

EXECUTIVE SUMMARY

In this final thesis report, the thesis proposal of creating a signature expression for the expansion to Union Station was carried out in full detailed. Using the design of the king post truss as the concept of the signature expression (located on the ground floor of the expansion), a full structural depth with an architectural and lighting study was accomplished where all three areas of architectural engineering focused on the trusses.

Changing the floor system from post-tension to composite steel was the first step in the structural depth portion of the thesis (starting on page 11). From there, multiple designs for the trusses were created by the author in order to determine a design that not only would be an expression in architectural, but as well in structural engineering (All of the design based on the look of the trusses can be found in the architectural breadth). Using standard truss analysis with the addition to using curved tension member as the brace members gave a unique way of looking at a truss in structural engineering. Two of the nine trusses are the focus within the body of the structural depth to show the process the author took in doing the structural calculations for each one.

Brace frames replaced the existing ordinary concrete moment frames as the new lateral system for the expansion to Union Station which are part of three of the nine trusses (refer to page 23). Each one of the trusses pin connections were analyzed as well as a heavy brace connection on one of the trusses. This was designated as the M.A.E. criteria for the thesis. Finally spot checks on the foundation were done to verify the trusses transferred the load from the upper floors down to the track level and then into the ground without any concerns in changing the existing foundation system.

As mentioned above, the design process of making the trusses look one of a kind is found in the architectural breadth portion of the thesis. On top of the design of the trusses, the author also looked at the vehicular circulation the busses need in order to maneuver and park under the trusses. Also, the waiting terminal on the ground floor was moved from its original location to help express the trusses in the expansion.

Within the lighting breadth of the thesis, LEDs were selected to highlight the trusses and full calculations for the Lumen Method were done in order to determine the amount of luminaries needed for one of the waiting terminals.

After each section of the report, a conclusion has been written to talk if the criteria goals for each section were meet (refer to page 10) and if not, the author talks about what could have been different in the process taken. All calculations for each of the breadths as well as the depth can be found in Appendixes A through M at the end of the report.