



**Structure, Tower &  
Antenna Council**  
Conseil des structures,  
pylônes et antennes

# Safety on the Moo-ve: Mobile Tower Safety

*April 18, 2018*

KC Yip, TELUS

Deana Spring, WSP (Moderator)



# 2018 STAC Conference

## COW Safety

Presenter: Xerxes (KC) Yip  
Date: 2018/04/18

# Agenda

---

- 1 What is COW?
- 2 Purposes of COW
- 3 Types of COW
- 4 Parts of COW
- 5 COW Inspection



# Agenda

---

- 6 Safety Equipment
- 7 COW Maintenance
- 8 Fueling Safety
- 9 Site Visits & Survey
- 0 COW Planning Demo



# What is C.O.W.?

➡ Cell On Wheels





# Purposes of C.O.W.

## Purposes of C.O.W.

- Special Events

For Examples: Calgary Stampede, Concerts, Fireworks

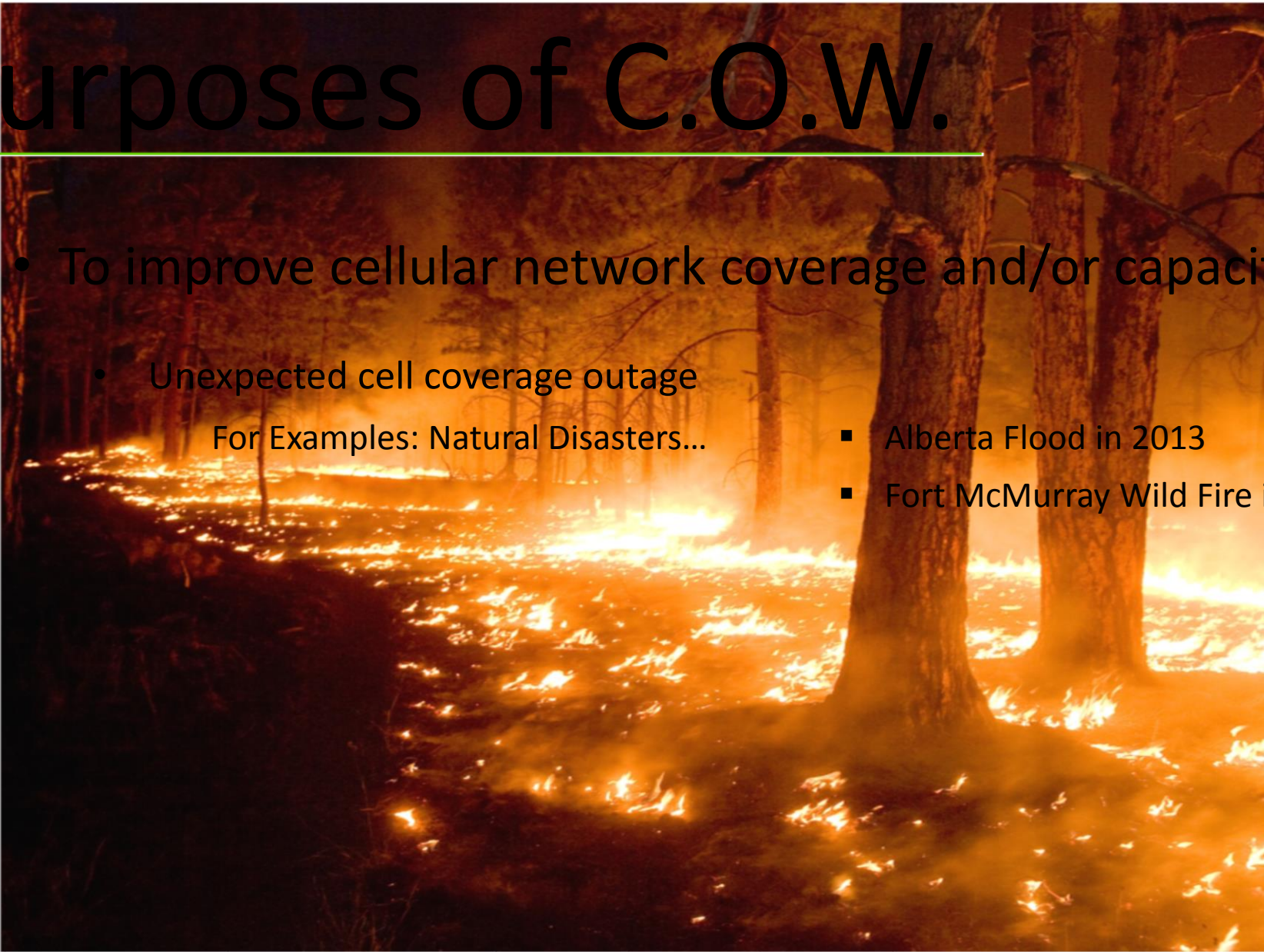
- To improve cellular network coverage and/or capacity





# Purposes of C.O.W.

- To improve cellular network coverage and/or capacity
  - Unexpected cell coverage outage
    - For Examples: Natural Disasters...
    - Alberta Flood in 2013
    - Fort McMurray Wild Fire in 2016



# Types of Co.W.

---

- Guyed or Un-guyed
- Extendable Self-Support or Monopole
- Tower Height: 10m - 60m
- Stand-alone Trailer
- Tower attached to Vehicle



Red & White



Holstein



Jersey



Milking Shorthorn



Ayrshire



Brown Swiss



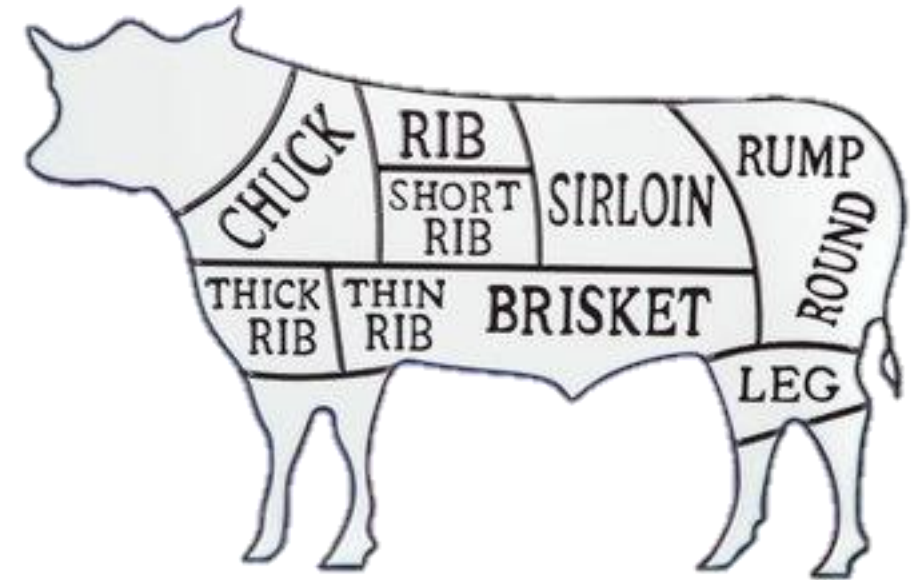
Guernsey



# Parts of Co.W.

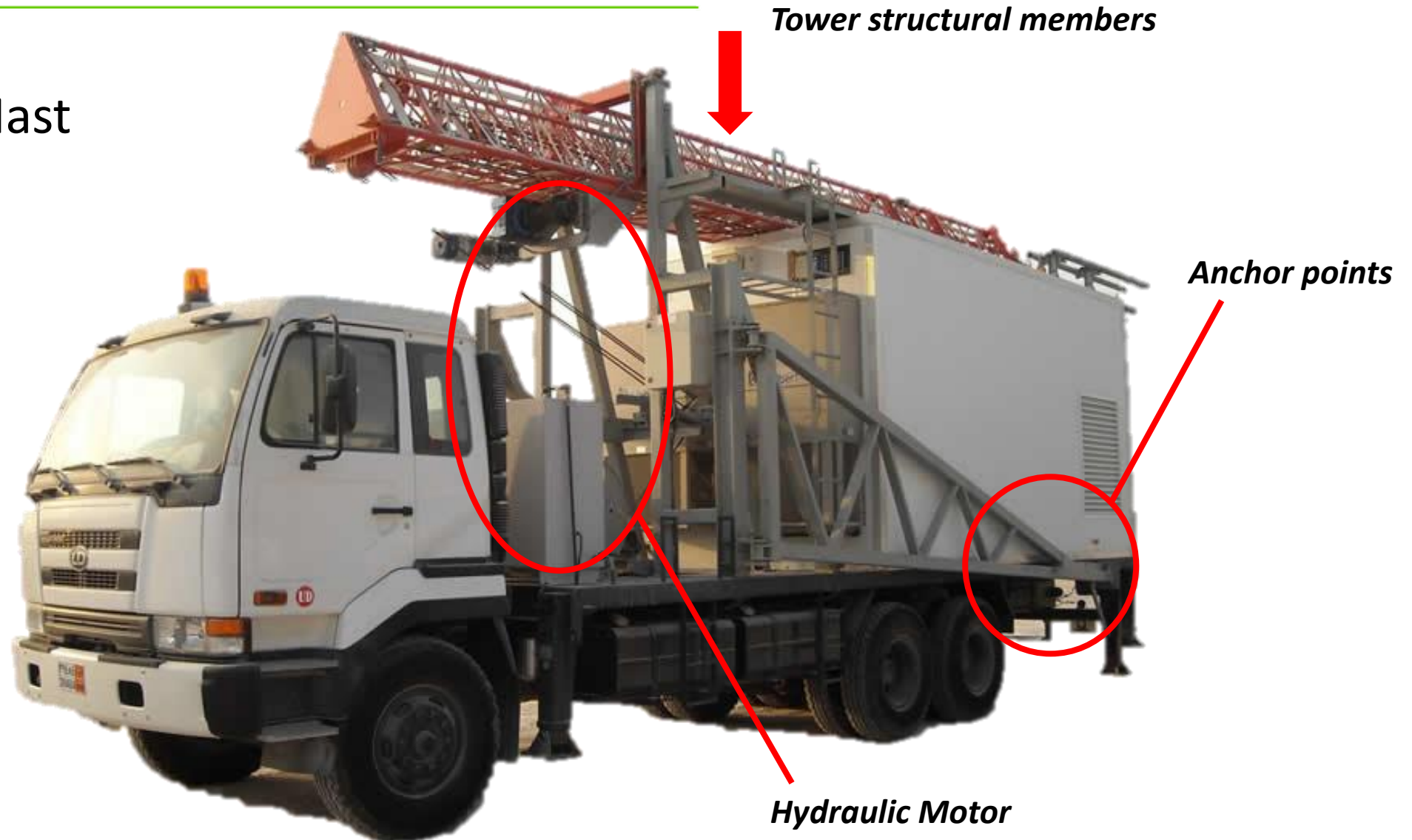
---

- Tower Mast
- Equipment Shelter
- Cellular Equipment (Outdoor)
- Cellular Equipment (Indoor)
- Power Source
- Vehicle



# Parts of C.O.W.

- Tower Mast



# Parts of C.O.W.

- Equipment Shelter





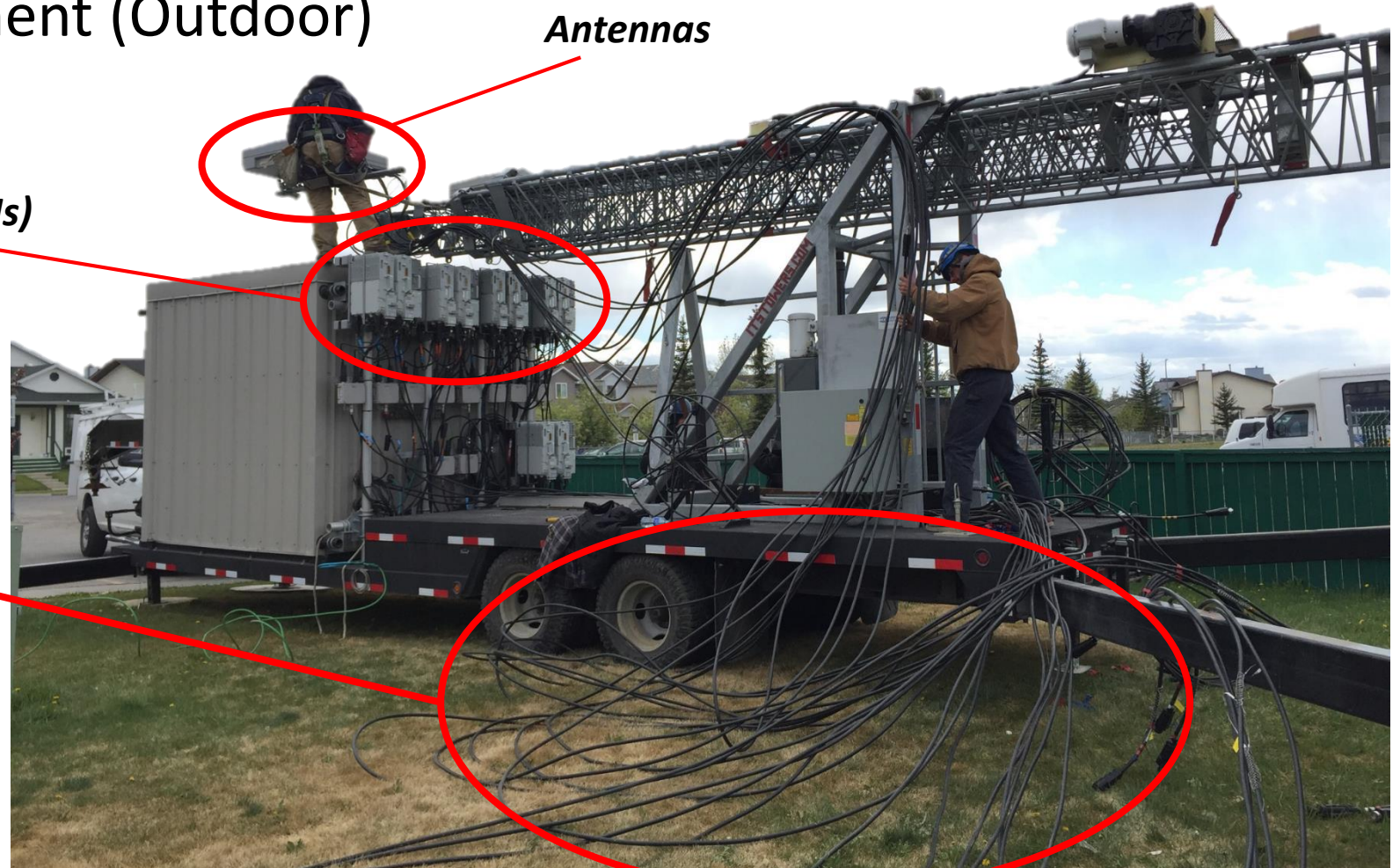
# Parts of C.O.W.

- Cellular Equipment (Outdoor)

*Antennas*

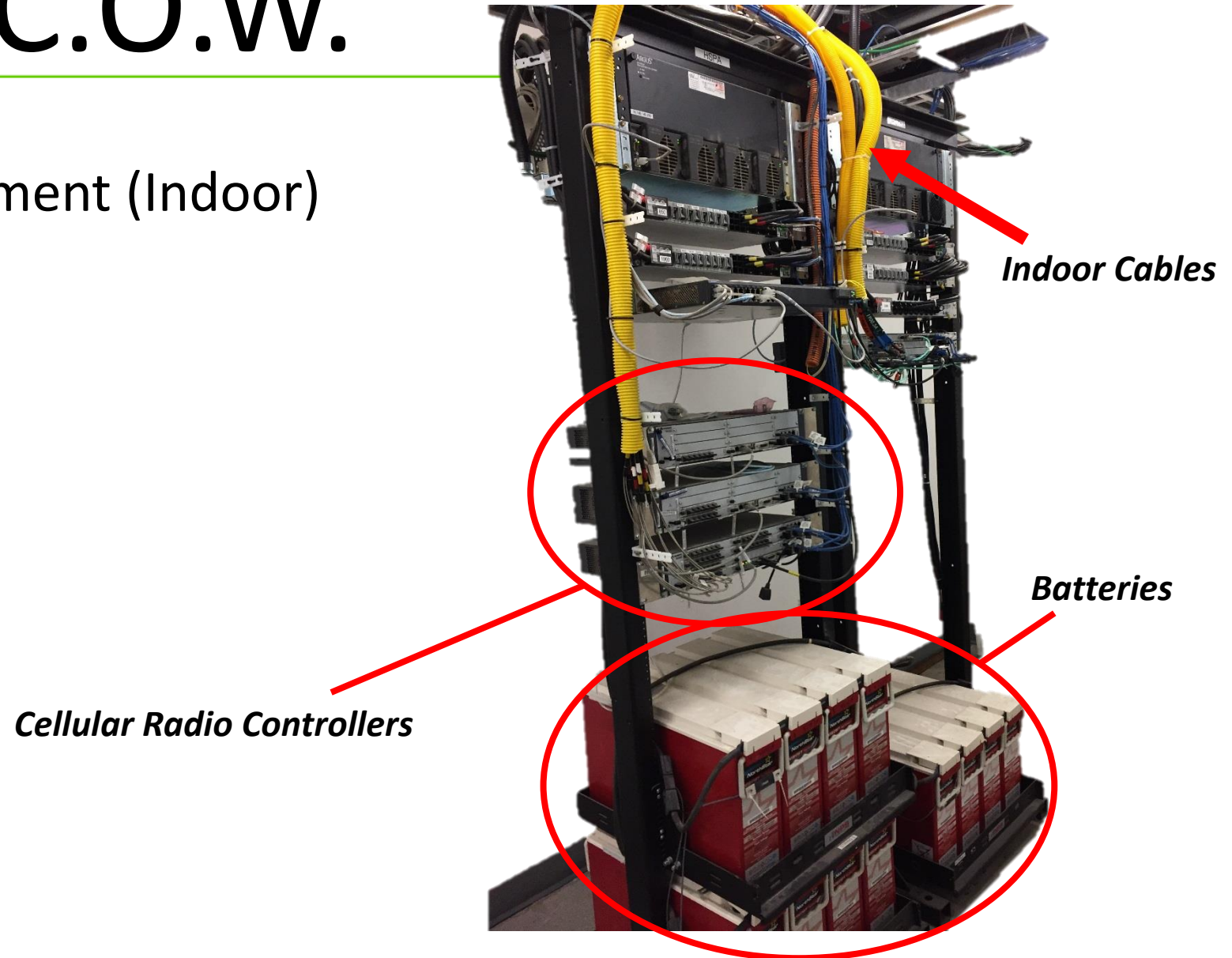
*Remote Radio Units (RRUs)*

*Cables – Power & Fibers*



# Parts of C.O.W.

- Cellular Equipment (Indoor)



# Parts of C.O.W.

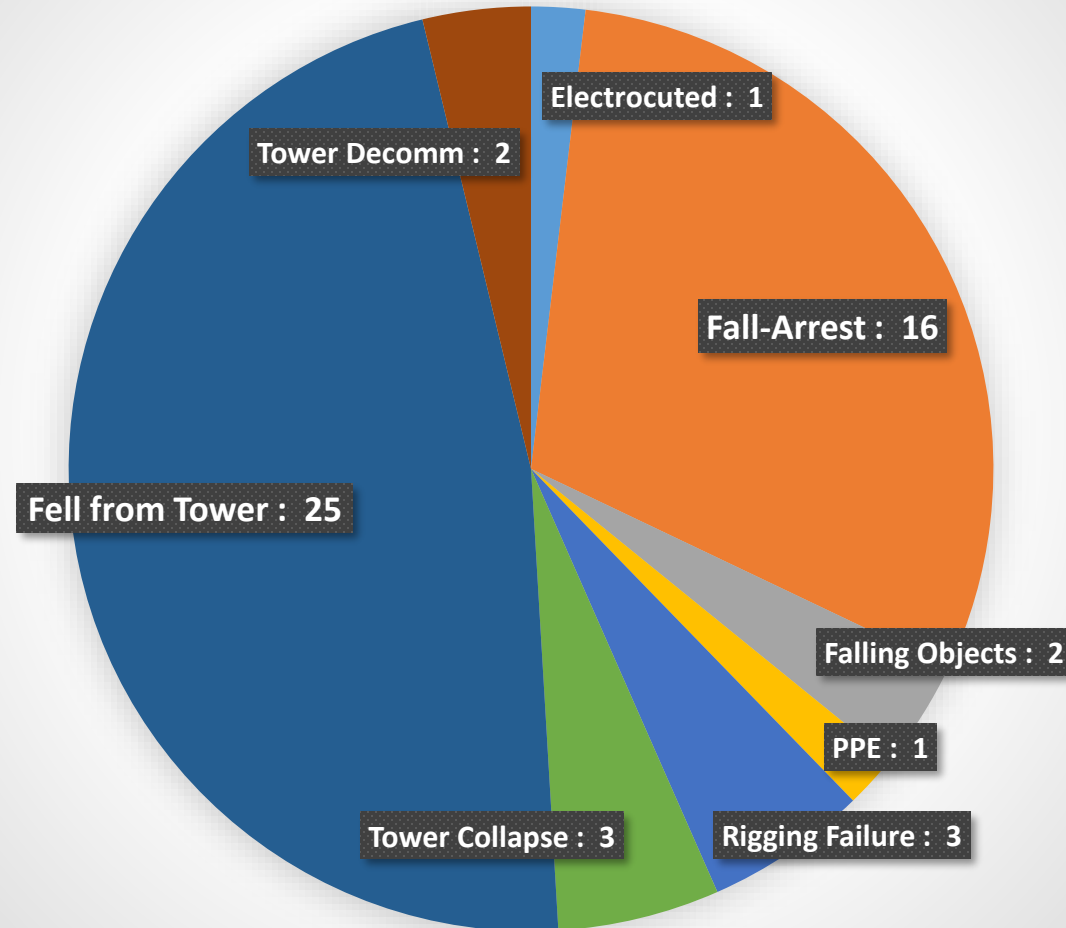
- Power Source
  - Local Power (AC power from local area)
  - Generator (built-in/rent)



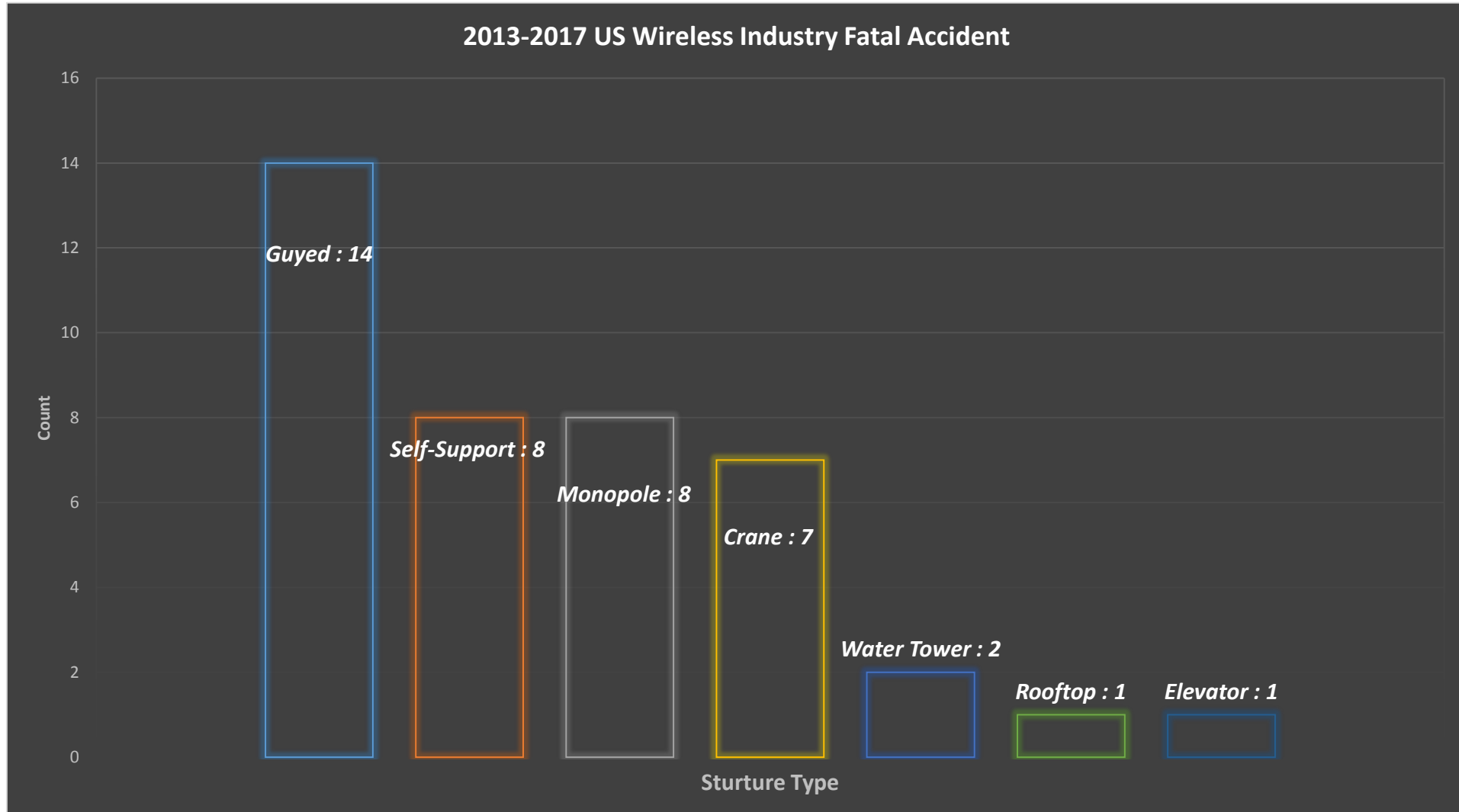


# US Fatal Accident Data

2013-2017 US Wireless Industry Fatal Accident



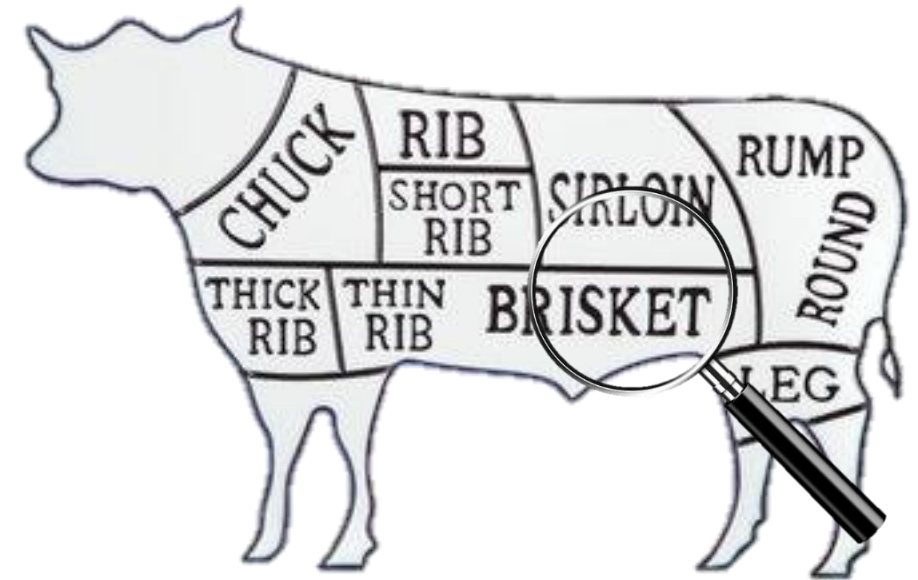
# US Fatal Accident Data



# C.O.V.W. Inspection

---

- Pre & Post Deployment Inspection
- Annual Audit and Inspection
- Crane Inspection





# C.O.W. Inspection

- ~~Arm & Post Deploy Inspection~~
  - Check integrity of the tower and guy wire components
  - Look for leaks on hydraulic components
  - Look for leaks on generator and fuel tank
  - Check trailer condition
  - ~~Basic Vehicle Inspection~~



# C.O.W. Inspection

---

- Annual Audit and Inspection
  - Check integrity of the tower and guy wire components
  - Look for leaks on hydraulic components
  - Look for leaks on generator and fuel tank
  - Check trailer condition
  - Detail Vehicle Inspection
  - Equipment Audit
  - Equipment Inspection: Mounts and Cables
  - Hydraulic Motor Test Run



# C.O.W. Inspection

- Crane Inspection
  - Confirm recent passed Crane Inspection Report (within 1 year) and maintenance records before deploying/hiring
  - Confirm valid crane operation licenses
  - Visual Inspection prior operating, such as check for any loose components
  - Advise contractor to check for any overhead objects prior operating
  - Advise contractor to maintain clear communication while operating





# Safety Equipment

- Personal Protective Equipment (PPE)
- Fall Protection Equipment
- Emergency Equipment
- Area Control Equipment
- Safety Equipment Inspection



# Safety Equipment

- Personal Protective Equipment (PPE)
  - must be equipped once within “controlled area”
  - Protective Helmet (CSA approved)
  - Protective Eyewear (CSA approved)
  - Safety Gloves
  - High-Visibility Vest
  - Protective Footwear (CSA approved)



# Safety Equipment

- Fall Protection Equipment
  - Contractors to have proper Fall Protection training
  - Must be equipped prior accessing 2.4m or above from lower level
- Safety Harness
- Lanyard & Hooks



# Safety Equipment

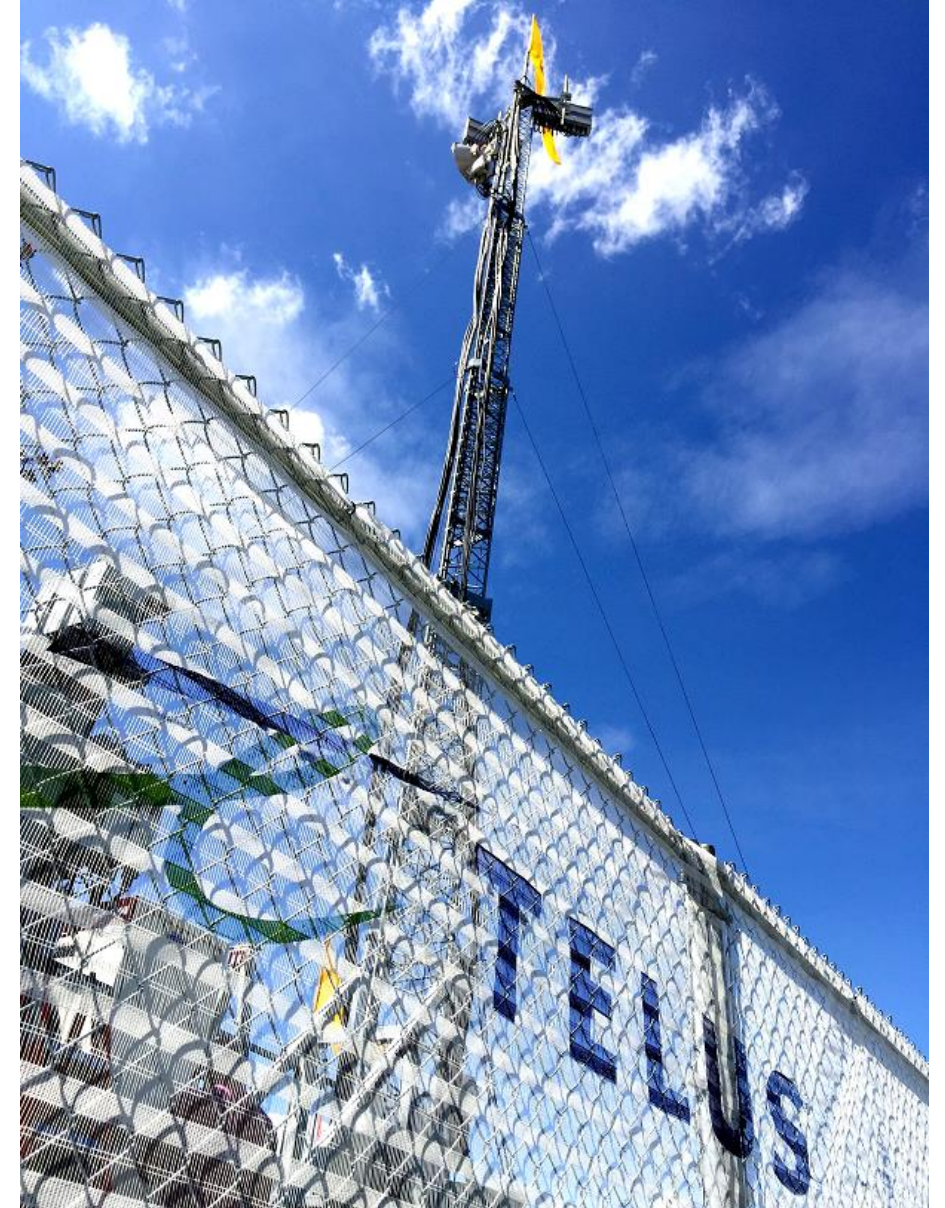
- Emergency Equipment
  - Contractors to have proper First Aid training
  - Fire Extinguisher – Powder Type
  - First-Aid Kit
  - Eye wash station





# Safety Equipment

- Area Control Equipment
  - Controlled area:  
20m radius from tower (Height < 40m)
  - Fences and Warning Signage
  - Tripping Protection Gear



# Safety Equipment

---

- Safety Equipment Inspection
  - Perform Basic Inspection on Safety Equipment before usage
  - Schedule Regular Inspection on All Safety Equipment







# C.O.W. Maintenance

---

- Tower & Shelter Maintenance
  - Resolving any reported deficiency from inspection
- Vehicle Maintenance
  - Regular Scheduled Vehicle Maintenance
- Generator Maintenance
  - Regular Scheduled Generator Maintenance
- Safety Equipment Maintenance
  - Replace All defective Safety Equipment at once





# Fueling Safety

- Valid Licenses (Meet Provincial Requirement)
  - Provincial Dangerous Goods Transportation and Handling Act and Dangerous Goods Transportation and Handling Regulation
  - Federal Transportation of Dangerous Goods Regulation (TDG)
  - <http://www.transportation.alberta.ca/519.htm>

**DIESEL FUEL**

**HAZARD WARNING: IRRITANT, COMBUSTIBLE**

**TARGET ORGANS: EYES, SKIN, RESPIRATORY TRACT.**

**HEALTH HAZARD**  
4 Deadly  
3 Extreme Danger  
2 Hazardous  
1 Slightly Hazardous  
0 Normal Material

**FIRE HAZARD** FLAME POINT  
4 Below 73°F  
3 Below 100°F  
2 Below 200°F  
1 Above 200°F  
0 Will Not Burn

**SPECIFIC HAZARD**  
OX Oxidizer  
ALK Alkaline  
W Use No Water  
SA Simple Asphyxiant  
ACID Acid  
COR Corrosive  
\* Radioactive

**INSTABILITY**  
4 May Detonate  
3 Shock + Heat may Detonate  
2 Violent Chemical Change  
1 Unstable if Heated  
0 Stable

**PROTECTIVE EQUIPMENT FOR HANDLING MATERIALS**

**NO SMOKING** **CHEMICAL GOGGLES** **CHEMICAL GLOVES** **EYE WASH** **SHOWER**

**CONFINED SPACE ENTRY PERMIT REQUIRED**

**EMERGENCY PHONE NUMBER**  
PH: \_\_\_\_\_

# Fueling Safety

- Detail Fueling Procedure
- Emergency Response Plans & Regular Practice
- Site survey prior deploying
- Personal Protective Equipment (PPE)



## DIESEL FUEL

**HAZARD WARNING: IRRITANT, COMBUSTIBLE**

**TARGET ORGANS: EYES, SKIN, RESPIRATORY TRACT.**

**HEALTH HAZARD**

4 Deadly  
3 Extreme Danger  
2 Hazardous  
1 Slightly Hazardous  
0 Normal Material



**FIRE HAZARD** FLAMMABLE

4 Below 73°F  
3 Below 100°F  
2 Below 200°F  
1 Above 200°F  
0 Will Not Burn

**SPECIFIC HAZARD**

OX Oxidizer  
ALK Alkaline  
W Use No Water  
SA Simple Asphyxiant  
ACID Acid  
COR Corrosive  
\* Radioactive

**INSTABILITY**

4 May Detonate  
3 Shock + Heat may Detonate  
2 Violent Chemical Change  
1 Unstable if Heated  
0 Stable

**PROTECTIVE EQUIPMENT FOR HANDLING MATERIALS**

  
**NO SMOKING**

  
**CHEMICAL GOGGLES**

  
**CHEMICAL GLOVES**

  
**EYE WASH**

  
**SHOWER**

**CONFINED SPACE ENTRY PERMIT REQUIRED**

**EMERGENCY PHONE NUMBER**

PH: \_\_\_\_\_

# Site Visits & Survey

What are we looking for?

- Selecting suitable location
- Safety and Risks measure









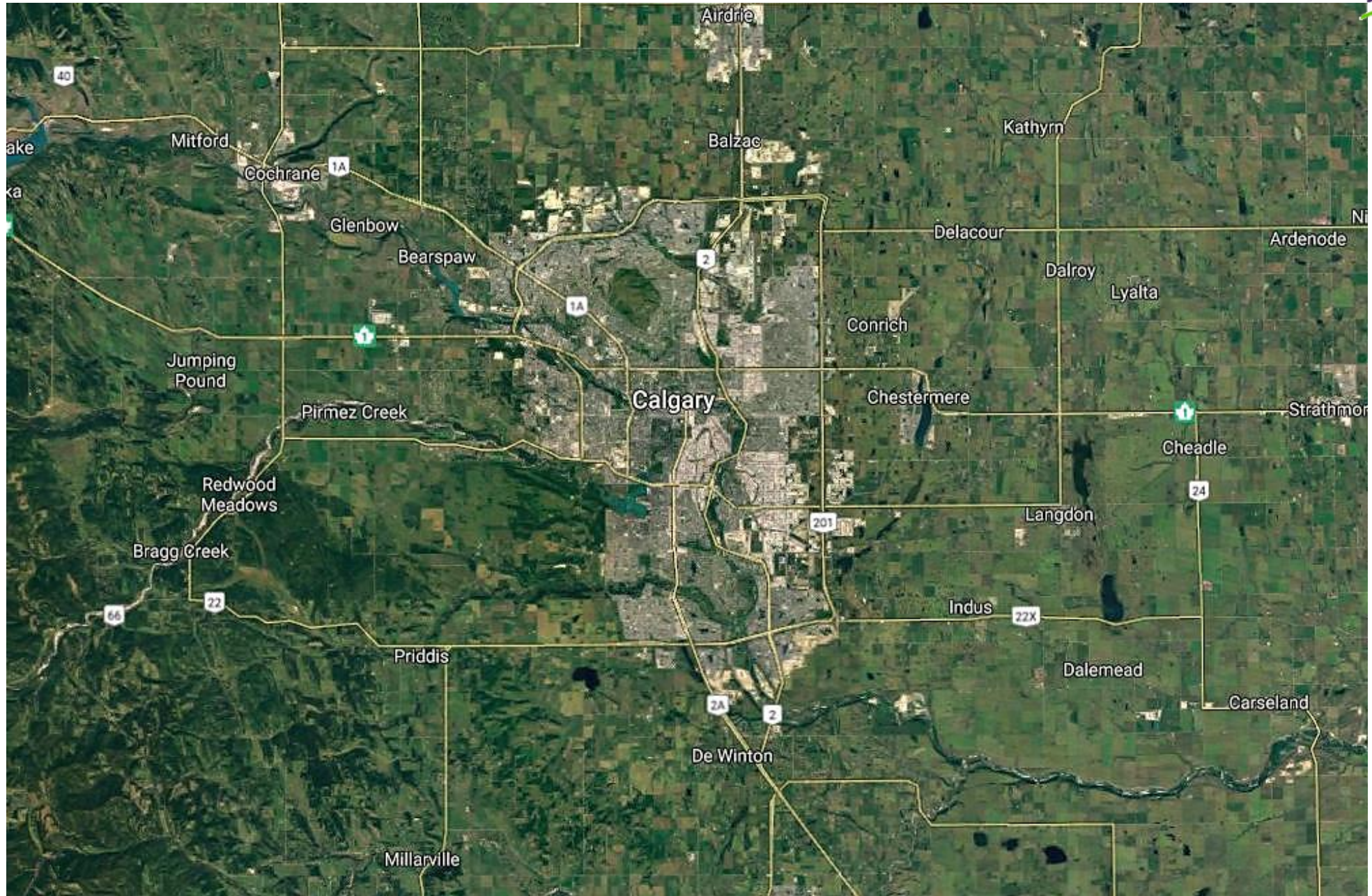




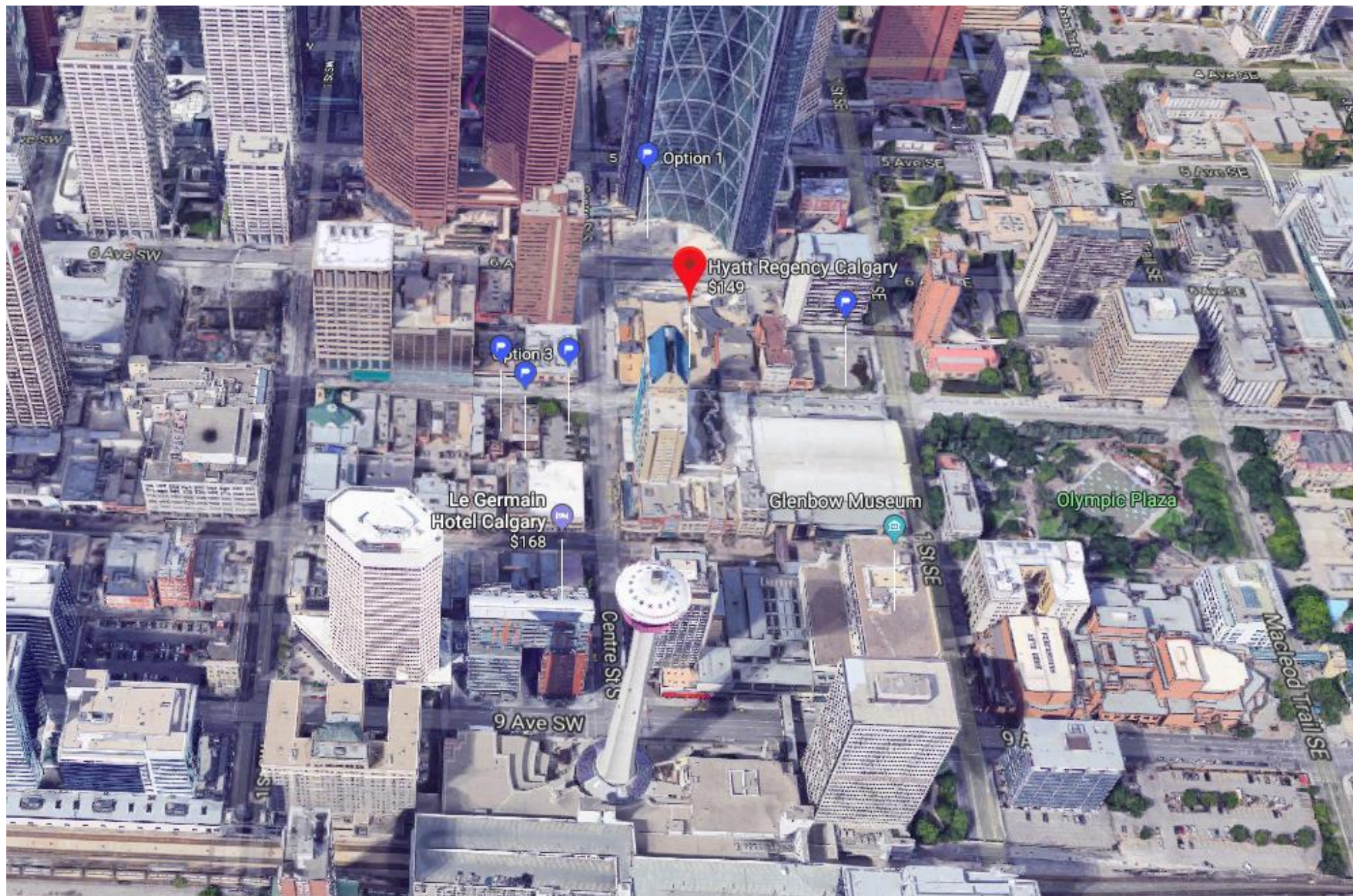
# COW Planning Demo

---

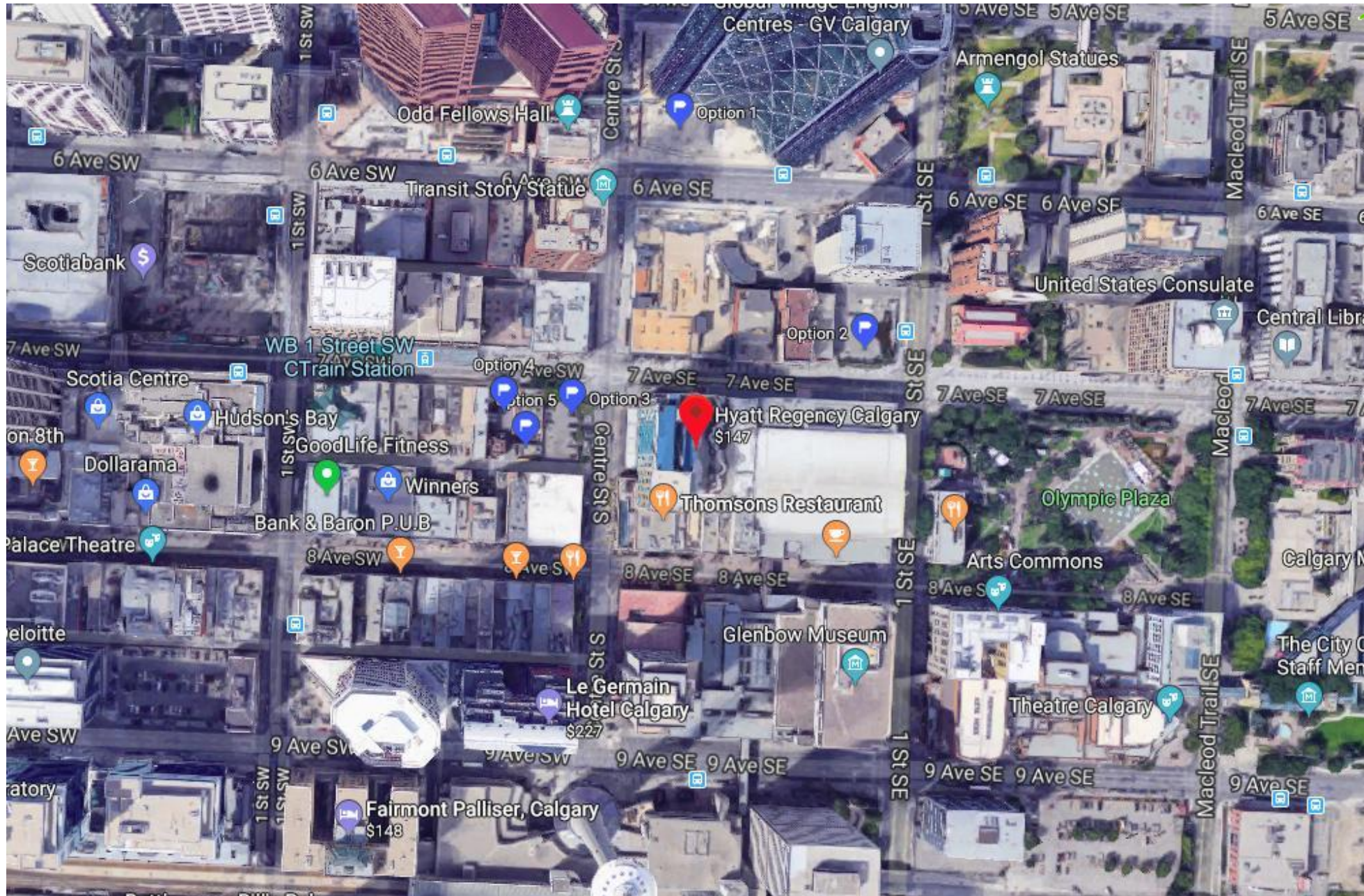




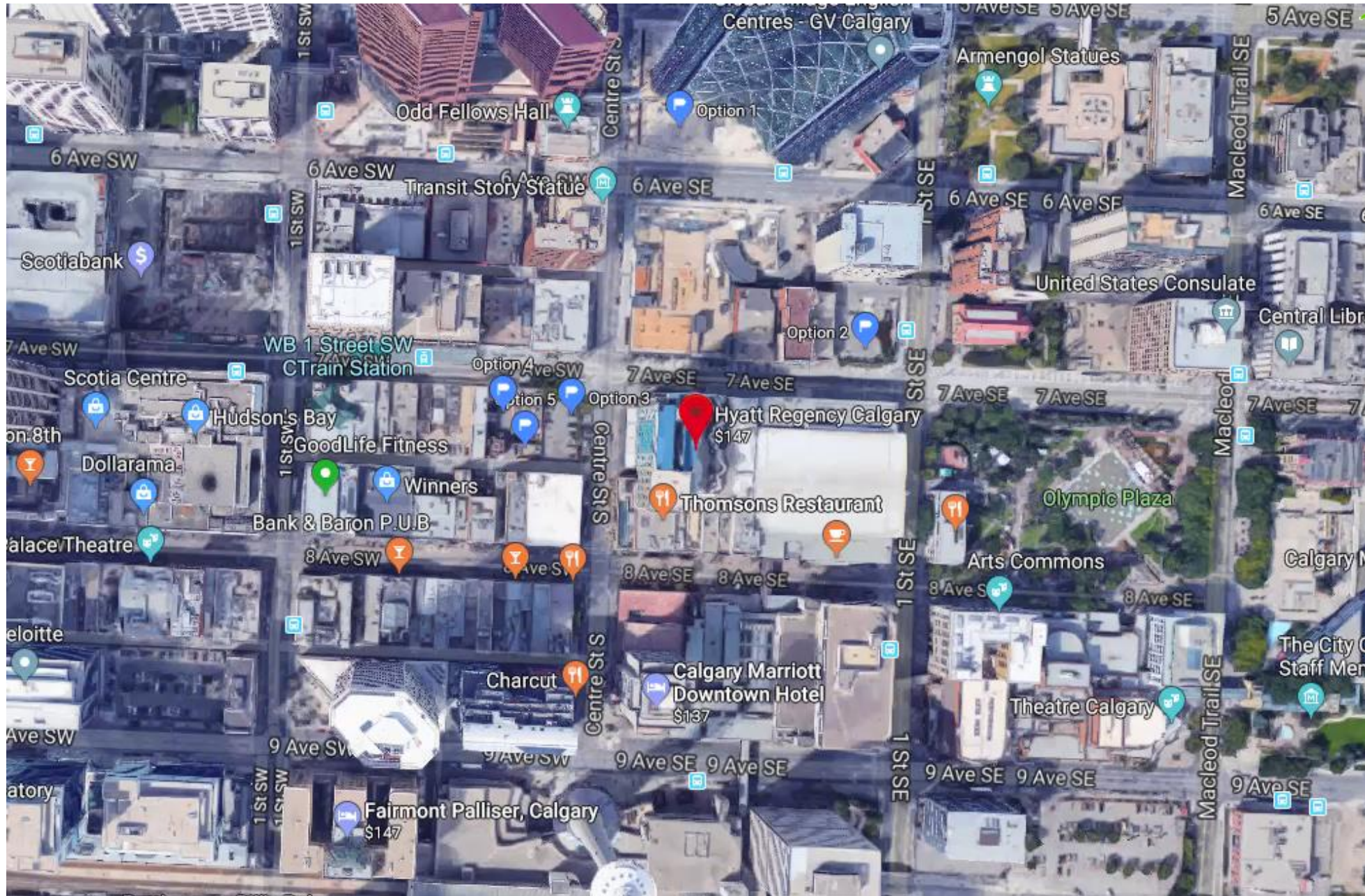




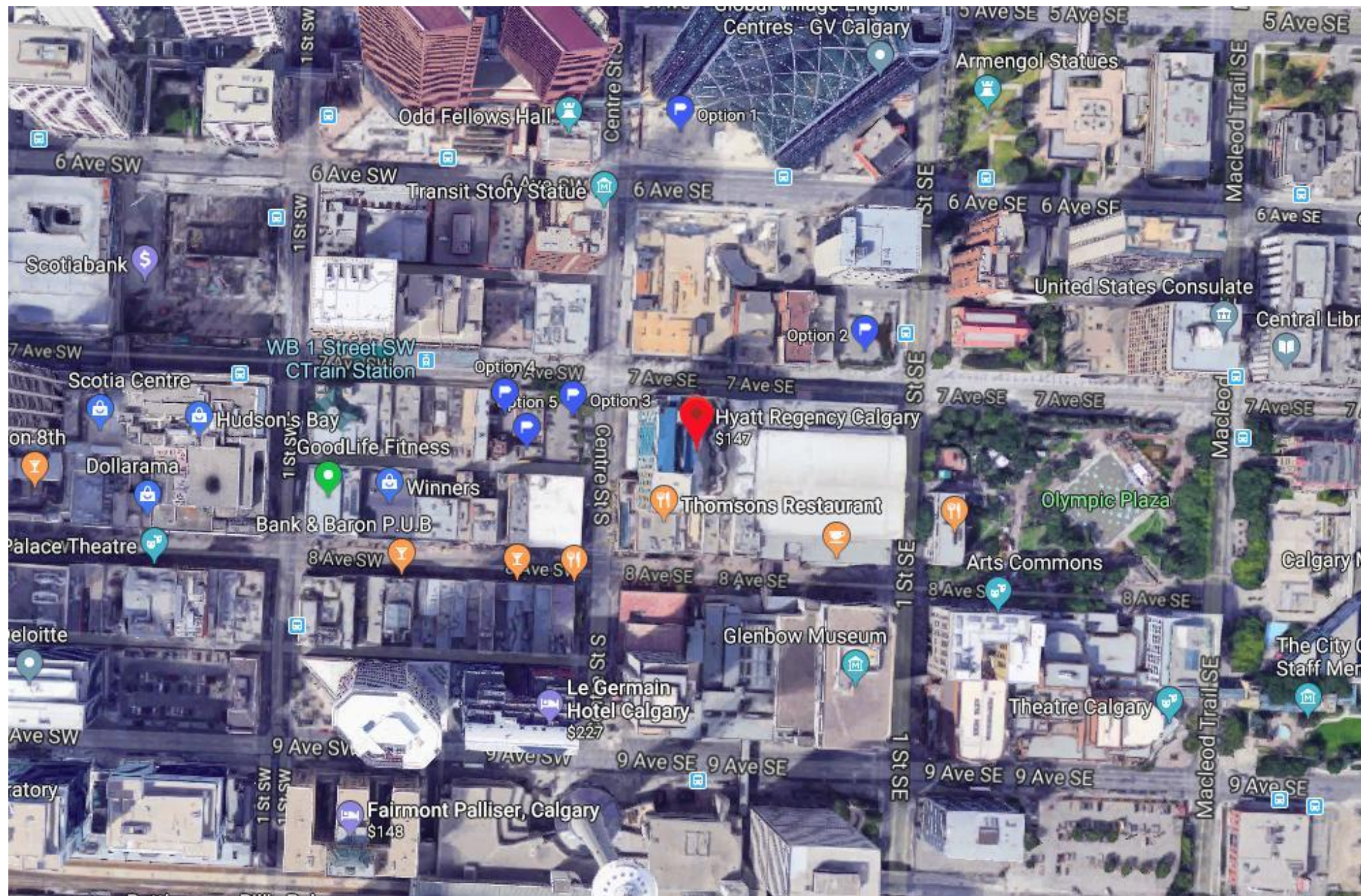




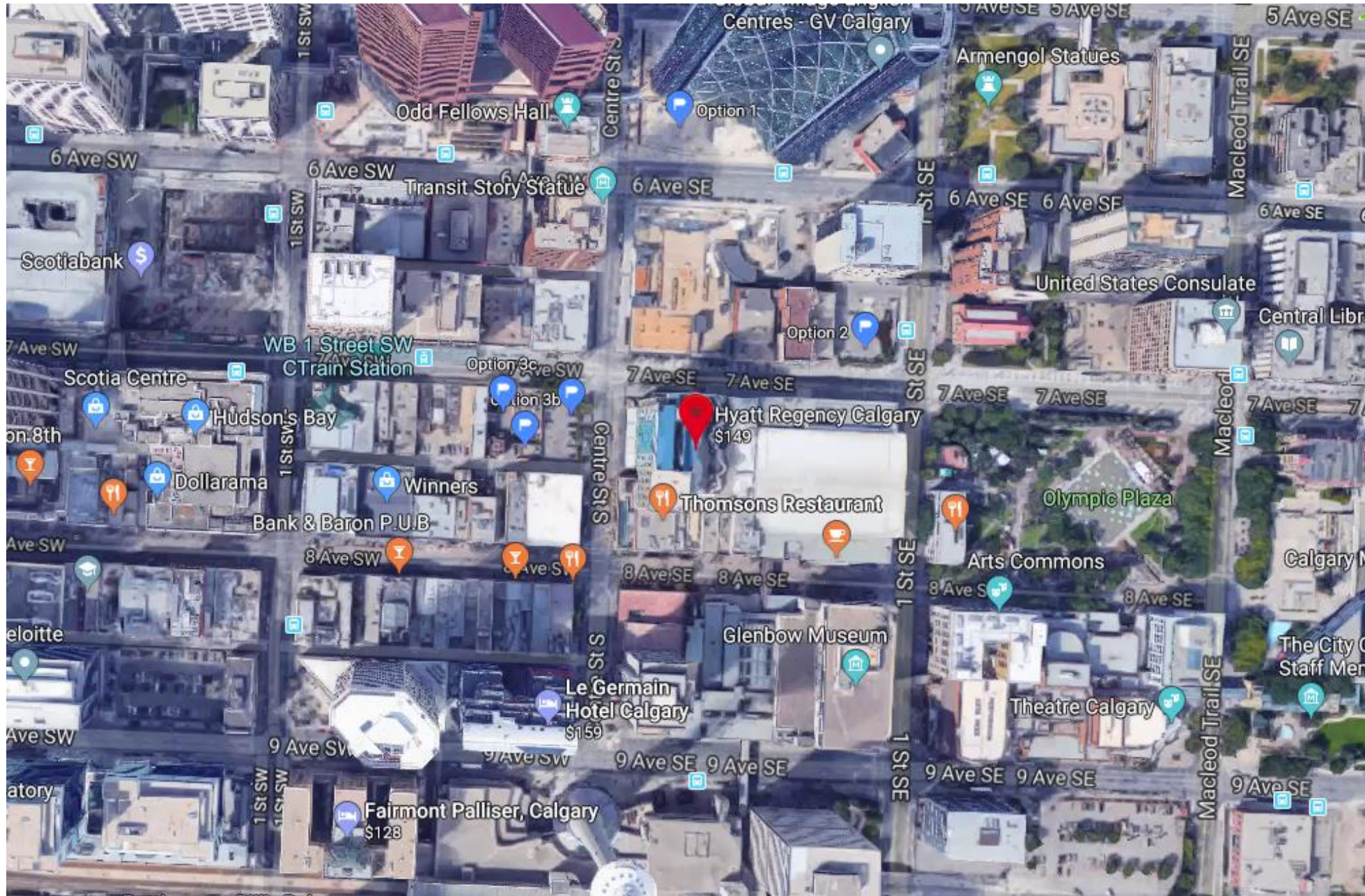




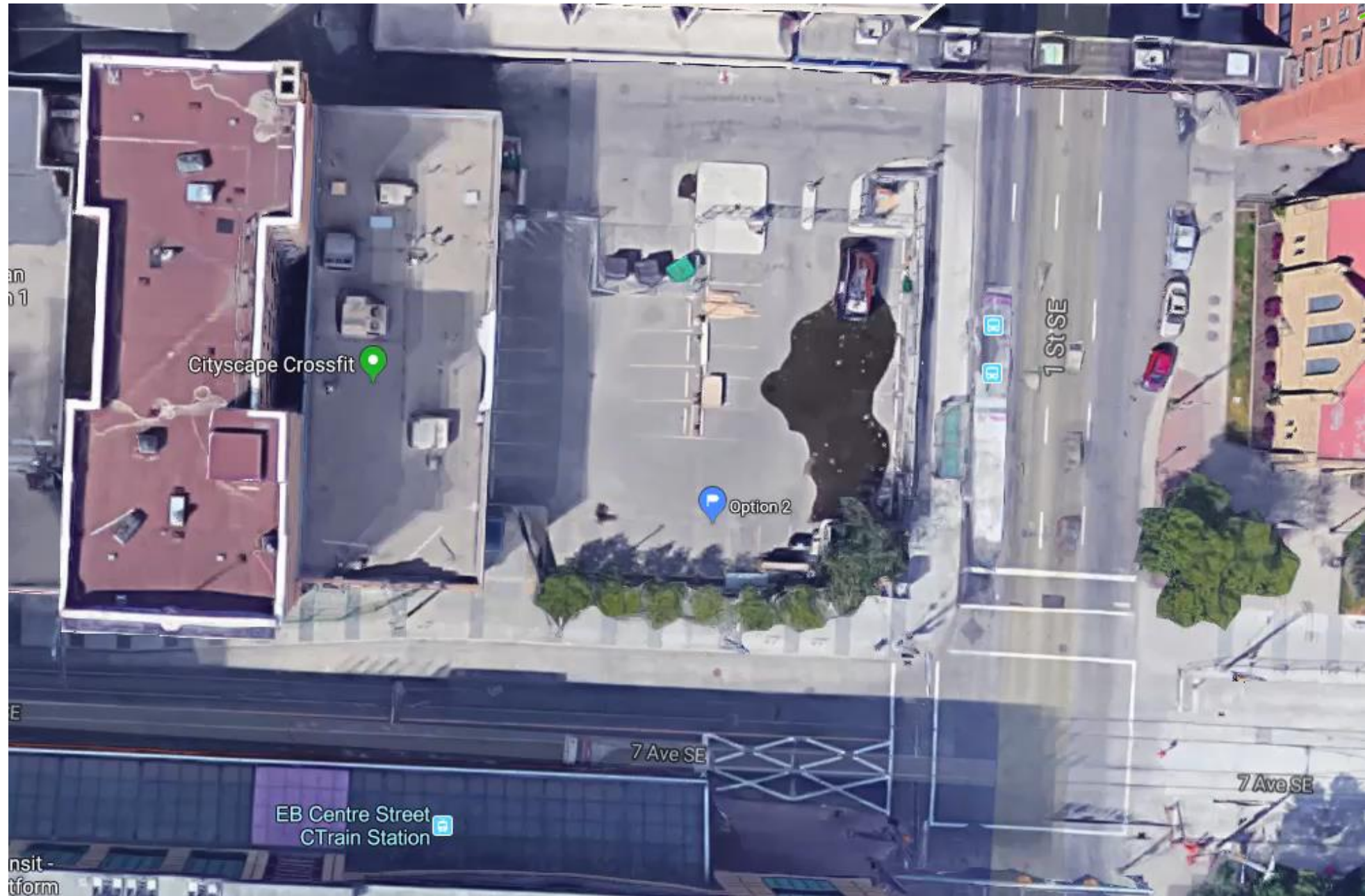




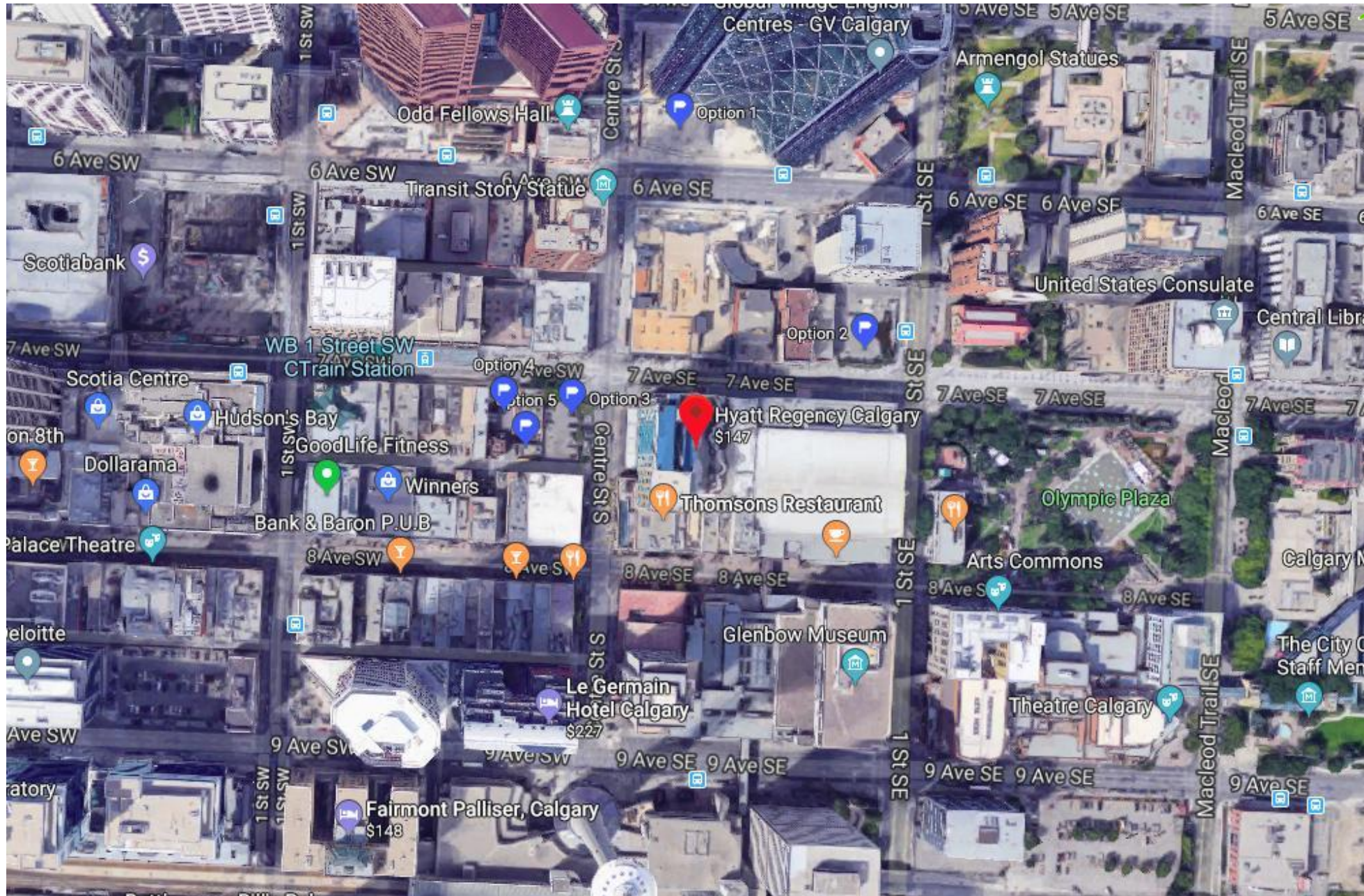




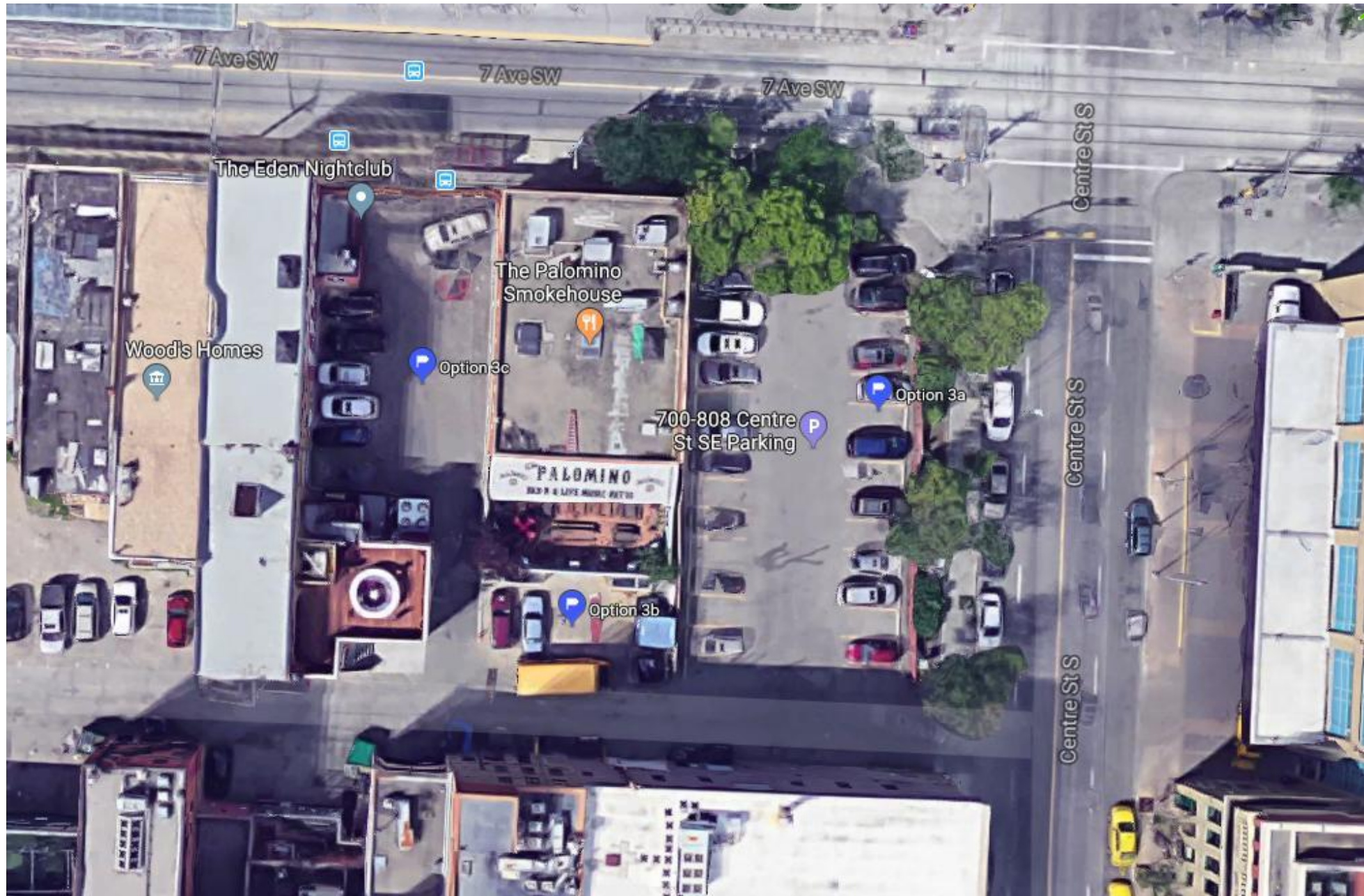




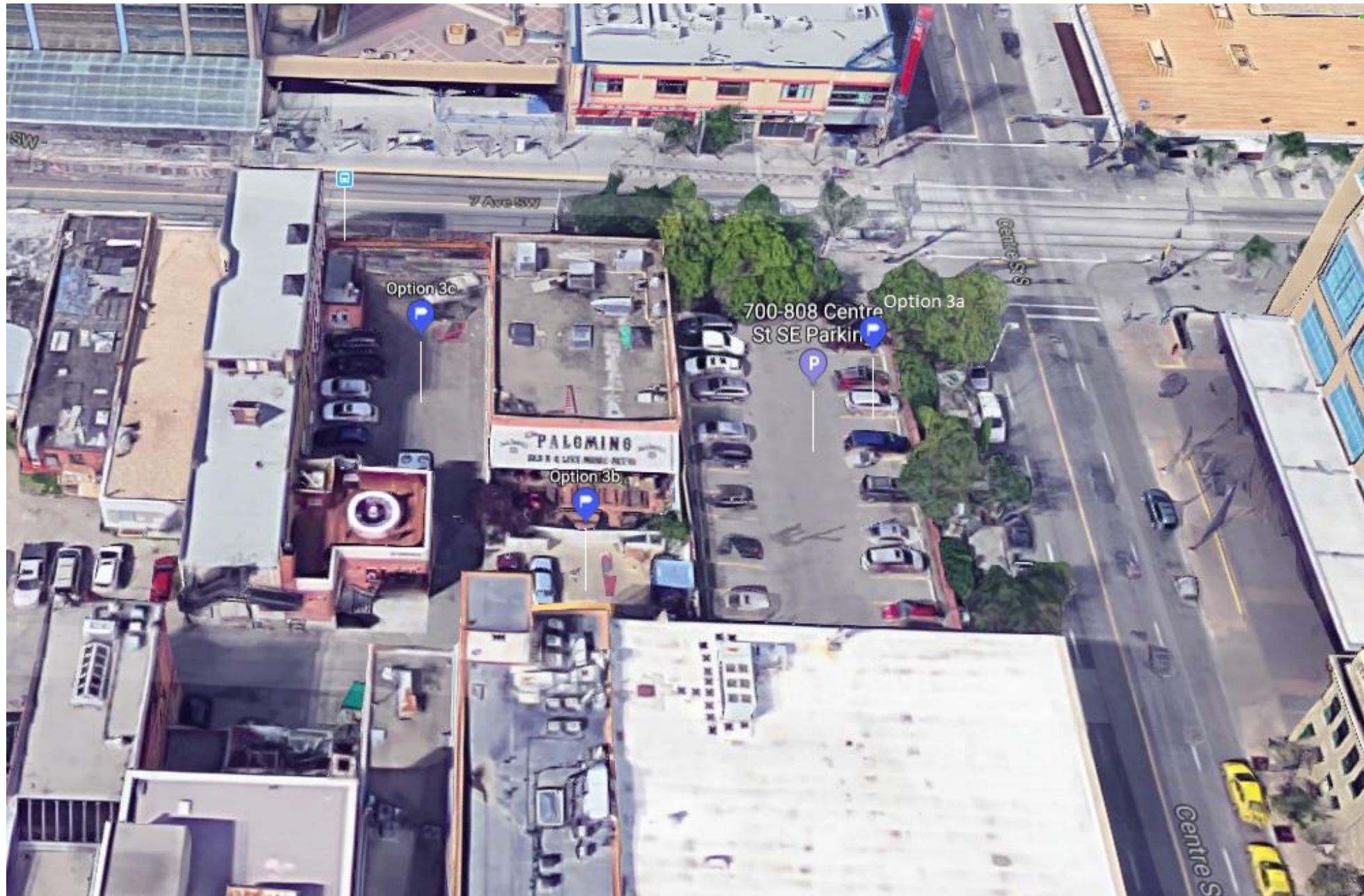




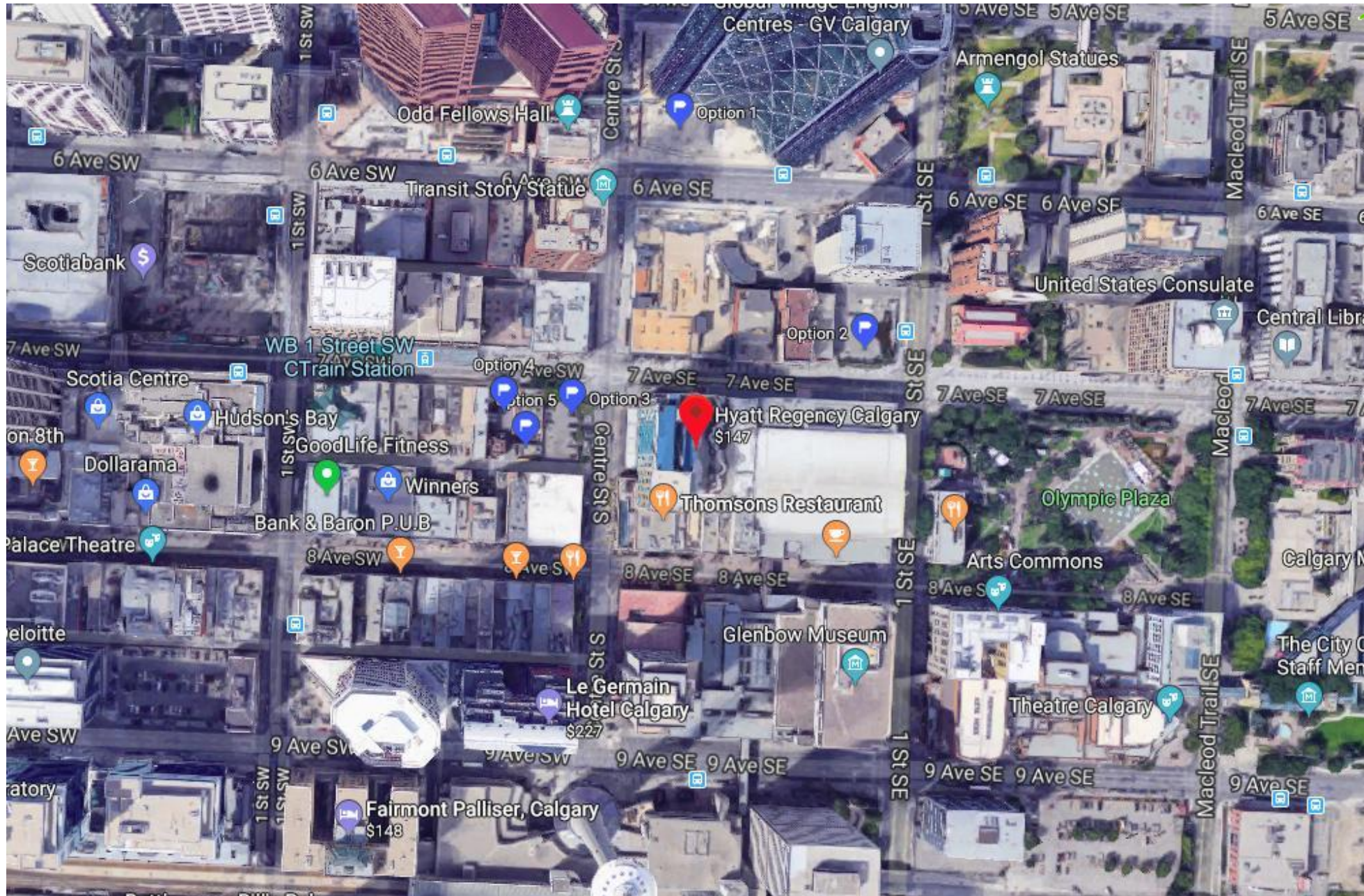












# References

---

## Information Reference

- *Wireless Estimator - US TOWER STRUCTURE RELATED FATALITIES – Slide #14-15*  
<http://wirelessestimator.com/content/fatalities>
- *Occupational Health and Safety Code – Personal Protective Equipment – Slide #21*  
[https://work.alberta.ca/documents/WHS-LEG\\_ohsc\\_p18.pdf](https://work.alberta.ca/documents/WHS-LEG_ohsc_p18.pdf)
- *Canada Fall-Protection Safety Federal Regulations – Slide #22*  
<http://www.fallpro.com/fall-protection-info-center/regulations/canada-federal/>
- *C.O.W. Inspection Information provided by Westower Communication – Slide #16-19*  
<http://www.westower.ca/>



# References

---

## Information Reference

- *Mast and Tower Safety Group – Drop Zones – Slide #24*  
[http://matsgroup.info/documents/GN\\_013-Drop\\_zones-Issue%201.0.pdf](http://matsgroup.info/documents/GN_013-Drop_zones-Issue%201.0.pdf)
- *YouTube - Drunk guy steals a plane and entertains the crowd – Slide #26*  
<https://www.youtube.com/watch?v=esEnMYAH-4>
- *Alberta Transportation - Transportation of Dangerous Goods – Slide #28*  
<http://www.transportation.alberta.ca/519.htm>
- *Fueling Safety Procedure Information provided by Jepson Petroleum Ltd. – Slide #29*  
<https://jepsonpetro.com/>
- *Google Map – Slide #34-44*  
<https://www.google.ca/maps>

# References

---

## Photos Reference

- *Cell On Wheels - On Heavy Trailer Model No. (COW) – Hurtz – Slide #4,9,10*  
[http://www.hurtzz.com/?page\\_id=24](http://www.hurtzz.com/?page_id=24)
- *Coca Cola Stage at Calgary Stampede – by Tye Carson – Slide #5*  
<http://www.readersdigest.ca/travel/canada/calgary-stampede-trivia/view-all/>
- *Concert – by Stéphane Gallay – Slide #5*  
[https://www.flickr.com/photos/isa\\_lias/](https://www.flickr.com/photos/isa_lias/)
- *Fireworks – by Alex Chen – Slide #5*  
<https://www.flickr.com/photos/wkc1/>



# References

---

## Photos Reference

- *East Village in Calgary, during the Alberta floods 2013 – by Ryan L. C. Quan – Slide #6*  
[https://en.wikipedia.org/wiki/2013\\_Alberta\\_floods#/media/File:East\\_Village\\_Calgary\\_Flood\\_2013.jpg](https://en.wikipedia.org/wiki/2013_Alberta_floods#/media/File:East_Village_Calgary_Flood_2013.jpg)
- *Farm COW eating grass – by Eliesa Johnson – Slide #30*  
<http://www.sprig-of-thyme.com/journal//turnip-rock-farm-part-2/beets-carrots-salad-crostini/bacon-kale-tart>



the future is friendly®