

CALGARY FLOOD CRISIS JUNE 2013

THE CITY OF CALGARY TRAFFIC MANAGEMENT CENTRE

YEATLAND WONG, P. Eng.
Traffic Division
The City of Calgary



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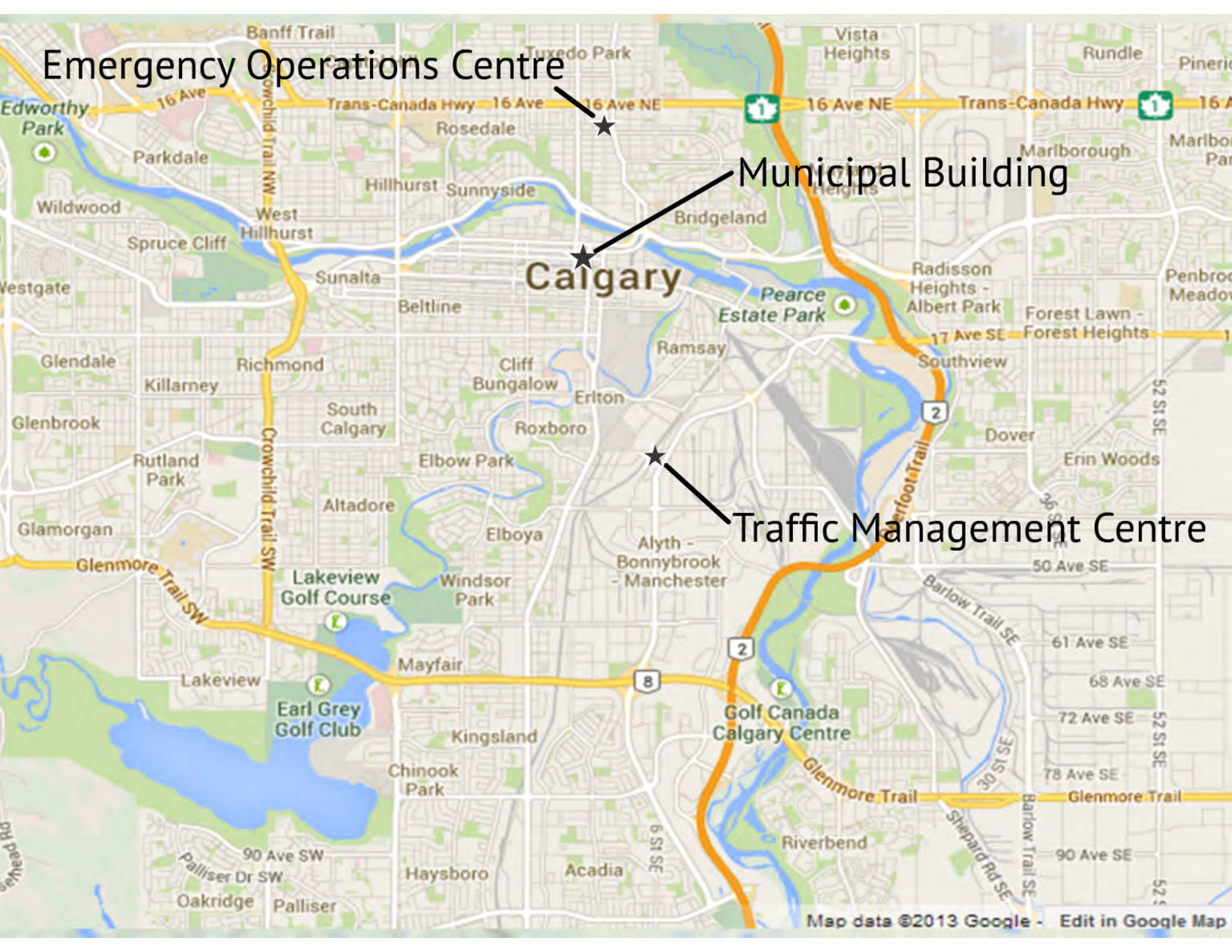
YEATLAND WONG, P. Eng.
Traffic Division
The City of Calgary



Emergency Operations Centre

Municipal Building

Traffic Management Centre



PREPAREDNESS

EOC

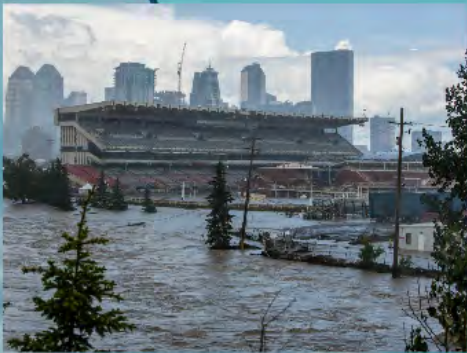


TMC

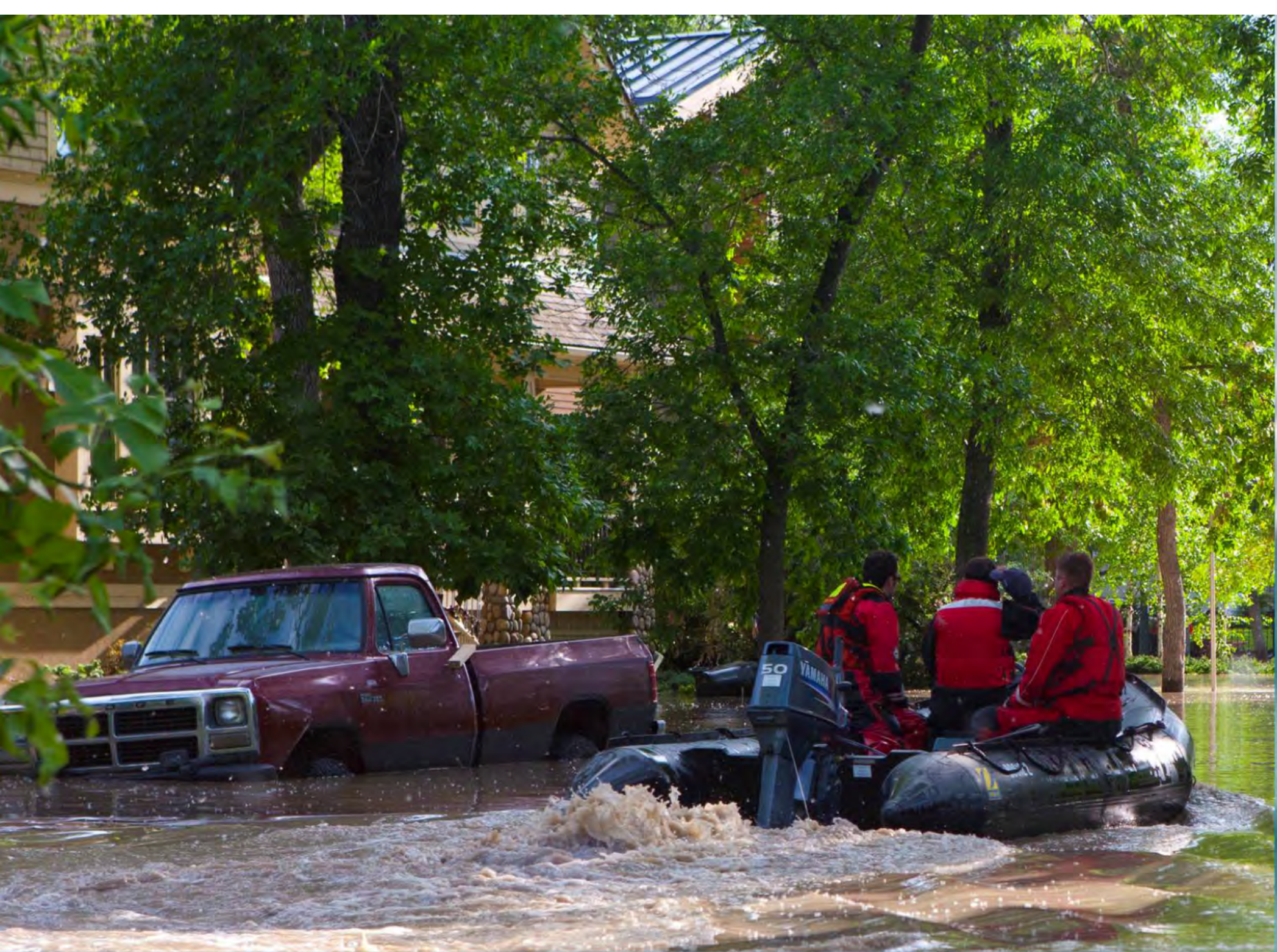
- Emergency Power ✓
- TELVENT - MIST ✓
 - Emergency Signal Plans ✓
- ATIS / TAR ✓
 - Website/GIS Mapping ✓
 - Traffic Radio ✓
- PTZ/CCTV ✓
- Network Redundancy ✓
- Evacuation Plans ✓

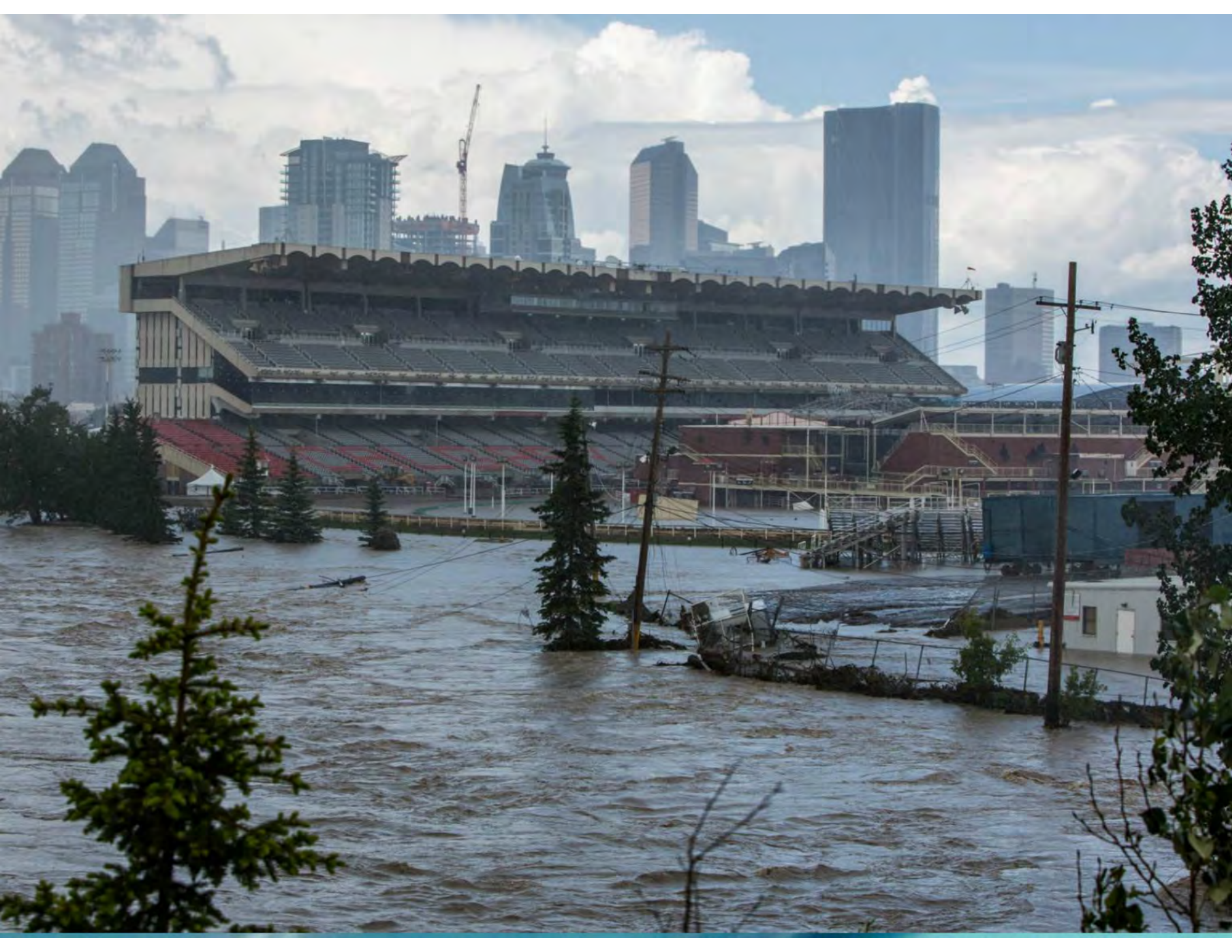


FLOOD JUNE 20, 2013



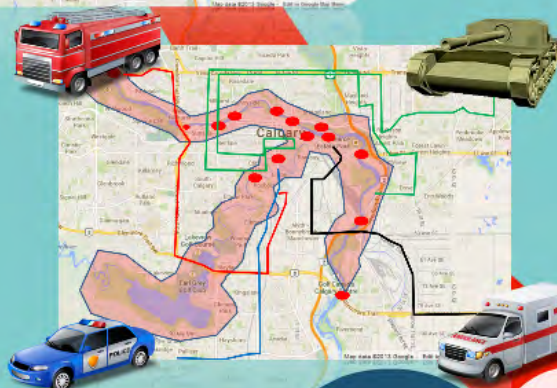
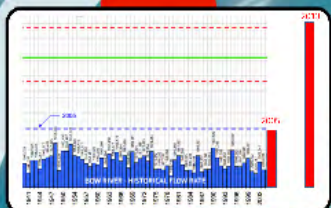








RESPONSE



- Loss of TMC Power: 1 in 2 Years?
- Loss of Phone: 1 in 3 Years?
- Loss of Network: 1 in 2 Years?
- Total Emergency Shutdown: 4 in 2 Years?
- Flood probability: 1 in 100 years?

$$\frac{1}{2 \times 365} \times \frac{1}{5 \times 365} \times \frac{1}{1 \times 365} \times \frac{1}{4 \times 365} \times \frac{1}{100 \times 365}$$

... = 1 in 53,290,000

Probability

Your child is a genius
1 in 250



Probability

Hit in One
1 in 2500



Probability

Hit in One
1 in 5000



Probability

Death by Lightning:
1 in 2,500,000



Death by Fugu Blowfish in Japan
1 in 3,000,000



TMC/ITS FAILURES

- Flood
- Loss of TMC Power
- Loss of Phone
- Loss of Network
- Loss of CCTV
- Loss of VMS/DMS communications
- Loss of Traffic Signal Control
- Loss of Traffic Advisory Radio
- Flooding of 500 Lane kms of roadway
- 95% of bridges closed / unscalable
- Loss of Traveller Information Website / GDS

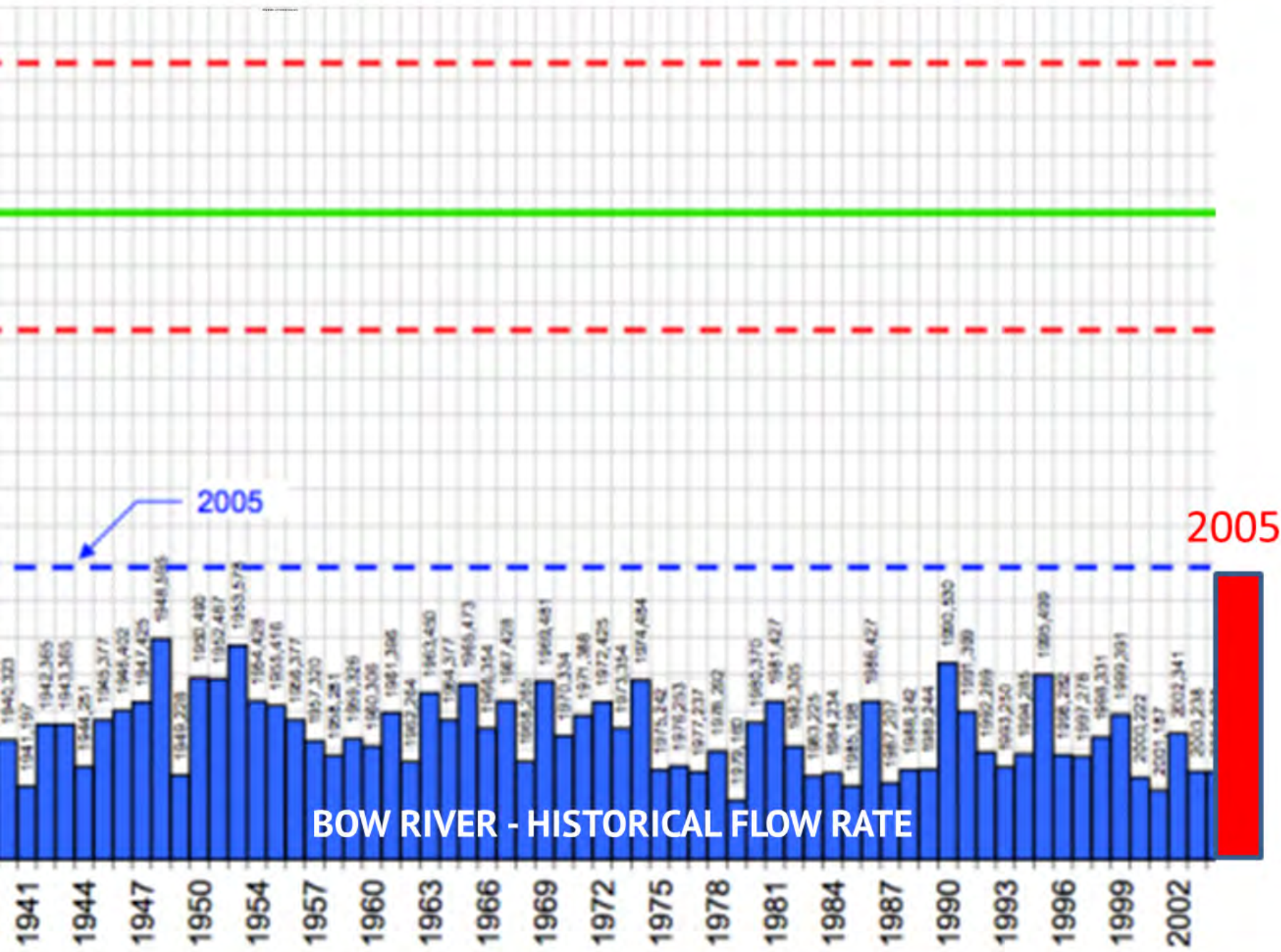
WHAT WAS STILL WORKING?

- paper
- horns
- hand-drawn maps
- cell phones / cell cameras
- one lead

SOLUTION



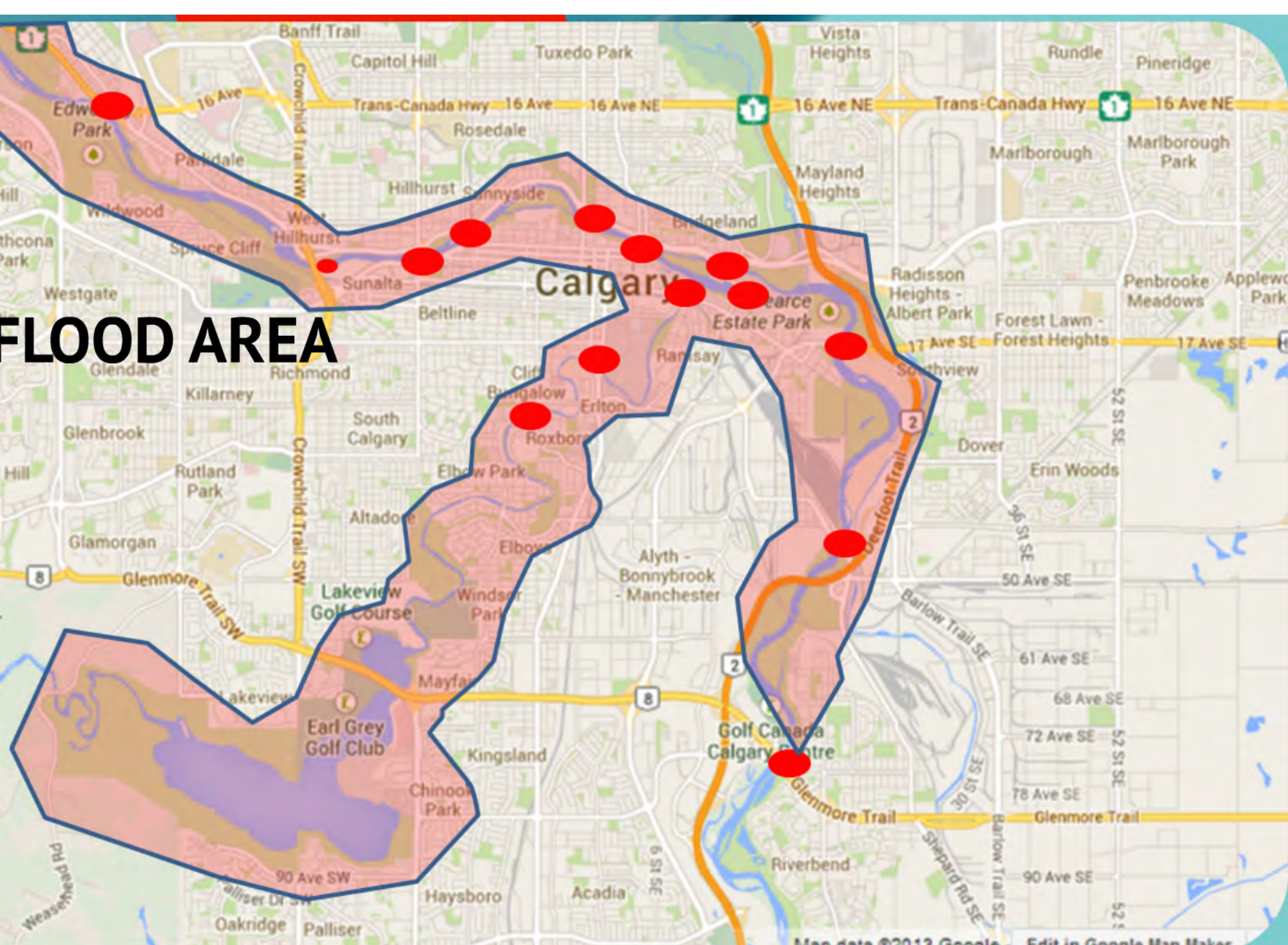
2013

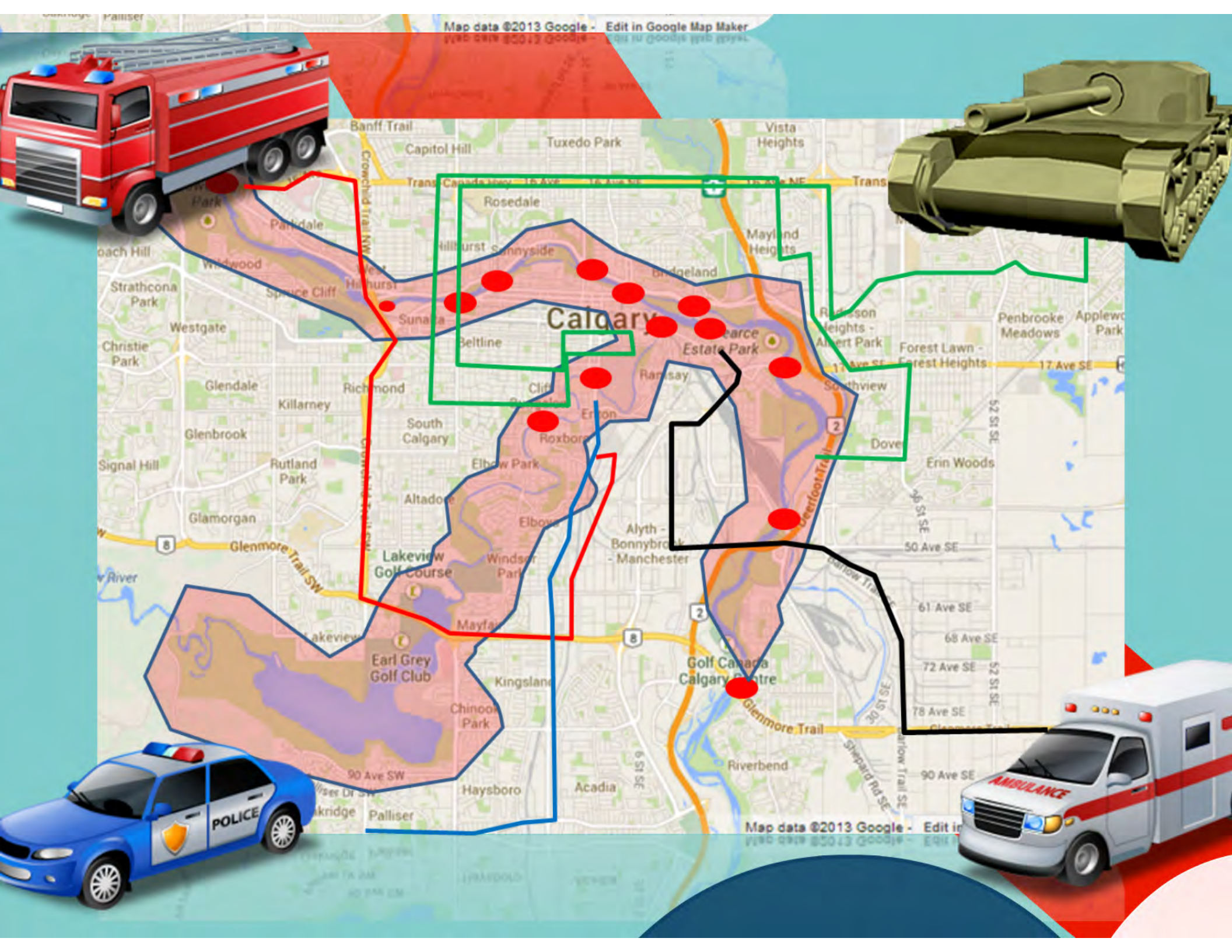


BOW RIVER - HISTORICAL FLOW RATE



FLOOD AREA





Map data ©2013 Google - Edit in Google Map Maker

Map data ©2013 Google - Edit in Google Map Maker

Calgary

POLICE

AMBULANCE

TMC ITS FAILURES



- Flood
- Loss of TMC Power
- Loss of Phone
- Loss of Network
- Loss of CCTV
- Loss of VMS/DMS communications
- Loss of Traffic Signal Control
- Loss of Traffic Advisory Radio
- Flooding of 800 lane kms of roadway
- 95% of bridges closed / unsafe
- Loss of Traveller Information Website / GIS

WHAT

- p
- p
- h
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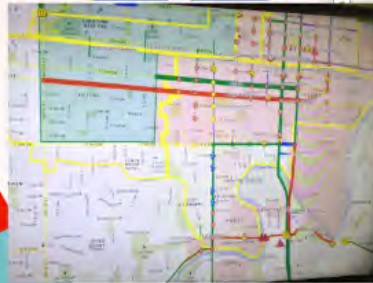
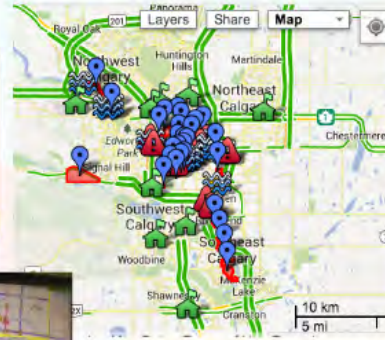
WHAT WAS STILL WORKING?

- paper
- pens
- hardcopy maps
- cell phones / cell cameras
- one ipad

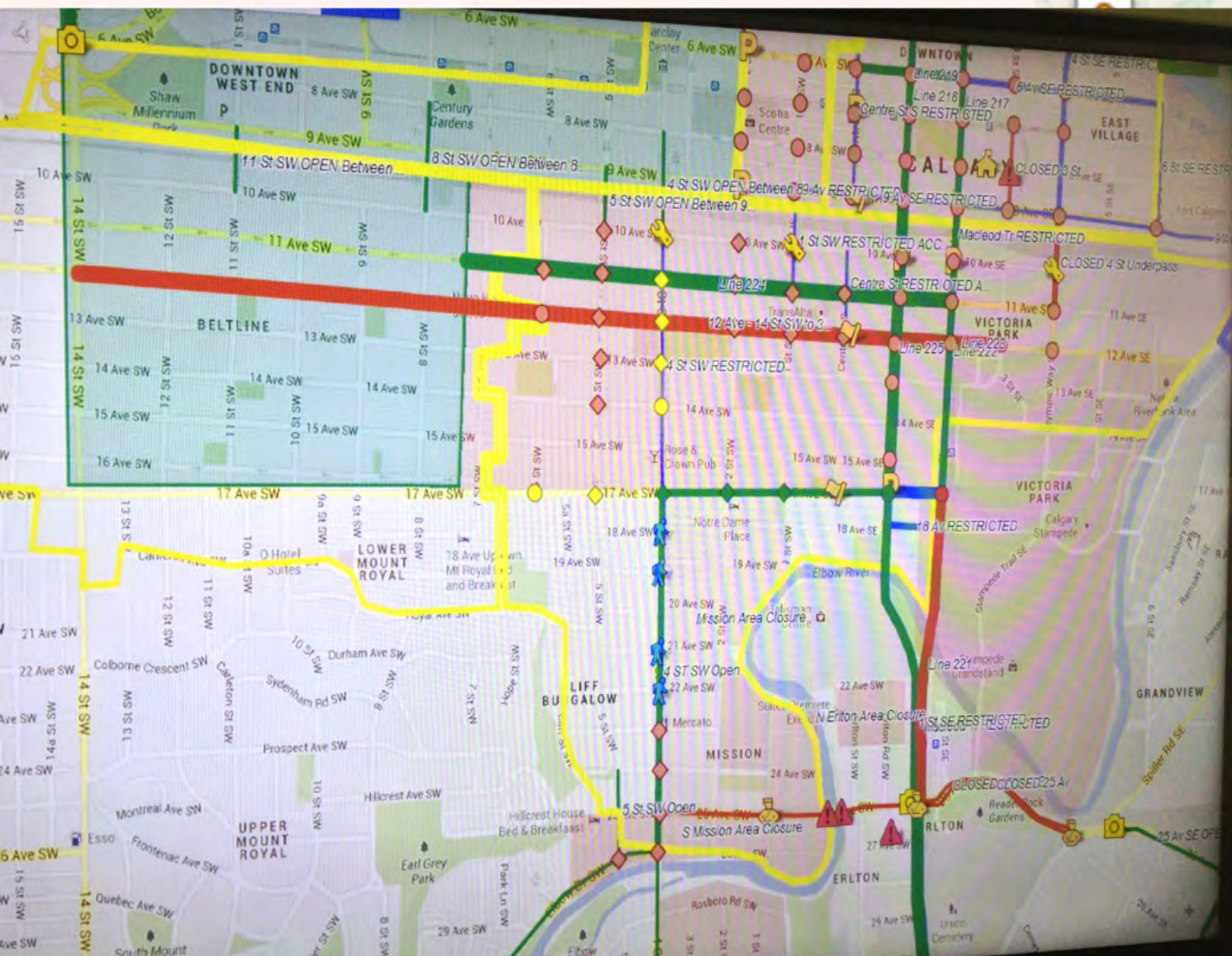
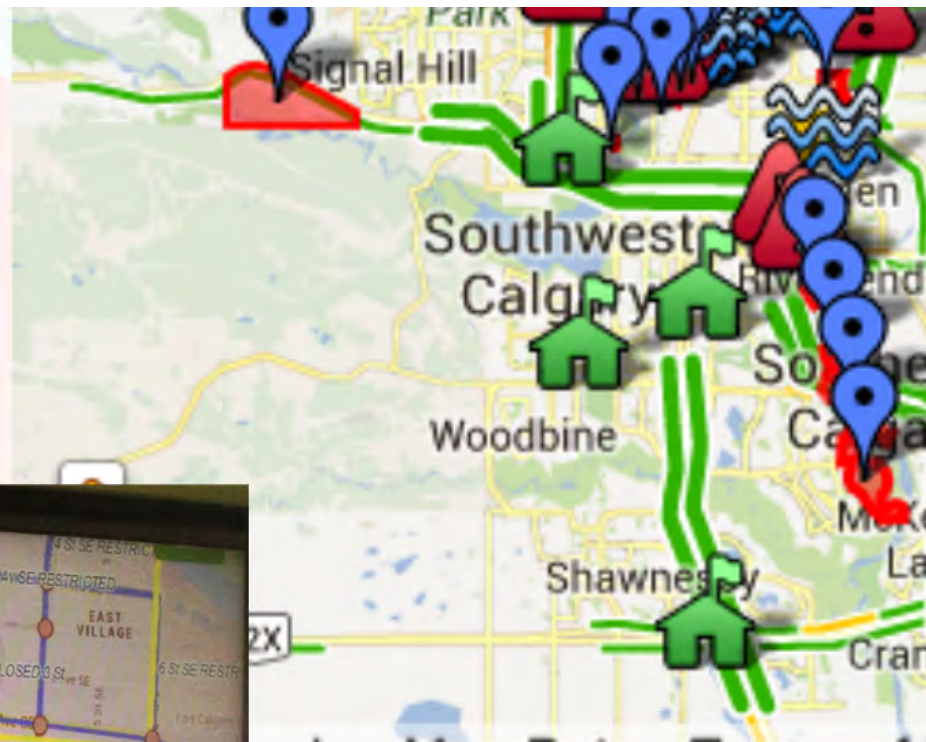
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way

SOLUTION



Mobile Devices
Google Online Crisis Map
Social Media Distribution



RECOVERY

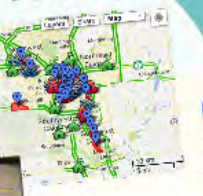
7 days later:

- re-opened downtown
- re-opened train service
- all evacuated areas re-opened
- most power restored
- most bridges/roads restored
- restored computer network
- restored traffic signal communications

DAY 8



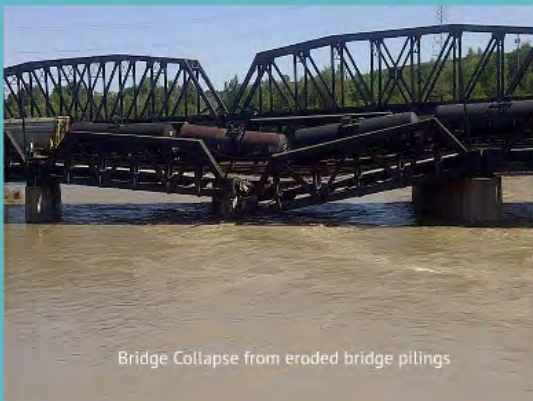
TION



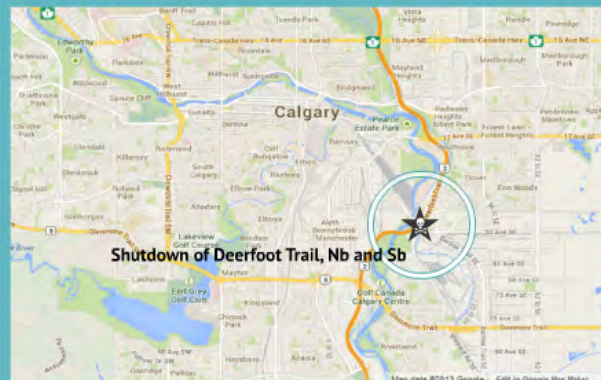
Mobile Devices
Google Online Crisis Map
Social Media Distribution



DAY 8



Bridge Collapse from eroded bridge pilings

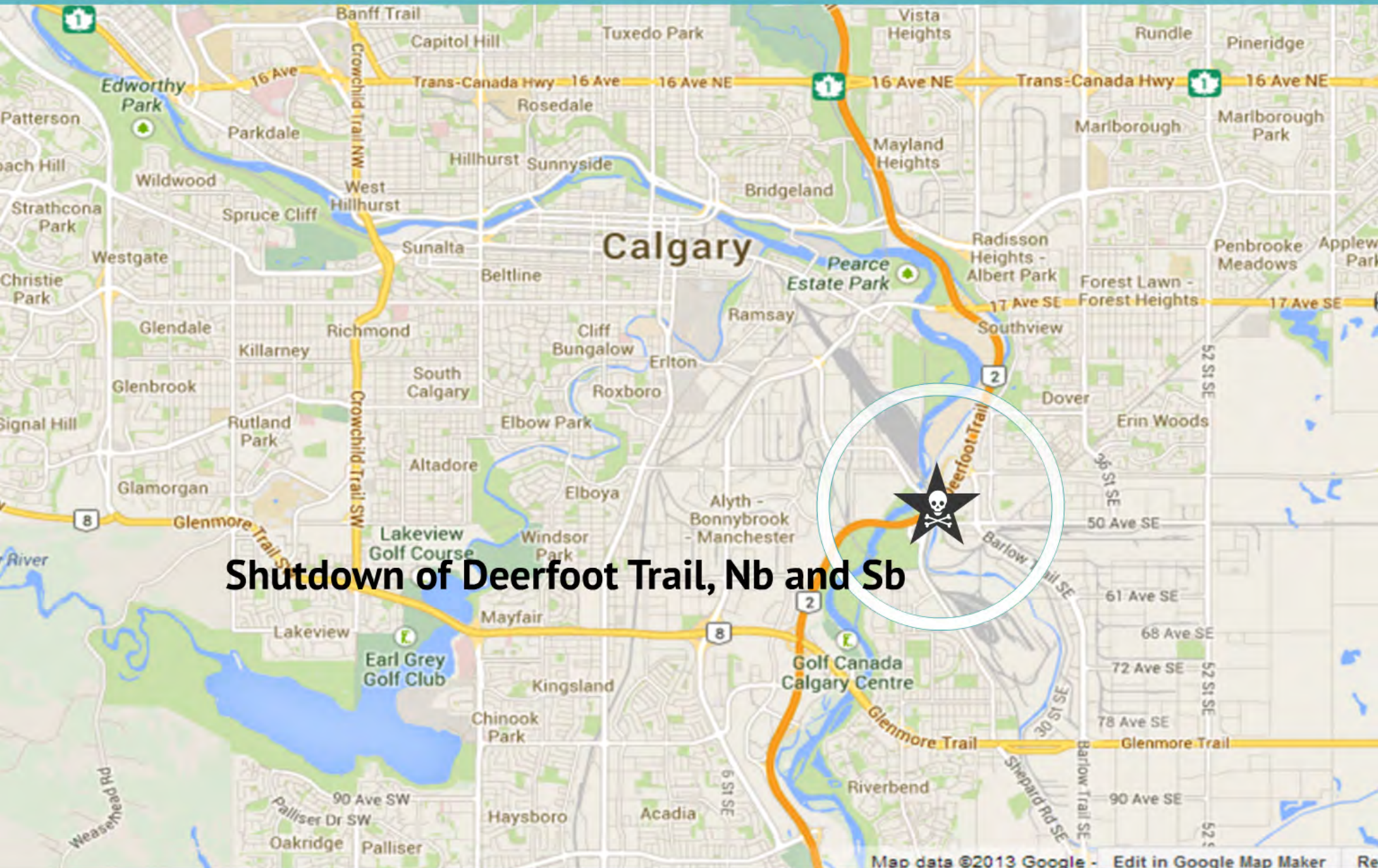


Shutdown of Deerfoot Trail, Nb and Sb





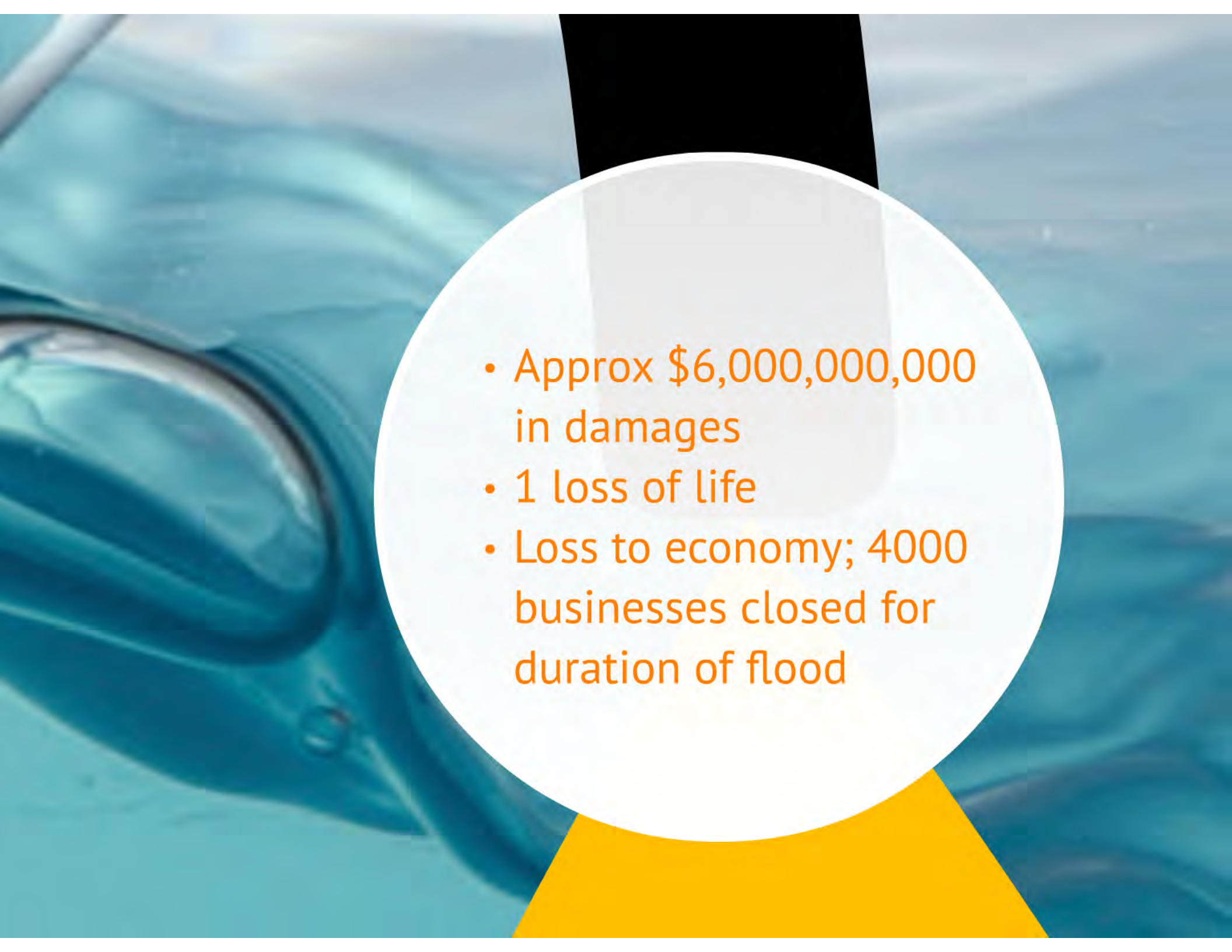
Bridge Collapse from eroded bridge pilings



Shut down of Deerfoot Trail, Nb and Sb



Opening Day of the
Calgary Stampede

- 
- Approx \$6,000,000,000 in damages
 - 1 loss of life
 - Loss to economy; 4000 businesses closed for duration of flood



MITIGATION

- resilient network rings
- riverbank flood mitigation
- Next Gen Traffic Management Centre
- phone network upgrades

PREPAREDNESS



MITIGATION

- resilient network rings
- riverbank flood mitigation
- Next Gen Traffic Management Centre
- phone network upgrades



RESPONSE

FLOOD AREA

8 THINGS YOU MIGHT NOT EXPECT IN AN EMERGENCY

The Response phase is depicted as a complex dashboard. It features a bar chart at the top left, a map of the 'FLOOD AREA' with red markers, and a detailed map below showing emergency vehicle positions. To the right, there are several circular icons representing different aspects of the response: 'Priority' (a person), 'Procedures' (a checklist), 'Publicity' (a megaphone), 'Resources' (a truck), and 'Weather' (a cloud). A large blue arrow points from the Response phase towards the Recovery phase.

RECOVERY

- 7 days later:
- re-opened downtown
 - re-opened train service
 - all evacuated areas re-opened
 - most power restored
 - most bridges/roads restored
 - restored computer network
 - restored traffic signal communications



SOLUTION



8 THINGS YOU MIGHT NOT EXPECT IN AN EMERGENCY

THERE ARE
24 HRS
IN A DAY



TIRED



FAILURE



TOP DOWN
COMMAND...
IS TOO SLOW



WIRES WILL
BE
CROSSED



RESOURCES
NEED TO BE
WASTED



LOTS OF
SOLDIERS...
NOT ENOUGH
GENERALS



TIME IS
OF THE
ESSENCE..



ALL
RE

CASCADE
FAILURE



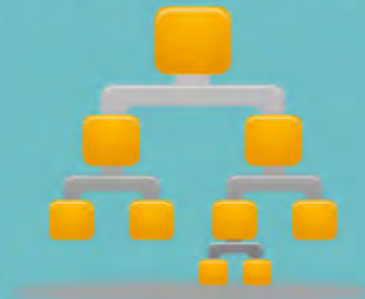
TOP DOWN
COMMAND...
IS TOO SLOW



THINGS



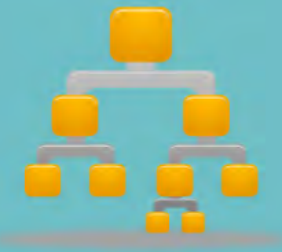
**TOP DOWN
COMMAND...
IS TOO SLOW**



OT

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TIME IS
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ESSENCE..



EMERGENCY

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EMERGENCY

LOTS OF
SOLDIERS...
NOT ENOUGH
GENERALS



TIME IS
OF THE
ESSENCE



EXPEC

EMER

**RESOURCES
NEED TO BE
WASTED**



**LOTS OF
SOLDIERS...
NOT ENOUGH**

TIRED



THERE ARE
24 HRS
IN A DAY



8 THING
YOU MIGHT
EXPECT

YOU CAN'T TELL
WHEN YOU'RE
TIRED



RE ARE
4 HRS
A DAY

OPEN

& THINGS