

# City of Brampton 5G Hyper-Connectivity Options Report




Council Workshop

March 2021

# 01. Background & Approach | Original Mandate

**Municipal connectivity is emerging as the key component to unlocking the commercial and social benefits of smarter cities. The development of hyper connectivity (5G) is expected to have an exponential impact on cities across the following four areas:**



ECONOMIC GROWTH 	SERVICE INNOVATION 	DIGITAL DIVIDE 	PANDEMIC RESPONSE 
A more attractive Brampton	A smarter Brampton	A more inclusive Brampton	A more resilient Brampton
<ul style="list-style-type: none"><li>▪ Stimulate economic growth sectors</li><li>▪ Create knowledge worker jobs and develop local talent</li></ul>	<ul style="list-style-type: none"><li>▪ A better Bramptonian experience</li><li>▪ More efficient and effective delivery of city services</li></ul>	<ul style="list-style-type: none"><li>▪ Support bridging the digital divide</li><li>▪ Enable greater and more diverse participation</li></ul>	<ul style="list-style-type: none"><li>▪ Support accelerated post-COVID recovery</li><li>▪ Build back a better and more resilient Brampton</li></ul>

# 01. Background & Approach | Review Approach

The 5G and connectivity review requested by Council ran from Nov 2019 to March 2020, at which point the report to Council was put 'on hold' as the City focused on its response to the pandemic. A COVID update to the report was provided in January of this year



## ACTIONS | November 2019 – March 2020

- **ANALYZE** the global and Canadian telecoms market re municipal approaches to 5G roll out
- **ENGAGE** the 5G ecosystem (telcos, OEMs, infra providers, Brampton citizens) for commentary
- **ENGAGE** city stakeholders (incl. residents, Smart City program, transport, PSN, Reg. of Peel) for input
- **IDENTIFY** relevant global and national case studies
- **DEVELOP** municipal connectivity profile to help define the City's role on 5G & connectivity
- **RECOMMEND** a city approach and governance to help accelerate 5G adoption in Brampton

## OUTPUTS

March 2020  
Brampton 5G CONNECTIVITY REPORT

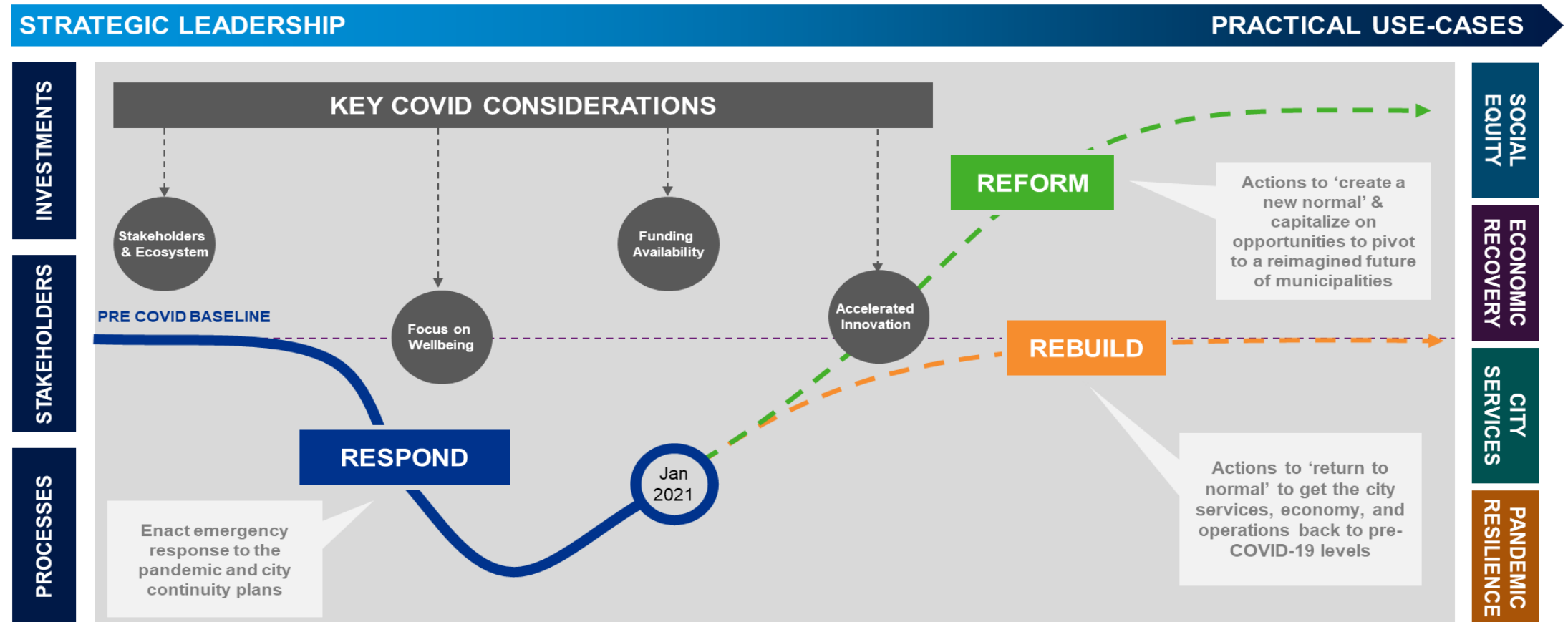


January 2021  
Brampton 5G REPORT (COVID UPDATE)



# 01. Background & Approach | Building Back Better: COVID-19

Whilst COVID19 has had a dramatic and immediate impact on our communities but, cities are now at a critical juncture in pandemic recovery journey and connectivity could be a key driver for municipal reform, community resilience and economic recovery.





## 02. Report Recommendation | Strategy & Tactical Activity

Whilst there are multiple options and opportunities for Brampton's connectivity strategy and development journey, the primary recommendation of the report is to mandate a proactive stance to strategic engagement and practical use case to accelerate to connectivity leadership

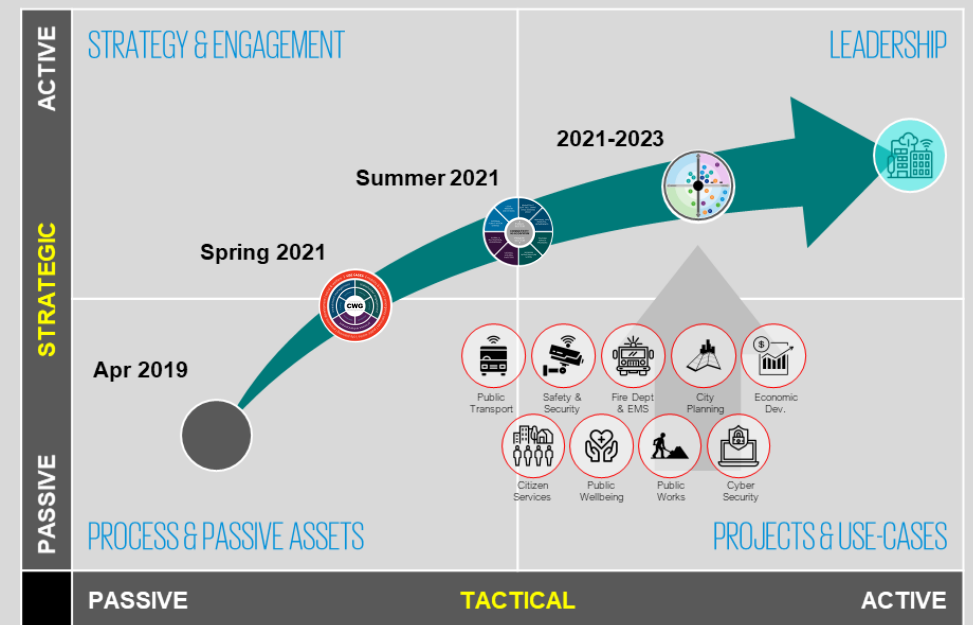
**To drive the value of future connectivity, the City will need to play an active role in developing connectivity and 5G from a strategic and tactical perspective.**

### Strategic Role

Actively engage the broader connectivity ecosystem on the City's strategic approach to 5G and hyper connectivity whilst proactively managing the portfolio of associated funding and third party investments.

### Tactical Role.

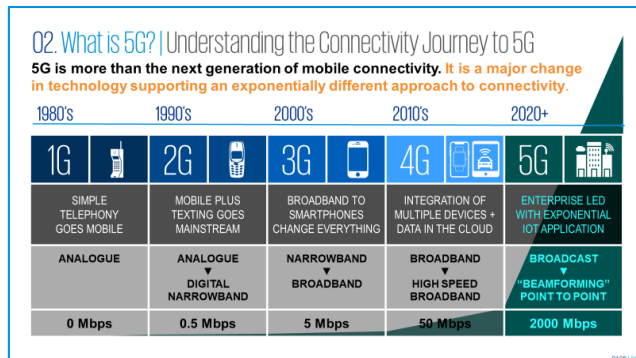
Actively support the development of pilots and use-cases, to be delivered by specific City departments or through collaborative industry working groups, to accelerate deployment and adoption hyper connectivity.



## 02. What is 5G? | Three provocations for 5G technology

**Critical to understanding and valuing the hyper connectivity revolution that is fast approaching is recognizing that 5G is not simply an upgrade to the network but a fundamental change in technology, services and customer to the current approach to connectivity.**

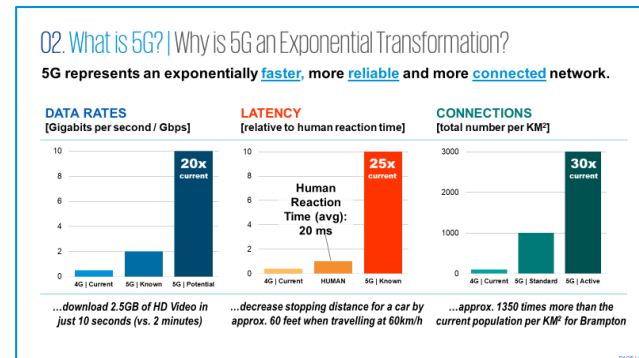
### (01) 5G isn't simply 4G+1



**5G & hyper-connectivity will unlock enhanced and/or next generation application of **smart city technology****

- Advanced Gunshot Detection,
- Enhanced Emergence Services,
- Traffic Optimization using HD tech

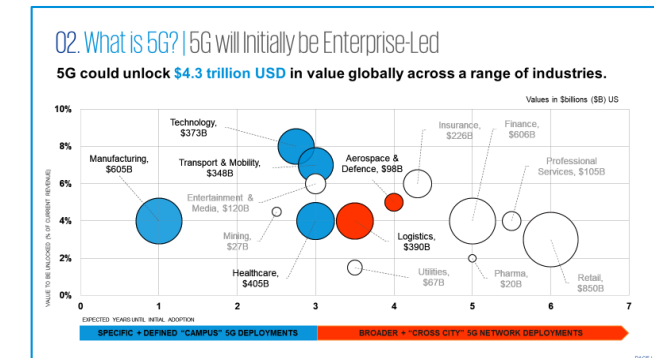
### (02) 5G will be exponential



**Furthermore, 5G technology will enable massive machine to machine connectivity **delivering IoT potential****

- Autonomous vehicles,
- Connected healthcare,
- Secure open campus networks

### (03) 5G will be enterprise-led

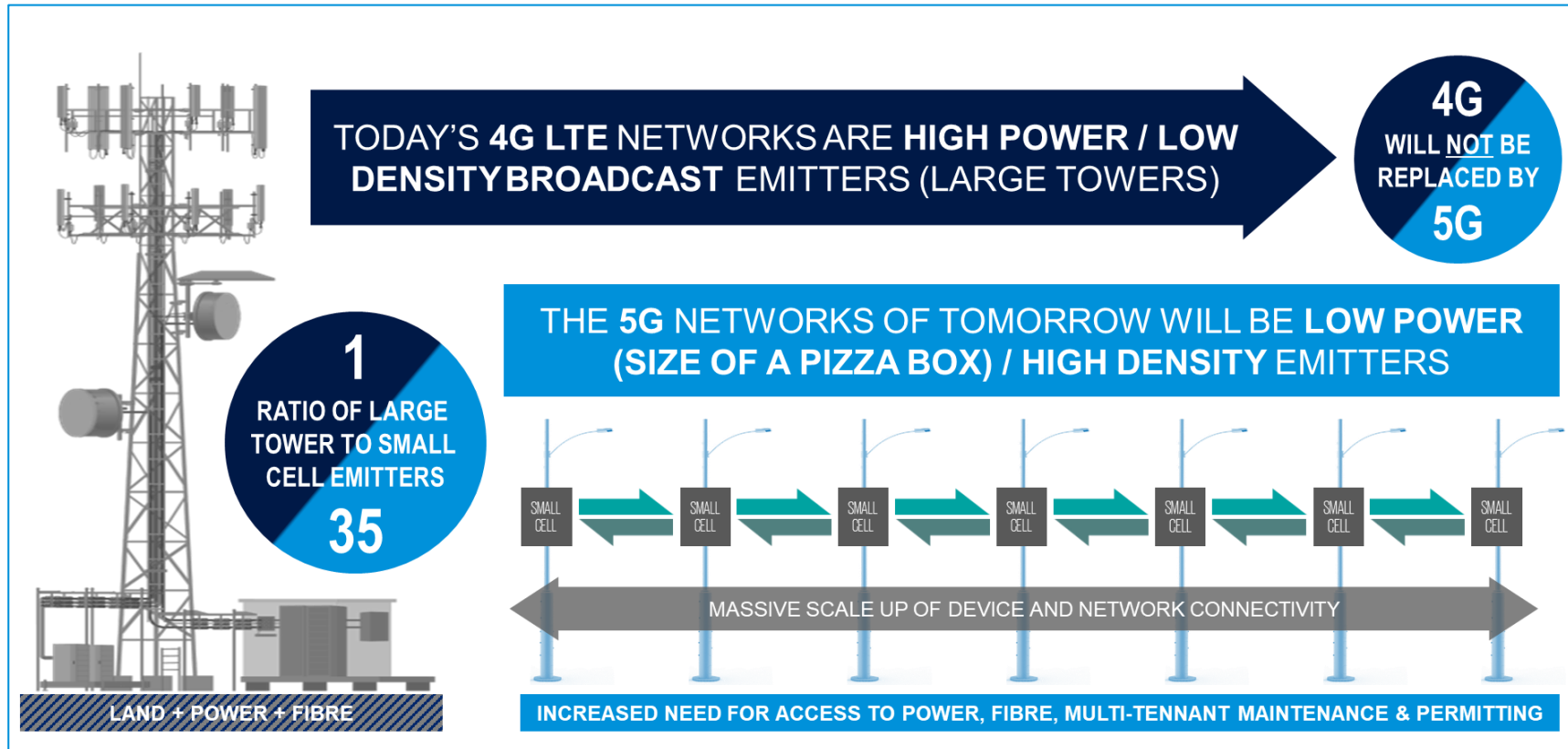


**Finally, 5G & hyper-connectivity will be driven by the **enterprise not the retail customer** – in distinct phases**

- Connected factories,
- Innovation & logistics corridors,
- High tech industrial estates

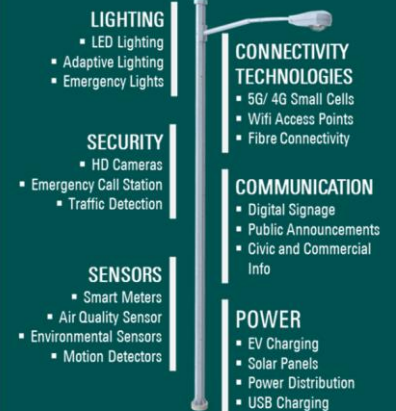
## 02. What is 5G? | The impact on the City's passive assets

The increasing demand to place an order of magnitude larger number of small cell emitters, the foundation of 5G technology, will also have a material impact on the use and value of the City's public sector network, passive infrastructure assets and street furniture.






### Development of Smart Street Furniture

The street furniture in the cityscape of tomorrow will need to support multiple connectivity and digital applications



# 03. Key Considerations | Critical Success Factors

To be a leader in the forthcoming 5G revolution and leverage the value from early adoption, Brampton needs to clearly define its role in the rollout. The following are five international examples of municipal connectivity leadership.

INDUSTRY FOCUS		ROLE RATIONALE			CITIZEN FOCUS	
<b>INNOVATION LEADERSHIP</b> Barcelona, Spain		<b>FACILITATING COLLABORATION</b> Calgary, Canada			<b>ATTRACTING INVESTMENTS</b> San Diego, USA	
<b>MONETIZING CITY ASSETS</b> Sacramento, USA		<b>USING A CITIZEN-CENTRIC MINDSET</b> Wakayama, Japan				
						
Driven by <b>economic development</b> and helping to transform Barcelona into a <b>world class digital innovation hub</b>		Accelerating 5G <b>innovation</b> and <b>adoption</b> through industry collaboration of <b>cross-sector working groups</b>			Streamlining <b>city processes</b> to become materially more attractive to <b>infrastructure investments</b>	
Using a <b>commercial-led approach</b> to managing the City's passive assets in support of the network expansion and 5G roll out		Acceleration of 5G roll out by leveraging pre-existing City investments on <b>service improvement</b>				
						
<b>City of Brampton</b>		<b>Transport</b> (Queen St Expansion)	<b>EMS / Fire</b> (Fire Dept)	<b>EC.DEV.</b> (Enterprise Zones)	<b>Welfare</b> (Social Housing)	<b>City Planning</b> (Activity Modelling)
		<b>Public Works</b> (Flood Defenses)	<b>Region of Peel</b> (PSN)			





# 03. Key Considerations | Deployment & Adoption

The 5G ecosystem continues to evolve at pace and 2021 will be a convergence of technology maturity, customer expectation and available funding.



CANADIAN MARKET 5G TIMELINES		<div><div>RESPONDING TO COVID</div><div>INITIAL “5G” ROLLOUT</div><div>SMALL CELL / HYPER-CONNECTED 4G+ &amp; 5G DENSITY EXPANSION</div><div>EVOLUTIONARY AND WILL LOOK LIKE 4G NETWORKS</div><div>EXPONENTIAL NETWORKS ENABLING ENHANCED USE-CASES</div></div>				
TELECOM OPERATOR 5G ROLLOUTS & BRAMPTON SERVICE	<div><div>APRIL 2019   INITIAL TELCO 5G SITE-VISIT</div></div>	<div>Telco operators begin rollout of live 5G services</div>				
POTENTIAL 5G DEVICE ECOSYSTEM EVOLUTION		<div><div>EARLY GEN 5G HANDSETS</div><div>GENERATIONAL HANDSET UPGRADES</div><div>5G FUNCTIONALITY HANDSETS</div><div>COMMERCIALLY AFFORDABLE HANDSETS</div><div>5G DRIVEN DEVICE EVOLUTION</div><div>WEARABLES &amp; SENSOR NET OF THINGS</div><div>5G CHIPSETS IN LAPTOPS, TABLETS</div><div>5G ENABLED WEARABLE DEVICES AND SENSORS</div></div>				
5G CITY PILOTS & COLLABORATIONS	<div><div><div>L5 Ottawa – 5G test-bed for autonomous vehicles</div><div>University of Waterloo – 5G collaboration and test-bed</div></div></div>	<div><div><div>Kelowna, BC: <b>Rogers</b> - 5G Smart City Pilot Transportation Focus</div><div>London, ON: <b>Bell</b> - Collaboration with Western Univ. for a 5G campus testbed</div><div>Windsor, ON: <b>Telus</b> – Partnership with Univ. of Windsor for a 5G connected campus</div><div>British Columbia: <b>Shaw</b> – Deployment of a 5G ready private LTE network for the mining industry</div></div></div>				
REGULATORY CONSIDERATIONS	<div><div>Key spectrum auction allowing for initial rollouts (600 MHz) – Apr 2019</div></div>	<div><div>External panel review on legislations related to communications</div></div>	<div><div>Key auctions (3500 MHz) – required for dense networks</div></div>	<div><div>Decision and potential auction of ultra high frequencies – enabling further densification and major network roll outs</div></div>		
TIMELINE	2019	2020	2021	2022	2023	

## 03. Key Considerations | Deployment & Adoption

The evolution of hyper connectivity is inevitable and its need to use a City's passive assets means there is no "do nothing" option. But the combination of population density and PSN means Brampton is uniquely positioned to benefit from playing an integral role in the roll out

### ENABLING AND ACCELERATING 5G DEPLOYMENTS

#### INCREASING THE VALUE OF PSN

How does the City **collaborate** with the other PSN **stakeholders** (Peel, Mississauga, Caledon) to **increase value** from the PSN?

#### LEVERAGING PSN CAPACITY

How does the City utilize **available PSN capacity** to support the City's **increased future connectivity footprint** and requirements?

#### MANAGING THE PASSIVE ASSETS

How does the City **protect the inherent value** of its passive asset base whilst actively supporting a **high density** 5G deployment?

### ENHANCING 5G ADOPTION

#### ENTERPRISE ATTRACTIVENESS

How does the City use connectivity to **accelerate adoption** and thereby increase the **economic impact** and **city attractiveness**?

#### ENHANCING CITIZEN SERVICES

How can the City work **collectively** to **leverage** the internal connectivity ecosystem to support the **modernization of service delivery**?

### TELCO INFRASTRUCTURE CENTRIC

### CUSTOMER CENTRIC

#### KEY RISKS

Legislation  
& Policy

Market  
Mechanics

Value  
Leakage

Decision  
delay

Technology  
Disruption

Stakeholder  
Engagement

Communications  
& Adoption

## 03. Key Considerations | Aligning with Brampton's bigger picture

**5G and hyper connectivity is not the destination but rather the enabler to unlocking significant value for Brampton. By developing practical use cases that align to Brampton's "bigger vision", hyper connectivity can be a multiplier for current initiatives and future proofing investments**



### TERM OF COUNCIL PRIORITIES

- Innovation ecosystem in downtown
- Develop and implement the Brampton Connected City

**VALUE | Build an inclusive city that is safe, sustainable, and successful**

### ECONOMIC DEVELOPMENT

- Cyber-security focus
- Skilling via academic partnerships
- Focus on start-up hubs and attracting entrepreneurs

**VALUE | Competitive advantage over other municipalities**

### BRAMPTON 2040 VISION

- A diverse new urban core
- Update and revitalize Bramalea
- Integrated transportation choices

**VALUE | Transform jobs, connect people, and revitalize living**

### URBAN DESIGN

- Precinct Plan for Downtown Brampton
- Queen Street Precinct Plan
- Pilot zones & innovation corridors

**VALUE | Evolve to a connected, inclusive, and innovative city**

## 02. Report Recommendation | Strategy & Tactical Activity

To drive the value of future connectivity, the City will need to play an active role in developing connectivity and 5G from a strategic and tactical perspective. The diagram below shows a potential trajectory and key milestones the City could take to increase ecosystem collaboration, enhance adoption and practical roll out, and accelerate the public benefits of connectivity

