

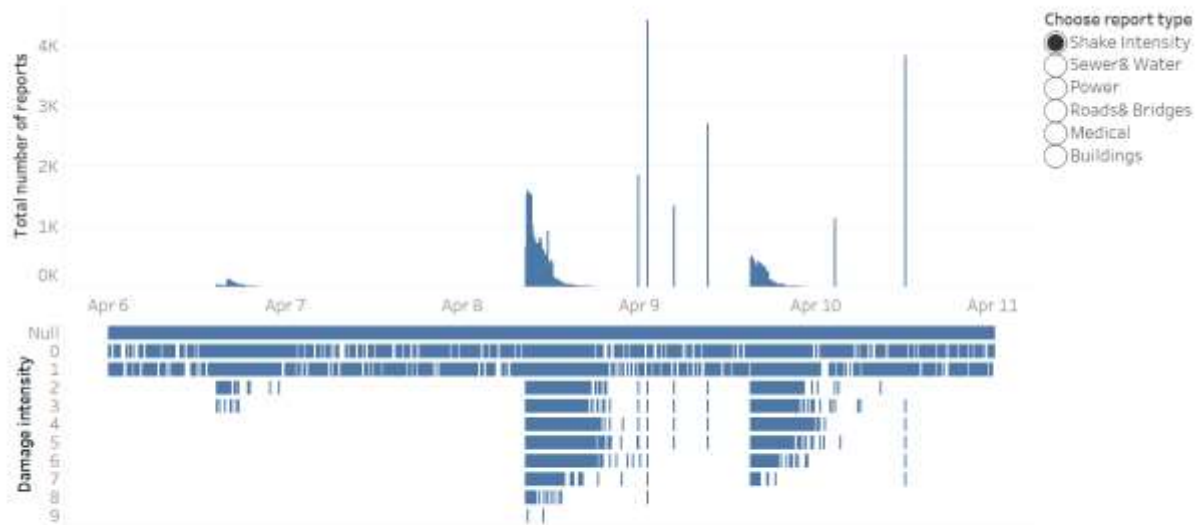
Project location in Tableau Public:

<https://public.tableau.com/profile/li.jing8612#!/vizhome/VASTchallenge2019/Story2?publish=yes>

## 1. Data overview

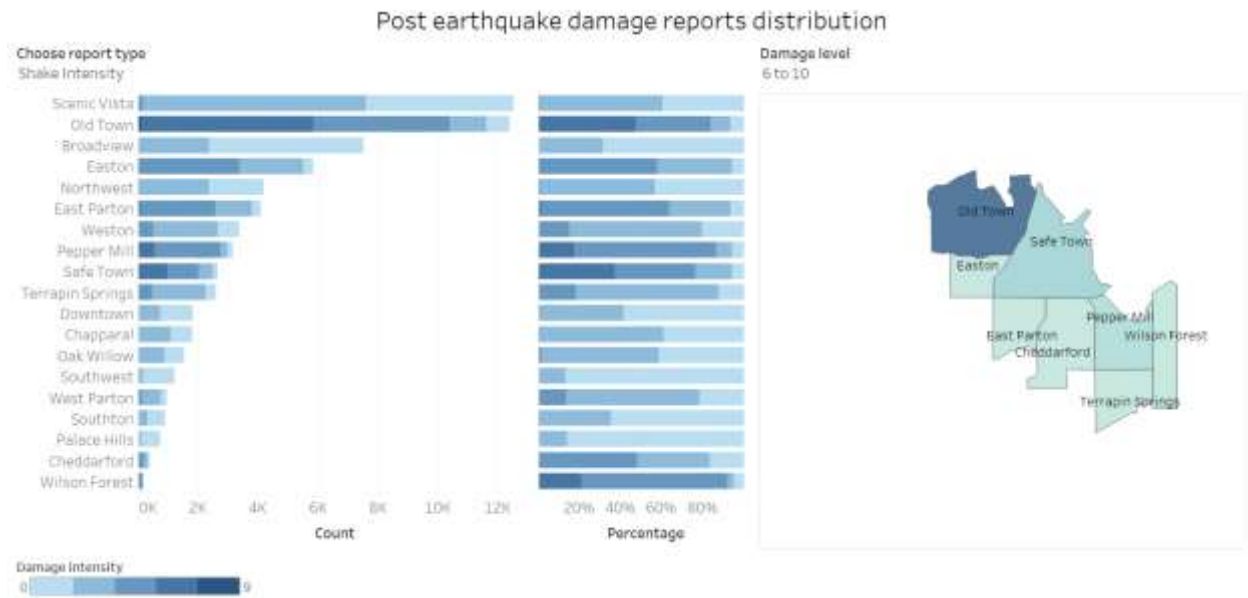
In first dashboard, we create a bar chart to record total number of reports and a Gantt chart to view the shake/damage intensity for each shaking/damage type over time. Each cell in Gantt chart represent a specific shake/damage report for particular time interval.

### Overview



## 2. Post earthquake shake/damage intensity analyse

Two stacked bar charts are shown on the left side, the darker color indicate the higher shake/damage intensity. The left-hand side stacked bar chart represents the actual amount of reports and the right-hand side represents the percentage of a pacific damage level reports among all the damage reports of particular neighborhood. And we also plot the total amount of reports of all neighborhood with customized range of damage level.



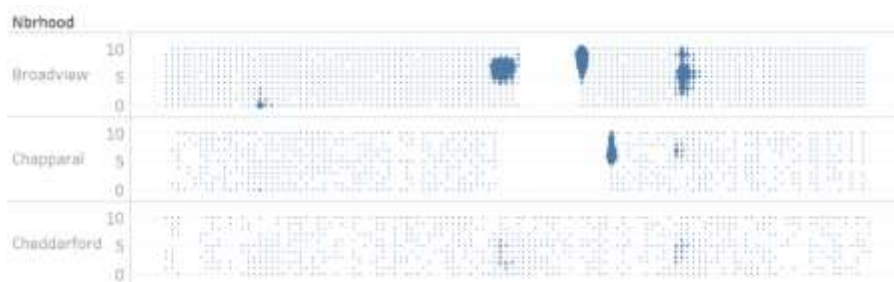
### 3. The heat map between shake map and all damage type among all neighborhoods

In this heat map, each cell represents that one particular shake intensity level and specific damage type's particular damage level. The darker color represents a higher number of reports.



### 4. Reports distribution over time

Each point represents a particular report in particular time interval. A larger size of the point indicates a larger amount of reports in this time interval.



### 5. Change over time comparison

Each cell represents a particular damage level report in particular date among all neighborhood. The darker color represents a larger amount of particular report on particular date.



## Insights

### Part 1 – all about the damage (10)

1. Emergency responders will base their initial response on the earthquake shake map. Use visual analytics to determine how their response should change based on damage reports from citizens on the ground. How would you prioritize neighborhoods for response? Which parts of the city are hardest hit? Limit your response to 1000 words and 10 images.

As shown in Figure 1-1, the total number of shake intensity reports increased rapidly on 8<sup>th</sup> April 2020 8:35 AM. At the same time, we start to receive shake intensity reports which value is greater than 4. Therefore, we inferred that the major earthquake is happened around 8<sup>th</sup> April 2020 8:35 AM.

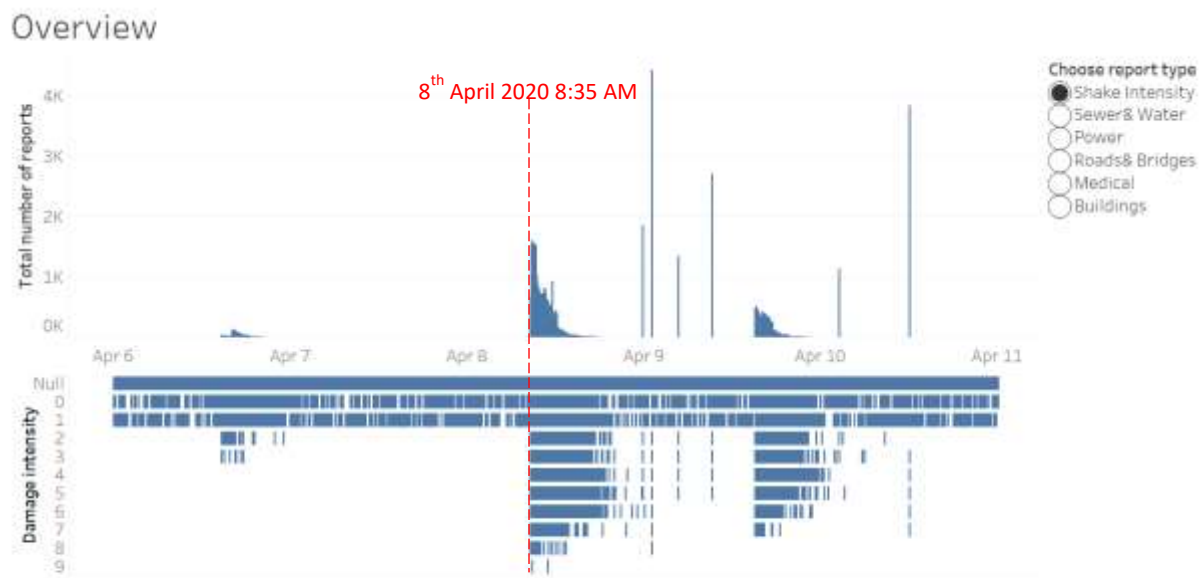
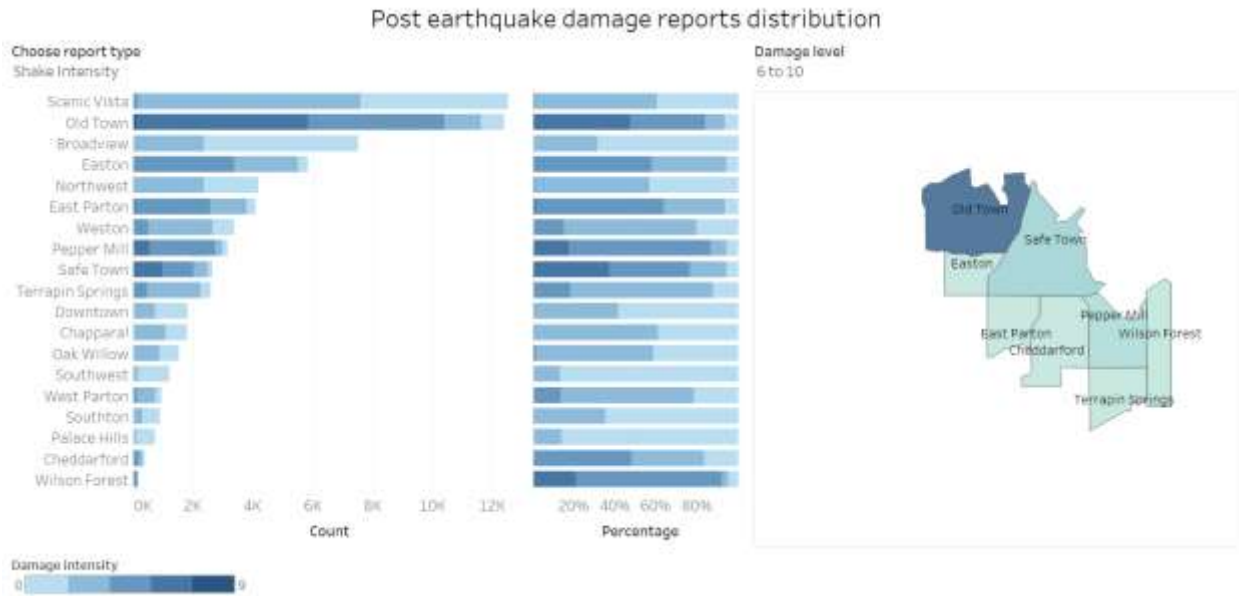
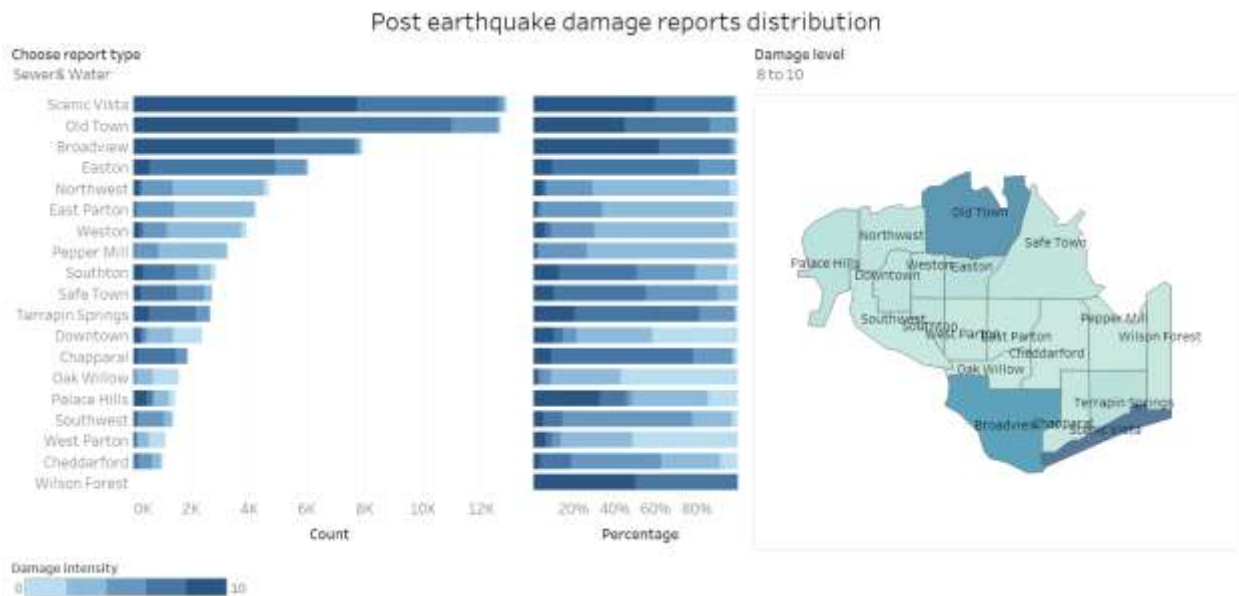


Figure 1-1

The post earthquake shake intensity damage reports distribution is shown in Figure 1-2. The seismic readings of the quake in shake map are between 0 to 4 but the actual feeling from citizens are high than the readings in most of the neighborhood. Citizens who are near the epicenters can feel the shake intensity more than 6. Among all the neighborhoods, citizens in Old Town have most strong feeling of shake.

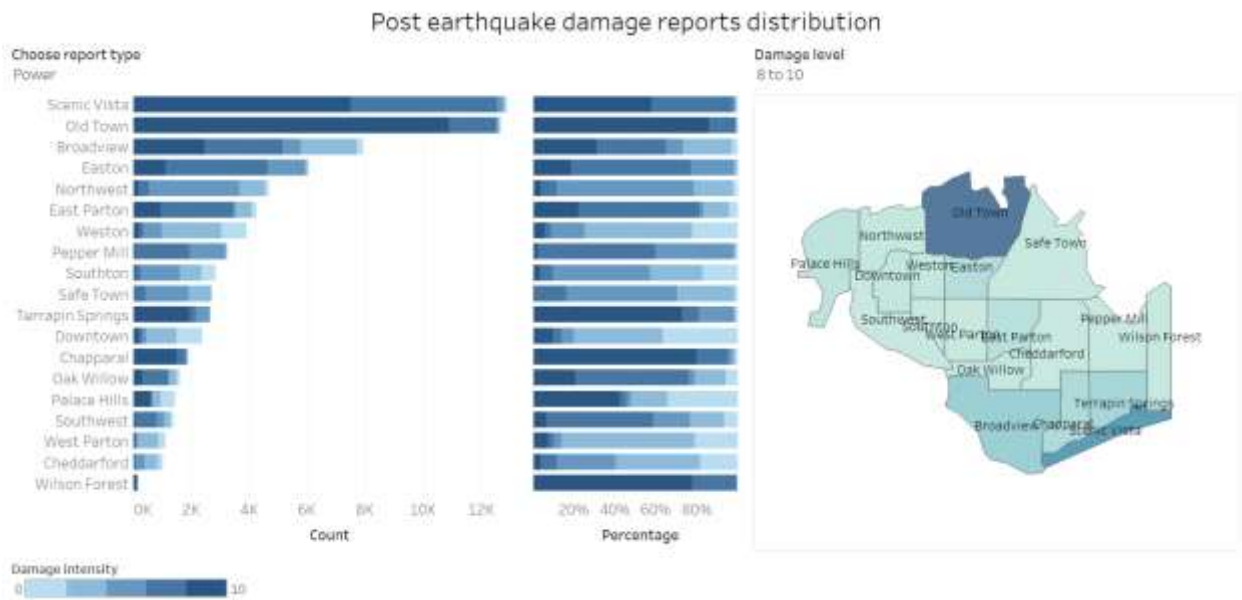


The post earthquake sewer and water damage reports distribution is shown in Figure 1-3. We noticed that Scenic Vista are hardest hit, follows by Old Town and Broadview. But when we plot the neighborhood in map and compare with shake map, we find that Scenic Vista and Broadview didn't have high seismic readings of the quake, but their sewer and water are damaged seriously. Furthermore, although Southton, Safe Town, Terrapin Springs and Chapparral don't have high amount of damage report in sewer and water, their percentage of serious (above 8) damage reports are very high among the neighborhood.

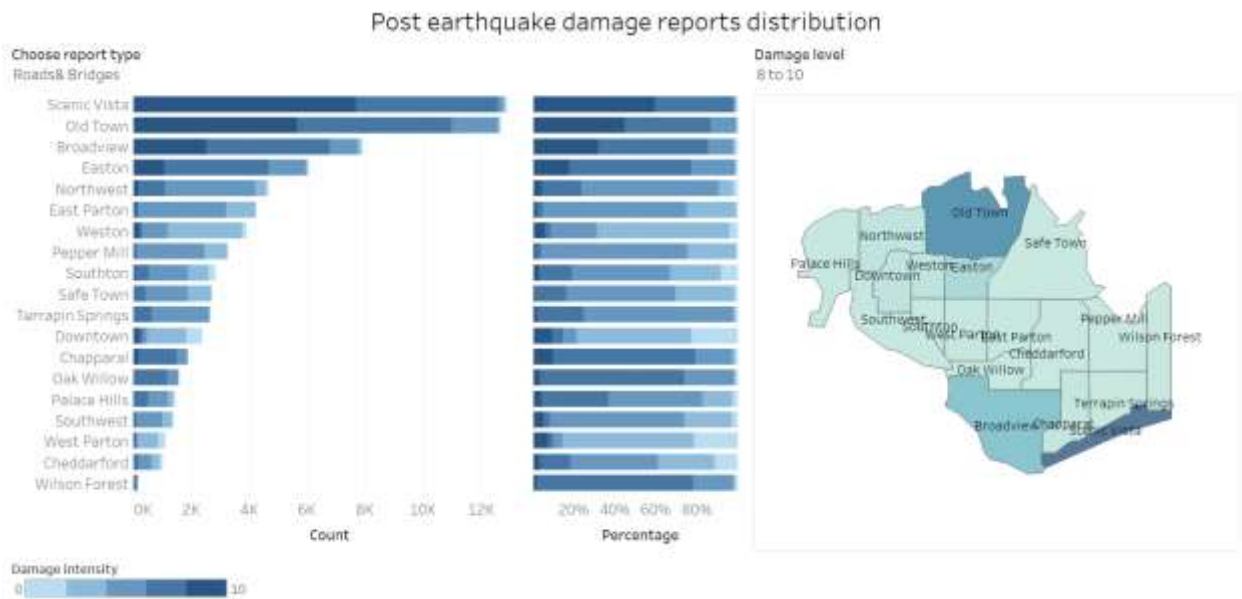


The post earthquake power damage reports distribution is shown in Figure 1-4. We noticed that Old Town sustained the most serious damage in term of power, followed by Scenic Vista and Broadview. Furthermore, in Terrapin Springs, Chapparral and Wilson Forest, the total number of serious (above 7) damage report are not high but the percentage of them are quite high. Similarly, when we plot the

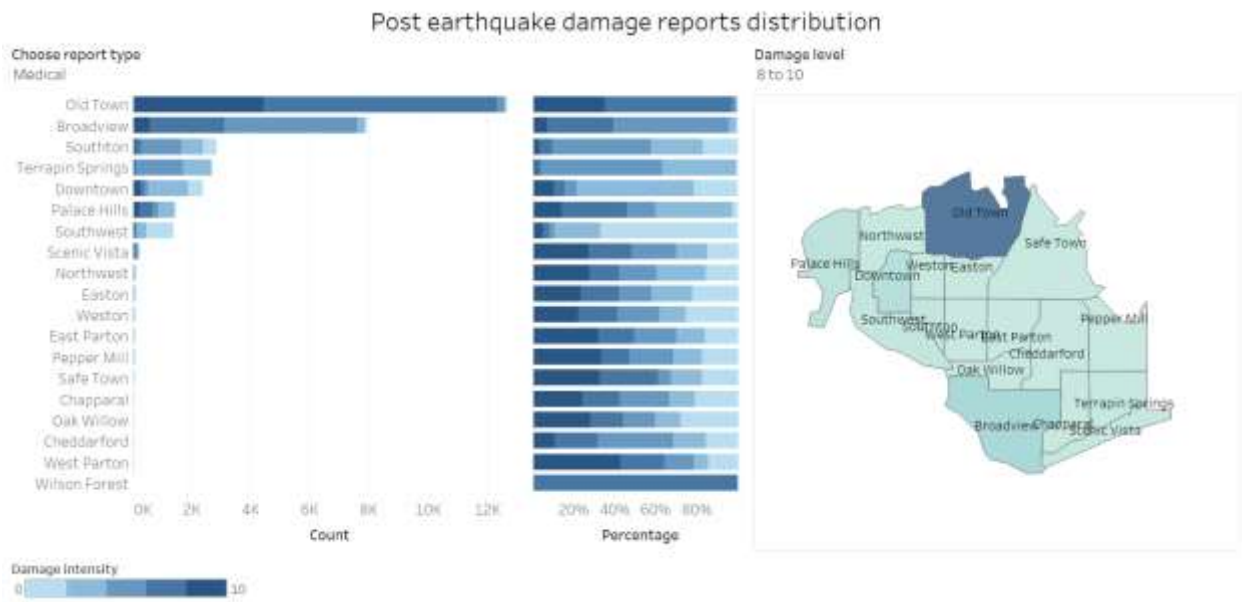
serious damage cases in map, neighborhoods which are far away from epicenters such as Scenic Vista, Broadview, Chapparral and Terrapin Springs have relatively high amount of serious damage cases and they are inconsistent with the shake map.



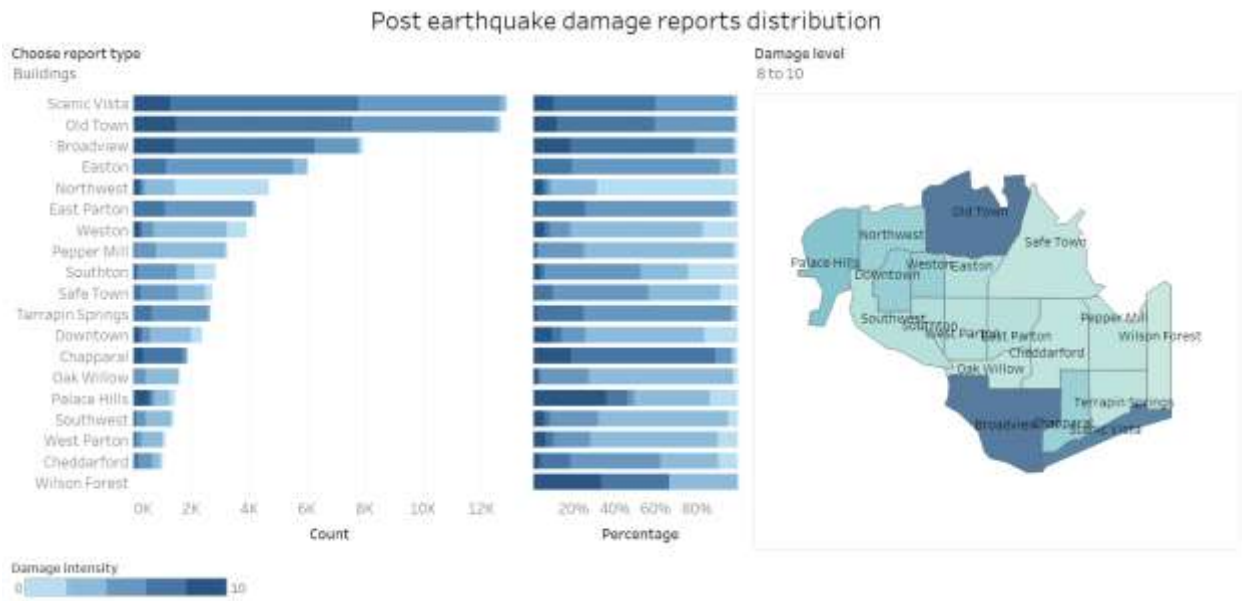
The post earthquake roads and bridges damage reports distribution is shown in Figure 1-5. We noticed that Scenic Vista sustained the most serious damage in term of road and bridges, followed by Old Town, Broadview and Easton. Then we plot the serious(above 7) damage report cases into the map and get the similar result as previous that Broadview and Scenic Vista which are far away from epicenters, but they receive relatively high amount of serious damage reports.



The post earthquake medical damage reports distribution is shown in Figure 1-6. It reveals that Old Town sustained the most serious damage. And the distribution of medical damage report is highly skewed, it mainly occurred in Old Town.



The post earthquake medical damage reports distribution is shown in Figure 1-7. It reveals that Broadview sustained the most serious damage, followed by Old Town and Scenic Vista. In Palace Hills, Chapparral and Wilson Forest, although the number of reported cases are not very high, they have relatively high percentage of serious damage reports among the neighborhoods. When plot the serious cases in the map, we noticed that beside Broadview and Scenic Vista, in Chapparral, Palace Hills, Northwest, Downtown and Weston, the amount of serious damage reports are relatively high as well.





Use visual analytics to show uncertainty in the data. Compare the reliability of neighborhood reports. Which neighborhoods are providing reliable reports? Provide a rationale for your response. Limit your response to 1000 words and 10 images.

As mentioned in the city description that only Palace Hills, Down Town, Southwest, Old Town, Broadview and Terrapin Springs have hospital, we look at the neighborhood response of medical separately with other type of damage reports.

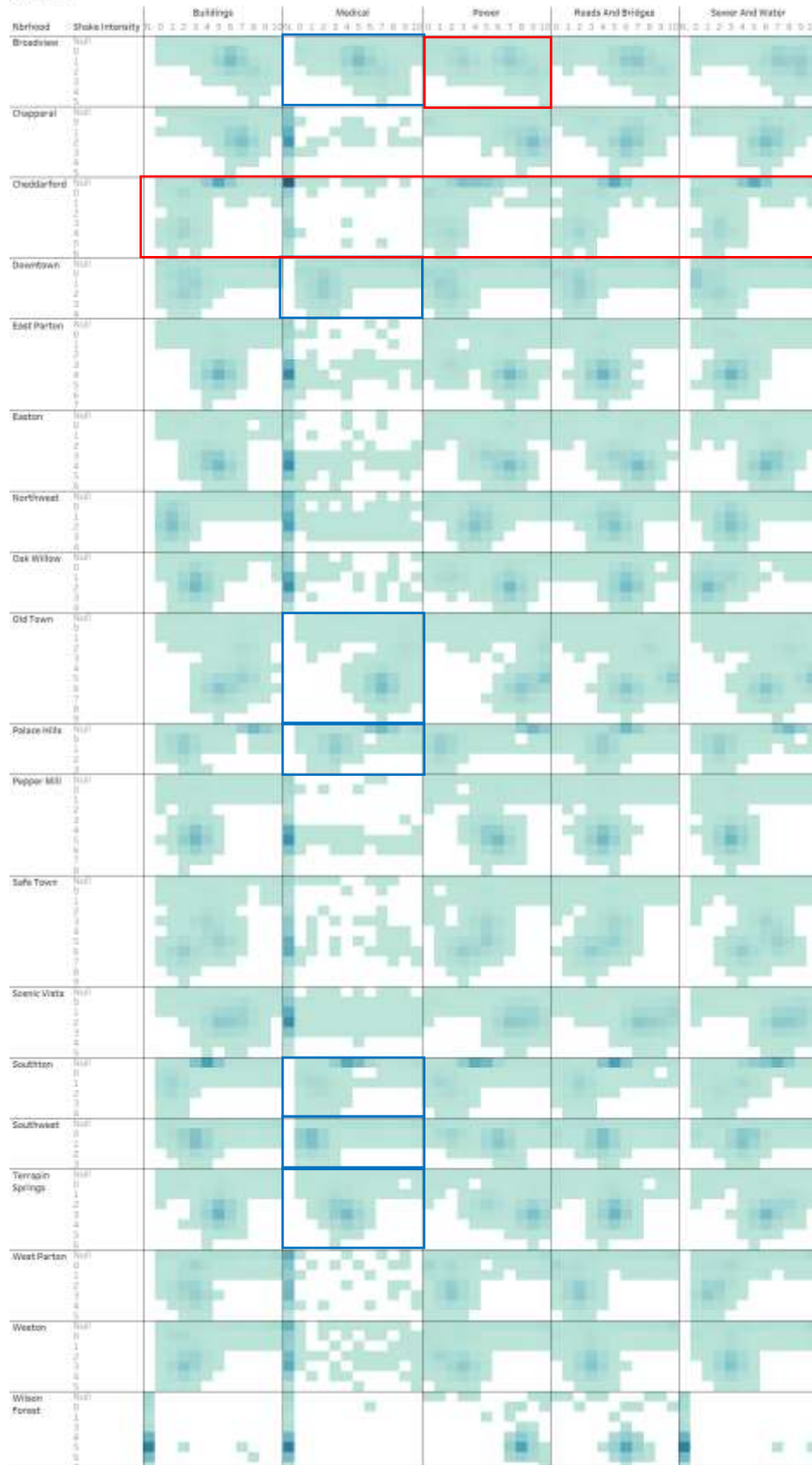
First, we look at the neighborhood's response in the damage intensity of buildings, power, road & bridges and sewer & power vs the shake intensity as shown in Figure 2-1. The smaller and darker, and more converge of all the squares indicate a more reliable of neighborhood reports. Furthermore, when there is more than 2 converge area, we look at the 2 areas, high shake intensity with high damage level indicate a reliable report.

The graph reveals that Chapparal, East Parton, Easton, Northwest, Oak Willow, Pepper Mill and Terapin Springs gives more reliable reports in power, building, sewer& water and road& bridge. And Wilson Forest doesn't give reliable reports on buildings, medical and sewer& water as they may not have many buildings and sewer& water utilities, but it gives reliable power and road& bridge reports.

Next, we look at the medical reports among the neighborhoods. It reveals that Broadveiw, Old Town and Terapin Springs give reliable damage report of medical.



# Sheet 10



Not reliable. Same shake intensity has 2 values in Power.

Reliable.

Not reliable. No shake intensity but gives around 5 damage level.

Not reliable. Converge area is not obvious.

Reliable.

Reliable.

Reliable.

Reliable.

Not reliable. High shake intensity but low damage level

Not reliable. Converge area is not obvious.

Reliable.

Not reliable. High shake intensity but low damage level.

Not reliable. Same shake intensity but different damage level

Not reliable. Damage response doesn't have much relationship with shake intensity.

Not reliable. Same shake intensity different damage level

Reliable.

Not reliable. Different shake intensity but same damage level

Not reliable. Data points are diverged.

Reliable on power and read& bridge.

The figure 2-2 reveals that for some of the neighborhood, they don't have any reports, it maybe due to system down of the application. For example, system doesn't receive any reports from Broadview from 7th April 2020 12PM to 8th April 2020 11PM and when it starts to receive, it suddenly receives a large amount of reports with higher damage level. Another example is that for Pepper Mill, system doesn't receive any reports from Broadview from 10th April 2020 9AM to 10th April 2020 7PM and there is no obvious increasement in amount of reports after system restarts.

As we don't know whether there is a system down issue during the period and the reason of the amount of damage reports increase rapidly immediately after the system down period is due to cumulated reports in the down period, there exists uncertainty in Broadview, Chapparal, Old town, Scenic Vista. Similarly, although there is no sudden increase when the system restart, we still not sure that whether there are no reports during this period or reports is lost due to system down. It also exists uncertainty in Oak Willow, Pepper Mill and Safe Town.

As a result, we cross check Figure 2-1 and 2-2 and conclude that East Parton, Easton, Northwest gives reliable reports in power, building, sewer& water and road& bridges. Wilson Forest gives reliable power and road& bridge reports. And Terapin Springs gives reliable reports of all damage types.



## Overview



### Part 3 – all about changes over time

How do conditions change over time? How does uncertainty in change over time? Describe the key changes you see. Limit your response to 500 words and 8 images.

As shown in Figure 3-1, it reveals that most of neighborhoods have less amount of reports with same or lower major damage level and the damage level are more diverged day by day after major earth quake.

But there are some parts of the city's condition didn't become well and even worse. Broadview's sewer& water damage's major damage level raised. People in Old Town still can feel strong shake intensity and its building, power, roads& bridge, sewer& water's damage become more serious day by day. The medical's condition doesn't have much change over time. Scenic Vista's number of damage reports decreased, and the damage level are more diverge. But the major damage level increase day by day.

