

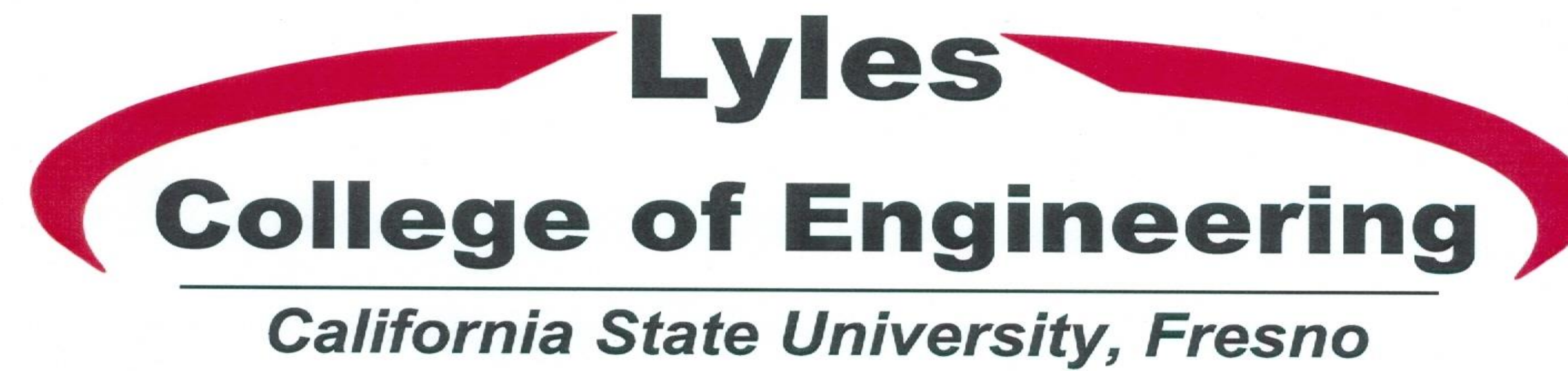
Southern California Potable Water Project

Design of a Desalination Plant

Department of Civil Engineering

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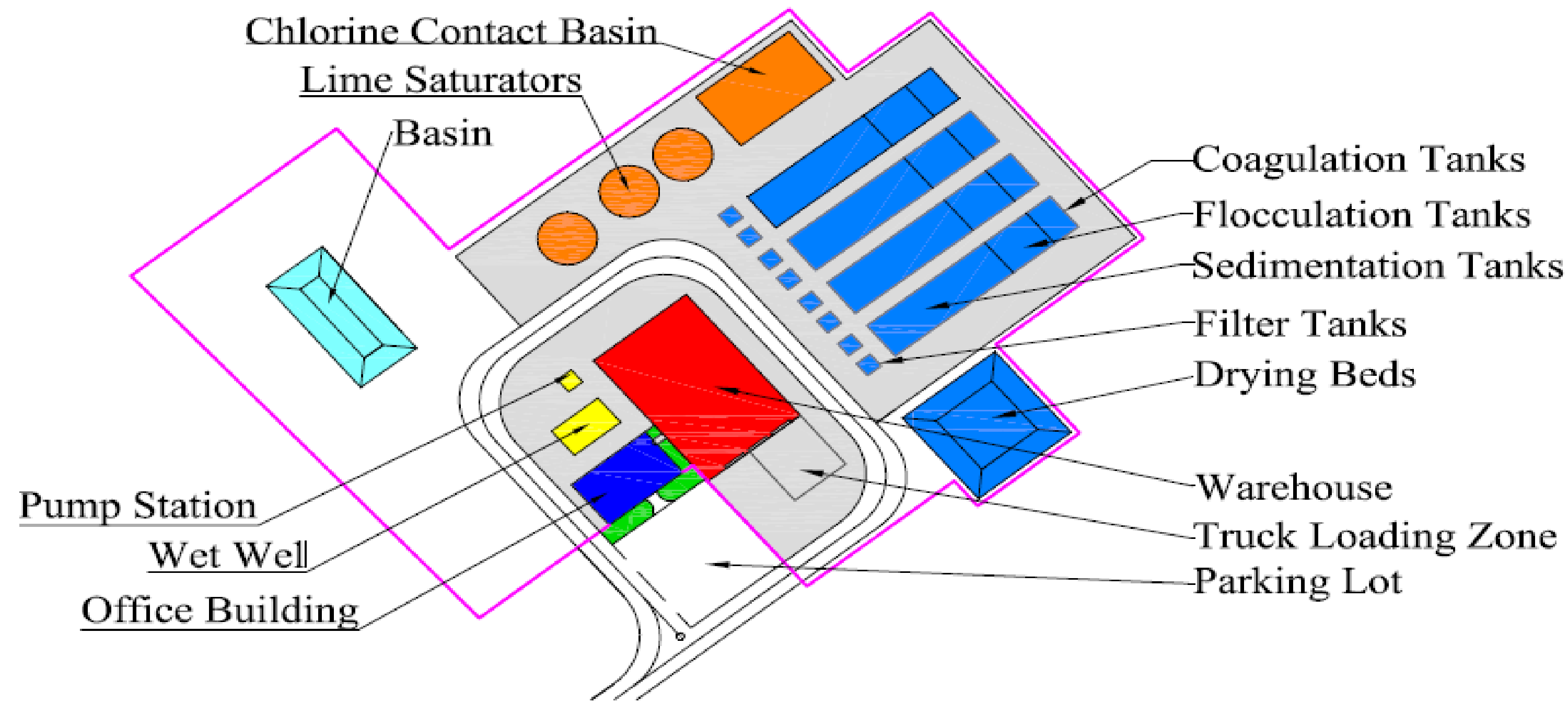
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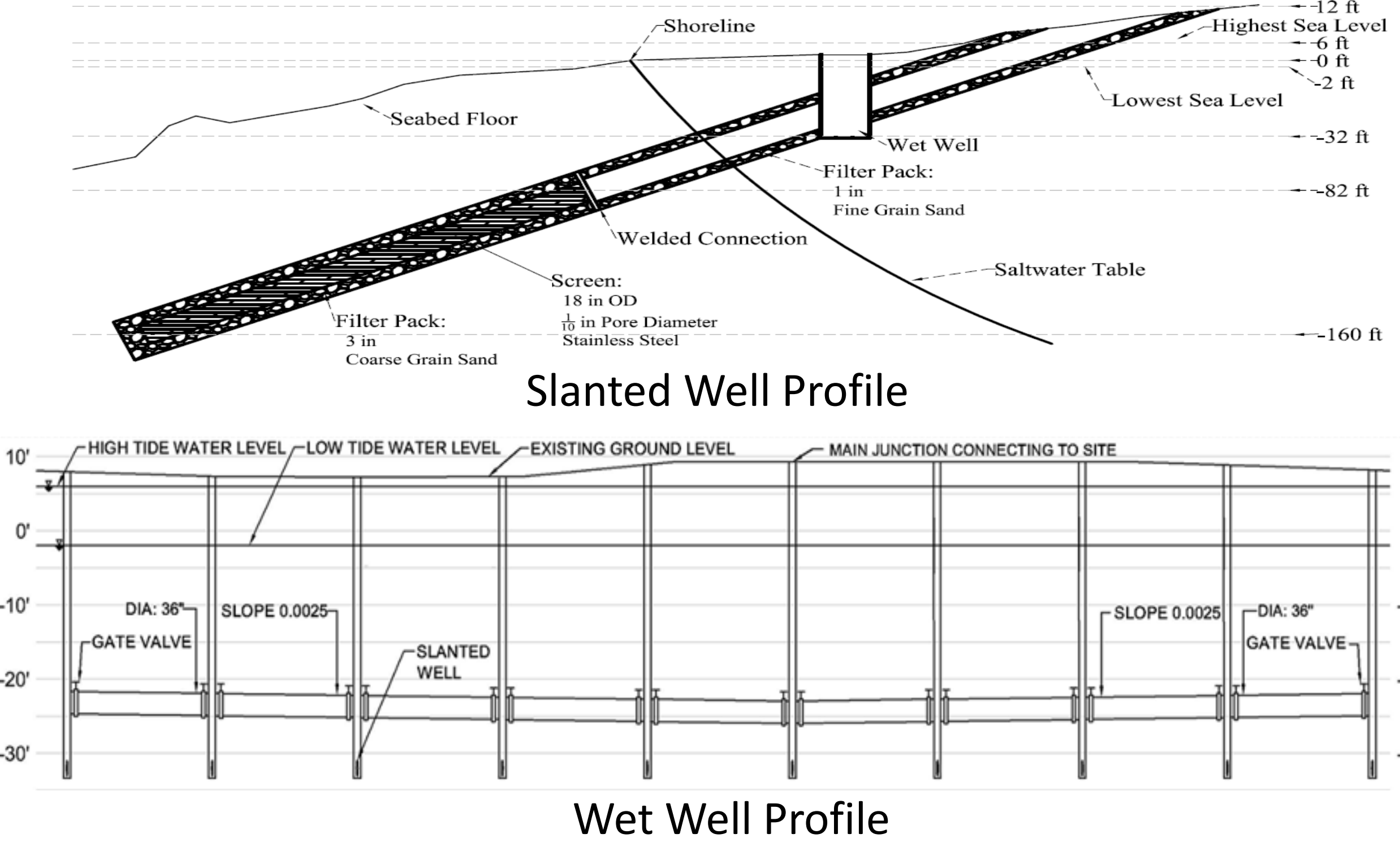
Abstract

Southern California is currently undergoing a water crisis in which prices continue to rise as available sources diminish. Nearly 52% of California's population resides in the region and approximately 47% of the available water is imported from external sources, e.g., the San Joaquin Delta and Colorado River. A desalination plant in specific locations in the south would remove an area's dependence from the Metropolitan Water District (MWD) and would secure stable water prices for the local residents and businesses. As water rates continue to rise following the historical trend of the last 5 years, the Los Angeles Times (2010) expects the price of imported water to surpass desalination water rates in 10-15 years. The project location lies 2 miles south of the City of San Clemente and 2 miles north of the San Onofre Nuclear Power Generating Station. Construction of the site will take place in two individual areas. The intake system will be located on the beach at 33°23'2.74"N 117°35'23.42"W, and the facility will be located at 33°23'49.83"N, 117°34'49.97"W. The design specification for the facility is 25 MGD for the City of San Clemente with the possibility of expanding to 50 MGD to supply Camp Pendleton if future water rates are comparable to the cost of import. Access to the facility is from Interstate-5 and the Basilone Road exit. The entry road is east from the highway exit and currently consists of a three-way intersection with a rarely used dirt road leading to the facility location. The Basilone / Chaisson Road intersection will be redesigned to a roundabout for the new four-way intersection so larger trucks can access the site with ease. The dirt road leading to the facility will need to be paved and require a drainage system capable of transporting all storm water safely to the storage basin. The selected primary treatment process is reverse osmosis membranes; the investment cost is high, although the energy consumption over the lifetime of the project would be reduced compared to other methods of desalination. The remaining treatment processes would consist of the following: 10 slanted wells (intake system), primary clarifier (pre-treatment), reverse osmosis membranes (primary treatment), and chlorine disinfection / remineralization (post-treatment). Due to the City of San Clemente's existing water storage capacity, storage tanks for the treated potable water will not be required on-site.

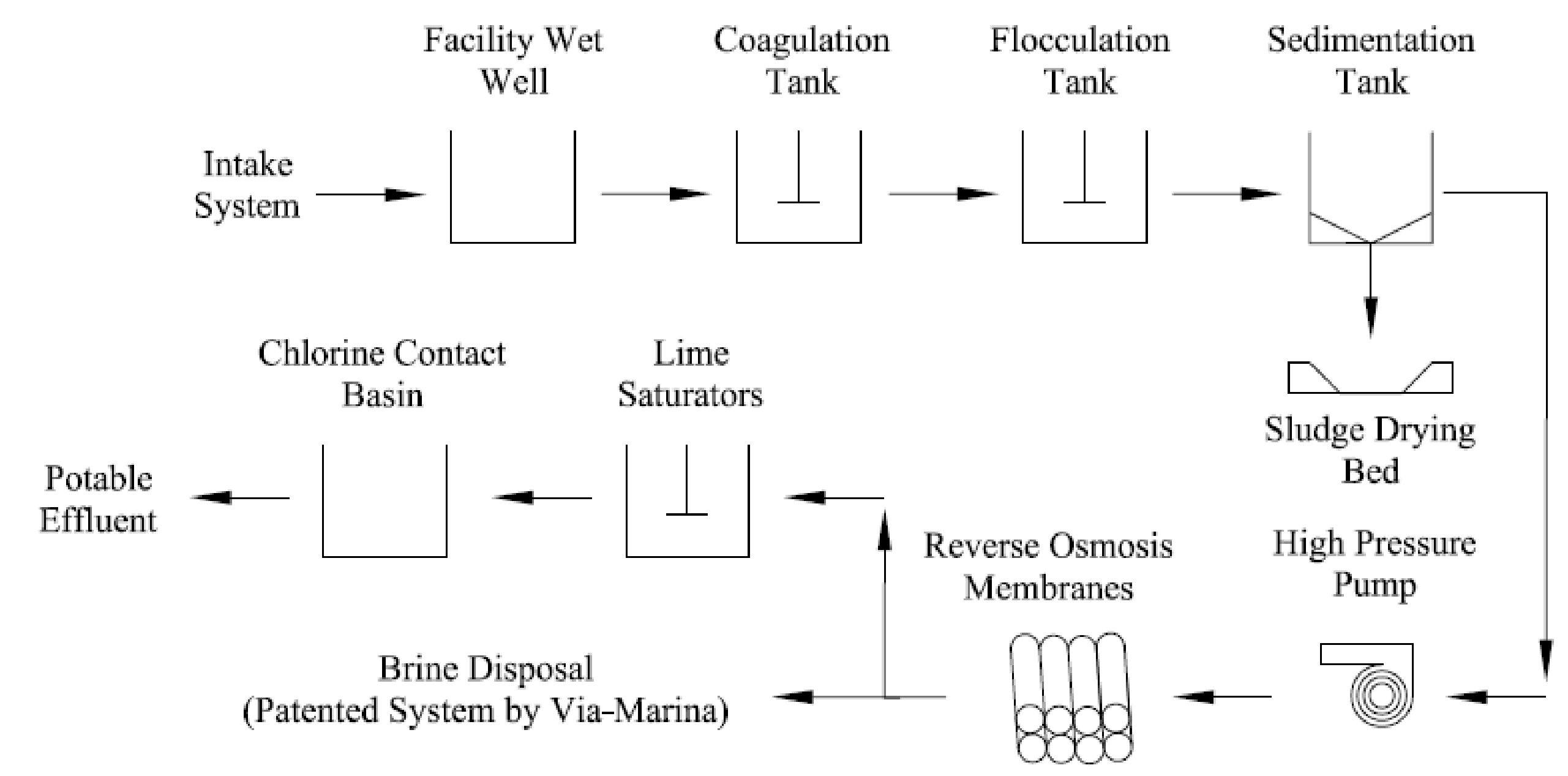
Site Layout



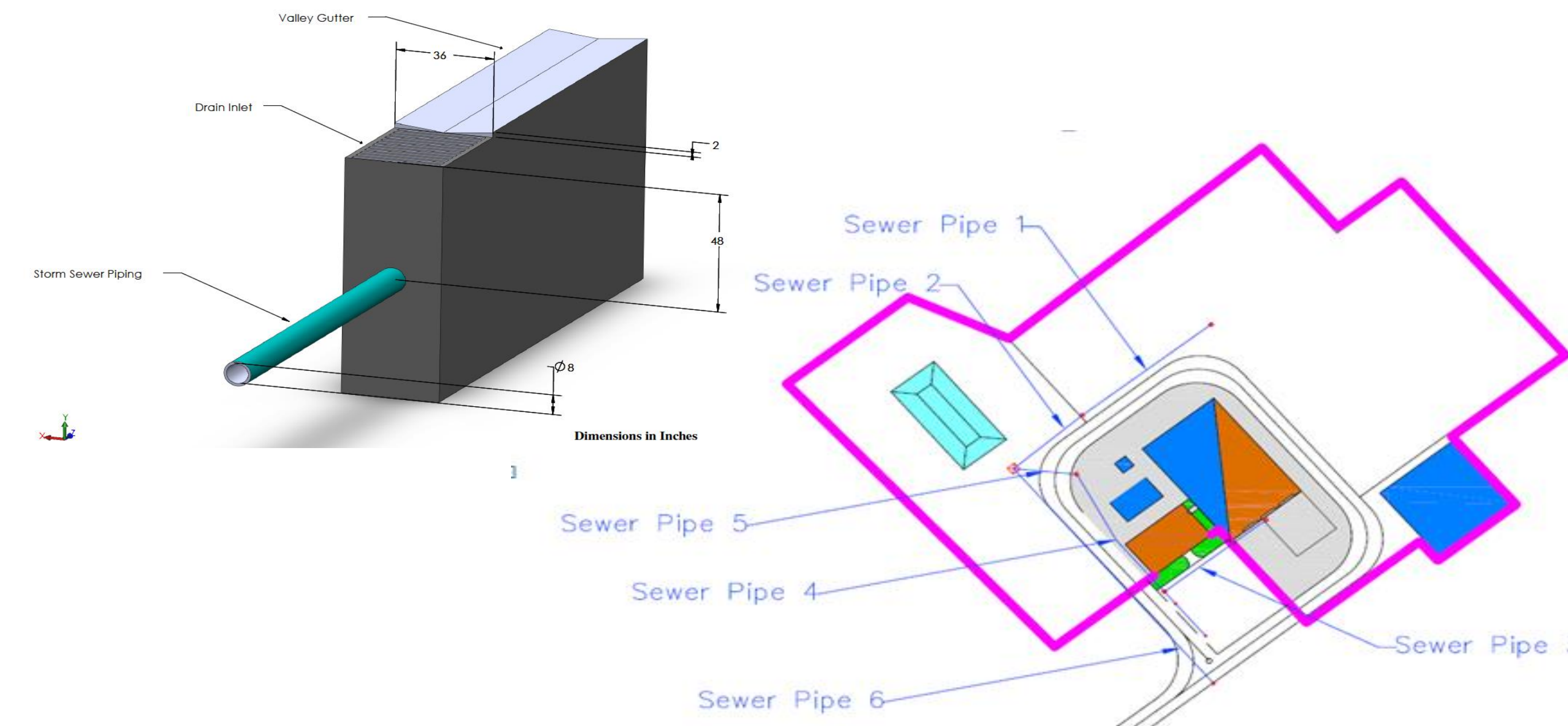
Intake System Design



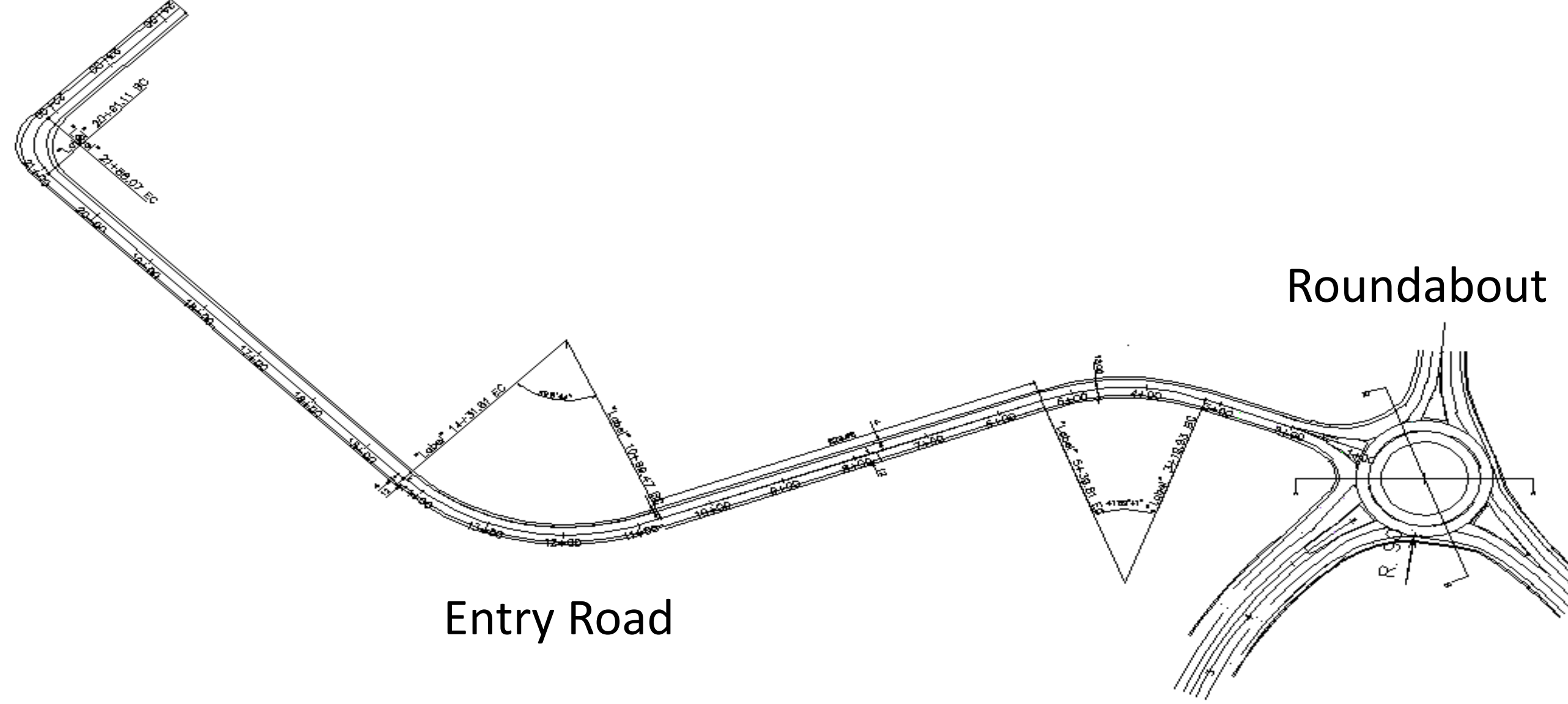
Water Treatment Flow Diagram



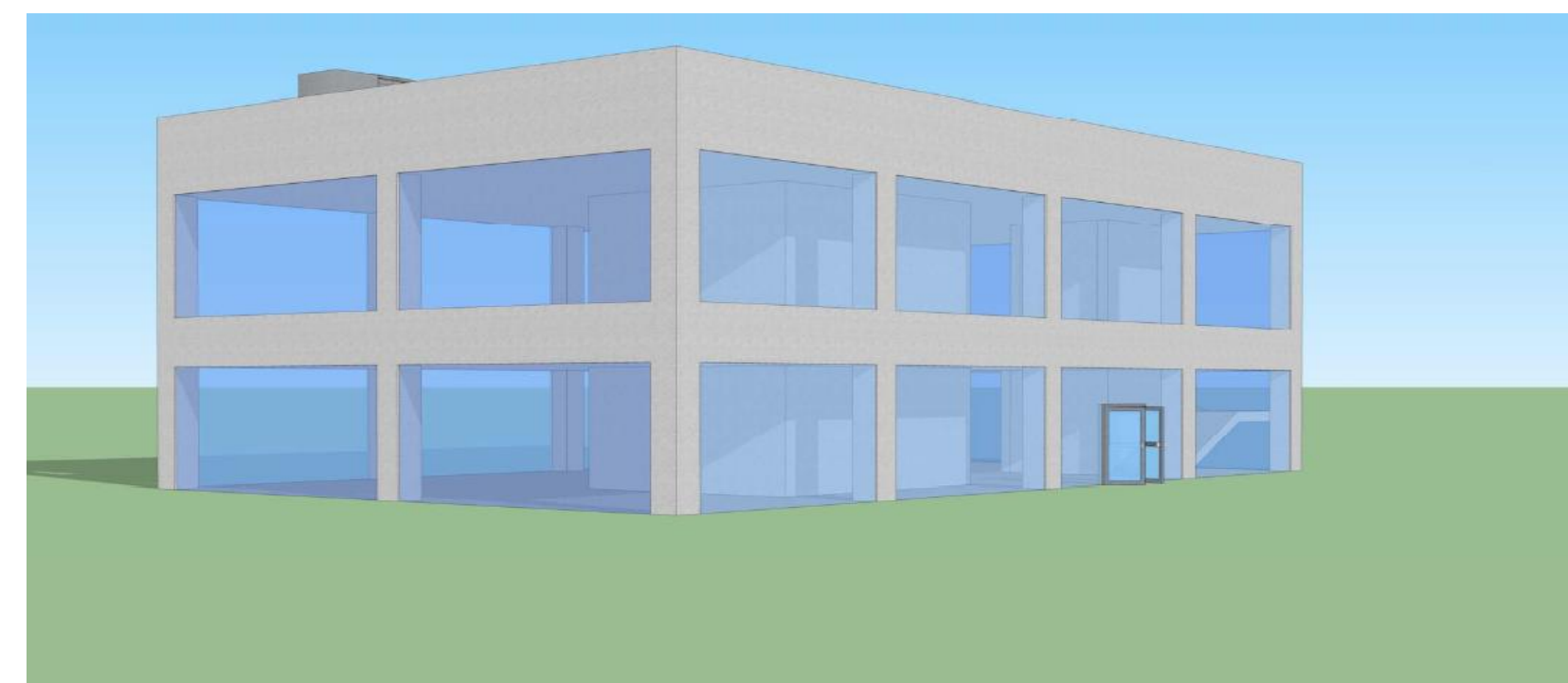
Storm Water Design



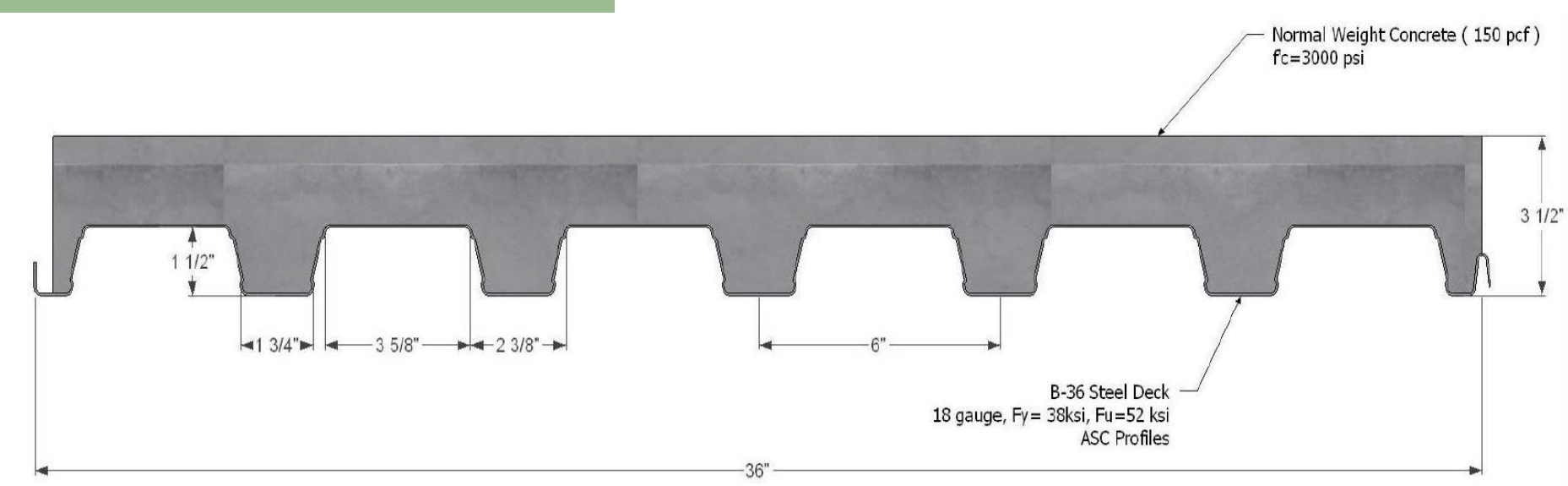
Transportation Design



Structural Design

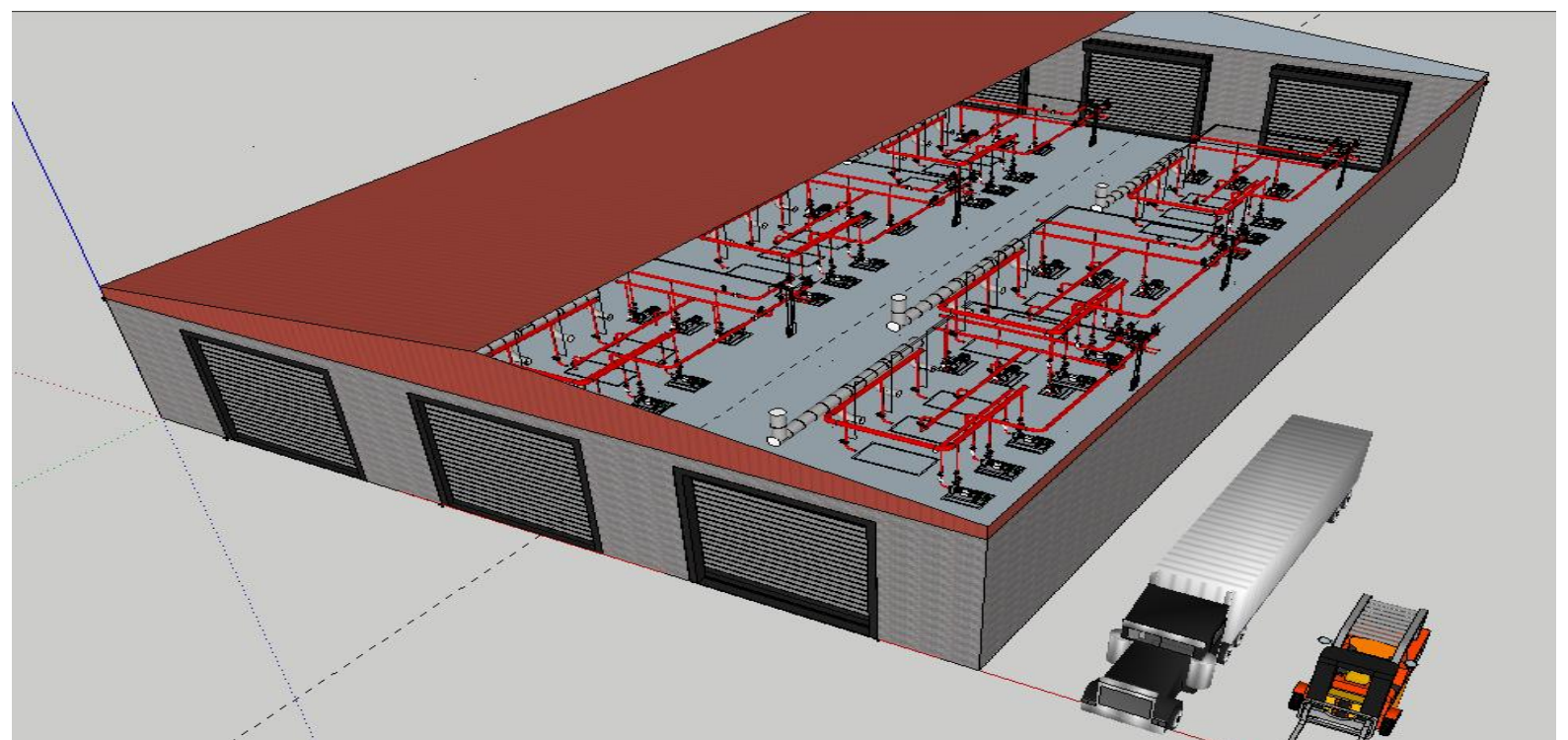


Office Building Layout

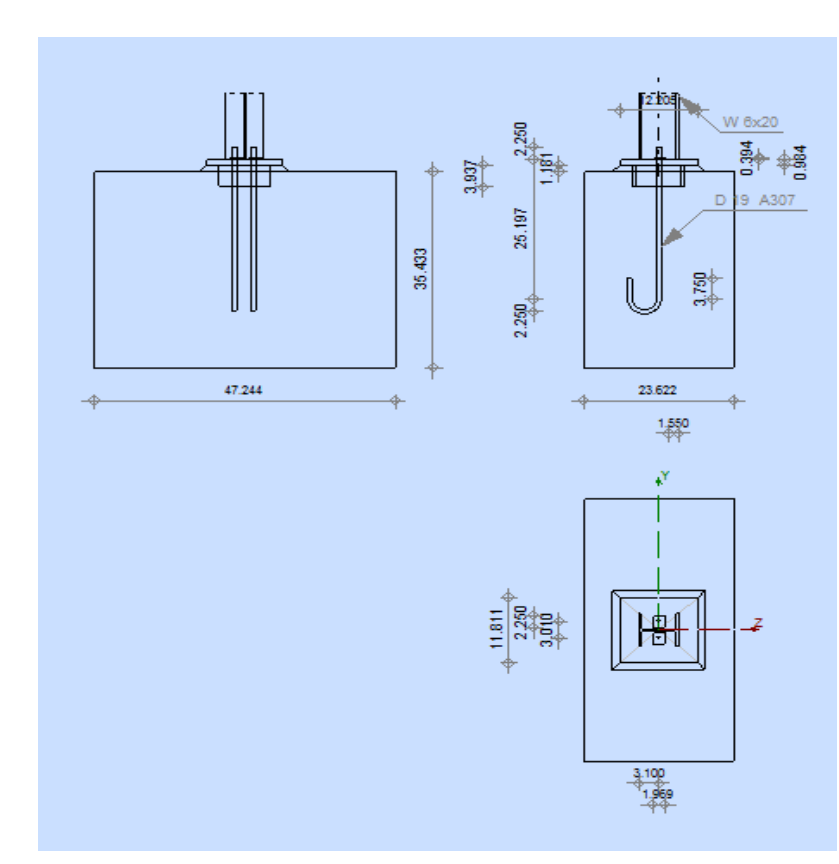


Composite Floor Deck

Structural Design



Warehouse



Welds and Foundation

Sponsors/Conclusion



Ashleigh Love P.E.



Steve Delsid, P.E.



An Employee Owned Company

David McGlasson P.E.



Bob Parrish