Executive Summary

The Largo Medical Office Building (LMOB) is a 154,240 ft^2 new medical office building which serves as an expansion of the Largo Medical Complex in Largo, FL. LMOB serves to replace the existing diagnostic center – which will likely be repurposed – and improved and centralized patient check-in. Built in the Fall of 2008 on a Design-Bid-Build contract, the facility incorporates several features not commonly found in other facilities built in Florida. For one, the gravity force resisting system uses structural steel, which is fairly unique for a region dominated by concrete. The lateral force resisting system however, is handled with reinforced concrete shear walls typically located around the emergency stairwells. LMOB's façade is composed primarily of reinforced masonry with a stucco finish. Since LMOB is located in an active hurricane zone, all window glazing is impact resistant.

This report primarily dives into redesigning LMOB's lateral force resisting system. Though the current lateral force resisting system adheres to strength and serviceability code requirements; the facility, in its present state, experiences significant torsional effects when exposed to wind and seismic loads. Should the facility be moved to a more seismically active region then the lateral force resisting elements will need to be redesigned to eliminate torsional irregularity and soft story irregularity. If the lateral force resisting elements are not redesigned then seismic induced damage will occur. One likely damage is the parking garage abutting to LMOB, which will become battered by the damaged and torsionally weak LMOB.

To solve torsion, two redesigns were generally studied and detailed. One lateral system involves adding additional lateral force resisting elements at the facility's perimeter, which became designated Design I. Majority of the original lateral force resisting elements in Design I require redesign arising from lateral load redistribution. As opposed to Design I, Design II eliminates all interior lateral force resisting elements and uses tilt-up walls to carry all the lateral forces to the ground. Surprisingly the controlling loads in Design II occur not during full occupancy but during the wall lifting process. The structural performance, like overall rigidity and resistance to torsion, are better for the redesigns. However, the redesigns are intrinsically complex to construct and carry a heavier financial burden – upwards to one million U.S. dollars (USD) more.

A façade redesign was also implemented to reduce weight, whilst maintaining moisture and thermal performance. The objectives were met, but attempts to reduce cost through using metal stud back-up wall were to no avail. As for acoustical attenuation, the redesign satisfies the recommended performance and had an acoustical performance that was generally similar to the original façade.