

SHOULD YOU BUILD A CONDO WITH NO PARKING? A FEASIBILITY STUDY

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Abstract. A 168-unit condominium development, N3, has been proposed in Downtown Calgary that seeks to be the first of its kind in the City, a 'car-less condo' that does not provide on-site parking for residents or visitors of the building. This paper discusses the feasibility of the initiative from both a conceptual and technical standpoint. The paper also reviewed car-free concept, including global trends, impacts, and advantages and disadvantages. A look at access to active modes facilities and shared parking opportunities were also presented. These items are further illustrated in direct relation to the proposed condominium, N3, in Calgary.

INTRODUCTION

A condominium development, N3, has been proposed in Downtown Calgary that seeks to be the first of its kind in the City, a 'car-less condo' for a new generation of young urbanites. The unique offering was aimed at attracting Generation Y, a socially and environmentally conscious group who are increasingly engaged in urban life and communities; and a group that trends show to be less likely to own or operate a vehicle.

A comprehensive parking study was completed in September 2014 for the developer of the subject project. The exercise sought to determine the feasibility and impact of not providing any parking spaces for both residents and visitors.

This paper seeks to summarize the parking study completed in support of this development and highlight key findings from both a conceptual and technical standpoint. The subject development, the N3 condominium, will be referenced throughout this paper to serve as an example of a Project candidate that was concluded to support the notion of providing no on-site parking.

SITE CONTEXT

To best understand the approach taken to determine the feasibility of supplying no parking for a condominium, it is important to understand the context in which the site exists. As discussed later in this paper, the feasibility of not providing parking stalls for a new condo development is entirely dependent on a number of contextual conditions.

The N3 project site is located in downtown Calgary, within the East Village, and is bounded by 8 Avenue SE to the south, 4 Street SE to the east, the LRT tracks and the new Calgary Central Library to the west, and a public lane to the north. The development will comprise of 1-bedroom and 2-bedroom dwelling units, totalling of 168 units.

As part of the Development Permit application, the developer requested a 100 percent relaxation from the City of Calgary Land Use bylaw-parking requirements. That is, the development will not supply any resident or visitor parking spaces. The minimum bylaw parking ratios for the East Village Transition District (CC-ET) are 0.5 stalls per unit for residents and 0.1 stalls per unit for visitors. The maximum is 1 stall per unit. To satisfy the traditional bylaw requirements, N3 would have to provide a minimum of 84 and 17 resident and visitor stalls respectively.

LITERATURE REVIEW

Parking Requirements

Land use bylaws generally prescribe parking requirements for various land uses. Minimum parking requirements ensure that developments satisfy peak-parking demands on-site so as to mitigate off-site traffic and parking congestion issues.

Parking maximums establish an upper limit on parking supply, and can either be used in conjunction with parking minimums, or on their own where there are no minimums. Parking maximums are being included in some municipality bylaws by cities that want to promote the use of active modes, prevent the construction of large lots, cap supply based on roadway capacities, increase tax revenues through parking lot redevelopment, improve pedestrian safety and comfort, and promote environmental benefits¹.

For residential developments, parking requirements are often prescribed for residents and visitors' uses. These parking requirements are not uniform across the city, they vary from planning district to planning district and may be dependent on factors such as, size of a dwelling unit, location of the development (downtown or suburb), proximity to transit stations and city's desire to control traffic.

A literature review and research exercise was undertaken in order to best understand the current parking policy practices for municipalities in North America and elsewhere. Information was sourced from 21 municipalities in Canada and the United States, and a questionnaire was distributed to respondents representing municipal planning departments in Boston, Edmonton, San Francisco, Portland, Seattle, and Toronto.

The results of this review yielded an inventory of municipal parking requirements, a discussion about limitations, trends and impacts of parking policy, and identified some established or trending best practices for reducing parking requirement.

The following table shows parking requirements for condominiums in 23 municipalities.

Table 1: Relevant Parking Requirements in North America and Europe

Municipality (Metro Pop.)	Studio	1 Bedroom	2 Bedroom	Visitor
Calgary (1.21 Million) *East Village Transition District	0.5 per unit, Max 1 per unit			0.1
Edmonton (1.16 Million) *Downtown Special Area	0-0.4 per unit, Max 0.5	0.4 per unit, Max 0.75-1.25	0.4-0.8 per unit, Max 1.25-1.5	0 to 0.1 per unit (max of 10 stalls)
Montreal (3.82 Million)	0.25 per unit (<50m ²)	0.5 per unit (>50m ²)		
Ottawa (1.24 Million)	West of Rideau Canal – 0 per unit East of Rideau Canal – 0.25 per unit Max: 1.5 per unit			West of Rideau Canal – none East of Rideau Canal – 0 per unit for first 12 units + 0.1 for next 300 units
Toronto (5.58 Million)	0.3 per unit	0.5 per unit	0.8 per unit	0.1 per unit
Vancouver (2.31 Million)	0.5 per unit (<50m ²), or 0.6 per unit plus 1 space for each additional 200m ² GFA to max 1.5			7.5% of base parking
Winnipeg (0.73 Million)	No parking requirements			-
Denver (2.90 Million)	0.75 per unit			-
Portland (2.29 Million)	0 per unit (up to 30 units on site) 0.2 per unit (31 to 40 units on site) 0.25 (41 to 50 units on site) 0.33 per unit (50+ units on site)			-
Seattle (3.44 Million)	0 per unit			-
Minneapolis (3.45 Million)	0 per unit, MAX 1.5 per unit			-
San Francisco (4.5 Million)	0 per unit, MAX 1 per unit			-
Paris (5.23 Million)	0 per unit, MAX 1 per 100sqm			-
Berlin	0 per unit, no maximums			-

(5.1 Million)		
London (14 Million)	0 per unit, Maximum 1 per unit	-
Birmingham (1.13 Million)	0 per unit, maximums depend on city area	-
Miami (5 million)	0 per unit w/l 1000ft of major transit network	-
Barcelona (1.67 million)	0.17 – 0.5 per unit (location dependent)	-
Hamburg (1.8 million)	0.2 per unit; parking cap is in effect	-
Stockholm (2 million)	0.14 per room	-
Strasbourg (500,000)	0.5 per unit	-

Of the 21 cities reviewed, 10 (48%) of them have no minimum parking requirement for residents if the apartment is a studio, 1 bedroom, or 2 bedroom unit within the urban centre or downtown core. Eleven (52%) of the cities reviewed have minimal parking requirements. In addition, 9 (43%) of the cities reviewed set maximums on residential parking requirements. Miami does not have minimum requirement if a residential development is within 1000 feet (350m) of a transit station, whereas depending on the number of units, Portland requires 0-0.33 stalls per unit. As can be seen, from the review, many cities have recognized that not all residential developments require parking spaces and have formalized it in their respective land use bylaws. Calgary requires minimum of 0.5 spaces per unit for residents within the East Village Transition District.

Of the municipalities reviewed, 15 (71%) do not have any requirements for visitors. Six cities (29%) have minimal parking requirements. Edmonton is the only city that employs a maximum of 10 stalls for visitor parking. It is noted that most cities don't reference any visitor requirements, and no record of significant issues was identified through the research process.

Promoting Active Modes through Parking Policy

The review confirmed that an increasing number of municipalities are indeed reducing parking requirements for transit-oriented developments, developments that feature on-site bicycle parking or bikeshare access, and carshare.

Many cities have allowed parking reductions for Transit-Oriented Developments (TODs) within their land use bylaws. Transit proximity has been proven to be a significant off-site factor that reduces parking demand in residential developments within close proximityⁱⁱ. Through our review, 8 municipality bylaws included a parking reduction for TOD developments (sites within 300 to 500m of major transit). Parking reductions ranged from 10% to 100%. The municipalities included in the review were Edmonton, Washington, San Francisco, Denver, Portland, Los Angeles, Miami, and Seattle. While in Europe, applying a significant relaxation (over 60%) has become commonplace for many cities including Paris, Antwerp, and Zurichⁱⁱⁱ.

Although not as commonly applied to bylaw parking requirements as proximity to transit, some municipalities have assigned specific parking reductions to encourage active-mode use, specifically cycling. As a TDM measure, developers may encourage residents to increase their use of bicycles over vehicles by installing bicycle parking facilities as well as bike share programs. Portland, Seattle, San Francisco, Toronto and Denver were found to offer parking relaxations for developments that provide bicycle parking or bike share availabilities. The reductions associated with bicycle amenities ranged from 20-25%.

Carsharing is a viable alternate mode for many, as the average vehicle owner actually only uses their vehicle for one hour each day. Residents who live in urban communities have been shown to own fewer vehicles and drive less on average^{iv}. Some municipalities are incentivising developers to include car share stalls within their on-site parking facilities by offering prescribed parking relaxations. Portland, Seattle, San Francisco, and Toronto were found to provide parking relaxations for this condition. For each carshare stall provided, the corresponding reductions in parking supply ranged from 1 to 4 stalls. In some cases, this reduction was capped at 5-25%.

Limitations of Parking Minimums

Parking minimums are most often established based on a combination of the Institute of Transportation Engineers (ITE) *Parking Generation* rates or locally observed data. The methods of establishing parking minimums are limited, most often resulting in inflated values and therefore over-supply of parking^v. Oversupply of parking separates land uses, reduces densities, impairs walkability, and create obstacles to providing transit and pedestrian friendly communities^{vi}.

The ITE *Parking Generation* ratios are a gathering of empirical data based on land-use from urban and suburban areas in the United States and Canada. Majority of these data may have come from suburban neighbourhoods where parking is often free, public transit not readily available, pedestrian or cycling facilities not adequately provided, and transportation demand management strategy less likely to be in place^{vii}. Therefore, vehicle-use becomes the primary,

if not the only, option for most residents in suburban settings. As a result, the observed demand for parking could be higher in the suburbs than within the city core where transit, cycling and walking facilities are available.

Similarly, planners may look to parking demands at land uses in their city to determine minimum parking requirements. In his 2002 publication, *Truth in Transportation Planning*, Shoup indicated that parking is free for 99% of vehicle trips in the US and that observed demand grossly over-estimates the actual needs^{viii}. Free and abundant parking increase demand because it makes vehicle-use the most convenient and oftentimes affordable option for short trips^{ix}.

According to Forinash, et al (2003), parking requirements may be better established based on:

- Development Type and Size – generic parking formulas address these factors to some extent.
- Population and Development Density – consider the density and demographics of the project. Information on income, car ownership, and age distribution can help forecast total parking demand.
- Availability of Transportation Choices – takes into account the active modes available for use by residents/employees or visitors/consumers of a project.
- Surrounding Land Use Mix – considers the surrounding land use mix and densities to determine a system's parking needs as a whole to determine if overall peak demand is lower than the sum of peak demands due to temporal demand distributions.

An additional study was conducted by Bunt & Associates (Edmonton) to assess the need for reviewing the City of Edmonton bylaw parking requirements^x.

Through an extensive analysis, it was recommended that the City of Edmonton could 'incorporate mechanisms to tailor parking requirements to specific development projects' considering the following factors:

- Locational factors – the location of the proposed project will impact parking demand (i.e. In proximity to transit, or amidst high density development with a mix of land uses, or nearby existing parking facilities).
- Demographic factors – demographics associated with the anticipated users of a project, including visitors and residents.

Both studies argue that parking requirements based upon project-specific characteristics versus a generic requirement will better match on-site parking supply and demand^{xi}.

The Costs of Parking Minimums

There exists a growing body of literature that supports the idea that the conventional method of establishing parking minimums results in an over-supply of parking, which in-turn encourages auto-dependency. This idea is associated with a variety of impacts including economic and environmental.

Parking represents a significant cost in residential developments. In the case of N3, parking would contribute approximately 28% of the purchasing price of a single unit (residential and visitor stalls included), limiting the project's affordability. As discussed by Robin Zimblers in, *Driving Urban Environments: Smart Growth Parking Best Practices*, parking requirements cause developers to be met with significant issues related to zoning, design, and financing. Parking drives site designs, which can become a make it or break it issue for financing a project.

Whether parking is provided below grade, at grade, or in a parking structure, there are environmental impacts associated with the land use. Excessive parking prevents a balanced transportation system, reduces green space, is a storm water management problem, contributes to the urban heat island effect, conflicts with objectives for promoting urban character and mixed-use development^{xii}. Parking supply also encourages vehicle-use, which contributes to poorer air quality and green house gas emissions. Literature abounds on the impacts of vehicle emission on the environment. Some of the impacts are summarized in the United States Environmental Protection Agency's publications.

Parking minimums can be an issue of equity. Vehicle ownership and usage rates tend to increase with income. Low-income earners still subsidize parking supply through increased housing costs, or mark-ups on consumer goods. Since parking represents a relatively fixed expense, it becomes a greater burden by percentage on a low-income household^{xiii}. Additionally, since the over-supply of parking promotes a car-centric culture, public transportation amenities are less widely used with reduced improvements to infrastructure—making it more difficult for those who cannot afford transportation by private automobile to get around^{xiv}.

CAR FREE CONCEPT

The proposed condominium is to be developed as a 'car-free' condominium, similarly targeted at those subscribing to a 'car-free' lifestyle. This section discusses the car-free concept, relevant global trends, and its possible merits for condominium projects.

Urban Planning & Sustainability

It was found that the car-free concept aligns well with City of Calgary initiatives, which include encouraging and supporting active mode use and affordable living. In general, the car-free concept promotes many sustainable and progressive urban planning concepts.

Automobile use is considered the least sustainable mode of transportation. In fact, over 5 years, the average compact car emits 17,608 kg of greenhouse gases^{xv}. The transportation sector accounts for 30% of Calgary's GHG emissions^{xvi}. Reducing the number of vehicles on the road is an important step towards achieving green house gas emission reductions, which in turn have positive environmental, social, and economic benefits. The car-free concept will help citizens have an active role in achieving sustainable initiatives in line with their City's objectives.

Community Benefits

As mentioned, the concept promotes active mode use, which has been shown to contribute to community vibrancy. Pedestrian and cycle facilities ensure community residents and visitors are interacting in the public realm. People using active modes for transportation are also more likely to patronize local retailers and other businesses, contributing to the overall social and economic health of the community. Active modes also enhance accessibility to public transportation, contributing to the diversification of resident ages and income levels.

Residents of a multi-modal community also experience health benefits including improved fitness and reduced stress levels. Active modes have been linked to a decrease in obesity – a major public health issue in North American cities. Literature has shown that 29% of those who use transit were physically active for more than 30 minutes per day solely by walking to and from the transit stops, which is the current recommended standard in preventing obesity in adults^{xvii}.

Affordable Housing

Providing on-site parking drives development costs up. At-grade parking reduces the site footprint that can be dedicated to housing. Whereas, below-grade parking facilities results in substantial excavation costs. These costs are eventually passed down to the buyer, limiting the ability for developers to construct lower priced housing. In the case of N3, providing enough below-grade parking to

satisfy the bylaw would cost the purchaser approximately \$80,000. This represents a significant affordability issue, putting a single unit in the \$300,000 dollar range.

Another perspective in support of the car-free concept is to understand the relationship between housing affordability and vehicle ownership. According to the Canadian Automobile Association (CAA), vehicle-ownership is the second largest expense that someone has, often after home-ownership. According to an Ipsos Reid poll of approximately 2000 Canadians in 2013, the annual average cost of vehicle ownership is approximately \$9,500 per year for a compact vehicle^{xviii}. To a homebuyer, this figure could represent a substantial portion of annual mortgage payments.

The financial benefits of living a car-less lifestyle are amplified by purchasing a unit in a car-less condominium as shown by the financial analysis developed by Bunt & Associates for illustration purposes.

Table 2: Housing Affordability Based on Vehicle Ownership and Parking Requirements

	Scenario 1: no car + no parking	Scenario 2: no car + 1 stall	Scenario 3: 1 car + 1 stall
Condo Price	225,000	225,000	225,000
Single Parking Stall	0	75,000	75,000
Total Condo Price	225,000	300,000	300,000
No visitor parking (cost savings)	7500	0	0
Down Payment (5%, First time buyer)	11,250	15,000	15,000
Mortgage Amount	206,250	285,000	285,000
Amortization	25 Years	25 Years	25 Years
Interest Rate	5% (Fixed)	5% (Fixed)	5% (Fixed)
Payment Frequency	Monthly	Monthly	Monthly
Payment (incl insurance, RBC Mortgage Calculator)	1199.57	1657.58	1657.58
Additional Monthly Costs (utilities, condo fees)	400	400	400
Total monthly housing costs	1599.57	2057.58	2057.58
Gross annual housing costs	19,195	24,691	24,691
Car-free Lifestyle (assuming savings passed over to cover housing costs)	(9,500)	(9,500)	0
Net annual housing costs	9,694.84	15,190.96	24,690.96
Annual gross income (CMHC affordability based on 32% spent on housing ^{xix})	30,296.38	47,471.75	77,159.25

As illustrated above, if the annual savings from vehicle non-ownership are passed onto housing costs, housing affordability increases significantly. Additionally, if a condo is built for purchasers without vehicles, the affordability is further amplified so much so that a purchaser with an annual salary of \$30,296.38 can purchase a condo that they would otherwise only afford with an annual salary of \$47,471.75 (without a car) or \$77,159.25 (with a car). These numbers are conservative, since in the context of Calgary, the average household spends approximately 40% of their annual gross income on housing as opposed to the 32% used above.

Generation Y

In terms of car-ownership, studies have found that Millennials are less likely to own a vehicle. In the United States, more than a quarter of Millennials (26%) in 2010 didn't have a driver's license^{xx}. At the same time, the high cost of fuel and maintenance and the convenience of electronic communication are making car-ownership a lower priority. Computers and smart phones are making transit navigation and car sharing easy and efficient, without the hassle or risk associated with driving a vehicle^{xxi}. Millennials are also making lifestyle decisions based on their personal finances. High mortgages, rents, and insurance costs on top of having seen the effects of the more recent economic recessions make Millennials more proactive in their approach to budgeting. As mentioned previously, vehicle ownership is the second highest expense for most people, an expense Millennials may not be interested in incurring. One unique characteristic of Millennials is that they exhibit a higher level of social and environmental consciousness than previous generations. As environmental stewards, Millennials are shedding their interest in vehicle ownership in order to play a part in the overall health of the environment.

LOCAL CONDITIONS

It was acknowledged that a variety of factors must come together to make a strong case for car-free condominium projects, which include shared parking facilities and proximity to transit and other active mode facilities.

Active Modes Facilities

For N3, there were a number of local conditions existing in the surrounding area that supported the notion of reduced or potentially zero parking requirements. The N3 site is located within East Village, an urban community on the fringe of the Commercial Downtown core. There is a high level of accessibility to active modes within East Village, specifically from the N3 site.

The N3 site is situated approximately 250 metres from the adjacent LRT station at City Hall, and is in close proximity to 10 bus routes. The current and proposed cycling network is accessible from East Village and N3. The network allows for transportation by cycling throughout downtown and elsewhere. East Village pedestrian amenities provide safe and comfortable pedestrian routes and public meeting spaces. East Village lies within the Car2Go home area in Calgary, allowing residents and visitors of the community and N3 to enjoy convenient access to the carshare fleet. Census data reviewed by Bunt & Associates confirmed that downtown residents are less likely to drive to work, exhibit lower levels of auto ownership, and the demographic is younger.

The combined effect of these conditions can accommodate residents who wish to live car-free, and allow visitors to reduce their dependence on auto-use as a means to travel to and from the area.

Shared Parking Opportunities

Supplying no on-site parking is only feasible in two scenarios: that no residents or visitors to the site use the automobile as their preferred mode of travel, or that adequate off-site parking is provided to accommodate the site demands.

In the specific case of N3, it was determined that since the project would be marketed to people who do not own or wish to own a car, they would exhibit zero parking demand. In the majority of cases, vehicle-ownership would not be feasible since residential parking permits, which would have allowed residents to park on-street without any time limit, are not issued in this community, and the cost of leasing a parking space would have made N3 unattractive to a car owner. As such, the site is expected to generate only visitor-parking demands, which may need to be accommodated by on-street or public parking supply if any in the area.

An inventory of parking supply within proximity to the N3 site was undertaken, which included both off-street and on-street spaces. A total of 1658 publicly

available parking stalls are located within 300 metres of the N3 site. This includes 175 surface parking stalls on adjacent roadways (with 12 of these located on 8 Avenue immediately in front of the site, west of 4 Street), the Calgary Parking Authority Lot #36 (City Hall Parkade) with 565 stalls, and the Calgary Parking Authority Lot #62B (9th Avenue), with 150 stalls. All of these stalls are all available 24 hours everyday, posing no access problems for visitors.

Additionally, the Calgary Parking Authority recently released a Request for Proposals (RFP) to develop a 630-stall parkade on the current Lot #62B surface parking lot. The parking structure is intended to absorb parking demand from future development in the East Village community. This would significantly increase the amount of parking available for visitors to the N3 site during peak visiting periods (evenings and weekends) when the main parkade facility is not in high demand.

A shared parking analysis was undertaken for N3 visitors and Lot #36 (City Hall parkade), based on data provided by the Calgary Parking Authority. Lot #36 is primarily associated with City Hall use, with peak demands experienced during the weekday daytime hours. Conversely, N3 visitor peak demands are expected during the weekday evening period and on weekends. The following two figures summarize the results of the shared parking analysis for both weekdays and weekends.

Figure 1: Lot36/N3 Visitor Weekday Parking Demand Distribution

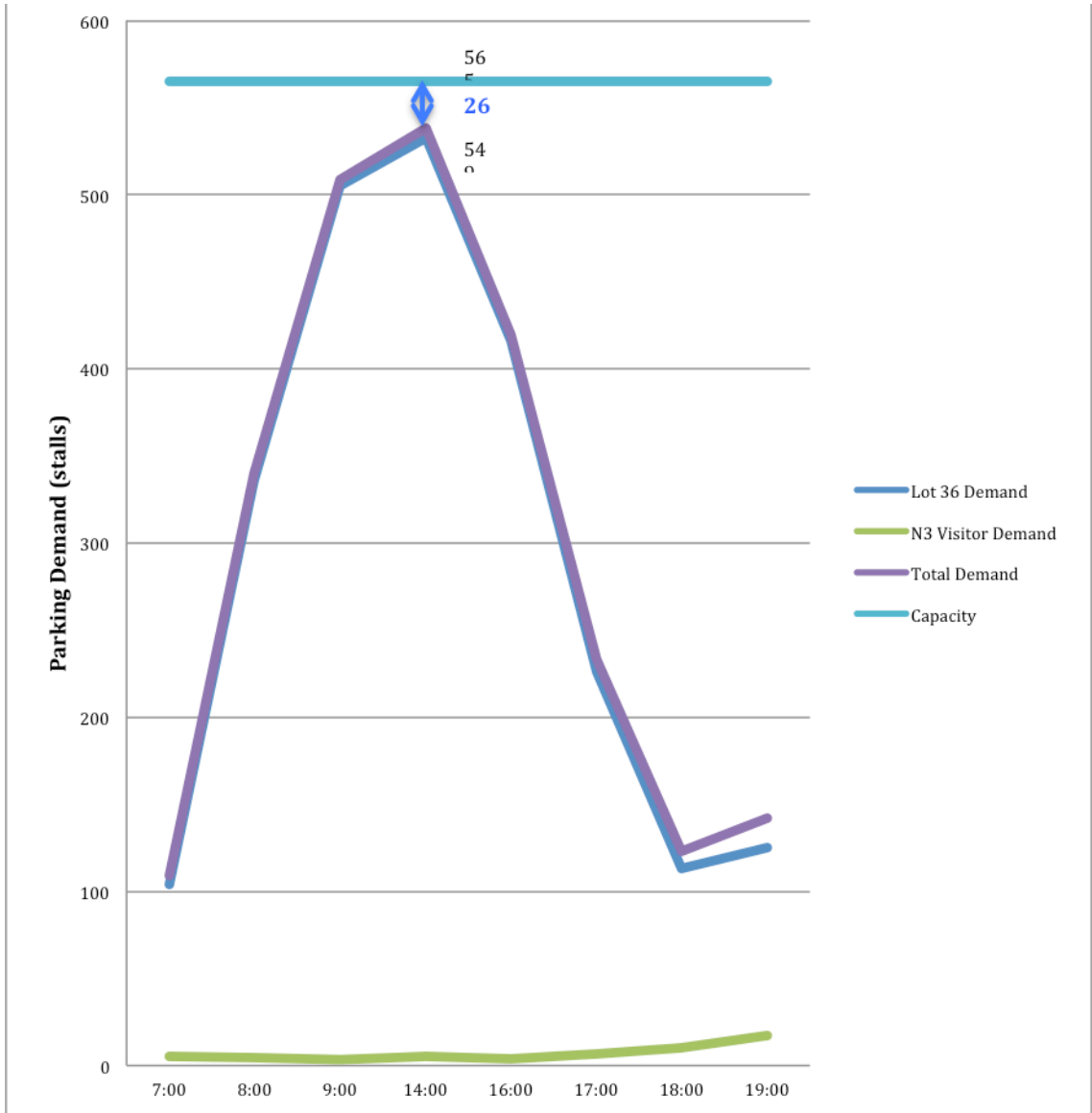
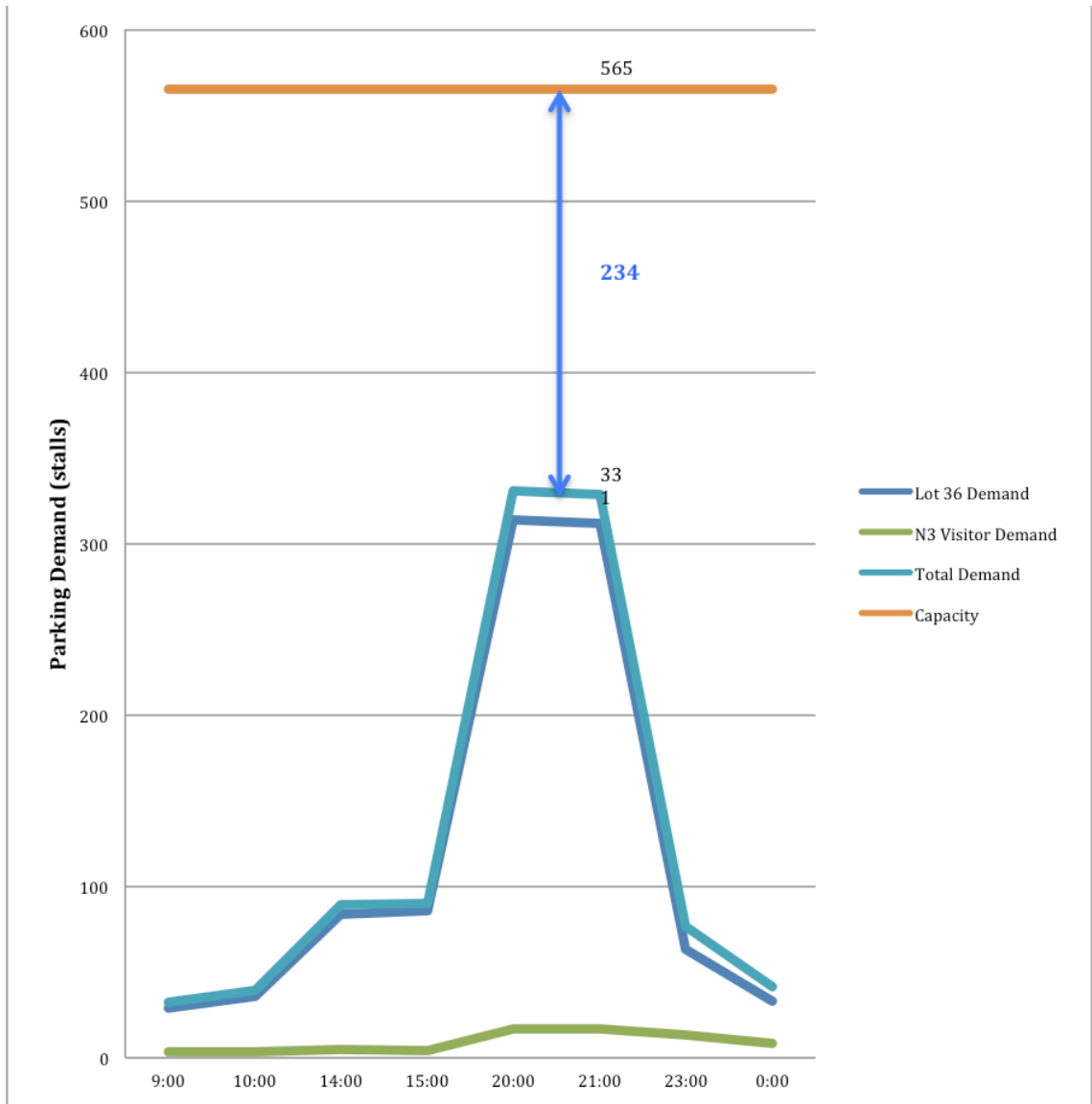


Figure 2: Lot36/N3 Visitor Weekend Parking Demand Distribution



The demand analysis shows that visitor parking can be accommodated within parkade. The proposed New Eastside Parkade is expected to increase parking supply in the area. Therefore, expected visitor parking can be accommodated at the existing and proposed parkades.

ON-GOING MEASURES: TDM STRATEGY

One of the main findings from the interview survey amongst the municipalities was that successful car-free projects also had in-place a comprehensive TDM strategy to support the provision of providing no parking on site. A successful TDM strategy encourages the use of the transit, pedestrian, bicycle, and carshare opportunities that exist and are accessible from project sites.

The following TDM measures were proposed as part of the development of N3:

- Transit-Oriented Development
 - 250 m from City Hall LRT
 - Fare-free zone within downtown
 - 30-minute transit radius provides service to a significant part of the City
 - Transit information will be accessible to all residents – leaflets and informational webpage
- Carshare
 - Free lifetime membership with Car2Go
 - \$500 Car2Go credit
- Cycling
 - 2 bicycle parking stalls per unit
 - 30 visitor bicycle stalls
 - 1 free bicycle per unit
 - Access to City cycle network – existing and proposed
- Pedestrian Facilities
 - Proximity to Riverwalk pathway and green spaces
 - Access to pedestrian connection through the new Central Library to 3 Street SE and City Hall
 - 4 Street SE underpass provides a pedestrian route to Stampede and East Victoria Park
 - Restaurant alley along historic St. Louis hotel
 - Enhanced pedestrian experience – public artwork

CONCLUSION

The provision of zero parking for residents of the N3 site can be supported based simply on the premise that the units are being sold without parking, and the onus would be on the purchaser to decide whether or not they can live without a car. If they cannot, then there are other projects developing in the downtown area that can support them. As such, the provision of zero parking for residents will be self-enforcing and poses little or no risk to the City in terms of parking impacts within East Village.

The provision of zero parking for visitors is less directly controlled, as residents will have no ability to directly facilitate the mode choice of their visitors. However, substantial capacity exists in the available parking supply within 300 metres of the N3 site, and this supply will increase with time. Given the small number of expected visitor's parking demand, the presence of more than 1000 public stalls in the immediate area can absorb any residual demand for visitor parking that cannot be met on the street frontage adjacent to the development.

Additionally, if a project provides high accessibility to active modes facilities, residents and visitors alike can take advantage of transit, bicycle, pedestrian and carshare opportunities.

With these conclusions in mind, allowing the zero parking condition to be approved for specific projects is concluded to be low risk, and as such, supports the N3 development proposal in the City of Calgary. This support is codified on the proviso that condominium developments with no on-site parking make an on-going effort to support appropriate TDM measures to ensure their continued application.

For the reasons stated above, it was concluded that the provision of zero parking for condominium residents and visitors could be deemed as feasible if a number of factors come together within the context of the project.

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