacity and condition as well.

Alt #4 Replacement: The existing generator is currently loaded to its full capacity. In order to increase reliability and provide assurance of operation in the future, it is recommended that the generator be replaced with a new unit. We also recommend upsizing the generator to 175kW or above and its associated automatic transfer switch to 500A or above to provide capacity to serve additional loads such as the elevator and any future loads.

5.6.4 Grounding System

The service ground was not readily visible at the Main Switchboard. Feeder and branch circuit ground conductor sizes were not verified. Bonding to the building mechanical systems was not confirmed.

General Condition

No hazard has been identified with the current grounding system.

Recommendations

Alt #1 No Upgrade: No work.

Alt #2 Min Seismic Upgrade: No work

Alt #3 Moderate Upgrade: The grounding electrode resistance should be verified and supplemented as needed with additional ground rods. The mechanical and plumbing system bonding should be verified.

Alt #4 Replacement: Provide new grounding system to meet current code.

5.6.5 Lighting

Interior Lighting

The existing lighting system consists mostly of recessed and pendant mounted fluorescent linear T8 32/26 watts source fixtures, with additional recessed incandescent downlight fixtures.

Illumination levels were observed to be uniform and adequate in all common area corridors, offices, work areas, and equipment rooms. Emergency exit signs are provided throughout the building according to Code. Emergency and egress lighting is provided by selected normal fixtures fed by emergency circuits from the generator.Exit lights are LED with battery back-up. Bug-eye type supplemental emergency fixtures was provided in the boiler room.

General Condition

Light fixtures appear to date back to the original construction and are in fair condition, with no operational issues.

Code Issues

Perform functional testing of all existing emergency lighting and measure light levels for code compliance.

Install additional emergency lighting as necessary after the functional testing of the existing installation to provide current code required minimum egress illumination.

Recommendations

Alt #1 No Upgrade: No work.

Alt #2 Min Seismic Upgrade: Provide adequate support suitable for the seismic and earthquake condition.

Alt #3 Moderate Upgrade: If improvements to the lighting system are to occur, the existing outmoded T12 source fixtures should be replaced with new higher efficiency T8, T5 or LED source fixtures to reduce energy usage. Newer fixtures will also provide better light distribution and higher uniformity to increase occupant comfort. Any existing incandescent source fixtures should be replaced with higher efficiency compact fluorescent source fixtures.

Alt #4 Replacement: Similar to Alternative 3

5.6.6 Lighting Controls

The existing general lighting is controlled by local switches located within the corridors and at the each room. Lighting in the Kitchen, bathrooms, stairwell and conference room "A" is controlled by motion sensors. Relay control panels provide time schedule control for corridors and general areas, and dimming equipment provides dimming functionality to meeting rooms.

Recommendation

Alt #1 No Upgrade: No work.

Alt #2 Min Seismic Upgrade: Provide adequate support suitable for the seismic and earthquake condition.

Alt #3 Moderate Upgrade: Ceiling mounted occupancy sensors can be added to individual rooms to automatically switch on one-half or all of the fixtures when occupancy is detected and switch off all fixtures when no one is present, to take advantage of irregular occupancy intervals. A time delay of 30 minutes or less can be used to minimize nuisance switching.

To meet current code, reduce energy use, and increase the effectiveness and flexibility of the lighting installation, it is recommended that automatic and multilevel lighting controls be installed in every space.

Alt #4 Replacement: As the perimeter office areas receive good access to daylight, ceiling mounted photosensors may used to provide automated dimming of the perimeter fixtures according to the amount of daylight available, further reducing the lighting load. The existing fluorescent source fixtures within the

perimeter daylight area will need to be provided with dimming ballasts in order to integrate with the photosensor input.

In addition, both occupancy sensing and daylight harvesting through photosensors can be employed together. This will keep lights off when the space is unoccupied and also dim the light output when sufficient daylight is available in order to maximize the energy saving potential.

Appendix

Meeting Minutes

By:	Haji Ishikawa	Date:	2/15/2012
Meeting Date:	2/14/2012	Project Name:	Cupertino City Hall Essential Services Facility Study
Meeting Time:	10am - 1pm	Project No.:	491204.000
Meeting Location:	Cupertino City Hall Conference Room C	Attendees:	*See Attached Sign-In Sheet*
Next Meeting Date:	2/21 1:30pm-2:30pm Conference Call		

Discussion

Items in **bold** are new, items in *italics* are revised.

Item No.	Description	Responsibility	Status
Introductions and Scope of Work			
2012-02-14.01	Goal of the study is to evaluate Essential Facilities status of the current Emergency Operation Center (EOC) in the City Hall can be maintained by: 1) Upgrade the building to meet the code requirement, OR 2) Relocate EOC out of the City Hall If any options are desirable the City will be incorporating into the master plan.	Information Only	n/a
2012-02-14.02	Carmen (Project Manager, Public Works) and Haji (Perkins + Will) will be the day-to-day contacts between the City team and the consultants team.	Information Only	n/a
Review of Reference Documents			
2012-02-14.03	3 CDs with the record pdf drawings from the 1965, 1987 construction, and the current exit plan diagrams were handed to the consultant team. P+W to share with the consultants team.	P+W	Closed 2/15
2012-02-14.04	There are additional retrofit work after 1987 renovation: • Council Room area, Main Floor • NW Open Office, Main Floor • SW Storage area, Basement Consultants to refer to the current exit plans for these revisions.	Information Only	n/a

Item No.	Description	Responsibility	Status
Deliverables			
2012-02-14.05	Priority in architectural analysis will be items associated with Fire & Life Safety.	Information Only	n/a
2012-02-14.06	The City intends to bring Nova Partners to the project to provide cost estimating service.	Information Only	n/a
2012-02-14.07	The City identified the following additional information and concerns for the consultants team to better understand the context. 1) The wall opening near west corridor on the main level has rating issue. It affected the occupancy certificate of the 1987 renovation. 2) The weight of the tile roof is not helping the structural capability. 3) The City is looking for clean and efficient means of achieving what is required. 4) The operation cost of the current building is substantially high. Although a specific energy savings target has not been established, the City is interested in improvement. The City will share the energy study report for the MEP consultants to review. 5) The City experiences temperature control difficulty for the occupants, especially during the transition of the seasons. Some occupants use portable space heaters. 6) Adaption of a new accessibility code is forthcoming. Concerns on discrepancies between the federal (Dept. of Justice) standard and CBC Ch. 11 were discussed. For this study the consultants team will use **2010 CBC**. 7) In addition to the study based on **2010 CBC**, the consultants team will identify the foreseeable potential issues that can be effected by the 2013 CBC adaption. 8) Electrical use is currently maxed out. The 1987 renovation gave some improvement. 9) The City shared the idea of installing solar panels on the roof. 10) PG&E has upgraded the transformer serving the building. 11) The current plan does not provide visual access to the most heavily used areas for the visitors. A receptionist is required at the lobby. 12) The City is looking for a holistic solution if EOC needs to be relocated. 13) In order to have a new City Hall the current building needs to be either deficient or unfixable. 14) The current parking satisfies only 54% to 84% of the demand. 15) IT related space needs expansion and improvement in function. 16) The server room at NW corner provides capacity for buildings beyond the City Hall. 17) Solid proposal /options are required to be developed before submittal to the council. 18) The City will provide the environmental hazard report to	Information Only	n/a

Item No.	Description	Responsibility	Status
	the consultant team. 19) The City experienced a flood problem in the sunken terrace area and the basement; however the existing sump tank should be sufficient.	Information Only	n/a
Schedule and Milestones			
2012-02-14.08	The proposed milestone works with City's subsequent activities. • 2/14 (Tue) Site Visit and kick-off Meeting • 2/21 (Tue) Clarifications Conference Call • 2/28 (Tue) Issue Electronic Rough Draft • 3/5 (Mon) Rough Draft Comment Response Conference Call • 3/9 (Fri) Final Report • 3/13 (Tue) Cost Estimate Meeting (to be confirmed)	Information Only	n/a
Other Issues			
2012-02-14.09	City encourages the consultants' team to lead the process for delivery of the report.	Information Only	n/a

End of Document

Sign In Sheet

Organization	Name	Title or Role
PERKINS WILL	HAJI ISHIKAWA	SENIOR PRO) ARCHITECT
City of Cupertino	Terry Greene	City Architect
City of Cupertino	Carmen Lynaugh	Project Manager
CITY OF CUPERTINO	LARRY SOMARCIA	SENIOR BUILDING
	ALBERT SALVADOR	BUILDING OFFICIA
	ARBOLD HOM	PLAN CHECK ENGR
PAE Consulting Engineers	Hooshang Pakzadan	Associate - Electrica
City of Cupertino	Timm Borden	Director of Public Wo.
CITY of CUPERTINO	CHRIS ORR	FACILITIES SUPERVISOR
11	Rick Kitson	Public & Env Affairs D
PAE CONSULTING ENGINEERS	MARCO ALVES	MECHANICAL ENGIN
AKH STRUCT. ENG. INC	TIM HYDE	PRESIDENT
PERKINS+WILL	Karen Alschuler	Principal
PERKINS+WILL	Susan Seastone	Senior Project Manager

From: Ishikawa, Haji
Sent: Tuesday, February 21, 2012 6:05 PM
To: Terry Greene (TerryG@cupertino.org) (TerryG@cupertino.org)
Cc: 'hyde@akhse.com' (hyde@akhse.com); Hooshang Pakzadan (hooshang.pakzadan@pae-engineers.com); Marco Alves (marco.alves@pae-engineers.com); Seastone, Susan; carmenl@cupertino.org
Subject: Cupertino City Hall: Target Alternatives

Terry,

Below is the key scope items of the four different alternatives that we discussed in the teleconference today. I would like to share this with the consultants team as a target to sort out our recommendations after the analysis is done. Please let us know if you have any comments. For the Alt #4, my assumption is a new construction after demolition of the existing building. Please clarify.

Facility Improvement Alternatives

Alt #1 No Upgrade

- Relocation of EOC

Alt #2 Min Seismic Upgrade – with items triggered by I factor improvement

- Replacement of roof tile – as maintenance
- Possible adjustment of roof profile & equipment screen
- Connection of collector beam and concrete shear wall
- Additional concrete wall to the main level, if req'd. (should not affect floor plan and egress)
- Ducts & equipment seismic support (per I factor change)
- 20% of cost for ADA upgrade

Alt #3 Moderate Upgrade

- All Alt #2 items
- Fire & Life Safety upgrade to meet 2010 CBC
- MEP upgrade to meet operation requirements as Essential Services Facilities
- Energy efficiency to meet performance of the existing building
- ADA upgrade

Alt #4 Replacement –New Construction

- Meet all the current codes
- Improve architectural and planning issues

Thank you,
Haji

Haji Ishikawa, AIA, LEED AP BD+C

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From: Ishikawa, Haji
Sent: Thursday, February 16, 2012 10:37 AM
To: Marco Alves (marco.alves@pae-engineers.com); 'hyde@akhse.com' (hyde@akhse.com)
Cc: Seastone, Susan
Subject: Cupertino City Hall: Additional Information

Marco, Tim,
After the Tuesday meeting Terry Greene mentioned his expectation of the range of recommendations. We need to further get into the study before deciding the format, but I'd like to share his input with you.

1. Do nothing – I understood this means relocation of the EOC
2. Min renovation – Likely limited to structural scope
3. Moderate renovation – Terry hopes that this doesn't trigger full ADA upgrade (by exceeding $129,000 construction cost). But from structural point of view Tim thinks even the option #2 min renovation could exceed the threshold.
4. Substantial Renovation – I understand this would improve most of the City's concerns expressed in the meeting (and beyond) to make the building more efficient and functional.

We will be issuing the minutes from Tuesday kick-off this shortly. I have also started a simple architectural code summary of the existing building. I will share with both of you by the end of the day today.
Thanks,
Haji

Haji Ishikawa, LEED AP BD+C

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