This allows users to determine, at a glance, the current number of messages arriving per minute. The blue line represents the most likely current rate, and the light blue bounds the 16/84 confidence interval. The rate itself is calculated via a conjugate prior used to emulate exponential decay. The grey bounds represent the likelihood the current rate is above or below the nominal rate. It only includes the currently selected districts, or all districts if none are selected. The timeline can be used to select a subset of the full time span of the data.

**REPAIR FOCUS**

First-responders would likely give some guidance on where they should prioritize. This graph provides that by conditioning the app feedback into a single, sorted metric. The hover text provides the name of the district, and the shape of the box plot allows users to tell how reliable the metric is. To generate the plot, the Dirichlet distribution of each selected district for the active timeframe is repeatedly sampled and one of the chosen metrics applied to each sample.

**FEEDBACK**

Civilians can submit their infrastructure damage ratings via the phone app, as well as detailed earthquake intensity. We've presented these as a series of Dirichlet distributions, to preserve any multi-modality in the original data. These graphs only include data from districts that the user selects, and respect the time frame the user chose on the timeline. Uncertainty is presented via error bars. Like the other graphs, mouse tool-tips provide more information.

**MAP**

In addition to the checkboxes at the bottom of the window, users can select the districts they are interested in on a map. The saturation of the given district varies based on the overall uncertainty of the Dirichlet distributions, with lower certainty corresponding to less saturation. This is a static SVG file based on the original map vector, with the car-based radiation sensor data overlaid to provide a rough trafficmap. The colours were chosen for people with deuteranomaly colour blindness.

**FINDINGS**

The third event hit Old Town especially hard in every infrastructure type. Scenic Vista was almost as badly effected, and its buildings fared worse. Chapparal’s power and road systems were also major concerns. Other key districts included Broadways, Palace Hills, and Downtown.

When no earthquake activity is present, all reports of infrastructure damage show a consistent pattern. Almost all categories of damage are equally likely, with the highest being roughly twice as likely as the rest. Earthquake intensity is always reported as one of the two least intense categories. The rate of reports drops significantly as well. All of this can be used to establish a nominal report profile for RUMBLE.

**Internal Design**

While the visualization treated the dataset as static, the code was designed to be easily adapted to real-time analysis. All algorithms are not allowed to rely on future data, to remain compatible with real-time operation. Conjugate priors are used where possible, via the Dirichlet and Gamma distributions. Preprocessing of the dataset is limited to calculating the nominal message rate, and generating a cumulative total of reports at each moment of time. The totals allow for performance when totaling reports over a window.

Determining the likelihood that the number of packets is above or below the nominal rate, as well as calculating the repair metric focus, are both done via statistical sampling as methods involving integrals took much too long and did not result in better quality. Caching processed data was also used, to minimize the amount of recalculations, and cumulative sums made tallying up reports over a specific window an O(1) operation. Plotly allows for data streaming, so the charts could be converted to update in real-time.