The sudden collapse of the 1,907 foot long deck truss bridge carrying eight lanes of I-35W traffic over the Mississippi River in Minneapolis, Minnesota on August 1, 2007 resulted in 13 deaths and 145 injuries. The incident, which was attributed to gusset plate failure under construction loads, raised the question of the safety of steel truss bridge connections. Since then, the FHWA mandates that gusset connections of non-load-redundant steel truss bridges be evaluated.

As a task order under a three-year term contract, SJH provided load ratings for thirty-two (32) gusset plate connections on the Lower Trenton Toll Supported Bridge. The superstructure is a five-span subdivided Warren Truss structure with span length between bearings from 166' to 201', and total length of 1,021'-7" between backwalls. Each span consists of two exterior trusses and one interior truss, providing a dual roadway, each carrying one lane of traffic. The bridge is currently posted for a five-ton weight limit, a ten-foot vertical clearance, and a 25 MPH speed limit. The height of the roadway above normal water level is 33'.

SJH staff conducted the study with the provided SAP 2000 analysis, inspection report, and design drawings supplied by the DRJTBC. SJH also developed a Finite Element Model using the CSi Bridge software for some sections of the structure. The gusset plates were rated using PENNDOT's Truss Gusset Plate Analysis and Rating Spreadsheet (TGPARv2.0). The ratings were calculated based on the provided information from the April 2012 Inspection notes and with the gusset plate dimensions taken or scaled from the provided drawings. Our staff completed the assignment within a short 60-day timeframe.