EXECUTIVE SUMMARY

The following report details the structural system design of 350 Mission, a 30-story high-rise in San Francisco, California.

With the end goal of designing a near net zero high-rise building in the heart of San Francisco, AEVITAS developed the overarching attitude of [ZEROimpact], encompassing four design goals of [ZEROinterruption], [ZEROenergy], [ZEROwaste], and [ZEROemissions]. Through integrated design analysis, AEVITAS achieves these goals through effective and efficient collaboration. AEVITAS is an integrated design team, composed of representatives from the construction, structural, electrical, and mechanical disciplines. Through a unified effort, 350 Mission's environmental impact has subsided. Information about the design of 350 Mission can be found in AEVITAS' reports as detailed in Table 1.

TABLE 1: SYSTEM OVERVIEW BREAKDOWN

ARCHITECTURAL	Floor Plan Changes, Vestibule Addition, Integrated Public Art Piece
FAÇADE	Natural Ventilation Louvers, Seismic Connections, Electrochromic Glazing
MECHANICAL	Radiant Floor System, Natural Ventilation Louvers, Dedicated Outdoor Air System
LIGHTING	LED Lighting, DALI Controls Responsive to Daylighting and Occupancy, Task Lighting
ENERGY GENERATION	Onsite Solar Array, Offsite Solar Array, Human Waste to Power Converter
ELECTRICAL	AC and DC Distribution, Natural Gas-Powered Fuel Cells, Dual Electrical Risers
STRUCTURAL	Steel Superstructure, Braced Frame Core, Composite Beams and Deck, Outrigger System, Concrete Substructure
CONSTRUCTION	Production Planning, Matrix Scheduling, Waste Management, BIM Execution Planning, Site Planning

The structural design is a concrete substructure with a seven foot thick mat slab foundation and a slurry-based retaining wall, with three levels of underground parking. The superstructure is a steel framed building with composite decking on top of composite steel beams and a steel braced frame core in a double-story X-braced configuration. At the top level, below the roof, are a series of 14' tall outriggers. The superstructure is covered in an alternating angled glazing façade system with natural ventilation louvers beneath the 8'-4" windows and a brushed aluminum panel above to cover the plenum.

The combination of the braced frame core and the outriggers reduces the lateral drift from a maximum considered earthquake to 0.6% of the building height, approximately 30 inches. This surpasses the requirement set at the beginning of the project to reduce the lateral drift to 1% of the building height, which is half of what Minimum Design Loads for Buildings and Other Structures (ASCE 7-05) allows for buildings in seismic design category D. This decreases the likelihood of the building experiencing any major structural damage during an earthquake, allowing the building to be immediately occupied afterwards. All connections between the structure and the façade are seismically detailed to prevent damage and the delay of the building becoming re-occupied. The choice in building materials, using predominately steel instead of concrete, reduces emissions to help contribute to the goal of net-zero emissions and waste. The building design meets and exceeds all codes set forth by the state of California, including ASCE 7-05, IBC 2012, AISC/ANSI 360-10, and ACI 318-11.

AEVITAS accomplishes our goals to create a net-zero high-rise that can return to occupancy immediately after an earthquake. The following report, in conjunction with the other disciplines and Integration reports, demonstrates how everything is achieved.