6. Conclusion

The redesign of American Eagle Outfitters: Quantum III was a success in a number of reasons for each of the structural, architectural, and mechanical studies performed:

1. The author gained invaluable knowledge of the design considerations in seismically controlled regions. This applies to both the design of EBF and SCBF systems and how system symmetry can aid in design.

2. Preliminary design was completed to a level of detail. The shear capacities of EBF beam links and SCBF girders were taken into account to obtain member sections. Calculations on one attempted system included shear reinforcing for links as well.

3. Through numerous iterations, the economic design of a lateral frame was performed. Although girders in inverted-V frames are heavy and should contain shear reinforcing, the column and brace sizes were determined through over five possible framing layouts. These layouts each took into account story drift limitations, P-delta effects, and torsion.

4. Structural interference with building architecture was minimal. Two frames were added in exterior bays where the façade displayed mass, limiting interference with the curtain walls and open plan.

5. Façade scaling was analyzed. No changes were made on the basis that minimal elevation change caused negligible effects to the perceived scaling of the building.

6. A redesign for the façade was presented. It proposed eliminating brick columns and replacing them with aluminum paneling—a more common façade element in Oakland and Bay Area California.

7. Mechanical systems were re-evaluated for Oakland and the increased building size. Heating and cooling loads were obtained and evaluated based on efficiency.

8. Building windows were changed to allow for heating and cooling savings. This resulted in the increased efficiency of the building and less heat loss through curtain wall systems.

The Architectural Engineering Senior Thesis has been the culmination of five years of intense study. It is the product of countless hours of research, design, and redesign. It has taught me the worth of design guides and the aide of colleagues, peers, and professionals. Above all else, it has been an invaluable tool in preparation for entering the field as an Architectural Engineer.