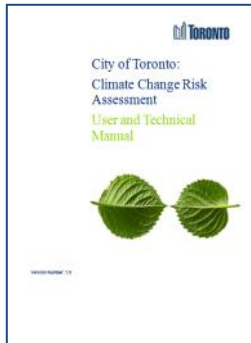# Mississauga's Corporate Climate Risk Assessment

Click to add subtitle

MISSISSAUGA

# Corporate Climate Risk Assessment

Process

- Present to Divisional Leadership Teams – recruit participants

- Initial Meeting with Participants – 1 hour

- Identification of Risks – through email and, if needed, meetings

- Evaluation of Likelihood – completed by Environment Division with OCC

- Workshop to present risks and evaluate severity – ½ to full day

Mississauga Data Points
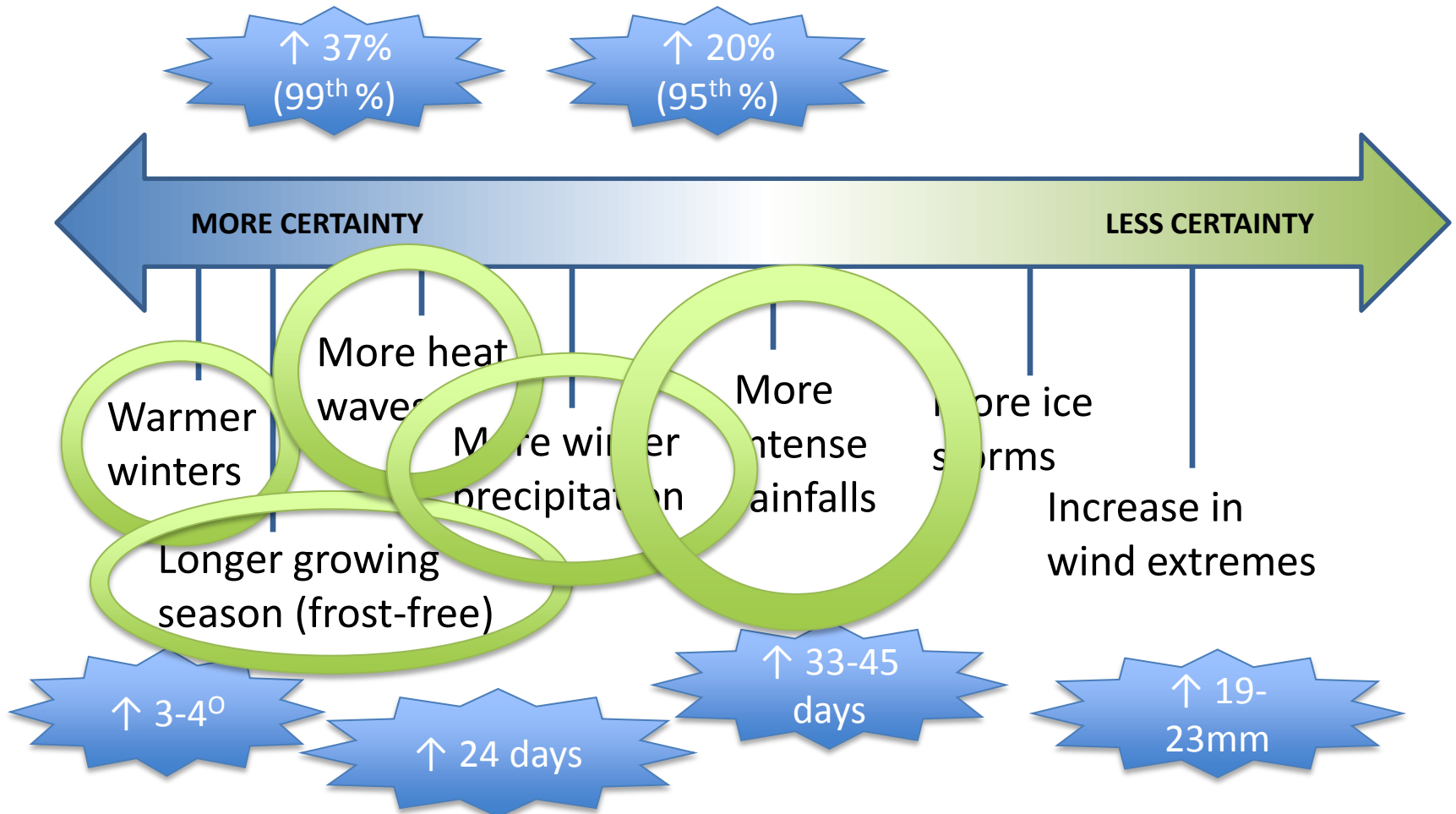
10km x 10km
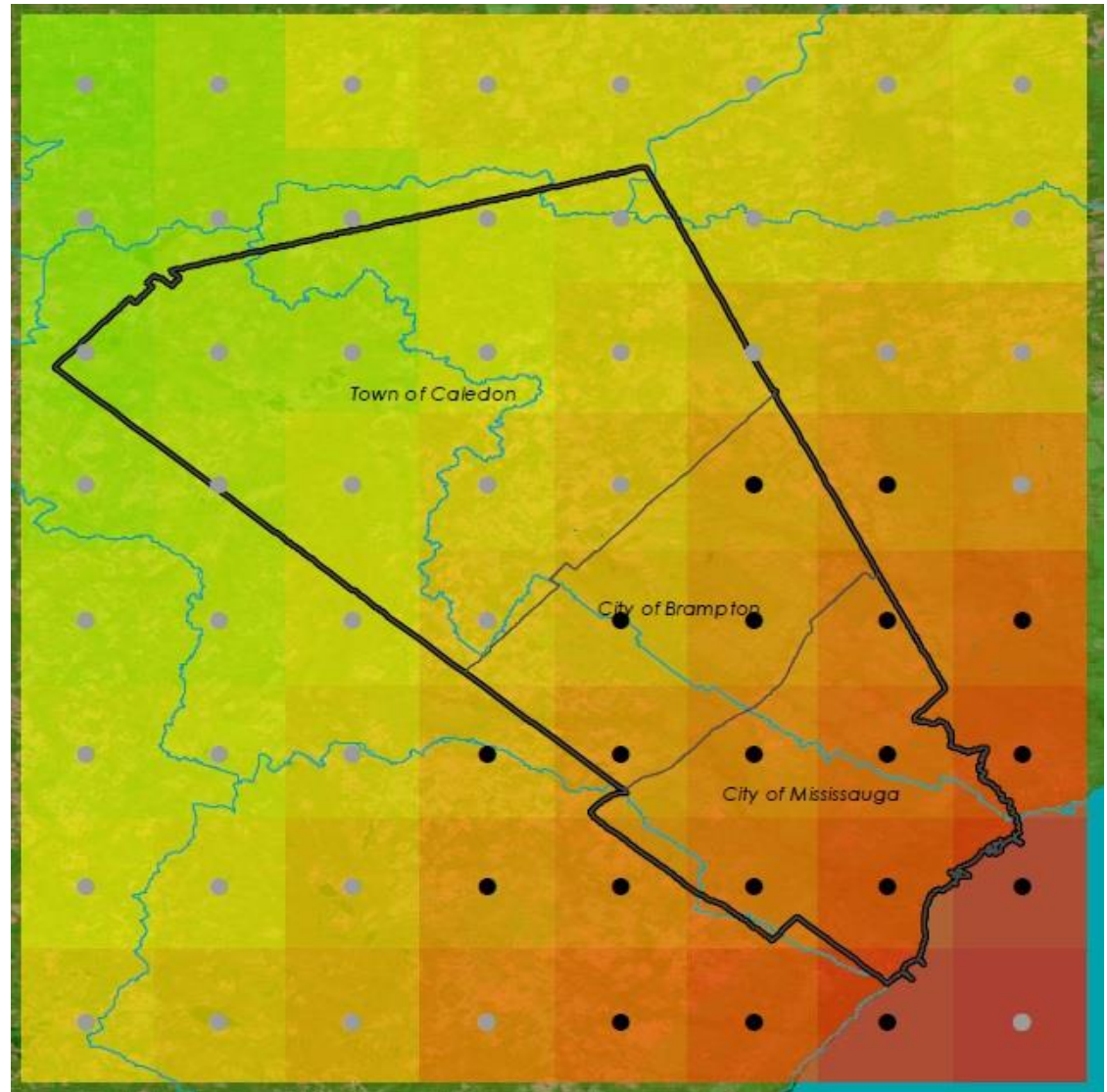
Climate Scenarios
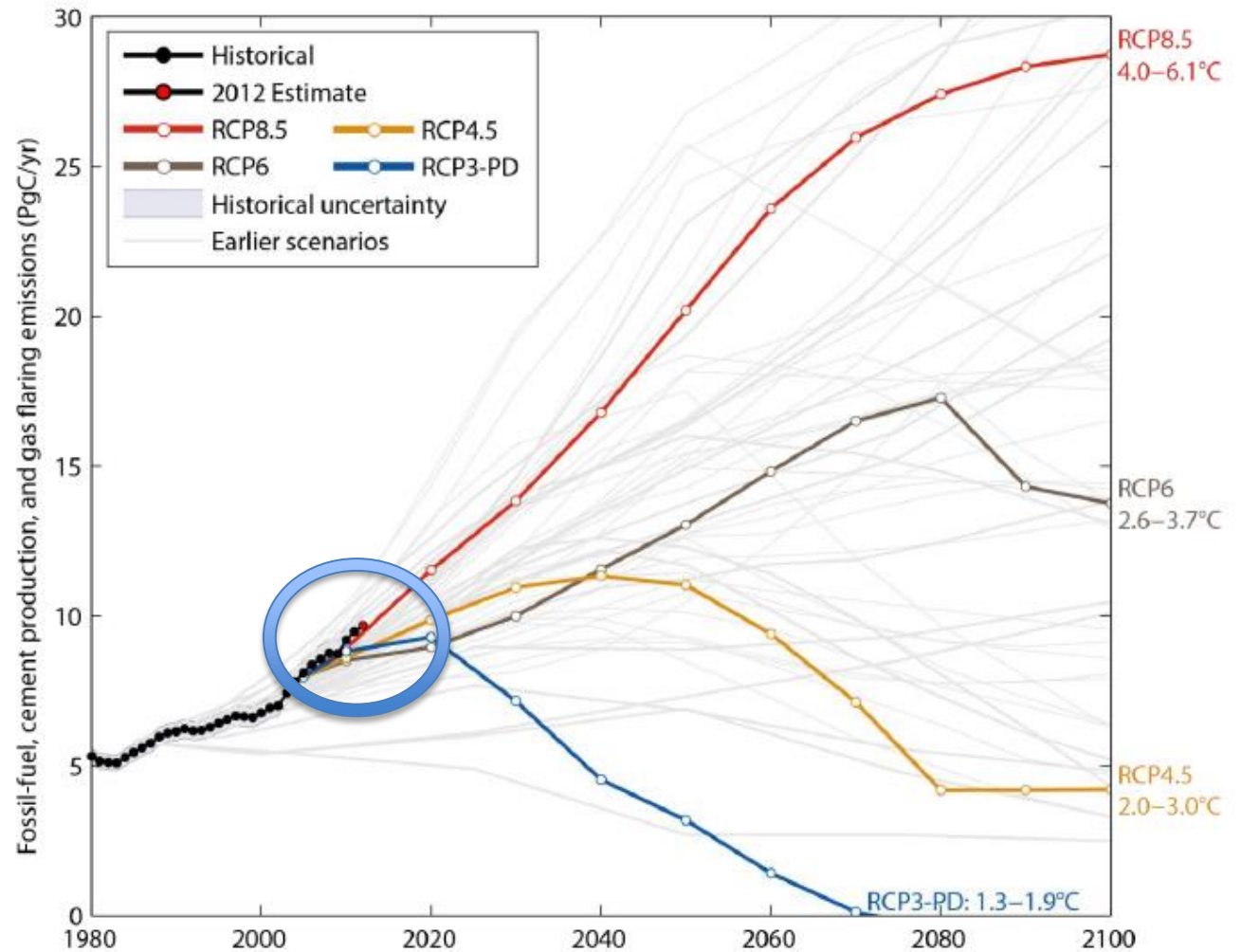
Future Climate Data Detailed (2050)

	Baseline (2010)	RCP4.5	RCP8.5
Annual Average Temperature (°C)	8.216667	2.366667	3.258333
Winter Average Temperature	-3.7	2.8	3.666667
Growing Season Length (Days)	178.2	23.7	23.7
Total Winter Precipitation (mm)	174.8	18.8	22.5
Days with Maximum Temperature Over 30°C (Days)	13.8	20	31.6
99th Percentile Precipitation (mm)	58.80672	74.28634(26%)	83.03952(41%)
95th Percentile Precipitation (mm)	218.34	243.8206(12%)	255.2548(17%)
Days with Freeze Thaw Cycles (Days)	6.941667	1.575(23%)	2.208333(32%)

Background

Climate Projections: 2050

↑ 37%
(99th %)

↑ 20%
(95th %)

MORE CERTAINTY

LESS CERTAINTY

Warmer winters

More heat waves

More winter precipitation

More intense rainfalls

More ice storms

Increase in wind extremes

Longer growing season (frost-free)

↑ 3-4°

↑ 24 days

↑ 33-45 days

↑ 19-23mm

Average Temperature

2050:
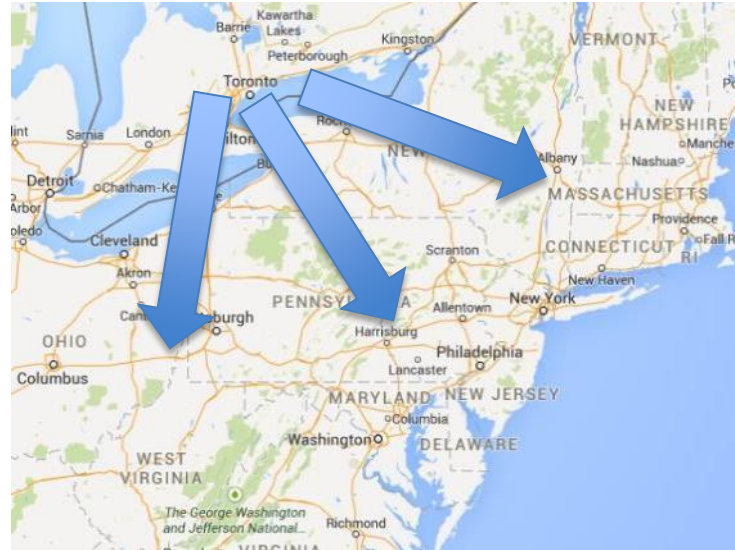
2100:

Background
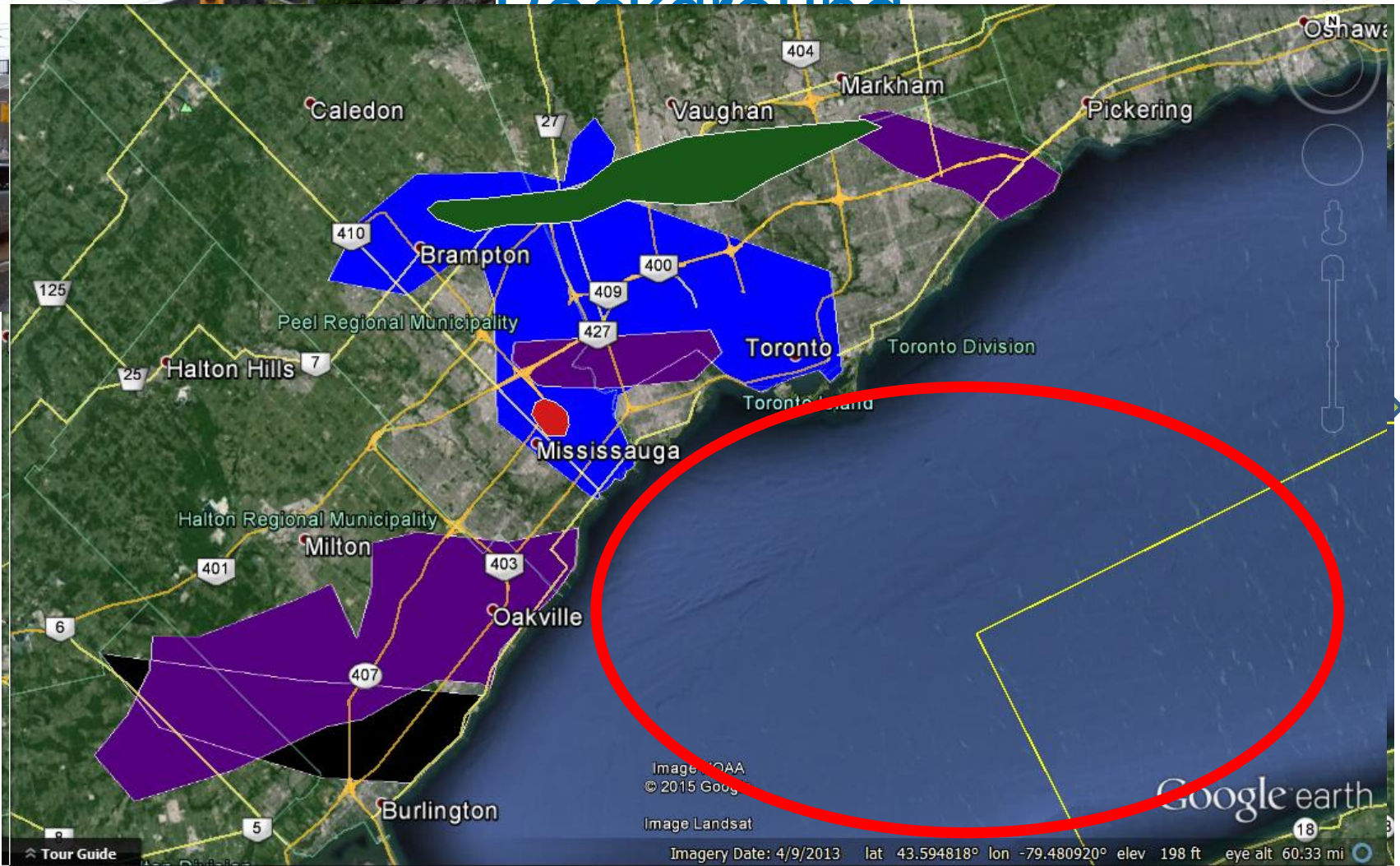
July 19, 2013
in Mississauga

Identifying Risks

Climate Impacts												
Longer Growing Season	Greater Average Annual Temperature	Hotter Summer	Warmer Winter	More Annual Precipitation	More Rain/ Snow in Winter	More Intense Rainfalls	More Heat Waves	Wetter Springs	Wetter Fall	Less Dry Days	More Freeze-Thaw Cycles	General Risks

Impact Likelihoods

Likelihood Rating			
	5	**Almost Certain** – the risk will occur	**90-100% probability**
	4	**Very Likely** – the risk will probably occur	**55-90% probability**
	3	**Likely** – the risk could occur	**30-55% probability**
	2	**Unlikely** – the risk may occur	**5-30% probability**
	1	**Rare** – the risk will occur only in exceptional circumstances	**<5% probability**

Workshop W[...]

11. Works Operation and Maintenance (2).xlsx [Read...]

Risk Source	Indicator	Historical (1981-2010) Value	Current Scenario Likelihood	Future (2041-2070) Value	Confidence in Trend	Future Scenario Likelihood
More Rain/Snow in Winter	Total Precipitation in Winter	174.8 mm	Almost Certain – the risk will occur	193.6 - 197.3 mm	Likely Increase	Almost Certain – the risk will occur
More Annual Precipitation	Total Annual Precipitation	814.3 mm	Almost Certain – the risk will occur	880.8 - 885.2 mm	Likely Increase	Almost Certain – the risk will occur
More Intense Rainfalls	Maximum 1 Day Precipitation	58.8 mm	Almost Certain – the risk will occur	mm	Likely Increase	Almost Certain – the risk will occur
	Maximum 5 Day Precipitation	218.3 mm		'369.2 - 428.4mm		
Wetter Springs	Total Precipitation in	420.4 mm	Almost Certain – the risk will	466 - 467 mm	Likely Increase	Almost Certain – the risk will

Consequences

Financial	Property / Physical Damage (City	People	Environmental	Business Continuity	Reputation	Critical Infrastructure (Electricit	Comments

Increased precipitation will lead to increased volume in the storm water system. This can lead to flooding in certain areas if the system cannot handle the anticipated volume, which will require additional maintenance due to pumping. Current storm water systems are designed based off a 5-year storm. New designs may need to be based off a 10-year storm and newer intensity charts.

City may require additional storm water ponds.

Sheet1 / Sheet2 / Sheet3

Consequences Definitions

Consequence Categories
Financial
Property/ Physical Damage (City Owned/Other)
People
Environmental
Business Continuity
Reputation
Critical Infrastructure (Electricity, Water, Etc.)

Consequence Numerical Ranking

1	Insignificant
2	Minor
3	Moderate
4	Major
5	Catastrophic

Calculating Risk

Single Category Risk Score

Impact Scenario Likelihood	X	**Highest Category of Consequence Rating**		**Risk**

Cross Category Risk Score

Impact Scenario Likelihood	X	**Sum of Consequence Ratings**	=	**Risk**

Risk Scales

Single Category Risk

	Consequence				
Likelihood		Insignificant	Minor	Moderate	Major	Catastrophic
Almost Certain	M	M	H	E	E
Very Likely	L	M	H	H	E
Likely	L	M	M	H	H
Unlikely	L	L	M	M	H
Rare	L	L	L	L	H

	Consequences				
Likelihood		1	2	3	4	5
5	5	10	15	20	25
4	4	8	12	16	20
3	3	6	9	12	15
2	2	4	6	8	10
1	1	2	3	4	5

Cross Category Risk

Low
- 0-28

Medium
- 28-70

High
- 70-105

High-Extreme
- 105-140

Extreme
- 140-175

Divisional Report

Environment Risk Assessment Report

Background

This report presents the results of the Corporate Climate Risk Assessment for your division. This will provide a preliminary overview of the impact climate change may have on your division to 2050. High risks should be prioritized for action; actions to mitigate risks can be built into your business plan over the next few years.

Results from all divisions will be combined and reported to LT and Council. These results and identified actions to mitigate risks will also be used as a key input into the development of adaptation actions in the climate change plan. This risk assessment is the first step in the City adapting to climate change.

Highlights

- 70 risks were identified
- Waste and events have most impacts on them
- No high cross category risks; top cross category risks related to waste, event equipment and expectations
- 13 impacts were identified high for a single consequence category; financial and operational has the most risks

Impacts Summary

Risk is the result when climate driver data is combined with impact. The same impact may arise from different sources, so each combination was considered.

Risk = Likelihood (how likely an impact might happen) **X Consequence** (the magnitude of the effect of that impact, were it to happen)

# of Impacts from Climate Drivers
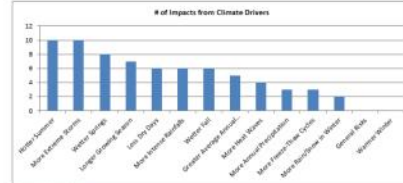
Impact Word Map

Shows major themes from all impacts; words that occur more often are bigger. (Created using wordclouds.com)


Cross Category Risks Summary
5 Highest Risks:

Risk	Risk Level	Risk Score
Wetter Springs leading to External waste equipment deteriorating	Medium Risk	65
More Extreme Storms Leading to Environment Division being expected to report on climate change events, outcomes, etc. and show trends	Medium Risk	60
More Intense Rainfalls May require sturdier/more weather resistant cover/tent for events	Medium Risk	60
Wetter Fall leading to external waste deteriorating	Medium Risk	55
More Extreme Storms leading to larger winds blowing over waste and recycling containers	Medium Risk	52

Risk = Likelihood X Sum of Consequences Across Categories

Cross Category Risks compare impacts by their consequence scores across categories. This identifies risks that have higher consequences across all the categories identified. Risks with higher scores should be prioritized for action. Risk scores fall into categories as follows:

- Low 0-28
- Medium 28-70
- High 70-105
- High-Extreme 105-140
- Extreme 140-175

Single Category Risk Summary

High and Extreme Risks by Consequence Category
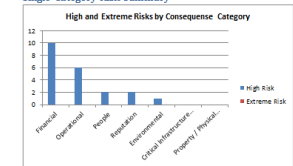
Risk = Likelihood X Consequence in Highest Category

See Appendix B for Risk Descriptions. Single category risks identify the highest consequence category for each impact. This identifies the highest risks for each type of consequence. If highest scores are tied, the risk appears in both categories. Risk scores fall into categories based on the following chart:

Risks with higher scores should be prioritized for action based on the category they are identified with.

Appendix A: Top Cross Category Risks

| Climate Driver	Impact	Risk Score	Risk Level
Wetter Springs	External waste equipment deteriorating	65	Medium
More Extreme Storms	Env Div may be expected to report on climate change events, outcomes, etc. and show trends	60	Medium
More Intense Rainfalls	May require sturdier/more weather resistant cover/tent for events	60	Medium
Wetter Fall	External waste equipment deteriorating	55	Medium
More Extreme Storms	Larger winds will blow over waste and recycling containers Larger storms tend to create litter issues(blowing) heavy front end container lids hurting people	52	Medium

Appendix B: High and Extreme Single Category Risks

| Climate Driver	Impact	Risk Score	Risk Level	Category(s)
More Extreme Storms	Env Div may be expected to report on climate change events, outcomes, etc. and show trends	16	High Risk	Financial Operational
Wetter Springs	External waste equipment deteriorating	15	High Risk	Financial Reputation
More Intense Rainfalls	May require sturdier/more weather resistant cover/tent for events	15	High Risk	Financial Operational
Wetter Fall	External waste equipment deteriorating	15	High Risk	Financial Reputation
Hotter Summer	Health and safety impacts on staff working outside events	15	High Risk	Operational
More Extreme Storms	Larger winds will blow over waste and recycling containers Larger storms tend to create litter issues(blowing) Heavy front end container lids hurting people	12	High Risk	Environmental
More Extreme Storms	Potential for increased inquiries/contact (e.g. from residents, other divisions, Council) regarding climate change Requiring additional staff resources (e.g. time) to respond	12	High Risk	Financial Operational
Hotter Summer	Additional measures may be required to ensure protection of employee and volunteer health and safety when working at outreach events (proper clothing, tents, access to water). Thus will need additional funds.	12	High Risk	Financial People
More Annual Precipitation	Ensure that outreach materials used at outdoor events can withstand more frequent wet weather (durable tent, protected IT equipment, appropriate format of information materials). Thus may need additional funds.	12	High Risk	Financial
More Intense Rainfalls	Ensure that outreach materials used at outdoor events can withstand wet weather (durable tent, protected IT equipment, appropriate format of information materials, etc.). Thus may need additional funds.	12	High Risk	Financial
Longer Growing Season	Programming costs of community gardens may increase Resulting in a potential need to increase grant amount	12	High Risk	Financial Operational
Hotter Summer	Increased need to provide water at events	12	High Risk	People
More Extreme Storms	Help other service areas with business cases for more funding to deal with climate change	12	High Risk	Financial Operational

Reporting
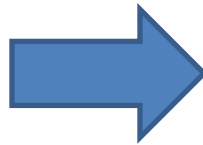
Divisional Leadership Team
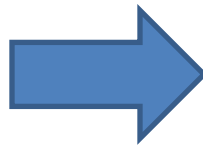
Divisional Leadership Team
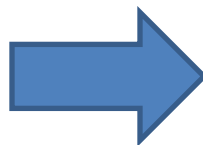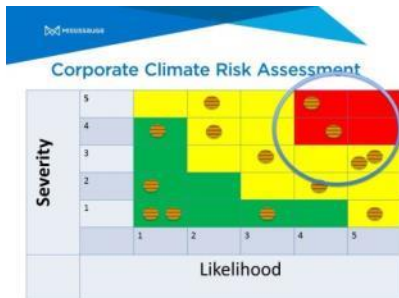
Divisional Leadership Team

Leadership Team
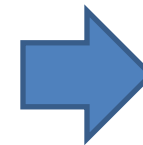
Council

Hindsight is 20/20!

- Ask for the engaged/interested

- Time for research

- Cross-pollinate among the divisions

- Engage Leadership throughout

Thank You!

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twitter.com/MiLivingGreen