APPENDIX G

STRUCTURAL ENGINEERING REVIEW

INTRODUCTION AND SUMMARY

Biggs Cardosa Associates Inc. has prepared this preliminary structural investigation regarding the rehabilitation and reuse of the La Bahia complex located at 215 Beach Street in Santa Cruz, California. Biggs Cardosa Associates has over 25 years of experience in structural retrofits of historic buildings, many of which are located in Santa Clara and Santa Cruz Counties. Our experience includes retrofit and restoration of unreinforced masonry, wood, steel and concrete structures. Examples of our projects include the Jose Theater, St. Josephs Cathedral, the Hayes Mansion, the Fallon House, the Metropole Building, the Montgomery Hotel, the DeAnza Hotel, the Letitia Building, the Security Building and the First Unitarian Church all of which are in San Jose, California.

The purpose of this report is to serve as a supplement to an Environmental Impact Report compiled by Strelow Consulting. It provides information regarding the structural conditions and requirements for the existing buildings. It is our understanding that there are two alternative proposed; full preservation of all buildings and partial preservation including only some of the buildings. The information provided below applies to both alternatives.

ASSUMPTIONS

The information in this investigation is based on the following:

- Two site visits were performed to view the exterior of the building. Observations were limited to what was visible at the time of our site visit. Demolition of existing finishes to verify existing construction and testing of existing materials was not performed.
- Original drawings by William C. Hays. Architect, some sheets dated 3/11/26, Sheets 2 through 9
- Geotechnical Investigation by Pacific Crest Engineering, Inc dated January 28, 2008
- Geotechnical Update Report by Dees & Associates, Inc. dated October 5, 2013
- Liquefaction Mitigation Alternatives Letter by Dees & Associates dated December 3, 2013
- Telephone conversation with Gary Taylor with Hayward Baker, Geotechnical Construction.
- City of Santa Cruz Initial Study / Environmental Checklist Draft dated July 1, 2013
- Historic Resources Technical Report by Architectural Resources Group Draft dated December 18, 2013

The following is a summary of our observations of the structure, code requirements, deficiencies found and recommendations of structural modifications to the existing structures.

BUILDING DESCRIPTION AND CONDITION

The project was constructed in the late 1920's on the site which slopes from the northwest to the southeast. The subject project consists of two and three story wood-framed apartment buildings situated around two outdoor courts. According to original architectural drawings, the five separate buildings that make up the complex are organized into six divisions (Blocks) used for clarification and design. The apartment buildings face Westbrook Street to the East and Beach Street to the South. Surface parking and a backfilled swimming pool are located on the northern portion of the site.

The structure's highest point is the bell tower that sits approximately 53' above Beach Street level. The 1st, 2nd and 3rd floor heights are at approximately 13', 23' and 32' respectively. The square footage of the footprints and the number of stories of the divisions are as follows:

Block Number	Approximate Footprint	Number of Stories
1	1,930 square feet	2
2	2,280 square feet	1
3	2,490 square feet	3
4	4,250 square feet	2
5	2,830 square feet	2
6	2,860 square feet	2

Interior walls are 2x4 stud walls with wood lath and plaster on each face. Exterior walls are 2x6 stud walls with wood lath and plaster on the interior face and plaster over what appears, on the drawings, to be wood sheathing on the exterior face. The drawings do not indicate if the wall sheathing is straight or diagonal. The floor framing is constructed of straight sheathing over 2x8 joists. The roof is assumed to be constructed of wood carpenter's trusses with spaced straight sheathing supporting the roof tiles.

The buildings are supported at their perimeters by unreinforced concrete footings extending approximately 12" below grade. Buildings are supported at the interior by 4x8 girders spanning to 4x6 posts that rest on interior concrete spread footings.

Structural Drawings include no information with regards to the intended lateral load resisting system. As constructed, the floors and roofs are serving as diaphragms and the interior and exterior walls act as the shear walls. The drawings show no connection from the walls to the foundations and no reinforcement in the footings.

The building is in poor condition and appears to be minimally maintained. The exterior plaster has areas with cracks, some of which appear to be the result of foundation settlement. There are signs of water infiltration and plumbing leaks which have likely resulted in dryrot in some of the structural members.

DESIGN CRITERIA AND EXPECTED BUILDING PERFORMANCE

At the time this report was written, the currently adopted code was the 2010 edition of the California Building Code (CBC). The State of California is intending to adopt the 2013 CBC on January 1, 2014. We assume that design work on this project be submitted for City plan check review after January 1, 2014, therefore, our evaluation is based on the 2013 CBC.

Vertical Load Resisting System

In existing buildings, where there is no increase in dead or live load and the members show sign of distress, the Vertical Load Resisting System is considered to have "withstood the test of time" and is assumed be adequate. The proposed project will likely include modifications that will require strengthening of the vertical load resisting system due to change in load. Also, the condition of the building indicates that there may be damage to the existing wood framing. Therefore, upgrades to the vertical load resisting system will likely be required under the following conditions:

1. Where members are damaged due to pests or moisture. Depending on the severity of the damage, the members can be repaired or replaced to match the original member size.
2. Where there are signs of damage or distress due to over loading. For example cracks and checks in beams, bowing columns and sagging floors. In this case the existing members should be analyzed and strengthened or replaced as required.
3. Where load is increased. For example, if gypcrete is added to the floors or if a heavier roofing material is added to the roof. In this case the existing members should be analyzed and strengthened or replaced as required. Conversely, load may be reduced to compensate for additional load, for example, by removing the existing wood lath and plaster on the ceiling and replacing it with gypsum board or installing a lighter roof material.
4. When a change in use requires the building to be designed for a live load greater than would be required for the original building use. For example if a guest room is changed to an office or a meeting room. In these cases the existing members should be analyzed and strengthened or replaced as required. Additional support members will likely be required where there is an increased live load.
5. Where the Vertical Load Resisting System is altered. For example where a bearing wall is removed to increase room size. In this case the existing members should be analyzed and strengthened or replaced as required. Additional support members will likely be required where the vertical load system is altered.

The retrofit and reuse of all or portions of the existing La Bahia building will likely be impacted by all five of the above items. Until the existing framing is exposed and a final building plan is developed, the extent of each item cannot be determined.

Although the foundation system of the buildings is unreinforced and does not meet the requirements of the current code, much of the system appears have to performed adequately for the life of the building to date. There are signs of settlement or lateral movement in some areas

indicated by large diagonal cracks in the exterior wall plaster. With our limited access, we did not confirm that the foundations were damaged at these locations. Due to the lack of reinforcement, some damage can be expected where the building has settled or moved.

The analysis of existing members would be done using the current edition of the California Building Code (CBC). All new members would be designed to meet the requirements of the current edition of the CBC.

Lateral Load Resisting System

Design criteria for the lateral analysis of existing buildings may vary based on the intent of the building owner and requirements of governing agencies. Generally accepted guidelines for analysis include the most current edition of the California Building Code (CBC) as the most stringent criteria. Performance goals of the current California Building Code for lateral loads include mitigation of life safety hazards as well as damage control.

When evaluating existing buildings and seismic retrofit is not mandatory, it is not uncommon to reduce the performance goal level to include mitigation of life safety hazards only. Evaluating the building for life safety only would reduce the required load level for which the building would be evaluated. The reduced load could be established using the California Historical Building Code (CHBC) which allows current evaluation recommendations set forth by the Federal Emergency Management Agency (FEMA), the American Society of Civil Engineers (ASCE) or American Technology Council (ATC) and/or a benchmark version of the Uniform Building Code (UBC), etc.

There are three conditions that would either require the buildings be brought up to a performance level greater than life safety or would require particular elements of a building to be retrofitted. The first condition is if there is a proposed change in occupancy to an occupancy with a higher relative hazard level. For example if the current classification is residential and the use of the building is changed to assembly, a current code retrofit would be required. The second condition is regarding increasing the weight of the building. If the added load causes the demand/capacity ratio of any of the existing lateral load resisting elements more than 10% from the original demand/capacity ratio, it is required that the deficient element meet current code. The third condition is regarding decreasing the lateral load capacity of the building. Examples of this would be removing existing walls and increasing the size of existing window or door openings. If the reduced capacity causes the demand/capacity ratio of any of the existing lateral load resisting elements more than 10% from the original demand/capacity ratio, it is required that the deficient element meet current code.

We discussed the City of Santa Cruz's requirements with representatives of Mark Ellis, the Chief Building Official. Based on these discussions, the City will likely accept a minimum life safety seismic retrofit of the building provided that there is no use change, as described above. The impact of any increased load or decreased capacity would need to be evaluated to meet code.

A consideration that should be taken into account when deciding what code the building should be retrofitted to, is the industry standard of care for the use of the building. We understand that the currently proposed project is a hotel with facilities available for rent. If, in the future, the La Bahia project is planned as a for-sale residential building managed by a homeowners association,

it is considered by the construction industry to be at a high risk for future litigation. If this is the case, the industry standard of care is to retrofit the building to meet the requirements of current code for life safety and damage control.

BUILDING DEFICIENCIES

The following building deficiencies are based on our experience with the rehabilitation of buildings similar to the La Bahia complex and on data provided in the Geotechnical Investigation:

1. The majority of the existing roof and floor diaphragms are not adequate to resist lateral loads. The diaphragms may be adequate in some locations where interior shear walls are spaced close together. The roof and floor diaphragms are not adequately tied between adjacent buildings and at reentrant corners.
2. Existing shear walls and foundations are not adequate to resist lateral loads and overturning forces.
3. Existing foundations do not meet current code and are not adequate to resist settlement and movement from liquefaction and liquefaction induced lateral spreading
4. The connection of the shearwalls to the concrete foundation is not adequate.
5. Parapets, exterior balconies and ornamentation are not adequately anchored to the studwalls.

RECOMMENDATIONS: RETROFIT OF EXISTING STRUCTURE

Based on the deficiencies noted in the previous section, the following modifications to the buildings' structural systems will be required to meet current code:

1. Remove existing roofing and roof sheathing and install plywood over the existing roof framing. Where the floor sheathing does not have adequate strength or is removed for access during construction, replace with floor plywood to meet the requirements of current code. Install additional beams, blocking and straps at reentrant corners and at collectors to tie buildings together. Some seismic separations might be used in lieu of tying the buildings. For example, a separation might be installed at the walkway between Blocks 1 and 6.
2. Install plywood over the existing studs at required shear wall locations. This can be done on the interior and/or exterior of the exterior studs and at selected interior stud walls. Install holdowns at the ends of shear walls, and strapping where required at perimeter of openings. Interior shear walls will likely require new concrete footings.
3. Install anchor bolts to connect the shear walls to the foundation.
4. Add parapet braces, and anchor architectural elements as required.

In order to mitigate life safety only, all of the items above will be required but to a lesser degree.

The Geotechnical Investigation and the Update indicate that this site has the potential for

liquefaction and lateral spreading in the event of an earthquake. The existing foundation will not perform adequately when subjected to the movement described in the Investigation. Therefore, modifications to the foundations will be required. The strengthening of the existing foundations and all new foundations will be designed to meet the requirements of the Geotechnical Investigation and the current CBC.

The Geotechnical Update indicates that the proposed new buildings can be supported on drilled piers or on conventional foundations supported by an approved ground improvement treatment such as vibro-displacement stone columns. If vibration of the existing buildings is a concern, deep soil mixing or another low vibration ground improvement method can be used as an alternative.

Ground improvement is required at the existing buildings as well. If the buildings are required to meet current code, the existing foundation will need to be replaced. To do so, the buildings will need to be shored, elevated and braced to install ground improvement and the new foundation system.

If a life safety retrofit is performed, the existing footings that are in good condition and are of adequate strength can be underpinned. Where the footings need to be replaced, the new footings can be supported on ground improvement. A combination of jet grout underpinning under the existing footings and compaction grouting under new footings can be performed to mitigate liquefaction. Based on our conversation with Hayward Baker, both of these methods can be performed with little vibration. In order to perform the ground improvement for the life safety retrofit, it is likely that the majority of the existing first floor of the buildings will need to be removed.

CONCLUSION

In conclusion, the existing buildings at the subject project will require some level of seismic and foundation upgrade. The extent of upgrade will depend on the proposed use of the buildings to be retained and the extent of modifications to the structural systems. The information supplied in this report is based on available data and preliminary visual observations of the existing construction. This report addresses only structural deficiencies and recommended modifications. Potential issues related to access, architectural, mechanical, electrical, plumbing, fire protection and hazardous materials requiring abatement are not considered. It should be understood that the recommendations specified herein are preliminary only. A thorough design of the project must be done if the contract drawings for the proposed modifications are to be prepared.

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