highway segments before ultimately ranking them against each other based upon a final composite rating. The original tool was then expanded to the entire primary highway system in Iowa.

ICE was used to evaluate the current condition of each candidate location. The segments that make up each location were analyzed using the seven criteria and the normalization and weighting processes that had already been established. This resulted in a composite ICE rating for each location. The process was completed for each individual candidate location.

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As mentioned in the “Freight Mobility Issues Survey” section, INRIX has a tool that identifies and ranks bottleneck locations. This tool, with additional analysis using traffic data, was used to develop a draft list of highway locations with freight mobility issues. To determine the performance ranking of each project location, the number of annual bottleneck occurrences for each location was used.

VCAP matrix (final ranking and prioritization)

After each candidate location was assigned a Value, Condition, and Performance rating, each was ranked using those values for each of the three categories. The average of these three rankings was calculated and the candidate locations were assigned an overall priority rank. If two locations had the same average ranking, total truck traffic at the location was used as a tiebreak. See the figures and tables below for VCAP results and Iowa’s highway freight priority locations.

Summary of the prioritization process:

1. Freight Mobility Issues Survey
   - Populate initial improvement list
2. Iowa Travel Analysis Model (iTRAM)
   - Complete analysis and then rank each location
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Value (Iowa Travel Analysis Model - iTRAM)

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This tool is used to evaluate the value of each project location to the overall freight transportation network. A run of the model was completed first to show a base case scenario. Then, a second series of runs was completed that excluded each one of the candidate locations individually. After each run, the truck vehicle hours traveled (VHT) was compared to the base case and the difference was assigned as the value of the location. Higher priority was assigned to locations with larger VHT increases when excluded from the network. In other words, higher priority was assigned to locations that make the truck network more efficient from a VHT perspective.

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<th>LOCATION</th>
<th>VALUE</th>
<th>CONDITION</th>
<th>PERFORMANCE</th>
<th>AVERAGE RANKING</th>
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**Highway Improvements**

In order to identify and prioritize candidates for highway freight improvements, Iowa DOT utilized the Value, Condition, and Performance (VCAP) matrix. This approach takes advantage of multiple tools available at Iowa DOT including the Freight Mobility Issues Survey, Iowa Travel Analyst Model (iTRAM), Infrastructure Condition Evaluation (ICE) tool, INRIX traffic speed data, and Iowa’s annual traffic counts. Below is a description of the prioritization process and an example of the VCAP matrix.

**Example VCAP matrix**

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<th>ID</th>
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<th>VALUE</th>
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