

White Paper #3: Parking Demand Forecasting - Commercial and Residential Development

1.0 Introduction

The City of Hood River is interested in better understanding the impacts of parking demand for new commercial and residential development in the downtown over a 20-year planning horizon. Currently, parking “demand” is influenced by minimum parking requirements in the City’s development code (Chapter 17). As in most city codes around the United States, code parking requirements are arbitrary and unrelated to the actual demand for parking generated by a use. Unfortunately, this is the case in Hood River as well. To this end, exploring future parking need within the context of actual demand can aid the City in refining its parking code and realistically planning for the future.

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The consultant team recently completed an analysis of estimated parking demand for commercial and residential properties located within the downtown Hood River parking study area. For commercial (non-residential) properties, the consultant was able to derive a “mixed-used blended parking demand rate” based on actual peak parking use in the downtown correlated with estimates for occupied building area in non-residential buildings.¹ Given the small number of residential units currently located in the downtown study area (62 units), the consultant derived actual parking demand rates from multi-family residential developments in other cities with similar land use characteristics that affect parking demand (e.g., low transit/high vehicle). Though not as robust of a data file as that developed for the non-residential buildings; this residential demand evaluation provides a realistic comparative model for Hood River to assess both its current code requirements and future planning related to residential impacts on parking.

This paper summarizes the consultant’s findings related to parking demand for both commercial (non-residential) and residential land uses in the downtown and forecasts potential parking impact scenarios over a 20-year period.

¹ These findings are summarized in detail in a White Paper titled *Downtown Parking Demand Assessment (Version 1 – April 2019)*, which was prepared by Rick Williams Consulting.



2.0 Commercial (Non-Residential) Parking Demand Forecast

2.1. Background

City staff and the consultant team developed a comprehensive list of all land uses within the downtown study area. This was compiled using available land use data for tax parcels in the study area and actual physical assessment of sites to verify use type and square footage. Square footages were derived for commercial, retail, and institutional properties. Through this process, it was determined that the total floor area for non-residential land uses in the downtown study area is currently 793,539 square feet.

The consultant was also able to determine the actual number of vehicles parked in the on- and off-street supply as a result of data collection conducted over four days in 2018. At the highest point of occupancy, there were 987 vehicles parked. Finally, the consultant estimated actual occupancy of built land uses (non-residential) in increments of 90%, 93% and 95%.² The formula for calculating demand is:

$$(total\ vehicles\ parked\ in\ peak\ hour) \div (occupied\ gross\ square\ footage / 1,000)$$

Using these metrics of building area, occupied building area and peak hour vehicles parked, actual demand estimates for parking demand for non-residential land uses were calculated. This is reflected in **Table 1**.

Table 1: Study Area Demand – Mixed Land Use to Occupied Land Use

Estimated Building Occupancy	Gross Square Footage (Occupied)	True Demand Ratio	Calibrated True Demand (with 15% Buffer)
95%	753,862 ft ²	1.31 / 1,000 ft ²	1.51 / 1,000 ft ²
93%	737,991 ft ²	1.34 / 1,000 ft ²	1.54 / 1,000 ft ²
90%	714,185 ft ²	1.38 / 1,000 ft ²	1.59 / 1,000 ft ²

As the table demonstrates, true parking demand ranges from 1.31 to 1.38 parking stalls per 1,000 square feet of occupied building area. When a market calibrated buffer is added to true demand, the overall demand per parking per 1,000 square feet ranges between 1.51 and 1.59.³

² In working with City staff, we were unable to identify any reliable data source (at this time) of actual building occupancy for non-residential buildings in downtown Hood River. If this were to change, the demand model could be revised.

³ If projects were built only to True Demand, they would theoretically be 100% occupied at their peak hour, leaving little flexibility for unique variations in the ebb and flow of parking activity over the course of a day or over time. To this end, demand models generally provide for a demand buffer or “flexibility cushion” that is added to True Demand. Traditional commercial buffers (for land uses with high turnover) are 15%, based on the parking industry’s 85% Rule for visitor parking. Providing a 15% buffer for mixed use, retail, and office land uses is considered ideal.



2.2. Forecasting Parking Demand (Non-Residential Land Use Growth)

Forecasting parking demand is simply applying actual parking demand to estimates of future land use growth. For this discussion, the assumption is that Hood River’s downtown will continue to add a mix of non-residential uses to its core area. At present, the City does not have any formal estimates or completed growth plans from which to draw future anticipated growth by land use type.⁴ For purposes of forecasting, the initial approach provides a model that estimates annual growth in new non-residential land uses at 1% a year over the current 2019 baseline of 793,539 square feet of non-residential buildings. This is summarized in **Table 2**.

Table 2: Study Area Demand – 20 YR Forecast

	Non-residential growth (ft2) @ 1% annually					Cumulative @ 20 Years
	2019	2025	2030	2035	2040	
Non-residential ft2	793,539	833,216	874,877	918,621	964,552	
Net growth ft2 (5 YR increments)		39,677	41,661	43,744	45,931	171,013
<i>Net new parking @ 1.51/1,000 ft2*</i>		60	63	66	69	258
<i>Net new parking @ 1.59/1,000 ft2*</i>		63	66	70	73	272

*[NOTE: Net new parking does not account for existing parking that might be removed to accommodate new development]

As the table illustrates, an annual growth rate of 1% in new non-residential building area will result in 171,013 square feet of new land use between 2019 and 2040. This would represent a cumulative increase of 171,013 additional square feet over the current non-residential building stock; an average of 43,000 square feet every 5 years or 21.5%.

In terms of parking impacts, the net parking supply would need to increase by 258 to 272 stalls to assure that existing and new users are effectively accommodated. This would increase the total supply of parking in the downtown study zone from 1,485 stalls (2019) to between 1,743 and 1,757 stalls (2040); an increase of 18%. Again, these estimates are based on the actual blended rate for parking demand in Hood River.

It is important to note that the demand forecast does not account for:

- Existing parking spaces that might be lost/removed to new development, or
- Potential future impacts of changes in user mode behavior (e.g., more people using transit, bike, walking or rideshare) that might reduce overall parking demand.

It is also important to note that any increase or decrease in the rate of growth (estimated here) at 1% annually will affect the model outputs. Nonetheless, we believe this provides a realistic basis from

⁴ If new information is provided over the course of the 2019 parking study, the model can be updated and revised to reflect new assumptions regarding land use growth.

which to engage stakeholder discussions and provide some front-end estimates to inform near and mid-term planning efforts.

3.0 Residential Parking Demand Forecast

3.1. Background

The City provided the consultant team with a list of residential properties in the downtown study area. Several of the sites on the list were ground-truthed by city staff to confirm address and location. There are 62 residential properties in the project study area. According to the available data, most development occurred in waves; the two largest increases came in 2006 (15 units), 1970 (11 units), and 2005 (11 units), with another 11 currently under construction. Only 19 residential units have been built in the downtown in the last thirteen years (since 2006). **Table 3** provides a summary of the residential properties.

Table 3: Downtown Residential Property Inventory

Land Use Type	Units	Year Built
Single Family Residential	1	1890
Single Family Residential	1	1895
Single Family Residential	1	1901
Single Family Residential	1	1937
Multifamily Residential	11	1970
Multifamily Residential	11	2005
Single Family Residential	1	2005
Multifamily Residential	15	2006
Single Family Residential	1	2006
Mixed Use Residential	1	2007
Residential Townhouses	6	2015
Mixed Use Residential	1	2018
Multifamily Residential	11	2019 ⁵
Total	62	

3.2. Current Residential Code Requirements

Based on to Municipal Code Section 17.03.040 G.2 all individual dwelling units, duplexes, and triplexes built within the study are required to provide two (2) parking spaces for each unit on the building site, one (1) of which may be within the required front yard setback area. For, multi-family dwellings the code requires one and one-half (1.5) off-street parking spaces per dwelling unit on or adjacent to the building site.

⁵ Under construction

3.3. Residential Parking Demand Comparison – Peer Review

For the purposes of residential land use planning and right-sizing the city’s parking development code it can be helpful to evaluate peer city parking demand ratios to ensure they are calibrated in a manner that is supportive of residential uses rather than being burdensome. Ideally this evaluation would have derived a demand ratio using local data rather than drawing from comparative data, similar to what was compiled for non-residential demand above. Unfortunately, there were insufficient examples of multi-family dwellings within the study area to provide a sufficient sample size. As such, the examples provided below were recently derived (within the last 3 years) from peer cities with similar land use characteristics that influence parking demand – i.e., low transit availability and have a greater demonstrated reliance on the automobile for general transportation needs.

Table 4: Municipal Residential Parking Demand Ratios

City	Urban Context	Type of Housing	Demand Ratio
Bend, OR	Low transit / High auto	Multi-family	1.25 / unit
Albany, OR	Low transit / High auto	Multi-family	1.33 / unit
SeaTac, WA	Some transit / High auto	Multi-family	1.15 – 1.27 / unit
Tukwila, WA	Low transit / High auto	Multi-family	1.26 – 2.00 / unit
Renton, WA	Low transit / High auto	Multi-family	1.74 / unit

The actual demand figures in the example cities range from as little as 1.15 vehicles per unit to as much as 2.00 per unit. The median ratio of the above samples is 1.27 vehicles per unit; the average ratio is 1.43 with a standard deviation of 0.29. As a rule of thumb, RWC favors using a *median* figure (1.27) rather than an *average* (1.43) which reduces the influence of outlier examples (especially high or low figures). By comparison, the Institute of Transportation Engineers (ITE) Parking Generation Manual (4th Edition) cites 1.23 as the average peak demand for Low/Mid Rise Apartments in a suburban location.

Using the median standard derived here, the City of Hood River can expect new residential development in Downtown to generate the following parking need using the (peer) derived median parking demand ratio for residential units. **Table 5** provides an estimate of future parking need based on development size. [NOTE: The consultant did not attempt to forecast residential demand over a 20-year period given the very low historical growth rate (i.e., 19 units since 2006).

Table 5: Estimated Parking Need for Future Residential Development

Sample Development Size	Parking Demand Ratio	Parking Stall Need
5 units	1.27	7 stalls
10 units	1.27	13 stalls
25 units	1.27	32 stalls
50 units	1.27	64 stalls
100 units	1.27	127 stalls

While somewhat simplistic in nature this residential demand evaluation provides a realistic (scaled) parking generation model for Hood River to assess both its zoning code requirements and future planning related to residential impacts on parking.

4.0 Summary

There is considerable pressure on the City related to development in the Downtown – in the form of providing adequate visitor parking, reasonable development expectations (parking development ratios and/or fees in lieu) and managing traffic and circulation in the manner that is safe and efficient for all user groups. One of the first steps in actively managing the parking component is to understand how and at what level land uses (development) generates the need for parking.

The commercial and residential parking demand assessment described in this white paper help to directly answer that question. In general, commercial space generates the need for between 1.51 – 1.59 parking spaces for every 1,000 square feet of occupied building area. Multi-family residential units can be expected to generate a need for 1.27 parking spaces for every occupied dwelling. These two important factors can be used to calibrate existing zoning code language to more accurately right-size new (parking) supply related to future development. It can also be a valuable tool in estimating long-term land use planning buildout scenarios and how that will impact the downtown parking system.

Going forward a good rule of thumb is to periodically update (every 5 -7 years) the commercial and residential parking demand ratios so they continue to reflect the reality on-the-ground and they continue to serve the role of providing accurate guidance for parking generation and a right-sized parking supply.