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Canmore Parking Opportunities Assessment

FINAL

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By
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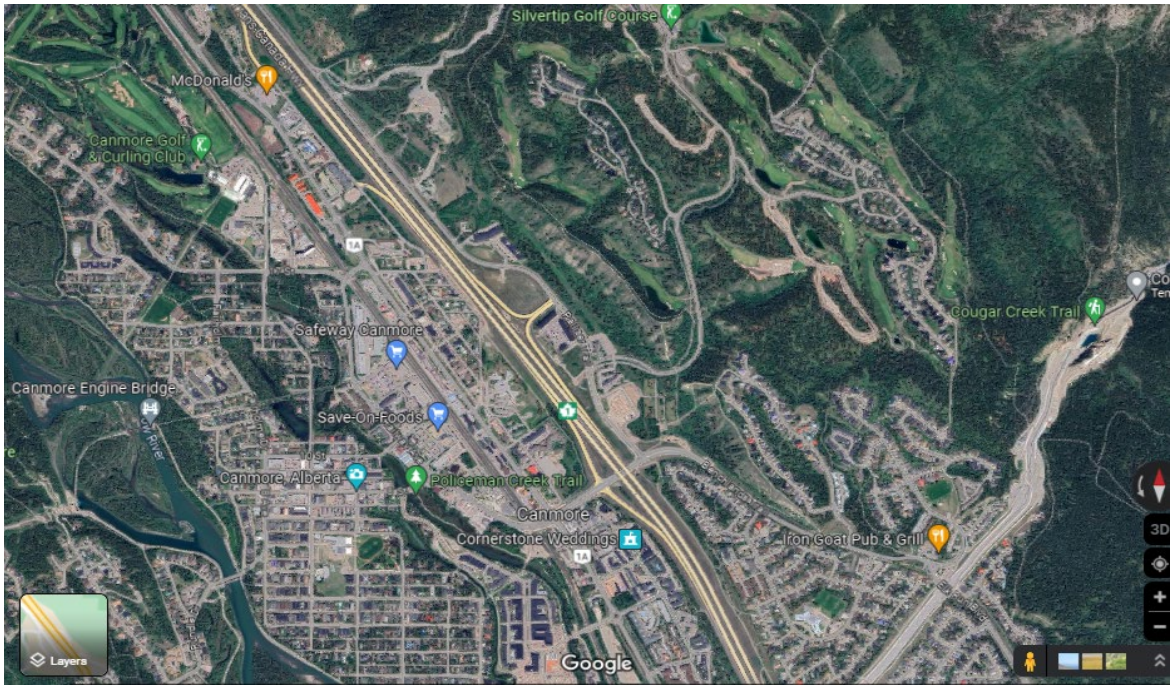
For
Town of Canmore



Efficient parking management can result in more affordable, compact, resource-efficient development that minimizes automobile ownership and trip generation in the Palliser Trail area.

Summary

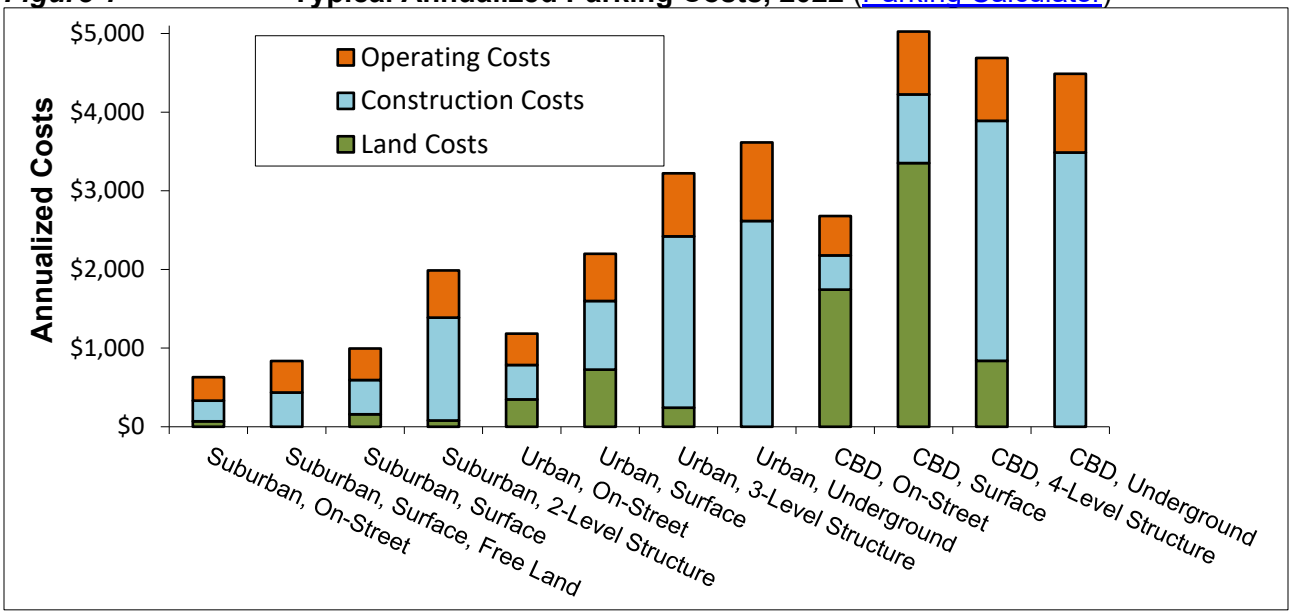
This project reviews the Town of Canmore's parking policies to identify opportunities to better align them with the Town's strategic goals including increasing affordability, enhancing the public realm and protecting local and global environments. It provides policy recommendations for the Palliser Trail Area Structure Plan that align with the Integrated Parking Management Plan. These recommendations may also be applicable in other neighborhoods.

Introduction

The Town of Canmore wants to ensure that future development is aligned with strategic goals including increased affordability, transportation system efficiency and environmental protection—this includes its local parking policies. Parking policies in various municipalities are being updated for efficiency, to support the convenience of motorists, while also reducing the number of spaces needed to meet demand. In recent years the Town has implemented parking policy reforms in the downtown area. This report identifies additional parking management strategies suitable for other neighborhoods, particularly the Palliser Trail area.

Parking policy reforms can provide large savings and benefits. Parking policies significantly affect development costs, public infrastructure costs, transportation patterns and community livability (Litman 2023). Considering land and construction expenses, building a parking space typically costs about $20,000 for surface, $40,000 for structured and $80,000 for underground facilities. Many parking spaces cost more than the vehicles they serve. Figure 1 illustrates typical annualized parking facility costs. Field studies find that typical North American communities have three to six off-street parking spaces per vehicle (Scharnhorst 2018), so parking facility costs often total $3,000 to $10,000 per vehicle-year. Parking facilities are also major contributors to stormwater management costs and heat island effects, and displace greenspace. Since Canmore has high land and environmental values, parking facilities tend to be relatively costly in the region.

Figure 1 **Typical Annualized Parking Costs, 2022** (Parking Calculator)



This figure illustrates annualized costs per parking space. CBD = Central Business District

As a result of these high costs, efficient parking management can provide large savings and benefits.

Context: A Changing Paradigm

A paradigm shift is changing the way practitioners think about parking problems and evaluate potential solutions. The old paradigm assumed that the goal was to make driving as convenient as possible by maximizing parking supply and minimizing user fees. However, that approach conflicts with other community goals: it requires large subsidies to finance parking facilities, which is unfair to households that drive less than average, and it increases vehicular traffic and sprawl-related costs. A new paradigm recognizes that not everybody can or should drive, that parking facilities are costly, and that communities can benefit from less traffic and pavement. This justifies policies that provide *optimal* parking supply: the minimum number of spaces needed to serve motorists' needs. The table compares the old and new paradigms.

Table 1 **Old and New Parking Paradigms Compared**

Old Paradigm	New Paradigm
Transportation means driving.	Travelers may use various modes. Not everybody drives.
Parking problems mean inadequate parking supply.	There can be many types of parking problems including inadequate or excessive supply, inefficient management, prices that are too low or high, inadequate user information.
Maximize supply.	Too much supply is as harmful as too little.
All parking demand should be satisfied on-site. Motorists should walk minimal distances to cars.	Parking can often be provided off-site, allowing parking facilities to serve multiple destinations.
Parking should be unpriced or as inexpensive as possible, funded indirectly.	Users should pay directly for parking facilities, with efficient prices.
Parking should be available on a first-come basis.	Parking should be prioritized to favor higher value trips.
Parking requirements should be applied rigidly, without exception or variation.	Parking requirements should reflect each particular situation, and should be applied flexibly.
Innovation faces a high burden of proof and should only be applied if proven and widely accepted.	Innovations should be encouraged, since even unsuccessful experiments can provide useful information.
Parking management is a last resort, to be applied only if increasing supply is infeasible.	Parking management programs should be widely applied to prevent parking problems.

Parking management changes the way parking problems are defined and solutions evaluated. The old paradigm is called "predict and provide" planning. The new paradigm applies "decide and deliver" planning which ensures that individual, short-term decisions support a community's strategic goals.

The old paradigm applied a relatively narrow set of solutions to parking problems, consisting primarily of increasing supply. It is assumed that, as much as possible, every property should serve all parking demands on-site, even during peak periods, resulting in far more spaces than needed at most times. The new paradigm considers a larger variety of possible solutions to parking problems, including management strategies that result in more efficient use of available spaces. The box below summarizes parking management principles.

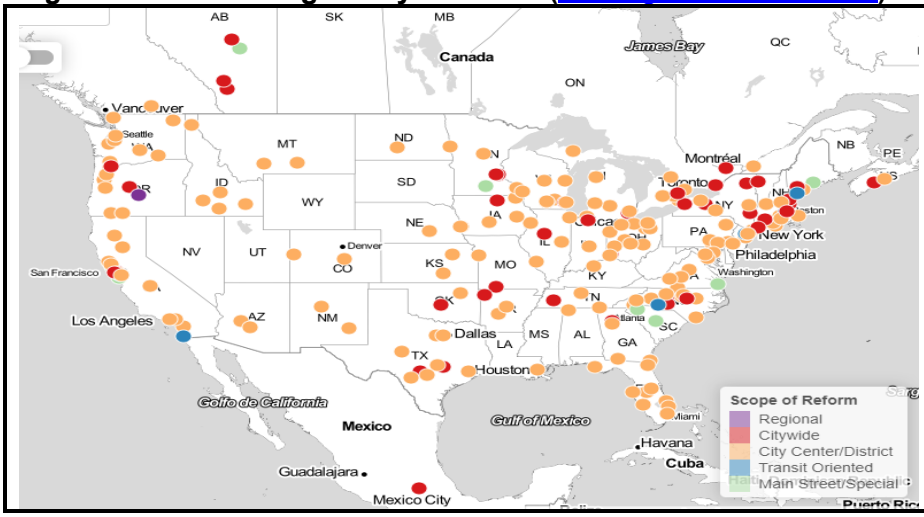
Parking Management Principles

These ten principles can help guide planning decisions to support parking management.

1. *Consumer choice.* People should have viable parking and travel options.
2. *Sharing.* Parking facilities should serve multiple users and destinations.
3. *User information.* Motorists should have information on their parking and travel options.
4. *Efficient utilization.* Parking facilities should be sized and managed, so spaces are frequently occupied.
5. *Flexibility.* Parking plans should accommodate uncertainty and change.
6. *Prioritization.* The most desirable spaces should be managed to favor higher-priority uses.
7. *Pricing.* As much as possible, users should pay directly for the parking facilities they use.
8. *Peak management.* Special efforts should be made to deal with peak-demand.
9. *Quality.* Parking facility quality (aesthetics, convenience, safety, etc.) is as important as quantity.
10. *Comprehensive analysis.* All significant costs and benefits should be considered in parking planning.

Many professional organizations support the new paradigm (Belmore 2019), and some jurisdictions are eliminating parking minimums altogether, as illustrated below. This does not eliminate parking supply; it simply allows property owners to determine the number of spaces to provide based on market demands and encourages them to manage parking efficiently in order to capture potential savings and benefits.

Figure 2 **Parking Policy Reforms (Parking Reform Network)**



This identifies North American jurisdictions that are reforming their parking policies for efficiency and fairness.

There are many possible parking management strategies, as summarized in Table 2. The Town of Canmore is implementing many of them in its downtown, where they are considered effective and successful. There is potential to apply these strategies in other areas, including residential neighborhoods. To maximize effectiveness and minimize problems, parking management is generally implemented as an integrated program tailored to a specific situation and adjusted as needed to respond to changing demands and community goals.

Table 2 **Parking Management Strategies** (Litman 2022)

Strategies and Descriptions
Strategies That Increase Parking Facility Efficiency
Share facilities. Parking facilities serve multiple users or destinations, such as shared rather than reserved spaces, and parking lots that serve multiple destinations.
Regulations. Regulate parking to favor higher-value uses, increase turnover and address spillover problems.
More accurate and flexible minimums. Adjusted parking minimums to reflect geographic, demographic and management factors that affect vehicle ownership and parking demands.
Parking maximums. Establish maximum parking requirements.
Remote parking. Use off-site parking facilities and improve user guidance and access to those locations.
Smart growth. Encourage more compact, mixed, multi-modal development.
Walking and bicycling improvements. Improve active travel conditions to expand the range of destinations serviced by a parking facility and reduce automobile trips.
Carsharing. Provide carsharing services as a substitute for private vehicle ownership.
Increase parking facility capacity. Use otherwise wasted space, smaller stalls, car stackers and valet parking.
Strategies That Reduce Parking Demand
Transportation Demand Management (TDM). Provide vehicle travel reduction incentives.
Ridesharing and transit. Improve and encourage ridesharing (car- and vanpooling) and public transit travel.
Efficient parking pricing. Charge cost-recovery fees with prices that increase at peak times and locations.
Unbundle parking. Rent or sell parking facilities separately from building space.
Financial incentives. Provide financial incentives to shift mode such as parking cash-out and transit benefits.
Improve pricing methods. Use better charging techniques to make pricing more convenient and cost effective.
Parking tax reform. Reform vehicle and property taxes to support parking management objectives.
Bicycle facilities. Provide bicycle storage and changing facilities.
Support Strategies
Improve user information. Provide convenient and accurate information on parking availability and price using signs, maps, websites and apps.
Improve enforcement. Ensure that parking regulation enforcement is efficient, considerate and fair.
Transport Management Associations (TMAs). Establish organizations that provide transportation and parking management services in a particular area.
Overflow parking plans. Establish plans to deal with parking demand peaks.
Address spillover problems. Use management, enforcement and pricing to address spillover problems.
Parking facility design and operation. Improve facilities to solve problems and support parking management.
Contingency-based planning. Identify additional strategies that can be implemented if needed in the future

This table summarizes the parking management strategies described in this guide. The Town of Canmore is implementing many of these in its downtown commercial district. There is potential for applying them in other areas, including residential neighborhoods.

Current Town of Canmore Parking Policies

During the last few years the Town of Canmore has reformed its parking policies to support more efficient management: it reduced some minimums, established maximums, established bicycle parking requirements, and implemented more efficient pricing and other management strategies for downtown parking. However, the Town's *Revised Land Use Bylaw 2018-22: Schedule A*, still requires one or two parking spaces per unit for most types of housing as indicated in Table 3, and at least two parking spaces per 100 square meters of gross building space for most commercial buildings such as stores, restaurants and offices.

Table 3 **Parking Stalls Per Dwelling Unit** (Canmore 2020, 2.7-3, p. 39-40)

Dwelling Type	Auto Parking		Bike Parking Minimum	
	Minimum	*Maximum*	*Short-Term*	*Long-Term*
Detached	2	N/A	N/A	N/A
Accessory	1	1	N/A	2
Manufactured	2	N/A	N/A	N/A
Duplex	2	N/A	N/A	N/A
Townhouse	1 0.15 visitor	1 Bedroom: 1.0 2 Bedrooms: 1.5 3 Bedrooms: 2.0	0.15 Visitor	With garage: N/A Without garage: 2
Apartment	Studio 0.25 1-3 Bedrooms 1 0.15 visitor	Studio: 0.75 1 Bedroom: 1 2 Bedrooms: 1.5 3+ 3+ Bedrooms: 2.5	0.25	1.5
Live/work studio	1 0.15 visitor	2	1	N/A
Bed & Breakfast	Principle resident: 1 Per unit: 1	1.5	N/A	Per rental unit: 1
Care facility	0.1 0.15 visitor	1	0.5	0.1

This table summarizes the number of parking spaces required for various dwelling types. It requires one to two parking spaces per housing unit, reflecting the assumption that most people own a personal vehicle, and parking should be abundant.

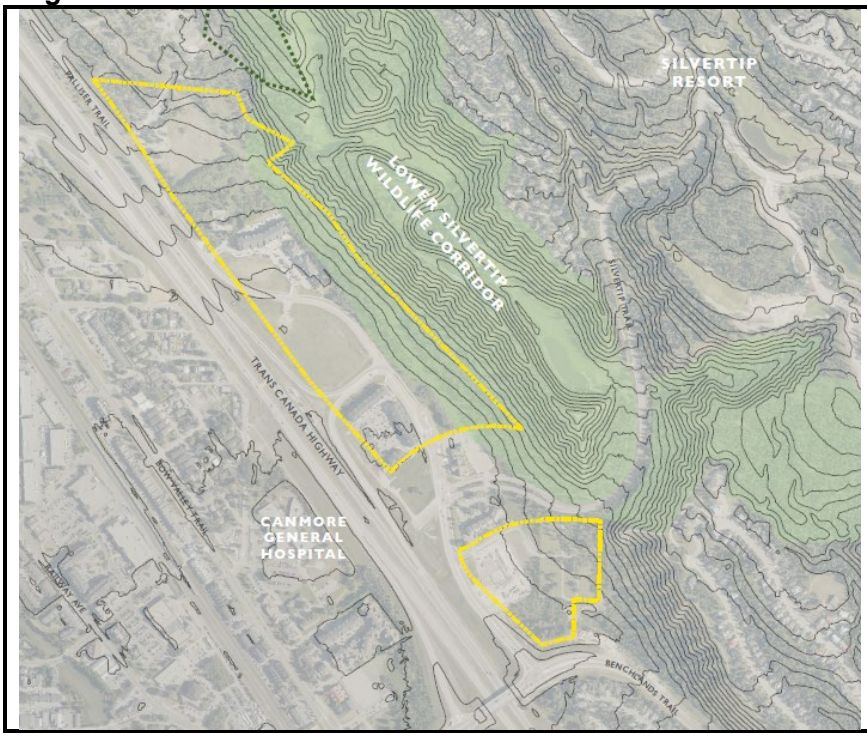
These minimums are typical of North American communities. They reflect the old parking planning paradigm, which often results in more parking supply than residents demand and removes incentives for efficient parking management. For example, if households are required to pay for off-street parking spaces, they are encouraged to own vehicles, and have less incentive and money to invest in alternatives such as bicycles, carsharing, and public transit. This increases housing costs, vehicle traffic and land consumption.

This suggests that there is significant potential for more efficient parking management for new development in Canmore.

Palliser Trail Area Development

The Palliser Trail area has many features that allow reduced parking supply and more efficient management. It is a large master-planned neighborhood with more than a thousand homes plus a variety of commercial buildings located in a compact area with many public trails and near numerous public services and amenities. These attributes can facilitate sharing of parking facilities, and other parking management strategies that increase efficiency and reduce the number of parking spaces needed to serve motorists' needs.

Figure 3 **Palliser Trail Area**



The Palliser Trail area development would include approximately one thousand new homes plus commercial and civic buildings within near downtown Canmore.

Table 4 estimates the total number of spaces require by current regulations.

Table 4 **Palliser Area Parking Supply Based on Current Mandates**

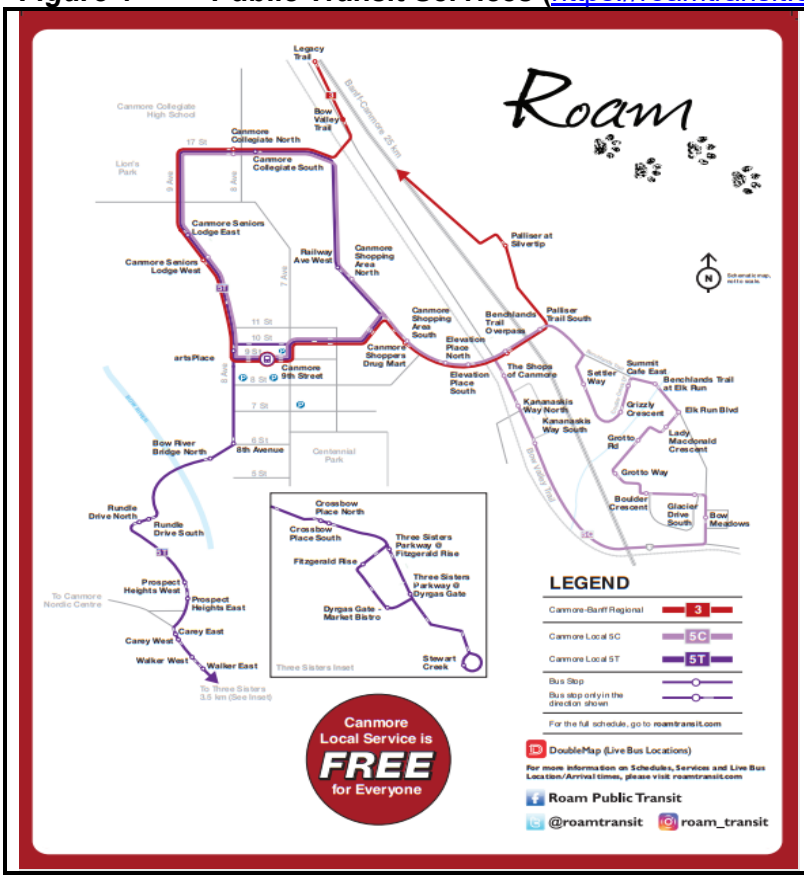
	Housing		Commercial		Total Parking
	Units (parking rate)	*Parking*	*Square Feet*	*Parking*	*Parking*
Townhouses/Low Rise Res.	480 (1.5)	720	10,400	21	741
Low Rise Residential	80 (2.0)	(2.0) 160	5,200	11	171
Park Space / Dog Park	0		0	10	10
Low-/Mid-rise Residential	110 (1.5)	155	0	0	155
Low-/Mid-rise Mixed Use	300 (1.5)	450	36,400	73	523
Townhouses	10 (1.0)	10	0	0	10
Civic (Fire Hall and Cemetery)	0		0	30	30
Civic (Cemetery)	0		0	10	10
Civic	0		110,000	220	220
Existing					
Low-Rise Residential	97 (2.0)	194			194
Low-Rise Residential	60 (2.0)	120			120
Low-Rise Residential	148 (2.0)	296			296
Totals	*1,285*	*1,225*	*162,000*	*395*	*2,480*

With current policies, the Palliser Trail development would require about 2,500 parking spaces. If supplied with surface lots, this would pave about 8 hectares (about 20 acres) and cost between $50 million and $150 million, assuming that parking facilities cost an average of $20,000 to $60,000 per space.

The Palliser Trail area has features that support efficient parking management.

- It is a master-planned community that can be designed and managed to support non-auto travel and efficient parking management.
- There are many ways to share parking facilities in the area, by maximizing on-street parking supply and developing shared parking lots, instead of requiring each property to serve all parking demands on-site.
- It will contain a variety of residential and commercial buildings with diverse travel and parking demands, allowing parking facilities to be efficiently shared. For example, a parking space can serve delivery vehicles in the morning, office workers during the day, restaurant customers in the evening, and residents overnight.
- There are opportunities to introduce innovative parking management strategies including bike- and carsharing, as well as commuter trip reduction programs.
- There are opportunities to efficiently price parking with permits and meters, unbundling (renting parking separately from building space) and cash out (non-drivers receive the cash equivalent of parking subsidies provided to motorists), with convenient payment methods.
- It is located within convenient walking, scooter and bicycling distance of many services and activities, and is served by public transit (Figure 4).

Figure 4 **Public Transit Services (https://roamtransit.com/services/canmore-local-service)**



Canmore's Roam bus service Is planned to provide frequent, fare-free local transit, and currently provides regional transit service to Banff. Quality transit service is expected to be a fundamental strategy for reducing vehicle ownership and trips, and therefore parking demands in the Palliser area.

Policies for Efficient Parking Management in the Palliser Trail Area

This section identifies various municipal policies for more efficient parking management in the Palliser area development.

1. Reduce or Eliminate Parking Minimums

Parking minimums require building occupants to pay for parking spaces regardless of demand. They force car-free households to pay for costly parking facilities they don't need, and they eliminate much of the potential savings from more efficient management. For example, an employer required to provide one parking space per worker has little incentive to implement a commute trip reduction program, since that would result in costly parking spaces sitting unoccupied. For this reason, reducing or eliminating parking minimums is an important first step in efficient parking management.

Canmore currently has relatively high residential parking minimums, requiring two spaces per unit for single-family, duplex and manufactured homes, plus one per accessory dwelling unit. There is significant potential for reduction.

Table 5 summarizes typical parking supply adjustment factors. In addition to this table, tools developed by professional organizations can be used to adjust parking minimums. For example, the Institute of Transportation Engineer's *Multimodal Transportation Impact;*

Analysis for Site Development, identifies ways to adjust traffic and parking generation predictions for compact and mixed-use developments. The "*Smart Growth Trip-Generation Adjustment Tool*" (http://bit.ly/1z2q5Dd) and the *Smart Location Mapping* (www.epa.gov/smartgrowth/smart-location-mapping) tools that predict how vehicle ownership and trip rates vary by factors such as location and price.

Many of the adjustment identified in Table 5 are likely to apply in the Palliser Trail area, including proximity to commonly used services and activities in nearby commercial districts, development density and mix which allow shared parking, numerous affordable housing units that will be occupied by low- and moderate-income households, good walking and bicycling conditions, plus expanding public transit services. In addition, the development can apply various transportation and parking management strategies and programs including shared rather than assigned parking facilities, efficient parking pricing, commute and school trip management programs, car- and bikeshare services, plus overflow and other contingency parking plans that can address occasional demand peaks.

As previously mentioned, many jurisdictions simply eliminate parking minimums, allowing developers to decide how much off-street parking to provide based on market demands. This is feasible for the Palliser Trail area provided that it is implemented with appropriate parking management programs, regulations and enforcement to maximize efficient and minimize spillover problems (motorists parking where they should not). These strategies are suitable for the Palliser area since there are few adjacent developments.

Table 5 **Parking Minimum Adjustment Factors** (Litman 2022)

Factor	Typical Adjustments
Geographic Location. Vehicle ownership and use rates in an area.	Adjust requirements to reflect actual vehicle ownership and trip generation rates. 40-60% reductions are often justified in Smart Growth neighborhoods.
Residential Density. Number of residents or housing units per acre/hectare.	Reduce requirements 1% for each resident per acre (e.g., 15% where at 15 residents per acre and 30% at 30 res. Per acre).
Employment Density. Number of employees per acre/hectare.	Reduce requirements 10-15% in areas with 50 or more employees per gross acre.
Land Use Mix. Land use mix located within convenient walking distance.	Reduce requirements 5-15% in mixed-use developments. Additional reductions with shared parking.
Transit Accessibility. Nearby transit service frequency and quality.	Reduce requirements 10% within 400 meters of frequent bus service, and 20-50% within 400 meters of a rail transit station.
Carsharing. Whether carsharing services are located within or nearby a building.	Reduce residential requirements 10-20% if carshare vehicles are located onsite, or 5-10% if located nearby.
Walkability and bikability. Walking environment quality.	Reduce requirements 5-15% in very walkable and bikeable areas, and substitute bike parking for up to 10% of car parking.
Demographics. Age and physical ability of residents or commuters.	Reduce requirements 20-40% for housing for young (under 30), elderly (over 65) or disabled people.
Income. Average income of residents or commuters.	Reduce requirements 10-20% for the 20% lowest income households, and 20-40% for the lowest 10%.
Tenure. Whether housing is owned or rented.	Reduce requirements 20-40% for rental versus owner-occupied.
Pricing. Parking that is priced, unbundled or cashed out.	Reduce requirements 10-30% for cost-recovery prices, and 10-20% for unbundling (parking rented separate from building space).
Sharing/overflow. Ability to share parking facilities with other nearby land uses.	Depends on the differences in peak demands with other land use. 20-40% reductions are often possible.
Management programs. Parking and mobility management programs implemented at a site.	Reduce requirements 10-40% at worksites with effective parking and mobility management programs.
Design Hour. Number of allowable annual hours a parking facility may fill.	Reduce requirements 10-20% if a 10th annual design hour is replaced by a 30th annual peak hour. Requires an overflow plan.
Contingency-Based Planning. Whether a plan exists to address possible parking shortages.	Minimize supply if a development has a plan for additional management strategies that can be implemented if needed.

This table summarizes various factors that affect parking demand and optimal parking supply.

2. Design for Shared Parking

Neighborhoods can be designed to facilitate shared parking. This can be done in the following ways.

Maximize and Manage On-Street (Curb) Parking

On-street parking is generally the most convenient and efficient type of parking, able to serve multiple users and destinations. For example, a curb space can serve delivery vehicles in the morning, shoppers during the day, restaurant patrons in the evening, and residents overnight. Efficient curb management becomes increasingly important as off-street parking supply is reduced, regulated and priced, and as local goods delivery and ridehailing/taxi trips increase demand for quick loading spaces.

Many North American jurisdictions are implementing curb management plans (Lee 2019), and professional organizations have developed guidance documents to support such planning (ITE 2019; Manville and Pinsky 2021; MTC 2021). These use regulations, pricing and user information to favor higher value users (deliveries, passenger drop-off and pickup, short-term errands, people with disabilities and other special needs, etc.) over lower-value users (commuters, long-term errands and residents) for these prime spaces.

City of North Vancouver's Curb Management Strategy (https://letstalk.cnv.org/curbstrategy).
We're developing a Curb Management Strategy to support active and sustainable ways for people and goods to move in the city.

Curbs are one of the most important aspects of mobility. Through our Council-approved *Mobility Strategy*, we have identified actions to help rebalance curb space to meet a wide range of user needs. This includes reviewing existing curb space uses to ensure sufficient loading zones, pick-up and drop-off zones, and accessible parking spots are available in high-demand locations, and determining how our Resident & Visitor Parking Policy meets the needs of as many people as possible.

There are trade-offs between on- and off-street parking because with conventional street design each driveway typically displaces one on-street parking space. If houses have 40-foot frontages, an urban street can park two vehicles per house if there are no driveways but only one if it has a driveway. As a result, in a typical urban residential neighborhood where residents on average park one vehicle per driveway, off-street parking provides little or no increase in parking supply, and because on-street spaces can serve multiple destinations they are more efficient overall. This is not a major issue in the Palliser Trail areas, where parking will be organized in bays, but may justify adjusting off-street parking minimums in other residential areas.

Sharing Within Parking Lots

Motorists share parking spaces rather than being assigned reserved spaces. For example, 100 employees can usually share 60-80 spaces since at any time some are on leave or in the field, commuting by alternative modes or working off-peak shifts. Hotels and apartments can share parking spaces since the number of vehicles per housing unit varies over time. Sharing can be optional, so for example, allowing motorists to choose between $100 per month for a shared space or $150 for a reserved space.

Share Parking Among Destinations

Parking can be shared among multiple destinations. For example, an office building can share parking with a restaurant or theater, since peak demand for offices occurs during weekdays, and on weekend evenings for restaurants and theaters, as indicated in Table 9. Sharing can involve mixing land uses on a single site, such as a mall or campus, or by creating a sharing arrangement between sites located suitably close together.

Table 6 **Typical Peak Parking Periods for Various Land Uses**

Weekday	Evening	Weekend
Public services such as shops and banks		
Offices and other worksites	Auditoriums	
Park & ride facilities	Bars and dance halls	
Schools, colleges and daycare centers	Meeting halls	
Factories and distribution centers	Restaurants	Religious institutions
Medical clinics	Theaters	Parks
Professional services	Hotels	Shops and malls

This table indicates peak parking demand for different land use types. Parking can be shared efficiently by land uses with different peaks.

Public Rather Than Private Parking and In Lieu Fees

Public parking, with parking facilities owned by governments or commercial operators, is more suited to sharing than private, on-site parking. *In lieu fees* mean that developers help fund public parking facilities instead of private facilities serving a single destination. Businesses in an area can be assessed a special assessment or tax to fund parking facilities in their area, as an alternative to each business supplying its own facilities. This can be implemented through a local organization, such as a business organization or transportation management association, that provides parking brokerage services.

3. Active Mode (Walking and Bicycling) Improvements

Improving active travel (walking, bicycling and variants such as wheelchairs and e-bikes) support parking management strategies in the following ways:

- Improved walkability expands the range of parking facilities that serve a destination, increasing the feasibility of using shared off-site parking.
- Increases "park once" trips, that is, parking in one location and walking rather than driving to nearby destinations, which reduces vehicle trip generation and parking demands.
- Allows walking and bicycling to substitute for some vehicle trips. E-bikes approximately double the portion of trips suitable for bicycling, increasing potential impacts and benefits.
- Improves transit access, since most transit trips have walking and bicycling links.

Walkability improvements can include better sidewalks, crosswalks, paths and shortcuts, and traffic speed reductions. Motorists generally want to park within 100 meters of destinations for quick errands (e.g., a convenience store or fast food), or if they have a disability or are carrying heavy loads, and within 300 meters for commuting or longer-term errands, although longer distances can be acceptable if walking conditions are favorable. Parking facilities (especially large lots) should have marked walkways that protect pedestrians from traffic risks. Parking lots can serve as mid-block walkways, providing pedestrian short-cuts, which improves nonmotorized accessibility and expands the number of destinations that a parking lot can serve.

Bicycle parking and changing facilities increase bicycle convenience. Long-term bicycle parking should be secure and protected from weather and have e-bikes charging.

4. Carsharing and Bikesharing Services

Carsharing services provide convenient short-term vehicle rentals that substitute for private vehicle ownership. It is generally priced by the hour and day, has quick pick-up and drop-off procedures, and vehicles located within walking distance of homes and worksites. Carsharing is typically cheaper than owning a vehicle driven less than about 5,000 annual miles. Each carshare vehicle typically substitutes for 10 to 20 private automobiles. Bikesharing can provide convenient travel for short trips, including many peak-period trips in both the Palliser Trail area and rest of Canmore.

5. Transportation Demand Management Programs

Transportation Demand Management (*TDM*, also called *mobility management*) is a general term for strategies that increase transportation system efficiency by changing travel behavior. It may affect travel frequency, mode, destination or timing (for example, shifting from peak to off-peak). There are many TDM strategies, as summarized in the table below.

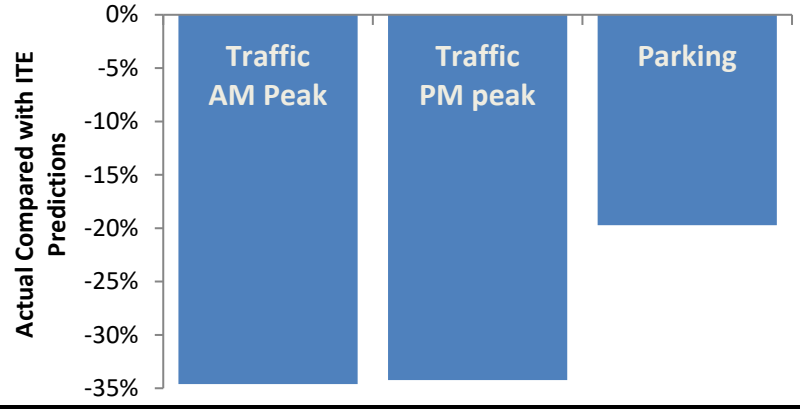
Table 7 **Transportation Demand Management Strategies**

Improved Transport Options	Incentives to Shift Mode	Land Use Management	Policies and Programs
Alternative Work Schedules	Bicycle and Pedestrian Encouragement	Car-Free Districts	Access Management
Bicycle Improvements	Congestion Pricing	Compact Land Use	Campus Transport Management
Bike/Transit Integration	Distance-Based Pricing	Location Efficient Development	Data Collection and Surveys
Carsharing	Commuter Financial Incentives	New Urbanism	Commute Trip Reduction
Guaranteed Ride Home	Fuel Tax Increases	Smart Growth	Freight Transport Management
Security Improvements	High Occupant Vehicle (HOV) Priority	Transit Oriented Development (TOD)	Marketing Programs
Park & Ride	Parking Pricing	Street Reclaiming	School Trip Management
Pedestrian Improvements	Road Pricing		Special Event Management
Ridesharing	Vehicle Use Restrictions		Tourist Transport Management
Improved Taxi Service			Transport Market Reforms
Telework			
Traffic Calming			
Transit Improvements			

TDM includes numerous strategies that affect vehicle travel behavior. Many affect parking demand.

Conventional traffic models tend to underestimate TDM impacts (Currans and Stahl 2023). Newer analysis tools and guidance documents are more effective at predicting how TDM programs will affect parking demands. These include the **San Francisco TDM Tool** (www.sftdmtool.org), the California Air Pollution Control Association's *Handbook for Analyzing Greenhouse Gas Emission Reductions* (CAPCOA 2021). The *GreenTRIP Connect* (https://connect.greentrip.org) calculates how smart location and traffic reduction strategies can reduce driving and greenhouse gas emissions from residential development, plus savings from right-sized parking. Figure 5 illustrates reductions in vehicle trips and parking demand provided by TDM programs.

Figure 5 **TDM Program Impacts** (Spack and Finkelstein 2014)



Office buildings with TDM programs actually generate a third fewer trips and require 20% fewer parking spaces than predicted by Institute of Transportation Engineers' models. This indicates that TDM programs can significantly reduce traffic impacts and parking costs, and other traffic impacts such as congestion, crash risk and pollution emissions.

6. Parking Regulations

Parking regulations control who, when and how long vehicles may park, particularly at the most convenient locations, to favor higher value uses such as delivery and service vehicles, passenger loading, people with disabilities and other special needs, and rideshare vehicles. This typically means that parking facilities with the most demand, such as the parking spaces located closest to building entrances, and curb parking on busy roadways, have regulations that limit who may park (such as freight and passenger loading, public transit and taxis, vehicles used by people with mobility impairments, and residents-only), and parking duration (under 5 minutes for loading, under 20 minutes for quick errands, under 2 hours for shopping and dining), and sometimes restrictions on overnight parking. The table below summarizes typical regulations.

Table 8 **Common Parking Regulations**

Name	Description	Favored Uses
User or vehicle type	Spaces dedicated to loading, service, taxis, customers, rideshare vehicles, disabled users, buses and trucks.	As specified.
Duration	Limit parking duration (5-minute loading zones, 30-minutes adjacent to shop entrances, 1- or 2-hour limits).	Short-term users such as deliveries, customers and errands.
Time-based restrictions	Restrict when parking is allowed such as before 10 a.m. to discourage commuters or overnight to discourage residents.	Depends on restrictions.
Employee restrictions	Require or encourage employees to use less convenient parking spaces.	Customers, deliveries and errands
Special events	Have special parking regulations during special events.	Depends on restrictions
Special use parking	Provide special bulk parking passes or reserved spaces for delivery, service and construction vehicles.	Vehicles used for specified purposes
Residential parking permits	Use Residential Parking Permits (RPPs) to give area residents priority use of parking near their homes.	Residents.
Restrict overnight parking	Prohibit overnight parking to discourage use by residents and campers.	Shorter-term parkers
Street cleaning restrictions	Regulations that prohibit parking on a particular street one day of the week to allow street sweeping.	Street cleaning. Ensures motorists move their vehicles occasionally.
Large vehicle restrictions	Limit on-street parking of large vehicles, such as freight trucks and trailers.	Normal-size vehicles
Arterial lanes	Prohibit on-street parking on arterials during peak periods, to increase traffic lanes.	Vehicle traffic over parking
Abandoned vehicles	Have a system to identify and remove abandoned vehicles from public parking facilities.	Operating vehicles

Various regulations can manage parking for efficiency and prevent problems.

7. Efficient Pricing

Efficient pricing means that motorists pay directly for using parking facilities, with rates that vary with demand. This means that prices are higher at times and in places with the highest parking demands (such as near building entrances), and lower at other times and locations. It uses shorter time units, such as hourly rather than daily rates, and daily rather than monthly rates, so motorists always have incentives to reduce parking consumption. This encourages turnover of the most convenient parking spaces and favors higher value trips over value trips, ensuring that motorists can always find an unoccupied space when needed.

As previously described, considering land, construction and operating costs, parking spaces typically have annualized cost of $1,000 to $4,000 per space. This means that cost recovery prices range from about $3.00 per day for inexpensive parking with high occupancy rates (each space is used every day) up to $20 per day for high-amenity structured parking that is used, on average, 200 days per year (as is typical for commuter parking).

Currently, most parking is inefficiently priced; it is provided free, subsidized or bundled (automatically included) with building purchases and rents, forcing consumers to pay for parking regardless of whether or not they want it. When parking is priced, it is often a flat annual or monthly fee, providing little incentive to use an alternative mode occasionally. Cost-recovery parking pricing typically reduces automobile ownership and use by 10-30%

An alternative to parking pricing is to *cash out* free parking, which means that non-drivers receive financial benefits equivalent to parking subsidies provided to motorists (Abou-Zeid, et al. 2023). For example, if automobile commuters are offered a free parking space worth $5 per day, commuters who use other modes receive a $5 daily cash or transit fare subsidy. Some jurisdictions mandate parking cash out. California and Rhode Island require it statewide, and Washington DC requires employers to offer 'Clean Air Transportation Fringe Benefits' equivalent in value to parking subsidies (Wilson 2022).

Parking *unbundling* means that parking is rented separately from building space, so for example, rather than paying $2,400 per month for an apartment that automatically includes two "free" parking spaces occupants pay $2,000 per month for the apartment plus $200 per month for each parking space they use. This is more equitable and efficient, since occupants only pay for parking they need (Nelson/Nygaard 2022). This is now required in the city of Seattle (Schmitt 2018). Parking can be unbundled in several ways:

- Facility managers can unbundle parking when renting building space or offer discounts to renters who use fewer than average parking spaces.
- Developers can make some or all parking optional when selling buildings.
- Parking costs can be itemized in lease agreements to help renters understand the parking costs they bear, and to help them negotiate reductions.
- Informal unbundling can be encouraged by helping create a secondary market for available spaces. For example, office, apartment and condominium managers can maintain a list of residents who have excess parking spaces available for rent to other occupants.

Efficient pricing does not necessarily increase consumer costs. Although it increases fees in some locations (where parking demands are highest), it reduces fees elsewhere (where demands are low). Parking unbundling allows households that own fewer than average vehicles to avoid paying for costly parking facilities they don't need. Similarly, parking cash out gives non-drivers a new financial benefit. Since automobile ownership and use tend to increase with income, these strategies tend to be progressive with respect to income.

Below are specific parking pricing strategies:

- As much as possible, charge motorists directly for using parking facilities to efficiently manage travel and parking, and to generate revenue.
- Charge higher rates and use shorter pricing periods at more convenient parking spaces, to favor higher-priority uses and increase turnover. Prime parking spaces should have prices at least twice those at less-convenient locations.
- Set prices to maintain optimal demand, such as 85% maximum occupancy during peak periods. Vary rates to achieve these targets. For example, charge $1 per hour for parking downtown during weekdays, $0.75 per hour for parking downtown during evenings and weekends, and $0.50 per hour for parking in other locations.
- Use short pricing periods. For example, for short-term parking change by the minute rather than the hour, and for long-term parking charge by the hour rather than the day or month.
- Unbundle parking, so parking is rented or sold separately, rather than automatically included with building space. The city of Seattle requires this for most apartments.
- *Cash-out free parking*, so commuters who use non-auto modes receive a financial benefit equivalent in value to parking subsidies provided to motorists. Washington DC requires this.
- Expand when and where on-street parking is priced to limit demand and recover costs. Where on-street parking is congested, install parking meters and sell a limited number of parking permits that are limited to specific blocks.
- Use improved pricing methods to make priced parking more cost effective, convenient and fair. For example, use pricing systems that charge for just the amount of time a vehicle is parked, rather than fixed time blocks.

Prices can be structured to achieve social equity goals, such as parking cash out and unbundling which tend to benefit lower-income travellers; lower rates or exemptions for people with mobility impairments and lower incomes; and using revenues to provide affordable mobility options or other local services that benefit disadvantaged groups.

8. Improve User Information

Use signs, maps, brochures, websites, and navigation apps to provide information about travel and parking options, including availability and price information, to encourage more efficient travel and parking decisions.

9. *Overflow Parking Plans*

Overflow parking plans describe the management strategies that will be applied when parking facilities fill, for example, during special events, peak shopping periods, or temporary reductions in parking supply. Because most parking facilities are sized to accommodate peak demands that seldom or never occur, having an overflow parking plan can significantly reduce the amount of parking needed, and provide reassurance that reduced supply will not create problems. This is an important component of contingency-based planning.

10. *Address Spillover Problems*

Spillover parking problems refers to the undesirable use of offsite parking facilities, such as when business customers and employees park on nearby residential streets or use another businesses' parking lot. Concerns about spillover impacts are used to justify excessive parking requirements and opposition to management solutions. Addressing spillover problems can increase parking management program acceptability and effectiveness.

There are several possible ways to address spillover parking problems:

- Provide information indicating where motorists may and may not park.
- Use regulations to control spillover impacts, such as time limits and permit programs on residential streets near activity centers.
- Use pricing to control spillover impacts, such as charging non-residents for parking on residential streets near activity centers, and businesses charging non-customers for using in their parking facilities.
- Create *Parking Benefit Districts* in areas that experience parking spillover problems, so on-street parking is priced (residents can be exempt).
- Establish a monitoring program to identify where parking spillover is a problem. This may include surveys to identify who is parking where, and ways for residents and businesses to report spillover problems.

Summary

The table below summarizes efficient parking strategies and policies for the Palliser area.

Table 9 **Summary of Strategies**

Parking Management Strategy	Municipal Policies and Actions
Eliminate or significantly reduce parking minimums.	Eliminate parking minimums city wide or establish a zoning overlay district for the Palliser area.
Design for shared parking.	Minimize driveways and efficiently manage on-street parking in the Palliser area. Used shared parking lots rather than off-street parking on individual lots. Support mixed development (residential and commercial in the same building or block) to maximize parking sharing potential.
Improve active travel (walking and bicycling).	Provide excellent walking and bicycling facilities in the Palliser area and connections to nearby destinations. Encourage active travel.
Provide carshare services.	Provide and promote convenient carshare services in the Palliser area. This can be required of the developer or managed by the Town.
Transportation demand management (TDM).	Require and encourage TDM incentives including commute trip reduction, school transport management for schools, special event transportation management, and other related programs.
Regulate parking	Control who, when and how long vehicles may park, particularly at the most convenient locations, to favor higher value uses.
Price parking efficiently	Expand when and where parking is priced. Apply more efficient pricing. Require or encourage property owners to unbundle parking, and businesses to cash out subsidized parking.
Improve user information.	Use signs, maps, websites and apps to provide information on travel and parking options to travellers when they are making travel and parking decisions. Encourage travellers to use the most efficient option for each trip.
Overflow parking plans.	Develop plans for addressing occasional overflow parking problems, such as during peak periods or special events.
Develop a contingency plan of responses if parking problems develop, and address spillover problems.	Identify and address spillover problems such as motorists parking without permission on private property, and on-street parking congestion. Address these with improved information, regulations, pricing and enforcement.

This table summarizes parking management strategies and municipal policies for the Palliser area.

Scenario Analysis

This analysis examines the potential reduction in parking supply provided by these recommended parking management strategies.

Table 10 **Summary of Strategies and Policies**

Parking Management Strategy	Potential Reductions in Parking
Eliminate or significantly reduce parking minimums.	Developers typically build 20-40% fewer spaces when parking minimums are eliminated.
Design for shared parking.	Shifting from private to shared parking, either on-street or a shared parking lot, typically reduces parking needs by 10-30%.
Improve active travel (walking and bicycling).	Walking and bicycling improvements typically reduce vehicle ownership and use by 5-15% and allow more shared parking.
Provide carshare services.	Carsharing can typically reduce vehicle ownership by 5-15%
Transportation demand management.	Well-planned and funded TDM programs (commute trip reduction, school transport management, etc.) typically reduce affected vehicle trips 10-30%.
Regulate parking	Improved regulation can result in more efficient use of on-street, reducing the number of spaces needed to serve demands.
Price parking efficiently	Efficient pricing, including metering on-street parking, unbundling residential parking and cashing out commuter parking typically reduces affected parking demands by 10-30%.
Improve user information.	Improving user information can result in more efficient use of parking facilities, reducing parking needs by 5-15%
Overflow parking plans.	Overflow parking plans can reduce the need to provide excessive supply to meet occasional peak needs. This can reduce parking requirements 5-15%.
Develop a contingency plan of responses if parking problems develop, and address spillover problems.	This does not directly increase supply but reduces potential problems, making supply reductions more feasible.

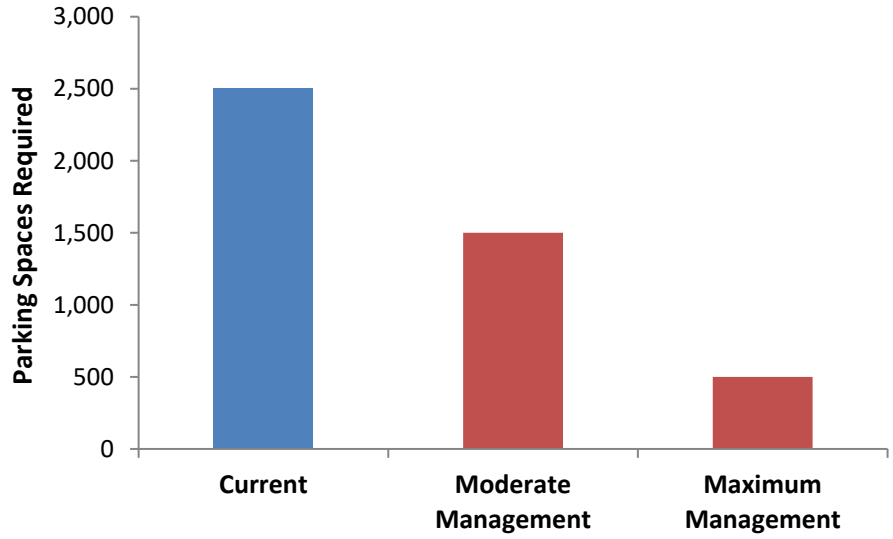
This table summarizes typical supply reductions made possible by parking management strategies.

Experience in other regions indicates that efficiently shared parking facilities with overflow options can reduce the number of parking spaces needed to serve demands by 20% to 40%, and cost-effective TDM incentives can reduce automobile ownership and use by another 20% to 40% (Galdes and Schor 2022; Spack and Finkelstein 2014), so a comprehensive, parking management program can reduce the number of parking spaced needed by 40% to 80%. Although it is not possible to predict the exact reductions, this uncertainty can be addressed with contingency-based planning, allowing the Palliser development to start with lower parking supply, provided that the Town has a plan for responding if that proves inadequate. This could include, for example, building more parking supply or implementing more parking management if necessary in the future.

This could reduce the number of parking spaces needed to serve the Palliser Trail area from 2,500 to 1,500 to 500, reducing 4 to 8 hectares of pavement (assuming surface parking), and saving $20 million to $120 million in facility cost savings, or $1 million to $6 million in

annualized, plus environmental benefits including reduced stormwater management costs and heat island effects, and habitat preservation. Property owners and communities should be willing to spend at least as much as the financial savings on parking management programs that help achieve these supply reductions, and often more in recognition of their environmental benefits.

Figure 6 **Parking Supply Reductions with TDM and Sharing Strategies**



Cost-effective TDM strategies, such as improving non-auto modes, local carsharing services, and efficient parking pricing can reduce vehicle ownership and trip generation by about a third, and parking sharing strategies, including more on-street parking, and shared off-street parking lots, and reduce parking needs by another third.

Critics could argue that these potential travel demand reductions and sharing opportunities are unproven in the Canmore area, that the region's climate makes non-auto travel difficult during part of the year, that a major highway creates a barrier to walking and bicycling between the Palliser Trail area and downtown Canmore, or that many local residents need vehicles and prefer parking in garages on their property. These are legitimate concerns that can be addressed by implementing a contingency plan that specifies how the community will respond if they are less effective than predicted.

Potential Benefits

The box below identifies potential benefits of efficient parking management. Drivers benefit in many ways including increased convenience finding a parking space when in a hurry (due to efficient regulations and pricing), better user information, improved walking conditions between parked vehicles and destinations, and reduced congestion and chauffeuring burdens (from improved non-auto travel options).

Parking Management Potential Benefits

- *Improved motorists' convenience.* Many strategies directly benefit motorists by ensuring that they can always find a parking space when needed, improving user information, reducing traffic congestion, and creating more attractive parking facilities.
- *Improved travel options.* Many strategies improve non-auto modes, which benefits non-driver, and improves walkability between parked vehicles and destinations,
- *Parking facility cost savings.* Reduces costs to governments, businesses, developers and consumers.
- *More flexible facility location and design.* Parking management gives planners, architects and designers more ways to address parking needs.
- *Supports equity objectives.* Management strategies can reduce the need for parking subsidies, improve travel options for non-drivers, and increase housing affordability.
- *Revenue generation.* Some management strategies generate revenues that can fund parking facilities, transportation improvements, or other desirable projects.
- *Reduced congestion.* Parking management encourages non-auto travel and reduces the number of vehicles cruising for available spaces (Hampshire and Shoup 2018; Weinberger, et al. 2023).
- *Reduces land consumption.* Improved management can reduce the amount of land needed for parking facilities, leaving that land for other productive uses.
- *Reduces stormwater management costs, water pollution and heat island effects.* Parking management can reduce impervious surface area and incorporate design features such as on-site percolation and shade trees, that enhance the local environment.
- *Supports transportation demand management (TDM).* Parking management is an important component of efforts to encourage more efficient travel, which helps reduce problems such as traffic congestion, roadway costs, pollution emissions, energy consumption and traffic crashes.
- *Supports Smart Growth.* Parking management helps create more accessible and efficient land use patterns and support other land use planning objectives.
- *Improves walkability.* By allowing more compact development and sidewalk-oriented buildings, parking management helps create more walkable communities.
- *Supports public transit.* It encourages transit use and transit-oriented development.
- *More livable communities.* Parking management can help create more attractive and efficient communities by reducing paved areas, increasing walkability and allowing more flexible design.

Integrated parking management can provide many benefits to drivers, non-drivers and communities.

Impacts on Affordability and Social Equity Goals

As previously mentioned, parking facilities are expensive and currently highly subsidized. Parking is never really free; the choice is really between paying directly or indirectly for parking facilities. Paying for parking indirectly increases mortgages or rents by thousands of dollars annually, taxes by hundreds of dollars annually, weekly shopping bills by a few dollars, and the cost of a beer by several cents to pay for off-street parking spaces used by customers who drive. This is inherently unfair because it forces households that drive less than average to subsidize the parking facilities of those that drive more than average, and since vehicle travel tends to increase with income, this tends to be regressive.

Parking requirements significantly reduce housing affordability (Fox Tuttle 2021; Hoyt and Schuetz 2020). For example, providing one $50,000 structured parking space adds only 5% to the cost of a million-dollar home, but 10% to a $500,000 townhouse, and 20% to a $250,000 condominium. One off-street parking space typically adds $100 to $300, and two parking spaces add $200 to $600, to monthly rents. A three-story apartment building typically requires twice as much land for parking as for building, so parking requirements often limit the number of housing units, or the amount of greenspace provided on a parcel. Reducing parking minimums increases the number of homes that can be constructed in an area and reduces sprawl-related costs such as stormwater management expenses and heat island effects.

Parking management allows money that, under current policies would be dedicated to parking subsidies to instead be invested in other modes and TDM programs. It can help achieve social equity goals by unbundling parking, which provides large savings to households that own fewer-than-average vehicles (only one vehicle where zoning requires two spaces, or zero vehicles where zoning requires one space), by cashing out free parking so non-drivers receive benefits comparable to subsidies provided to motorists, by improving affordable transportation options (walking, bicycling, e-bikes, public transit and carsharing), and by allowing more compact and mixed development with more greenspace, creating more walkable and livable neighborhoods.

To maximize efficiency and equity, parking management programs can be designed to favor affordable housing, transportation and parking options, and, if necessary, include targeted discounts and subsidies for people with disabilities and lower incomes.

Examples and Case Studies

There are many examples and case studies of successful parking and transportation management programs. There are summaries in the reports, *Stuck in Park* (Strong Towns 2019), *Don't Underestimate Your Property: Forecasting Trips and Managing Density* (Galdes and Schor 2022), *Parking Management: Comprehensive Implementation Guide* (Litman 2022), and *TDM Success Stories* (Litman and Pan 2023), and the *Push and Pull* website.

Conclusions and Recommendations

Parking policies have significant economic, social and environmental impacts. It is therefore important to align parking policies with long-term strategic goals. Current policies are intended to maximize motorists' convenience by providing abundant and generally unpriced parking, with costs incorporated into mortgages and rents, taxes, and the prices of other goods. A new planning paradigm favors more efficient transportation and parking management in order to reduce the number of parking spaces needed to serve demand. This approach can provide large and diverse benefits to motorists and communities.

Efficient management does not eliminate parking supply; it strives to use each parking space as efficiently as possible. This allows resources currently dedicated to subsidizing parking facilities to be reinvested in other modes and in TDM programs. It supports more compact and mixed-use development and encourages parking facility sharing so fewer spaces are needed to meet travelers' needs. By prioritizing use and increasing turnover in high demand areas, efficient parking management helps ensure that motorists can always find a parking space when needed. It tends to improve user information and walking conditions between parked vehicles and destinations. It also improves non-auto modes, providing benefits to travellers who cannot, should not, or prefer not to drive, and indirectly benefiting motorists by reducing their congestion delays and chauffeuring burdens.

The Palliser Trail development has many features that make it suitable for efficient parking management: it is relatively compact, multimodal, suitable for sharing parking facilities, and close to many services and activities. This study identifies ten parking management strategies, listed below, that are particularly suitable for implementing there.

1. Eliminate or significantly reduce minimums.
2. Design for shared parking.
3. Improve active travel (walking and bicycling).
4. Provide carshare services.
5. Transportation demand management (TDM).
6. Regulate parking.
7. Price parking efficiently
8. Improve user information.
9. Overflow parking plans.
10. Address spillover parking problems.

An integrated program that applies these strategies to the degree they are cost effective can reduce vehicle ownership and trip generation 20-40%, and with efficient parking sharing can reduce the number of spaces needed to serve parking demands by 40% to 80%. Although it is not possible to predict exact reductions, this uncertainty can be addressed with contingency-based planning, allowing the Palliser development to start with the least parking supply and implement additional management strategies or add supply as needed to meet community goals.

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