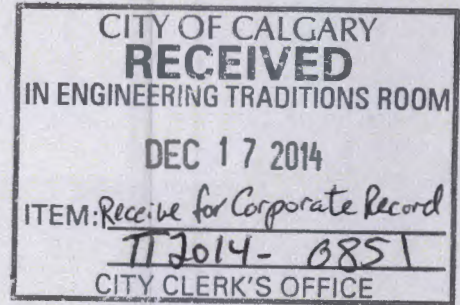# SHIFTING GEARS

PART II: SAFER CYCLING IN CALGARY

JEROMY ANTON FARKAS

DECEMBER 17, 2014

KEY POINTS

- *Calgary should measure its progress on cycling by using an easy to read scorecard with clear performance targets.*

- *These performance targets should include more on cyclist safety and quality of infrastructure, not just quantity.*

- *Cycling infrastructure should be designed to maximize safety, enhance accessibility, and minimize inconvenience to others, wherever possible.*

- *City plans must be designed around evidence-based policy, not policy-driven evidence.*

- *Calgary still relies heavily on manual counting, despite technological advancements that have made automated data collection systems far less expensive and far more accurate.*

- *Calgary must follow its own Open Data policies and release as much original source data as possible, not just final interpreted results and figures.*

ABOUT THE AUTHOR

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PREFACE

This report is the second of two focused on cycling policy in Calgary. Combined, the Manning Foundation for Democratic Education hopes these reports will contribute to the ultimate aim of achieving a seamless, safe, and efficient transportation and recreation network to better move Calgarians of all ages, means, and abilities.

The previous report, *Shifting Gears Part I: Smarter Cycling in Calgary*, provided a mix of guiding principles for the creation of a comprehensive Pathway and Bikeway Plan ("Framework") for the City of Calgary, as well as some more ground-level suggestions for smarter cycling in Calgary at large.

This report, *Shifting Gears Part II: Safer Cycling in Calgary*, focuses on providing a set of best-practice criteria for measuring a 'bicycle-friendly city' and track progress towards that goal.

MANNING FOUNDATION
FOR DEMOCRATIC EDUCATION

SECTION I:
INTRODUCTION

BICYCLING IN CALGARY

In many ways, Calgary is a great city for cycling.

The Manning Foundation report, *Shifting Gears Part I: Smarter Cycling in Calgary,*[1] showed that Calgary is the safest major Canadian city to cycle in, and that Calgary leads North America in terms of its investment in cycling infrastructure. For example, Calgary has about 1157 kilometers of multi-use pathways[1], roughly six times as many 'pathway meters per capita' than Seattle, Washington[1] - a regularly used comparison city.

In addition, much of Calgary's network enjoys dedicated snow removal throughout the winter and the City's lead in infrastructure is only going to grow with a plan to increase overall length of the pathway and bikeway network by 30 per cent to 1500 kilometers in the next six years.[2]

Calgary's pathway and bikeway system has always been very popular with, and strongly supported by, Calgarians.[3] The city's young demographics and relatively flat terrain also help residents more easily take advantage of active modes of transportation compared with other cities.[4]

It is also important to note that, historically, private business has driven the expansion of this network, rather than opposed it. According to the City of Calgary, "since the mid-1990's, the vast majority of pathways have been built by the housing development industry" and the City has been the beneficiary of maany major capital and asset donations for pathway infrastructure.[5]

Both private and city-commissioned polls consistently show that mobility is the most frequent reason given by Calgarians for perceptions of both an improved and worsened quality of life.[6,7] This shows that transportation policy has the potential to dramatically improve or worsen the quality of life of Calgarians[8] and, if done right, cycling poses an opportunity of which Calgary is almost uniquely suited to take advantage.[9]

OPEN DATA

Good data makes for good decisions and, thanks to advancing technology, the ability of organizations to gather, store, and analyze data has grown exponentially in recent years. All levels of government, but especially municipalities, have failed to keep pace with these developments both for internal planning purposes and for public transparency and disclosure.

The City of Calgary has recently launched an Open Data Catalogue – a great step toward open government – but there is much room to expand the practice of data sharing across all aspects of its operations. Calgarians, to the utmost degree possible, should have access to more ways to assess the performance of their administration and elected officials.[10]

Where no baseline data yet exists for new measures recommended in this report, investments should be made in technologies that provide reliable and unbiased data in the most cost effective and efficient way available. Where data does exist, it should be released in full - including source data - not just final, interpreted results and figures.

Doubtless, governments would prefer to control what information is released regarding their own operations, as well as how it is presented to the public. Indeed, there is always a risk that some people will misinterpret source data, but most disagreements reflect differences of opinion or interpretation, not malice.

Attempting to control the flow of information in the modern era is futile and the ability for others to reverse engineer calculations, such as in an academic peer-review process, is the key to the accountability and robustness of the Open Data process. In the end, when it comes to the interpretation of data in a democracy, the public gets to be the judge, and the public has made it clear they want as much transparency as possible.[11]

For more on integrating data in to planning, see the Manning Foundation report: *Shifting Gears Part I.*[1]

For more on open governance, see the Manning Foundation report: *Municipal Government & Open Data.*[10]

CYCLING COUNTS

There are many different types of automated counting technologies with varied features - permanent vs portable installation, the ability to distinguish between cyclists and pedestrians, or real-time streaming counts and/or live video feeds available to the public, etc. Depending on the selected technology, Wilke et al. estimated that monitoring 12 sites for 1 year costs about $700 - $1100 per site.[12]

Passive infrared technology works by detecting a change in thermal contrast by sensing the heat of cyclists or pedestrians passing by. This technology cannot easily differentiate between modes of travel, but can be easily moved to other locations. As it can undercount individuals who are traveling exactly side by side, it is more appropriate for narrower sidewalks or paths than wide city streets.[13]

Active infrared technology works by detecting an obstruction in an infrared beam. When the beam is crossed, a traveler is counted. This active technology can better differentiate between modes of travel, but otherwise has similar costs, advantages, and disadvantages to passive technologies.[13]

Video and imaging technology works by recording a video of an area and using computer algorithms to analyze pixel changes. The cost varies depending on the amount of additional manual quality control used. This technology can differentiate between modes of travel but, as it requires a line of sight, can be obstructed by weather. It can cover wider city streets, and be moved from location to location though more permanent installations can improve long-term cost effectiveness.[13]

Inductive or magnetic technology works by embedding loops in the pavement that sense a magnetic field change as a metal object passes over. As such, this is a permanent installation that is most appropriate for streets and is unable to reliably detect pedestrians. This is the most common sensor used to track motor vehicles, and can be used to track bicycles as well, although bicycles with carbon fibre frames may be missed.[13]

Piezeometric technology works by installing hoses, tubes, or pads on the pavement that sense pressure changes when an automobile or bicycle travels over them. This is an emerging technology for bicycle counting, is able to differentiate between modes of travel, and is generally very portable. However, they are most appropriate for use on streets, as they may pose a tripping hazard on pathways or sidewalks.[13]

At present, the City of Calgary only uses technology to supplement and verify its manual counting program and, while automated technology may potentially influence decision making, none of this raw data has yet been released to the public. Technology in use includes:

- Miovision cameras for turning movement counts and volume counts
- An Eco-Counter permanent pedestrian and bike counter on the Peace Bridge
- A portable hose Eco-Counter to collect the "before" counts for the Centre City Cycle Track Pilot
- A RadioBeam People-Bicycle Counter on the 7 Street Cycle Track.

As discussed in *Shifting Gears Part I*, the City should move away from manual methods of counting cyclists as soon as possible. Technology has advanced sufficiently that it is able to both improve data accuracy and reduce costs at the same time, leaving little reason to continue with manual counts.

Automated detection systems are able to count traffic continuously, 24 hours a day, 365 days of the year, and the huge increase in data they would provide could also help to improve public confidence in cycling data and cycling overall.

In addition to releasing the data collected by these automated counting technologies, the City should also track the number of counting infrastructure technologies installed around the city. By disclosing more about how, where, and when it conducts counts, and the amount of physical infrastructure and human capital being used, the City's Transportation Data Division can improve public confidence in its work.

SECTION II:
A BICYCLE-FRIENDLY CITY

When it comes to cycling policy, it can be difficult to measure success. Even something seemingly as straightforward as counting the number of cyclists can be a challenge when there is no easy way to quantify the results.[15]

Why measure a 'bicycle-friendly city' to begin with? Simply put: what's measured improves. Using a scorecard to define and organize measures can provide a structure that allows policy planners, elected officials, and the public to quickly determine how their government is performing and what areas may need more attention.

Cycling policy is just one of many areas that would benefit from more thorough performance evaluations. Such an exercise sould be performed for all types of transportation planning, such as large automobile projects that, up until now, have received little scrutiny.

While cycling in Calgary is used as a case study for this discussion, this report is best understood as an exercise in unconstrained optimization for any city facing similar transportation planning challenges. In other words, this section of the report aims to set out best practice ways for cities to measure

their progress towards improving cycling based transportation policy, regardless of their present progress.

The proposed measures can be used to compare performance over time, or between cities. Some municipalities suffer from a significant lack of data and so merely being able to source and determine a baseline for many of these measures would be significant progress for these cities.

Calgary presently tracks 25 measures in 4 main categories: cycling infrastructure, cycling activity, cyclist satisfaction, and cycling safety.[16] While a good start, these four themes miss many of the bigger issues that impact cycling in Calgary as a whole. In addition, all 25 measures focus exclusively on cyclists but more should be done from the perspective of all road users, and residents.

Finally, the City's measures are also heavily focused on the needs of "home to work" downtown commuters, over those who might ride recreationally or to school. This is a substantial problem as all types of cyclists have a role to play in helping to achieve an efficient and safe transportation network.

Table 1 outlines Calgary's current set of measures, compared with an alternative set of measures proposed by the Manning Foundation.

What follows in this report is a detailed examination of this proposed new set of measures, that better reflect what makes a truly 'bicycle-friendly city'.

Tables 2-11 list these measures, identifies whether the City has access to the data, and whether the data is regularly released as part of the City's Open Data catalogue.

Table 1:

CITY OF CALGARY CYCLING STRATEGY		MANNING FOUNDATION RECOMMENDATIONS	
Category	Number of Measures	Category	Number of Measures
Cycling Infrastructure	11	Infrastructure	44
		Facilities	9
		Technology	12
		Transit	8
Cycling Activity	7	Activity	19
		Investment	26
Cycling Satisfaction	4	Satisfaction	13
Cycling Safety	3	Safety	33
		Security	9
		Education	8

INFRASTRUCTURE

Of the 25 measures currently tracked by Calgary in its 'bicycle-friendly city'[16] strategy, 11 measures relate to cycling infrastructure: length of future primary cycling network built, length of primary cycling network completely implemented including snow clearing, total length of cycling network, length of regional pathways, length of signed routes/bicycle boulevards, length of shared lanes, length of bicycle lanes, length of cycle tracks, total length of on-street bikeways, percentage of population and jobs within 800 meters of cycling network, and level of on-street cycling network with high level of snow and ice control service.

Calgary should continue to use its current measures for judging the quantity of its cycling infrastructure, but also introduce measures that can aid in tracking its progress in delivering better quality infrastructure – only the measure regarding snow and ice control does this presently.

As it stands, the City's Cycling Strategy is inadvertently weighted in such a way that predisposes it toward increasing quantity of infrastructure without as attention to safety outcomes or quality control. It's often argued that more cycling infrastructure will improve safety, but many of the reported injuries are because of poorly maintained infrastructure, so a focus on both aspects is required.

The City currently aims to perform annual inspections of its pathway network, with each segment rated Green (good physical condition), Yellow (deterioration evident), or Red (failure imminent). Given the extensive nature of its pathway network, it is unlikely that a full and thorough review can be done on a yearly basis. Regardless, the City should disclose how much of its pathway system it was able to safety audit that year, and set performance standards accordingly. Such measures should be tracked and disclosed as an element of regular performance reporting for on-street bicycling facilities as well. Another measure for quality of road surfaces for cycling purposes would be the total length of gravel roads remaining within the city.

The level of snow control given to mixed-use and on-street infrastructure is also a key element of a 'bicycle-friendly city'. The City should track how much of its network receives snow control, and qualify the level of service provided. These measures should be based on outcomes rather than intent – for example, the City may aim to provide a certain level of service, but its performance should be based on actual results, rather than intentions or targets.

The first key recommendation of *Shifting Gears Part I* was the creation of a lighting policy for pathways. At present, lighting on the pathway network is done on an ad-hoc basis, without major seasonal considerations. By tracking the level of lighting coverage on both the mixed-use and on-street network, the City can gauge its performance in delivering better lighting that will result in improved safety and ease of use for all users.

Another key recommendation of *Shifting Gears Part I* was the improvement and prioritization of maintenance, gravel sweeping, and snow clearing

for bike routes shared with cars. The City should strive to use data analysis to identify as many spot maintenance problems and high crash areas as possible. The number of problems identified would be a useful proxy for determining the quality of the overall network. Furthermore, the City should report on the number of problems rectified, as well as the time taken to fix such problems. Timely identification and resolution of issues is key to a 'bicycle-friendly city'.

Another way to look at the quality of the overall cycling network is to consider how much of it was subject to hoarding or other forms of closure during the year. For any transportation network to be useful, it must not only be well maintained but also reliable. Data regarding closures of on-street or mixed-used infrastructure should be tracked in order to contribute to return on investment calculations. When closures must occur, efforts must be made to provide infrastructure solutions that provide functional equivalence in terms of ease of use as well as safety. By tracking such information about closures, planners will be incentivized to reduce them as well as the overall negative impact upon Calgarians' mobility.

Also recommended in *Shifting Gears Part I* was the adoption of a comprehensive pathway and bikeway Wayfinding system. While first steps have been made to alleviate "missing links" in its network, the City does not have a comprehensive pathway and bikeway signage plan in place. Such a plan would increase safety and confidence in Calgary's cycling network overall, as well as ridership in general.

Next, the City uses the percentage of population and jobs within 800 metres of the cycling network as an indicator of how connected its cycling network is. However, network connectivity should be thought of as more of a gradient than a passing or failing proposition. By breaking the analysis in to groups of 0-500 meters, 501-1000 meters, and more than 1000 meters, the City would gain a better insight into which portions of Calgary have good, moderate, or poor connectivity.

Finally, in the past, cycling network additions have been made on a piecemeal basis, without a concerted focus to leverage technology in order to find missing links. At the very least, the City should use GIS and mapping technology available in order to come up with more objective measures of the cycling network's connectivity, rather than rely on its perceived utility through polling. Such analysis could be conducted on a community-by-community level to determine whether certain areas of the city - especially outside of the downtown core – are lacking in infrastructure relatively. If such analysis is being conducted, the results should be released in order to increase confidence amongst the public that the infrastructure investment choices of planners demonstrate cost effectiveness.

Table 2:

PROPOSED INFRASTRUCTURE MEASURES	DATA AVAILABLE TO CITY?	DATA RELEASED TO PUBLIC?
Total length of cycling network	Yes	Yes
Total length of regional pathways	Yes	Yes
Total length of signed routes/bicycle boulevards	Yes	Yes
Total length of shared lanes	Yes	Yes
Total length of bicycle lanes	Yes	Yes
Total length of cycle tracks	Yes	Yes
Total length of on-street bikeways	Yes	Yes
Geographic distribution of cycling network	Yes	Yes
Legal claims due to poor pathway conditions	Yes	No
Number of "red" pathway kilometres - failure imminent	Yes	Incomplete
Number of "yellow" pathway kilometers - deterioration evident	Yes	Incomplete
Number of "green" pathway kilometers - good physical condition	Yes	Incomplete
Length of pathway lighting coverage	Yes	Incomplete
Level of pathway network with snow control - high, low	Yes	Incomplete
Length of pathway network safety audited	Yes	Incomplete
Spot pathway maintenance/crash problems identified	Yes	No
Spot pathway maintenance/crash problems rectified	Yes	No
Response time for pathway maintenance problems	Yes	No
Performance in delivering spring pathway maintanance	Yes	No
Duration and length of pathway subject to closure	Yes	No
Legal claims due to poor on-street roadway conditions	Yes	No
Number of on-street "red" kilometres - failure imminent	Yes	Incomplete
Number of on-street "yellow" kilometers - deterioration evident	Yes	Incomplete
Number of on-street "green" kilometers - good physical condition	Yes	Incomplete
Number of on-street gravel kilometers	Yes	Incomplete
Length of on-street lighting coverage	Yes	Incomplete
Level of on-street network with snow control - high, low	Yes	Incomplete
Length of on-street network safety audited	Yes	Incomplete
Spot on-street maintenance/crash problems identified	Yes	No
Spot on-street maintenance/crash problems rectified	Yes	No
Response time for on-street maintenance problems	Yes	No
Performance in delivering on-street spring gravel cleaning	Yes	No
Duration and length of on-street network subject to closure	Yes	No
Number of km of on-street network covered by Wayfinding system	No	No
Number of km of mixed-use network covered by Wayfinding system	No	No
Overall coverage of Wayfinding system	No	No
Percentage of population within 500 metres of cycling network	Yes	No
Percentage of jobs within 500 metres of cycling network	Yes	No
Percentage of population within 1000 metres of cycling network	Yes	No
Percentage of jobs within 1000 metres of cycling network	Yes	No
GIS routing data for cycle trips - via pathway only	Yes	Yes
GIS routing data for cycle trips - via street only	Yes	Yes
GIS routing data for cycle trips - time to city centre, by community	Yes	No
GIS routing data for cycle trips - time to activity centre, by community	Yes	No

·FACILITIES

At present, Calgary does not consider destination cycling facilities when measuring a 'bicycle-friendly city'.[16] Calgary should introduce measures that help assess the City's progress in delivering destination-oriented facilities for cyclists.

Where possible, the City should also track, on a voluntary basis, the provision of these facilities by private organizations and buildings. Many parking garages, apartment buildings, and community and business associations already have detailed information regarding their bike facilities and their utilization, meaning such tracking could be done very cost effectively. This information could be incorporated into the City's own cycling-oriented digital infrastructure and apps, and help supportive businesses connect with an audience.

In 2002, the City of Calgary launched its Bicycle Rack Sponsorship Program. Between 2002 and 2013, more than 800 racks have been installed citywide, though mostly within the city-center.

Anyone can request that a bicycle rack be installed on City land, subject to land availability. Data such as the number location of facilities requested and installed should be tracked and incorporated as a measure within the City's Cycling Strategy, in order to ensure that the City is providing services in a timely as well as equitable manner, throughout Calgary.

As discussed in *Shifting Gears Part I*, many opportunities exist for the City to partner with the private sector on the design, construction, and maintenance of cycling infrastructure. For example, a downtown gym might already have showers and lockers for cyclists, but no bike parking. A request for proposals might allow for creative solutions to cycling infrastructure that the City has not yet considered.

Table 3:

PROPOSED FACILITIES MEASURES	DATA AVAILABLE TO CITY?	DATA RELEASED TO PUBLIC?
Number of City buildings providing end of trip bicycle facilities	Yes	Incomplete
Type and number of City facilities provided, such as bike showers, racks, pumps	Yes	Incomplete
Number of private buildings providing end of trip bicycle facilities	No	No
Type and number of private facilities provided, such as bike showers, racks, pumps	No	No
Requests for proposals issued for bicycle facilities and partnership	Yes	No
Responses given to RFPs	Yes	No
Number of bike racks requested through Bike Rack Sponsorship Program	Yes	Incomplete
Number of bike racks deployed through Bike Rack Sponsorship Program	Yes	Incomplete
Geographic distribution of bike racks distributed through Program	Yes	Incomplete

TECHNOLOGY

At present, Calgary does not consider technology, like apps, websites, social media, and open data when measuring a 'bicycle-friendly city'.[16] Calgary should introduce measures that can help assess the City's progress in deploying effective digital infrastructure.

Measuring and improving digital infrastructure will help both the City in its planning efforts, and help improve the experience of cyclists in Calgary. Such measures are essential to assess and improve the effectiveness of these resources.

For example, the City currently only provides an iPhone version of its biking and pathway app. In the United States, the Android operating system is actually more popular now than the iPhone operating system, iOS, and this is likely to be similar in Canada. The City should immediately develop an Android version of this app in order to considerably improve its outreach in terms of education and data regarding cyclists.

It is also possible for the City to provide real-time bicycle counts online, or for app users to see how other cyclists are avoiding construction areas. This type of easily and transparently shared data helps generate support from the public for cycling-oriented infrastructure, and helps demonstrate a good return on investment.

Overall, investment in digital infrastructure will provide an insight into who rides a bicycle in Calgary, and the type of trips they make. Performance targets may also incentivize staff to come in under-budget, or deploy resources in a more cost-effective manner.

Table 4:

PROPOSED TECHNOLOGY MEASURES	DATA AVAILABLE TO CITY?	DATA RELEASED TO PUBLIC?
Number of downloads of smartphone app	Yes	No
Operating systems support by smartphone app	Yes	No
Number of regular users of smartphone app	Yes	No
Opt-in rate of smartphone app (users / # of cyclists)	Yes	No
Number of page views and unique visitors to City's online cycling resources	Yes	No
Number of downloads of City's online cycling resources, reports, data	Yes	No
Followers, shares, likes, and reach of City's online cycling social media resources	Yes	No
Number of cycling related datasets published	Yes	Incomplete
Number of locations used for conducting cycling counts	Yes	Incomplete
Number of automated installations used for cycling counts	Yes	Incomplete
Number of seasonal workers hired for cycling counts	Yes	Incomplete
Amount of automated infrastructure deployed, and breakdowns of technology used	Yes	Incomplete

TRANSIT

At present, Calgary does not consider transit integration when measuring a 'bicycle-friendly city'. [16] Calgary should introduce measures that help assess the City's progress in integrating cycling and transit.

A bicycling trip may end at a particular destination, such as work, a school, or a store, or it can be part of a longer journey that involves transit. By better integrating transit operations with cycling infrastructure, the City could give people more transportation choices, as well as expand the reach of the transit and cycling network overall.

Cycling and public transit are not necessarily competing modes of transportation. Better and smarter integration of cycling and transit infrastructure would see the quality of service increase for all users.

Effective targeting of bicycling infrastructure, such as pathways, bike lanes, or bike racks, can help significantly increase the service radius of a transit stop.

Where it is advertised that all buses on a given route are equipped with bike racks, it's important that quality control measures are tracked to determine how often such a promise is delivered on. There are also many interesting opportunities for how this could integrate with the City's cycling technology, in order to improve the experience of cyclists. For example, a cyclist could check an app in real-time to see when the next bus equipped with a bike rack is arriving, or to know, in advance, whether there is bike parking available at their local LRT station.

Finally, utilization information is incredibly important, as it is a clear demonstration to the public of a positive return on investment and also helps planners decide where to allocate limited resources for additional infrastructure.

Table 5:

PROPOSED TRANSIT MEASURES	DATA AVAILABLE TO CITY?	DATA RELEASED TO PUBLIC?
Number of bus routes equipped with bike racks	Yes	Incomplete
Hours of bus transit service provided with bike racks	Yes	No
Number of LRT boardings with a bicycle	Yes	No
Cyclist utilization of transit infrastructure, such as racks on buses	Yes	No
Number of transit stops with bike parking	Yes	Incomplete
Percentage of transit stops with bike parking	Yes	Incomplete
Number of LRT stations with bike parking	Yes	Incomplete
Cyclist utilization of transit facilities, such as racks at stations	Yes	No

ACTIVITY

Of the 25 measures currently tracked by Calgary in its 'bicycle-friendly city'[16] strategy, 7 measures relate to activity: home to work mode split, cycling mode split, percentage of female cyclists, centre city cycling mode split, major activity centre cycling volumes, average increase in cyclist volumes observed after a route improvement, and number of cycling trips using a bike share system per year.

Calgary should continue to use its current measures for judging cycling activity, but also expand upon an approach that will better inform policymakers on who rides their bicycle, why they ride, where they go, and how long their trips are.

Presently, the City conducts manual 'Pathwatch' surveys that do not always used the same sites for monitoring each year, which greatly reduces their usefulness. Measures for the performance of such counts should include the number of old and new locations used, with an aim to achieve as much consistency across years as possible.

The City's first official bicycle count, "conducted in the summer of 2013,"[17] is a promising start to the annual monitoring of changes in cycling volumes and demographics at specific activity locations across Calgary, rather than just within the city-center. As with the 'Pathwatch' surveys, it's imperative that these counts be done in consistent locations across years.

The distinction between cyclists and trips is also important. The City's 2013 Bicycle Count claims that "19,476 cyclists were counted at 51 locations in six-hour data collection time period," but this is better understood as a count of bicycle trips rather than as a count of cyclists. The City should take care regarding the language it uses for communicating cycling activity, and set targets for cyclists and bicycle trips separately, rather than using the terms interchangeably. While some might consider this to be pedantic, language is important, particularly when media end up inaccurately reporting the number of cyclists in Calgary, based on unclear language used in City reports.

In terms of vulnerable groups, efforts should be made to consider the cycling activity of visitors or nonresidents wherever possible. Infrastructure should be intuitive and easy to learn and understand at just a glance, even for non-English speakers and an increase in ridership amongst visitors to Calgary would be indicative of a more user-friendly cycling network.

Lastly, it is expected that winter months will show less cycling activity than summer months, but the City should make efforts to understand exactly what that reduction in activity is and a reduction in the gap may be indicative of improved infrastructure quality and education.

Table 6:

PROPOSED ACTIVITY MEASURES	DATA AVAILABLE TO CITY?	DATA RELEASED TO PUBLIC?
Major activity centre cycling volumes observed	Yes	Yes
Number of activity centre locations used per year	Yes	Yes
Bicycle volumes per count location	Yes	Yes
Number of new activity centre count locations used	Yes	Yes
Nonresident cyclist activity	No	No
Home to work mode split (24 hours, city-wide)	Yes	Yes
Winter coefficient - reduction in bicycle trips during winter months	Yes	No
Cycling mode split (all purpose trips, 24 hours, city-wide)	Yes	Yes
Centre City cycling mode split (AM peak, inbound only)	Yes	Yes
Average increase in cyclist volumes observed after a route improvement	Yes	Incomplete
Observed gender breakdown of cyclists	Yes	Yes
Observed age breakdown of cyclists, ie. under age 18, over age 65	Yes	Yes
Observed helmet use	Yes	Yes
Observed income data	Incomplete	Yes
Number of pathway survey locations used per year	Yes	Yes
Number of new pathway survey locations used	Yes	Yes
Percentage of Calgarians riding a bicycle at least once a week	Incomplete	Yes
Percentage of Calgarians never riding a bicycle	Incomplete	Yes
Percentage of Calgarians riding a bicycle daily	Incomplete	Yes

17

INVESTMENT

At present, Calgary does not consider economic indicators or public and private infrastructure funding when measuring a 'bicycle-friendly city'.[16] Calgary should introduce measures that help assess the City's progress in investing in cycling.

A 'bicycle-friendly city' requires stable, consistent, and predictable investment in transportation infrastructure that serves, rather than directs, customer demand.

The City should measure and publish the amount of taxpayer funds being allocated to its own cycling related facilities, projects, and staff. This information should also be delineated so that the public can view how that funding is split between primarily recreational or mixed-use (i.e. pathway systems) versus primarily commuter infrastructure (i.e. bikeway network, on-street bike lanes).

Next, the City should measure and publish data regarding the construction of its cycling facilities – for example, disclosing how much was built, in terms of total kilometers and dollar cost per kilometer. Another measure might be the number of new or rehabilitated roadway or bridge projects.

Recent 2014 Citizen Satisfaction Survey results implied that many Calgarians felt that the City overspent on cycling infrastructure. It is likely that the public over-estimates how much is actually spent, and ambiguity regarding recent projects contributes to this perception. Better information regarding how much is actually spent by the City

may help address this and improve support for active modes of transportation overall.

Similarly, it would be useful to measure and publish the amount of private funds or donations being sought and allocated to cycling related projects around Calgary, again on a mixed-use or commuter basis. The majority of Calgary's pathways have been built or donated by private interests and the City has been the recipient of high-level donations for infrastructure in the past – for example, $1,000,000 by an anonymous donor toward the construction of a pedestrian/cycling bridge under Crowchild Trail.

There is no evidence that the City is currently attempting to court further donations. Measuring private support for City cycling programs or infrastructure would help incentivize the City to partner with the private sector and seek new donations and opportunities. Support for additional funding might also increase if city administration has clearly first pursued all other available options.

A key recommendation of *Shifting Gears Part I* was the establishment of a systematic program for major road-reallocation projects. The City currently approaches projects that significantly reallocate road space on an ad-hoc basis, with ambiguous and inconsistent performance measures. Instead, the City should measure and publish data regarding the net amount of parking stalls and length of roadway removed due to the implementation of bicycling facilities. Often, parking may be removed in one area and added in another within the scope of a single project, with the overall net impact ambiguous to the public. By providing such data, the public can

also more clearly weigh the trade-offs involved in various infrastructure options – as it stands, it is likely that the City inadvertently allows the public to overestimate the negative impact of cycling infrastructure by not consistently providing clear data.

Lastly, the City should measure and publish data regarding the number of cycling focused events and the number of participants. Other measures might be the number of independent cycling events conducted on public property, number of pathway permits issued, or the number of community events that provide bicycle parking.

Table 7:

PROPOSED INVESTMENT MEASURES	DATA AVAILABLE TO CITY?	DATA RELEASED TO PUBLIC?
Funding from private sources to recreational cycling network	Yes	No
Funding from City to recreational cycling network	Yes	Incomplete
Funding from private sources to commuter cycling network	Yes	No
Funding from City to commuter cycling network	Yes	Incomplete
Staffmembers assigned	Yes	Incomplete
Kilometers of recreational cycling network built that year	Yes	No
Dollar cost per kilometer of above	Yes	No
Kilometers of commuter cycling network built that year	Yes	No
Dollar cost per kilometer of above	Yes	No
Number of roadway or bridge projects including bicycle facilties within scope of work	Yes	No
Wear and tear costs for commuter and recreational cycling network, in total and by kilometre	Yes	No
Snow control costs for commuter and recreational cycling network, in total and by kilometre	Yes	No
Parking removed due to cycling network related projects	Yes	Incomplete
Automobile lane kilometres added and removed due to cycling network related projects, net	Yes	Incomplete
Automated count infrastructure used, by type	Yes	Incomplete
Manual count man hours	Yes	Incomplete
Number of private partnerships or donors participating in cycling projects	Yes	No
Revenue (profit) earned from partnerships	Yes	No
Support (net) given to partnerships	Yes	No
Number of city sponsored bike focused events	Yes	Incomplete
Number of city sponsored events providing bike parking	Yes	Incomplete
Number of independently run bike focused events	No	No
Number of independently run events providing bike parking	No	No
Number of community events that provide bike parking	Incomplete	No
Utilization of bike parking at community events	No	No
Permits for pathway use	Yes	No

SATISFACTION

Of the 25 measures currently tracked by Calgary in its 'bicycle-friendly city'[16] strategy, 4 measures relate to satisfaction: satisfaction with the on-street cycling network, perceived safety in traffic (% agreement), perceived coverage of the bikeway network (% agreement), and perceived satisfaction with amount of bike parking (% agreement).

Calgary should continue to use its current measures for judging cyclist satisfaction, but also introduce measures that track citizen satisfaction more generally.

In order to get a better measure of actual satisfaction with cycling in Calgary, the City must make a more concerted effort to include and understand non-cyclists as well. A 'bicycle-friendly city' is best achieved with the engagement of as broad as possible a representation of Calgarians. This means taking in to account not only the priorities and interests of current or potential users of the system, but also those residents, property owners, and businesses who may not necessarily ride a bicycle, but will nonetheless be impacted by policy and planning decisions.

Every year, Calgarians are asked through a telephone survey to rate their satisfaction with City services. The survey contains a question about rating the importance of, and satisfaction with, the pathway network. For the first time, in 2014, an additional question about the importance of, and satisfaction with, on-street bike lanes was asked in order to help provide an indication of satisfaction with the network as a whole.

Analysis of this source data should be undertaken to explore how citizen satisfaction varies amongst different groups. The City should not exclusively determine the success of its Cycling Strategy via cyclists alone.

Cycling infrastructure does impact those who choose walk or to travel by automobile, and their support (or at least, lack of hostility) is key to support for cycling as a whole. For example, the City's 2014 Citizen Satisfaction survey depicts 61 per cent of Calgarians as wanting to invest "the same or more" in on-street bike lanes. However, that same data can be used to show that they want to invest "the same or less" 72 per cent of the time, making for a very unclear mandate.

The City should also incorporate readily accessible data from its 311 Citizen Services Centre when measuring a 'bicycle-friendly city'. Measures could include the number of 311 tickets involving bicycles or facilities, as well as the City's performance in responding to Calgarians' concerns in a timely manner.

Finally, consultations aim to discover public preferences, yet special interest groups have the ability and incentive to dominate the public consultation process. Cities should rely less on planning by consultation and allow development to take place through the market, which allows people to have a direct input proportionate to their level of investment and risk.

For more on public consultations, see the Manning Foundation report: *The Consulter's Conceit*.

Table 8:

PROPOSED SATISFACTION MEASURES	DATA AVAILABLE TO CITY?	DATA RELEASED TO PUBLIC?
Cyclist satisfaction with the on-street cycling network	Yes	Yes
Cyclist perceived safety in traffic	Yes	Yes
Cyclist perceived coverage of the bikeway network	Yes	Yes
Cyclist perceived satisfaction with amount of bike parking	Yes	Yes
Percentage of public expressing importance of on-street bike lanes	Yes	Yes
Percentage of public expressing satisfaction with on-street bike lanes	Yes	Yes
Percentage of public expressing importance of pathway system	Yes	Yes
Percentage of public expressing satisfaction with pathway system	Yes	Yes
Number of 311 tickets involving bicycles or facilities	Yes	No
Response time of 311 tickets involving bicycles or facilities (submitted, opened, closed rate)	Yes	No
Number of consultation sessions held involving bicycles or facilities	Yes	No
Duration of consultation sessions held involving bicycles or facilities	Yes	No
Number of consultations with raw data published in open data catalogue	Yes	No

SAFETY

Of the 25 measures currently tracked by Calgary in its 'bicycle-friendly city' strategy,[16] 3 measures relate to safety: collisions involving a cyclist on public streets, cyclist injuries due to collision, and number of fatalities.

Calgary should continue to use its current measures for judging safety, but greatly expand this section to reflect the importance safety plays in making a 'bicycle-friendly city'.

As discussed in *Shifting Gears Part I*, Calgary should follow Toronto's lead in using data to target three important ways of addressing the many factors that can contribute to collisions: bike-friendly infrastructure, education, and police enforcement. To achieve the best results in increasing cycling safety and promoting the use of bicycles, all three must be used in combination.

The first major step in preventing collisions is to know more about how and why they happen. Data on collisions should be indexed to the number of bicycle trips, rather than the number of cyclists, as the City's data on the former is more robust. The collision data that is tracked should also be expanded to consider the severity of injury, for example collisions involving no injury, collisions involving minimal or minor injury, collisions involving major injury, and collisions involving fatal injury. Pedestrian and motorist injuries and fatalities due to collision with bicycles should also be tracked, rather than just the injuries and fatalities of cyclists.

All of this new data should be delineated by location, in order to help determine if Calgary as a whole is getting safer, or if some areas are losing ground and some are gaining. Further, this analysis should be applied on a demographic basis, in order to determine if a particular gender or age group is more at risk than others.

Currently, safety data is sourced from the Calgary Police Service and the Civic Census transportation survey. However, the data provided by the Police only includes "reportable" collisions, meaning that the data is quite limited. This lack of available data has led to safety being unintentionally downplayed in the City's current Cycling Strategy. Safety considerations should permeate all of the City's cycling policy efforts – whether education, security, infrastructure, transit, satisfaction, or any other activity.

To counter these issues, the City should investigate other sources of bicycle crash data - hospital and ambulance records of cycling-related injuries are one possible source of further data that would provide information on the kind of injuries sustained in incidents that are not reported to police. Other mechanisms can be developed to facilitate the collection of information from cyclists on hazardous locations – for example, the inclusion of crash reports or near-miss reporting within the City's own cycling app.

Finally, between 2005 and 2010, two thirds of falls and collisions reported to the Claims division of the City's Law Department related to the condition or slipperiness of pathway surfaces, demonstrating that this is a crucial area that must be given attention

in the overall Cycling Strategy. The number of
such claims, both for pathways and on-street
bicycle facilities, should be tracked and disclosed
and a reduction would imply not only better
overall maintenance standards, but also improved
infrastructure design.

Table 9:

PROPOSED SAFETY MEASURES	DATA AVAILABLE TO CITY?	DATA RELEASED TO PUBLIC?
Near Miss data for recreational/mixed use portion of network	Incomplete	No
Non Injury data for recreational/mixed use portion of network	Incomplete	No
Minimal Injury data for recreational/mixed use portion of network	Incomplete	No
Major Injury data for recreational/mixed use portion of network	Incomplete	No
Fatality data for recreational/mixed use portion of network	Yes	Yes
Causes data for recreational/mixed use portion of network	No	No
Factors data for recreational/mixed use portion of network	No	No
# crashes / 1,000 pathway users	Incomplete	No
# injuries / 1,000 pathway users	Incomplete	No
Near Miss data for commuter/on-street portion of cycling network	Incomplete	No
Non Injury data for commuter/on-street portion of cycling network	Incomplete	Yes
Minimal Injury data for commuter/on-street portion of cycling network	Incomplete	Yes
Major Injury data for commuter/on-street portion of cycling network	Incomplete	Yes
Fatality data for commuter/on-street portion of cycling network	Yes	Yes
Causes data for commuter/on-street portion of cycling network	No	No
Factors data for commuter/on-street portion of cycling network	No	No
# crashes / 1,000 home to work cyclists	Yes	Yes
# injuries / 1,000 home to work cyclists	Yes	Yes
City-wide cyclist fatalities due to collision	Yes	Yes
City-wide pedestrian injuries/fatalities due to collision with bicycle	Incomplete	Incomplete
City-wide motorist injuries/fatalities due to collision with bicycle	Incomplete	Incomplete
# crashes / 1,000 bicycle trips	Yes	No
# injuries / 1,000 bicycle trips	Yes	No
Location or quadrant data	Yes	No
Age collision data	Yes	No
Gender collision data	Yes	No
Seasonal collision data	Yes	No
Nonresident collision data	Incomplete	No
FOIP requests received regarding bicycle safety	Yes	No
FOIP request response time regarding bicycle safety	Yes	No
Safety collision statistics from non police sources	Incomplete	No
Hospital, ambulence records data as reported	Yes	No
City Law department safety data as reported	Yes	No

SECURITY

At present, Calgary does not consider security when measuring a 'bicycle-friendly city'.[16] Calgary should introduce measures that help assess the City's progress in improving cyclist's security in terms of traffic enforcement and bicycle thefts.

Measures of security should include the number of bicycles reported stolen, the rate of bikes returned to owners, the number of bylaw officers assigned to pathways, reported crimes involving cyclists, and cycling related law enforcement actions undertaken against drivers and cyclists.

Pathway enforcement in Calgary is targeted and occurs sporadically within the system, but the public continually identifies it as an important and significant way to increase public safety and cycling popularity. In 2010 survey samples, the percentage of the public that believed in the need to enforce pathway regulations varied from 61 to 69 percent.

Such data must be indexed to the number of cyclists or the number of trips undertaken, rather than being measured absolutely, to increased cycling activity giving the appearance of less security. Care should also be taken to ensure that any measures that are implemented do not encourage unnecessary enforcement actions simply to improve statistics.

Better data on cyclist security can help direct enforcement and education activities. For example, the City can gain insight into whether certain areas of the city are becoming more or less secure, or if certain demographics are more at risk than others. Review of vulnerable areas and improvements to existing facilities will help alleviate fears about theft and personal security, and improve cycling overall.

Table 10:

PROPOSED SECURITY MEASURES	DATA AVAILABLE TO CITY?	DATA RELEASED TO PUBLIC?
Number of bicycle thefts	Yes	No
Theft rate indexed per number of cyclists	Yes	No
% rate of stolen bikes returned to original owner	Yes	No
Seasonal, location, age, and gender data for thefts and return rate	Yes	No
Number of officers assigned to bicycle related activities	Yes	No
Number of officers assigned, per capita (cyclists)	Yes	No
Cycling related enforcement actions taken against cyclists	Yes	No
Cycling related enforcement actions taken against drivers	Yes	No
Indexed rates for enforcement actions taken	Yes	No

EDUCATION

At present, Calgary does not consider education when measuring a 'bicycle-friendly city'. Calgary should introduce measures that help assess the City's progress on reducing educational barriers to cycling and on partnering with educational institutions.

According to the City's 2010 telephone poll, more than 80 per cent of Calgarians agreed that increased education for motorists and cyclists would make them more likely to cycle. Education on cycling rules is currently done by a variety of different City departments, including Parks, Animal and Bylaw Services, Transportation, and Police Services. Collaboration between these various groups could significantly improve education outcomes.

The City's 2011 Cycling Strategy suggests developing a course for motorists and cyclists to take as an alternative to paying a fine for driving and cycling violations. This course development should proceed with the aim of educating motorists and cyclists about the rules of the road and their respective rights and responsibilities.

Finally, the City has a wealth of cycling education resources at its disposal, and should reach out to as many schools as possible in order to help them promote cycling education. Elementary, secondary and post-secondary schools could all be benefit from participation in safety and education initiatives and from cycling resources.

For more on data on education, see the Manning Foundation report: Shifting Gears Part I: Smarter Cycling in Calgary.

Table 11:

PROPOSED EDUCATION MEASURES	DATA AVAILABLE TO CITY?	DATA RELEASED TO PUBLIC?
Number of educational courses developed	Yes	No
Participation in educational courses	Yes	No
Awareness of rules of road, as determined by polling results	No	No
Amount of bike parking available at elementary schools	No	Yes
Amount of bike parking available at secondary schools	No	Yes
Amount of bike parking available at post-secondary schools	No	Yes
Location, utilization data for previous	No	Yes
Schools partnered with City on educational programs	Yes	Yes

SECTION III:
CONCLUSION

Given the reality of Calgary as a world-class bicycling city, it is important to question why the recent City Hall debate around the proposed cycle track network has become such a partisan political issue. After all, the case for bicycling as a form of competition, recreation, exercise, and transportation is clear.

Unfortunately, recent City planning principles that have largely directed, rather than served, development, have created transportation policies that approach mobility as a zero-sum game, where for cyclists to gain, motorists must lose. The interests of drivers and cyclists are certainly not mutually exclusive and this adversarial approach may be doing long-term damage to the wider mobility and cycling cause that, up until now, has gained broad support from Calgarians.

In their pursuit of a worthy cause, both central planners and cycling advocates have gone all-in on a strategy that relies on government intervention while circumventing genuine consultation or collaboration with local businesses and residents. Without transparency, community collaboration, or evidence-based measures of success, the proposed City Hall cycling schemes may actually harm public support for cycling.

For real gains to be made for mobility in Calgary, both critics and proponents of government intervention must avoid polarizing rhetoric and instead embrace a more robustly evidence-based approach to transportation planning for infrastructure of all kinds.

Cycling advocates must challenge some of their own assumptions - a critic of a certain implementation of cycle track is not necessarily a critic of cycling. Questions such as "Will this work?" or "How do we measure the success or failure of this project?" should not be seen as attacks on cycling and cyclists, but rather as a defense of good public policy. Critiques from outside sources may well resolve problems that were previously unforeseen.

Blind support for the wrong kind of infrastructure may very well reduce the safety of cyclists, pedestrians, and motorists all; as well as harm public support for the right investments. Blind opposition to the right kind of infrastructure creates the same problems. However, with fair measures and good evidence, a better and far less political conversation on cycling can emerge.

"CONSIDER A MAN RIDING A BICYCLE. WHOEVER HE

IS, WE CAN SAY THREE THINGS ABOUT HIM. WE KNOW

HE GOT ON THE BICYCLE AND STARTED TO MOVE. WE

KNOW THAT AT SOME POINT HE WILL STOP AND GET

OFF. MOST IMPORTANT OF ALL, WE KNOW THAT IF AT

ANY POINT BETWEEN THE BEGINNING AND THE END

OF HIS JOURNEY HE STOPS MOVING AND DOES NOT

GET OFF THE BICYCLE, HE WILL FALL OFF IT. THAT IS

A METAPHOR FOR THE JOURNEY THROUGH LIFE OF

ANY SOCIETY OF LIVING THINGS."

– William Golding

NOTES

1. Farkas, J. (2014) Shifting Gears Part I: Smarter Cycling in Calgary. Manning Foundation for Democratic Education.

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7. Manning Foundation for Democratic Education. 2013 Municipal Survey.

8. Seymour, D. (2013). Decongestion: Getting Calgary Moving. Manning Foundation.

9. Farkas, J. (2014) Shifting Gears Part I: Smarter Cycling in Calgary. Manning Foundation for Democratic Education.

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11. See: Wilke, A., Lieswyn, J., & Taylor, S. (2012). Cycle counting programme in Hamilton. Available online: http://www.hardingconsultants.co.nz/2walkandcycle/ downloads/L10_Wilke__Axel___Poster.pdf. Conversion of New Zealand dollar vallues performed at Bank of Canada historic currency rate of 0.8351 [1.1975]

12. National Bicycle and Pedestrian Documentation Project. (2009). Automatic Count Technologies. Available online: http://bikepeddocumentation.org

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14. Discussed largely here: The City of Seattle. (2014). Seattle Bicycle Master Plan. Available online: http://www.seattle.gov/transportation/bikemaster.htm

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22. Manning Foundation for Democratic Education. 2014 Municipal Survey.

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