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TO: Daniel Rowe, King County Metro Transit
SUBJECT: Barriers and Opportunities Technical Memo
King County Multifamily Park & Ride
DATE: June 11, 2015

This Technical Memo presents an assessment of barriers and opportunities to utilizing surplus parking in multifamily (MF) buildings for park & ride (P&R) users. The intent of the Memo is to provide guidance on the most promising business models to pursue, and to identify areas of supplemental research needed to support business model development. The potential business models range from a private model to a public model, with several possibilities for “hybrid” models that would combine desired features from private and public models.¹

The project team conducted assessments of barriers and opportunities in the following categories:

1. Opportunity Mapping
2. Market Acceptance
3. Regulations
4. Design
5. Technology

Each of these topics is summarized below, and further details can be found in the Appendices.

1. Opportunity Mapping

The project team evaluated a set of factors to identify areas of opportunity by leveraging geospatial data and previous parking demand models.² Overall, the mapping revealed that there is ample supply of surplus parking in multifamily (MF) buildings throughout King County that could support a MF P&R program. The analysis also revealed how different “filters” could be applied to locate opportunity sites according to their appropriateness to different business models. The methodology for the opportunity mapping is illustrated in Figure 1.

Note that this analysis is designed to assess opportunities for MF parking to provide access to high-capacity transit. There is also potential to design a MF P&R system around providing parking for people who wish to join vanpools or carpools. Opportunity mapping for vanpools and carpools would require a set of filters different from those described in this memo that apply to transit. Developing a MF P&R program intended to serve vanpool and/or carpool users is beyond the scope of the present work, but should be considered for future study.

¹ See the March 2015 *Multifamily Park & Ride Pricing White Paper* for descriptions of the business models

² See Appendix 1 for further details

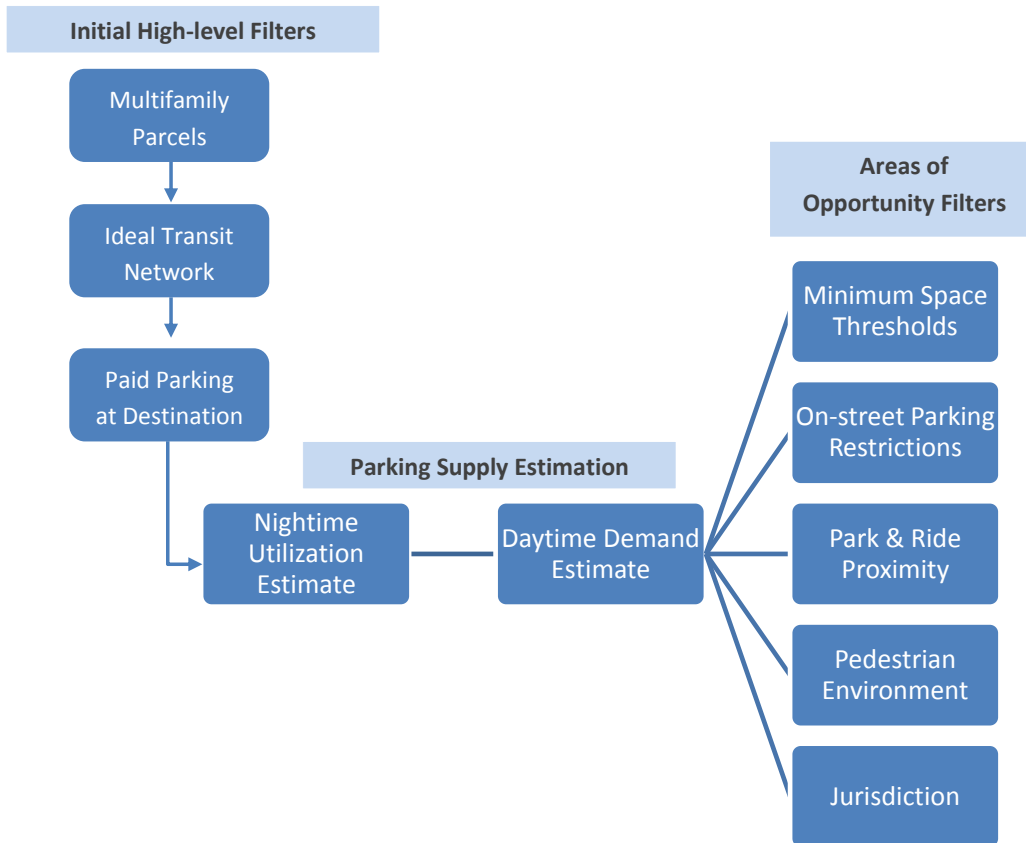


Figure 1: Opportunity Mapping Process

Initial High-level Filters

A set of three primary filters was first applied to the county-wide set of parcels in order to narrow the list of potential MF P&R sites. These filters identified a subset of potential parcels that hold promise for a multifamily shared-use parking program. The primary filters included:

- *Multifamily Parcels:* King County Metro staff provided the full set of parcel data filtered by present use which included apartments, condominiums, and nursing homes³. In total, there are over 11,000 multifamily parcels and covered a majority of the jurisdictions within King County.
- *Ideal Transit Network Proximity:* King County Metro staff defined a subset of routes that provide frequent or express service during the peak period as this type of service is favored by park & rides users. A distance of 1/10th of a mile was used as a buffer around each stop to filter the list of MF properties down to close to the ideal transit network⁴. The filter provided a subset of 3,240 parcels within the county.
- *Paid Parking at Destination:* A shared-use priced parking business model would only be applicable for users of routes that are destined for areas with paid off-street parking⁵. The subset of parcels was further reduced by 600 parcels by removing any that were on routes destined for areas with free off-street parking.

³ A full list of land uses included can be found in Appendix 1

⁴ The distance of 1/10th of a mile is the approximate distance the current park & ride users must walk from the lot to the transit stop

⁵ Source: Puget Sound Regional Council off-street parking study, 2013

Parking Supply Estimation

With the initial multifamily parcels identified, the project team developed a process to estimate the available daytime parking space availability. The process began by applying the Right Size Parking demand calculator⁶ to estimate the peak utilization of the residential parking supply and adjusting the demand for daytime usage with factors developed by the Urban Land Institute (ULI) and the Institute of Transportation Engineers (ITE)⁷. Additionally, automobile mode split data from the Puget Sound Regional Council travel demand model provided further adjustments to the daytime usage estimation⁸. This analysis yielded an estimated 71,320 available stalls (during the midday) on 2,637 parcels in King County.

Areas of Opportunity Filters

With the baseline set of potential sites identified along with the estimated daytime supply, a number of filters were applied to identify different subsets of areas of opportunity. Depending on the chosen business model, different combinations of filters may be appropriate. For example, a business model that focuses on working with a limited number of property owners may require the set of potential sites to be only those with a large number of available spaces. This would provide economies of scale and offer a higher incentive for larger property owners to participate in the program. The following filters were tested to further narrow the opportunity sites:

- *Minimum Space Thresholds:* This filter reflects an assumption that the more parking that is available at a given site the more likely it will be a viable opportunity for a shared-use pricing model. This would make the site more attractive to parking operators and/or building owners. Results of the minimum space threshold filters are shown in the table below.

Minimum Space Thresholds and Impact on Parcel and Space Availability

Minimum Space Threshold	Parcels	Available Daytime Spaces
None	2,637	
10	993	64,180
20	623	58,930
50	346	50,040

- *On-street Parking Restrictions in Seattle:* This filter reflects an assumption that priced shared parking is likely to be more viable if the nearby on-street parking is restricted or priced. Data for jurisdictions other than Seattle were limited and were not as extensive city-wide as with the data from Seattle. Therefore, the sensitivity of the parking

⁶ <http://www.rightsizeparking.org/>

⁷ Appendix 1 provides a summary of the comparison between the ITE and ULI demand estimates were compared

⁸ Puget Sound Regional Council Travel Demand Model 2015

restriction filter was tested on parcels located in Seattle, which removed between 5% and 15% of the available supply of stalls in the city. This sensitivity analysis will inform future application of the parking restriction filter for other jurisdictions depending on the chosen pilot sites and business model⁹.

- *Proximity to Park & Rides with > 90% utilization:* This filter identifies sites that could capitalize on demand that is not being met by nearby existing full P&Rs. Parcels within one mile of an over-utilized P&Rs (over 90%) were identified from the initial subset of parcels. Application of this filter eliminated roughly 60% of the available supply of stalls. This filter would only be applied in cases of a MF P&R program intended specifically to supply additional P&R parking near over-utilized P&Rs; the filter would not be relevant for a system that was intended to create P&R parking in places not near existing P&Rs. With this in mind, for this analysis the available stalls located along the ideal transit network corridors but not proximate to over-utilized P&Rs are still considered as their own market and were not removed.
- *Pedestrian Environment:* A Walkscore of 70 or greater was used as a proxy to identify sites likely to have a pedestrian environment that would be attractive to MF P&R users. This filter is based on an assumption that MF P&R users are likely to be walking further distances than they have been accustomed to, and therefore the pedestrian environment would be an important factor in their decision to use the system. This filter removed between about 60 to 80% of the available supply of stalls, with the most elimination occurring when the highest available space threshold was also applied as a filter. Note that this filter may not be appropriate to apply in all contexts. For example, there may be overutilized P&R lots in areas with low walkability that are nevertheless excellent locations for MF P&R.

Additional Criteria

As the list of potential sites is further reduced during the business model development process, additional criteria may be applicable to identify priority areas. This includes evaluating the access shed of potential P&R locations and understanding the potential market reach of these areas.

King County Metro and Sound Transit have identified user locations of a sample of P&Rs based on license plate surveys. As shown in the Figure 2, the access-sheds of different P&Rs vary across the region, with the average user of the Overlake Transit Center P&R traveling 2.6 miles and a typical user of the Auburn Station P&R traveling 4.1 miles. As business models are refined, this type of analysis will assist in understanding the potential market reach of each potential site.

⁹ For example, if pilot sites are located in a certain jurisdiction, additional data on all forms of parking restrictions (paid, residential parking zones, no parking zones, etc.) will be collected.

Travel patterns were also investigated to supplement the opportunity mapping. As a test case, data for the Overlake P&R in Redmond were analyzed, based on the PSRC's travel demand model that provides origin-destination flows of P&R users for home-based work trips. The sample traffic analysis zone (TAZ) 274 was chosen for display as it encompassed a high percentage of users of the Overlake P&R. As shown in the Figure 3, 70% of trips were destined for Downtown Seattle, First Hill, South Lake Union and Uptown, while 12% were destined for Redmond. The information will help refine the business models by providing an understanding of how travelers typically use the system, and the likely size of the catchment area.

Figures 4 and 5 highlight the change in the spatial distribution of parcels based on application of one set of filters. Figure 4 shows all MF parcels identified from the initial present use filter (the filter that identified whether the parcel contained a MF use). Figure 5 shows an example filter that highlights only those parcels that are within 1/10th of a mile of an ideal transit network stop, have a Walkscore above 70 and have at least 10 spaces available during the day. This example shows how various filters may be applied to identify potential pilot sites as the preferred business model is refined. A description of the market acceptance and the potential business models is included in a later section.

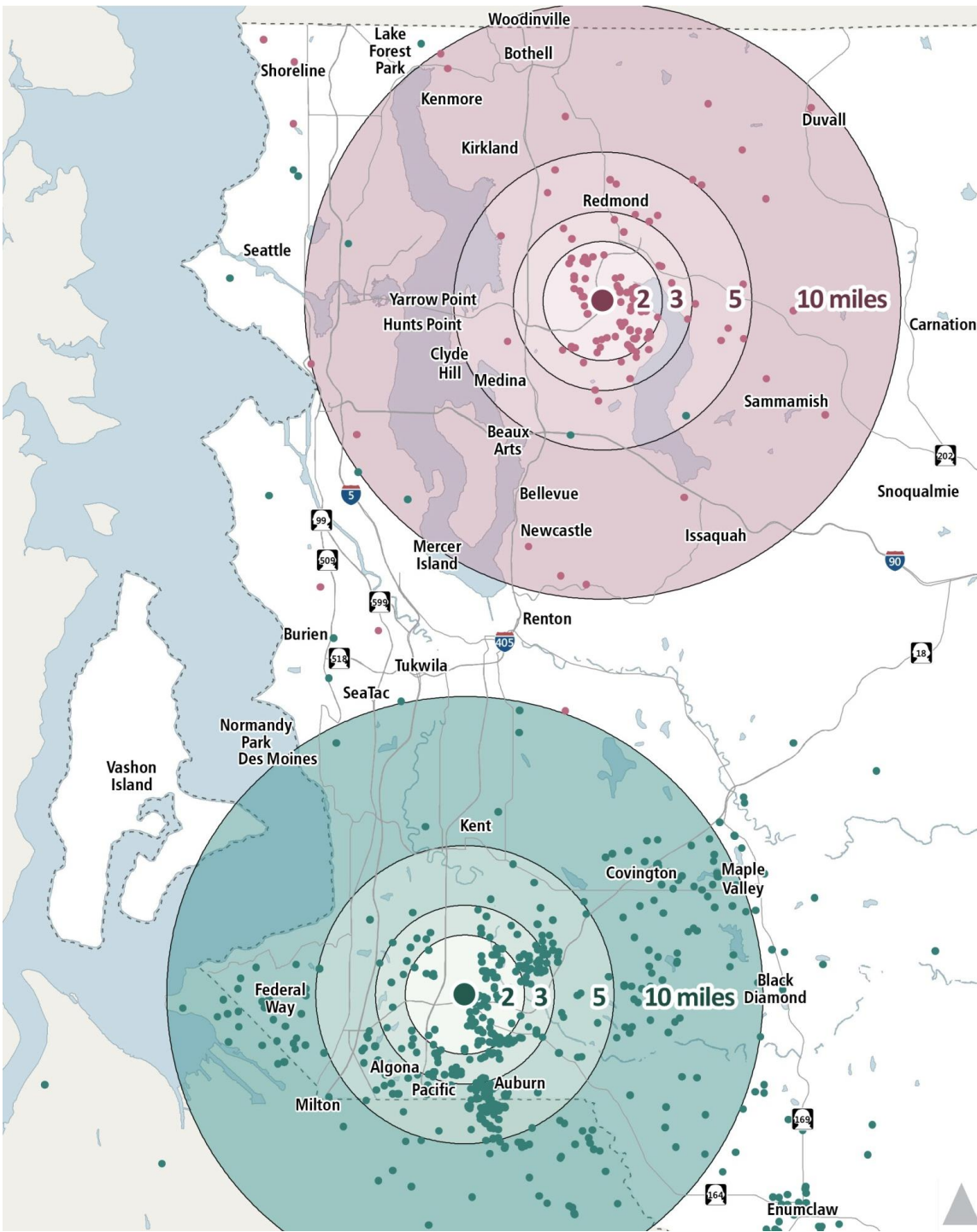


Figure 2: Transit access-sheds

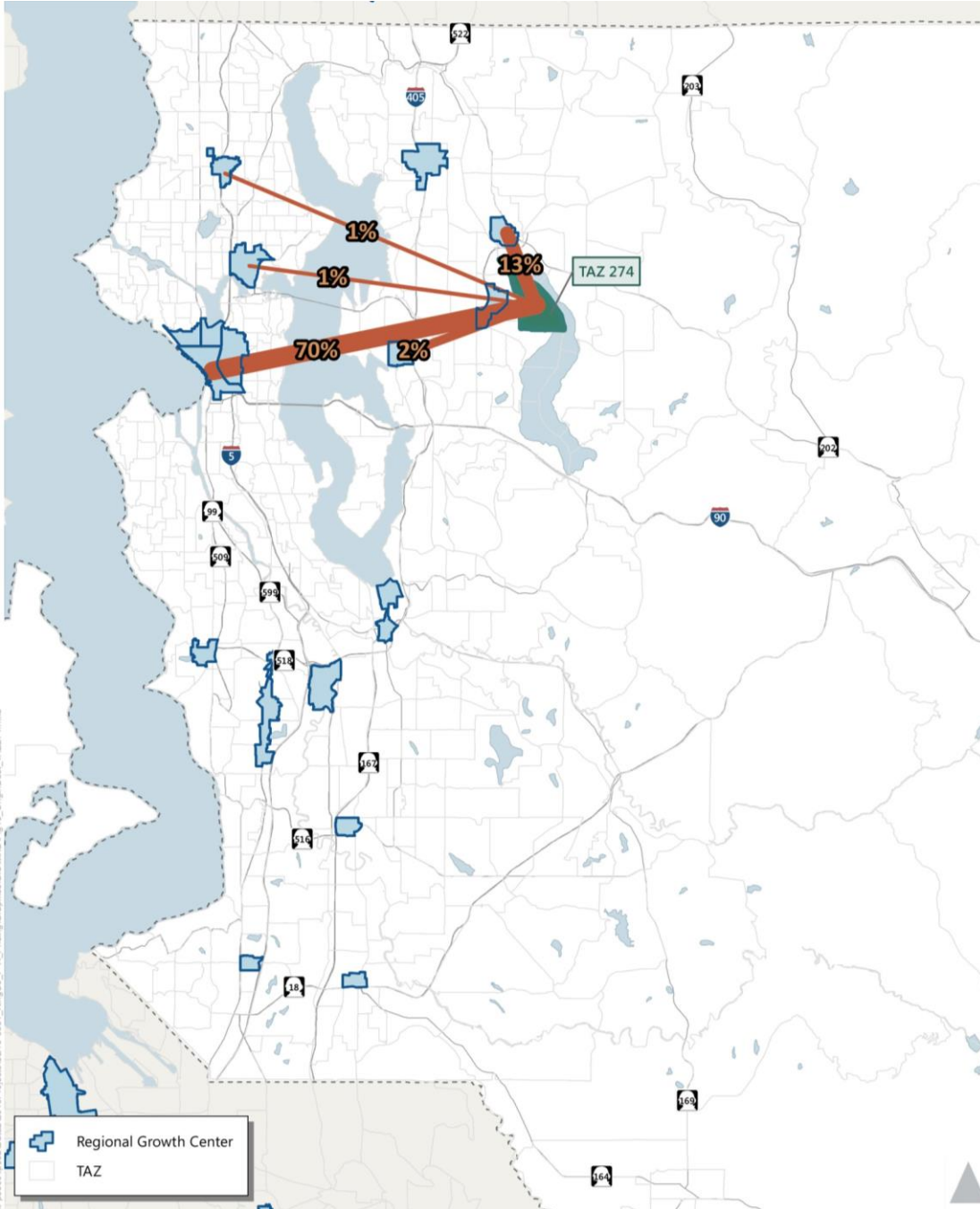


Figure 3: Origin-destination flows

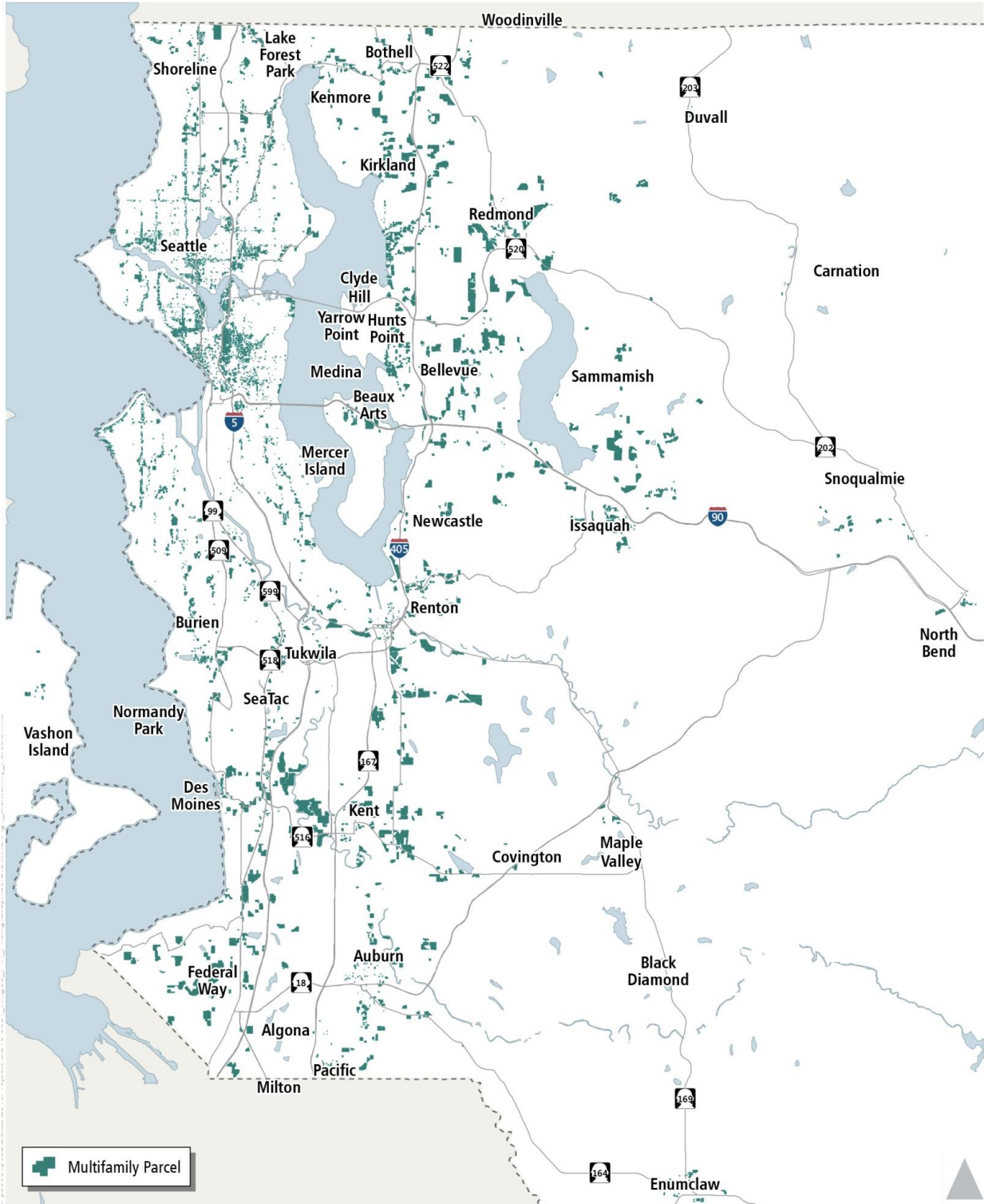


Figure 4: MF parcels identified from the present use filter

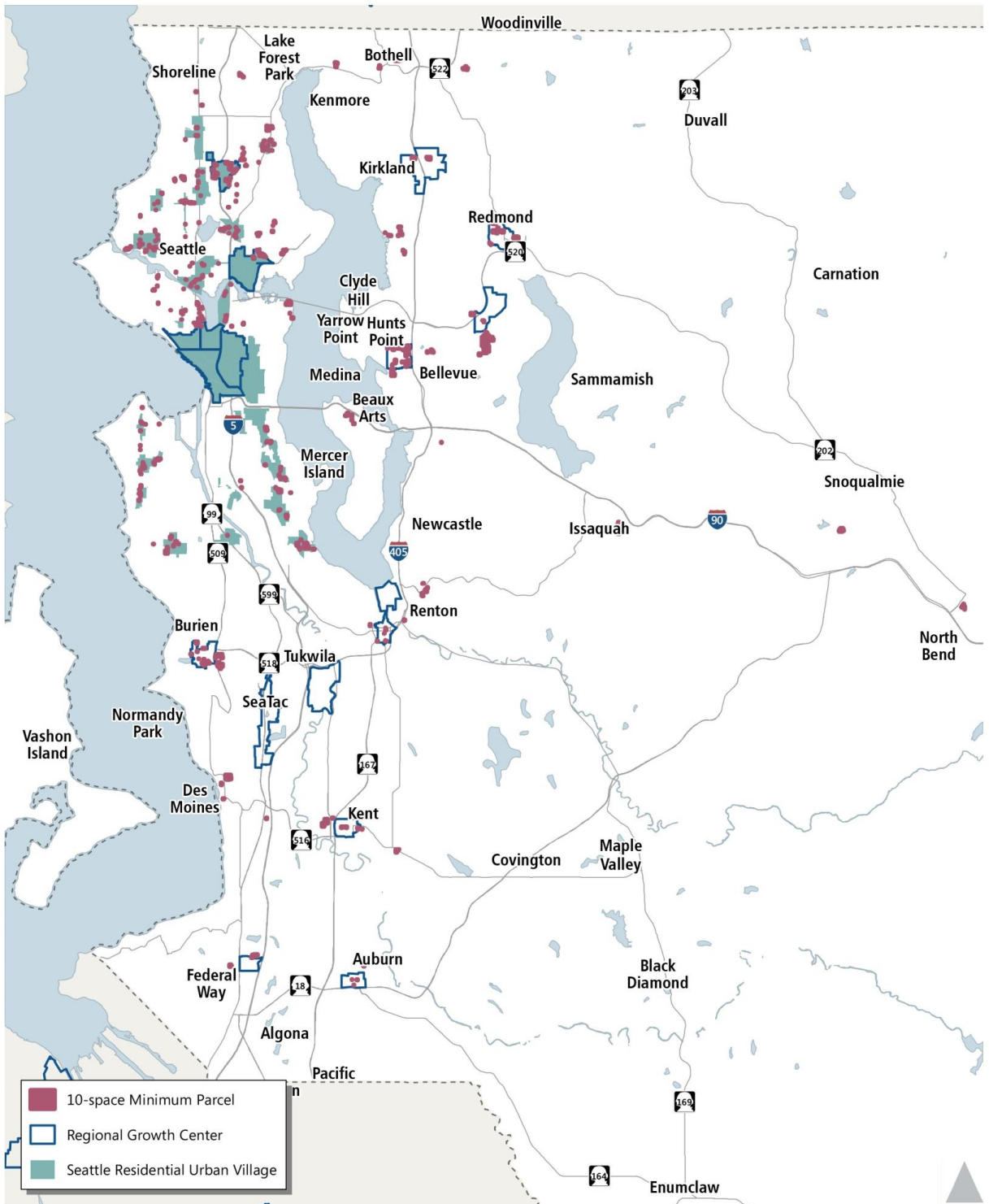


Figure 5: Parcels within 1/10th of a mile of an ideal transit network stop, with a Walkscore above 70, and at least 10 spaces available during the day

2. Market Acceptance

Building Owners and Managers

The likelihood of a business model to attract MF property owners to the program will be one of several factors that will influence the choice of the optimum business model.¹⁰ For most MF owners, financial returns will be the primary motivator. One simple metric that can be used to measure financial returns is Return on Cost (ROC), which is defined as $ROC = \text{Net Operating Income (NOI)} / \text{Costs}$. NOI is revenue minus operating expenses. Costs are the upfront investments required to launch the system.

Owner expenses associated with a MF shared parking system include a range of upfront costs and ongoing operational costs. In addition, there are other financial considerations such as unit marketability, competition from non-P&R parkers, risk versus return, and effects on the valuation of the building.

When parking revenue alone doesn't generate an adequate ROC, subsidies or other incentives may be necessary to attract building owners to the program. Incentives that could be provided by King County include cash incentives, free advertising, transit passes, lot maintenance, and use of revenue from desirable P&R spaces to subsidize less desirable spaces in MF buildings.

ROC will be a valuable tool to help assess the most promising business models to pursue for a given site or set of sites. If projected ROC is low, it will indicate that a hybrid or public business model would be necessary, because there would be the potential for public subsidies and incentives that would not be available in the case of a fully private business model.

Building Operator Interviews

For an initial assessment of market acceptance among building operators, the team conducted interviews with two building operators, upon which the following observations are based:¹¹

- The total profit generated by the program is as important as the profit per space; it's probably not worth dealing with the management headaches for three or four spaces.
- Identified opportunities include serving P&R users that aren't adequately served at existing P&R lots (such as service workers who arrive later in the morning); buildings that are in neighborhoods suffering from P&R spillover, and finding buildings with enough surplus parking and in areas where parking revenue generates enough profit to make the hassle and risk of program participation worthwhile.
- Many of the potential barriers are financial; however, there are also non-financial barriers such as parking regulations, and the actual or perceived issues that building tenants might have with giving garage access to non-residents.
- Both neighborhood support and support of the program at the city level will likely be crucial to success.

¹⁰ See Appendix 2 for further details

¹¹ See Appendix 3 for further details

- Ideally spaces would be dedicated to P&R users as opposed to mixed with tenant parking, and P&R users would be vetted and/or tracked. (Note that this is one building operator's opinion and if implemented would mean that only excess parking above peak utilization would be available for P&R.)

Parking Operator Interviews

For an initial assessment of market acceptance among parking management firms, the team conducted interviews with three parking operators: Diamond Parking, SP+, and ImPark.

Diamond Parking

Diamond Parking has been managing MF parking and selling parking to non-residents since 2008, when the recession motivated owners of underutilized parking to seek new sources of revenue. Diamond manages 78 MF properties in Seattle, and a total of about 120 in the greater region.¹² Key points from the interview are as follows:¹³

- Price is important, but lack of parking supply is the main factor for determining an attractive opportunity
- Without a third party vendor, most owners do not have the means to market, communicate and manage both enquiries and sales
- Rates are determined by a combination of the local market, congestion, and what on-site tenants are paying
- They have not employed app based technologies, and they appear to be waiting for the app market to mature a bit more
- Focus on monthly parking sales as most facilities are gated access, making daily and hourly sales difficult (note that daily and hourly use could be enabled with access cards issued to users who are regular enough to make card distribution with the expense)
- Target 30% of gross revenue for its fee
- Prefer facilities that provide gated access because this makes the distribution of access (AVI cards, etc.) easier and reduces labor.
- Security has not been an issue in the facilities that Diamond operates, though it is of high interest to owners.
- There are no additional legal or insurance issues that apply compared to their normal parking operations
- Separation of elevators and pedestrian portals from direct access into interior building space is very important.
- Surface lots can be very attractive to users because of perceptions of safety that some users have about garages
- Overall, they believe that this will continue to be a growing market

SP+

SP+ currently manages a total of 200 facilities at MF properties in King County, and serves as a liaison for owners to market and provide parking access to non-tenants. The majority of these properties are in the Seattle City limits and in Bellevue, with a small number along the I90

¹² An initial interview with Diamond Parking was documented in the team's March 2015 *Multifamily Park & Ride Pricing White Paper*

¹³ See Appendix 7 for a more detailed write up of the interview.

corridor. SP+ began providing this type of shared use service in 2013 as a response to customer demand. Key points from the interview are as follows:¹⁴

- SP+ sees a growing opportunity for non-tenant shared parking
- At many properties that provide non-tenant access they are running waiting lists as demand is very high.
- Customers usually contact them by phone or through their webpage, but they would be very interested in mobile apps.
- The separation of elevators and pedestrian portals from direct access into interior building space is very important.
- Surface lots have the disadvantage that the hang-tag process can be labor intensive.
- Getting long-term commitments from a property owner to provide parking to non-tenants is very difficult.

Impark

Impark currently manages a large number of parking facilities at MF properties, almost exclusively in downtown Seattle. They do sell access to non-tenants but is it not a large portion of their business or something they actively promote at this time to clients. Key points from the interview are as follows:¹⁵

- Currently, a program like this would not be attractive to them, especially outside downtown where parking is typically free; they believe it will become more attractive as more P&Rs start charging for parking.
- They do like the concept of a large supply of parking being assembled and turned over to a private vendor.
- Solutions are generally easy for security, managing access into sites and insurance/liability.
- Impark takes from 15% to 30% for monthly parking fees.
- They suggested a lease back arrangement for which King County would lease stalls from a property owner at a rate that attracts participation, then work through a private vendor to sell the stalls at a lower rate.

Customer Input

The team is currently planning to conduct focus groups to test market acceptance of users. Capitol Hill Housing's District Shared Parking Pilot project conducted interviews with residents and potential users, and found that:¹⁶

- In general residents were comfortable with sharing and believed that most people in Pike Pine apartment buildings would be similarly comfortable.
- Resident concerns over allowing non-tenant access to garages were that residents should be given a priority for spaces, and that HOA (condo) rules prevented this type of sharing and that many people in the condo building would be concerned about security.

¹⁴ See Appendix 7 for a more detailed write up of the interview.

¹⁵ See Appendix 7 for a more detailed write up of the interview.

¹⁶ Based on December 2014 draft reports for the King County Right Size Parking Project

3. Regulations

An examination of municipal codes for shared use parking in 11 King County cities found no examples of explicit allowances for sharing underutilized MF parking with non-resident individuals.¹⁷ The survey did not find any explicit disallowances either. A MF P&R shared parking system is technically supplying “commercial” parking, a designation that in most codes is limited to either strict accessory designations, or to on-site users or adjacent users. This lack of defined regulations will have to be addressed for any business model pursued.¹⁸

In the case of a totally private business model, it may be possible for owners and parking operators to provide the MF P&R service in the absence of explicit regulations, though there could be some risk associated with that kind regulatory ambiguity. Parking management firms such as Diamond Parking are currently selling MF parking to non-residents, primarily in Seattle, but also in smaller cities such as Bellevue, Kirkland, Redmond, and Burien. For the MF parking they manage and sell to non-residents, Diamond Parking uses a contract that is no different from the contract they use with any other private parking lot owner, and the insurance and liability issues are also no different.

If the business model involves King County and direct collaboration with cities, then formal adoption of new regulations might be required. New codes will likely have to address:

- Allowance for MF to share parking with private individuals who have no connection to the property or to an adjacent property
- An exemption from proximity requirements that typically apply to conventional shared parking
- A new type of contractual agreement, since conventional shared parking contracts are typically made between property owners. One option is user “license” agreements, which are common to the industry and set the terms related to liability, protocols for use, term and termination, renewal and general rules and responsibilities.

King County may play a role in the above by facilitating regulatory updates in partner cities. The need for this work supports the case for a business model that is not purely private, i.e. either hybrid or public.

¹⁷ See Appendix 4 for further details

¹⁸ See Appendix 5 for further details

4. Design

The physical design of parking lots is not likely to be critical to success, but can be expected to augment the likelihood of success.¹⁹ The main factors are for the most part common sense: convenience of access (i.e. getting in and out), perceptions of security (i.e., gate systems, lighting, openness, and cleanliness) and understandability (i.e. signage and wayfinding).

The single most important specific design feature in structured parking is pedestrian entrances and exits that do not connect directly to the private interior spaces of the residential building. Another important factor that can be a barrier in many existing lots is when too many stalls are assigned to specific units. Segregating a residential-only section from a shared section that includes parking for both guests of residents and MF P&R users may ease concerns of residents, however that segregation also eliminates resident-only designated stalls from the shared pool.

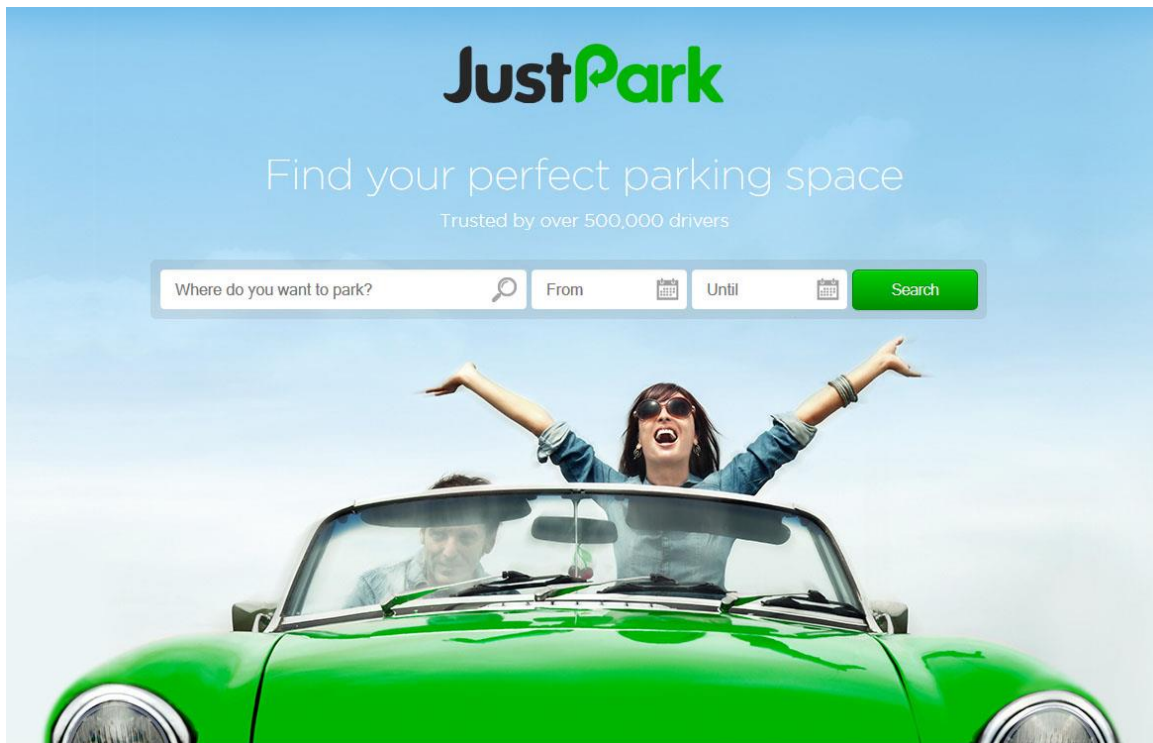
Currently most MF shared parking is occurring in garages, simply because demand tends to be higher in more urban areas where garages are found. Compared to garages, surface lots have the inherent advantage of simply communicating ease of access, safety, and legibility. On the other hand, surface lots tend to be more spread out, which may require longer walks out of the lot. Garages have the advantages of added security and weather protection.

All of the above design factors would apply equally to any shared parking business model. If the desired features are not in place, the upfront costs to install them can be high, e.g. a new parking entrance gate. Parking management firms such as Diamond would not be willing to make such investments, because contracts and ownership can change rapidly. Owners would be unlikely to make such investments unless the returns were guaranteed to be relatively high. Thus a hybrid or public business model would be advantageous, because of the potential for subsidies that could cover upfront costs to improve design, if needed.

¹⁹ See Appendix 6 for further details

5. Technology

An initial survey of technology companies that provide services related to the needs of this project concluded that the ongoing rapid evolution and adoption of mobile technology creates opportune timing for developing MF P&R over the coming years.²⁰ For example, SP+, JustPark, ParkMe, and ParkWhiz, have already developed technology that allows users to find, reserve, and pay for parking in commercial lots. To supplement this information, the team had discussions with two local tech companies: Parkt and Luum.



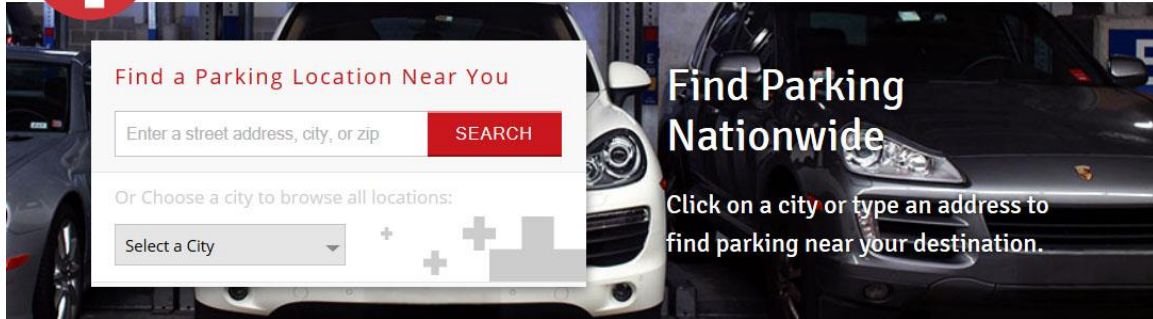
Parkt (firm contact: Tov Arneson)

Parkt connects parkers to shops, restaurants and other merchants who provide parking validations, and allows them to combine validations from multiple merchants and “bank” them for later use. Parkt previously worked with Laz Parking (Boston based) to develop a smartphone-based valet system similar to Zirx.²¹ They moved on from that business model after recognizing that the most important factor is price, i.e. there is usually plenty of parking supply, but people don’t want to pay for it. They decided the best way they could offer innovation was to recognize that the endpoint is connecting parkers to services they want, not the parking itself.

Parkt’s business model is to charge the merchants a fee, but only when they make sales to people who have used their service to find parking. It is essentially a service that is funded by merchants who recognize it as a way to bring in more customers. Overall, Parkt’s business model is not closely related to what’s needed for MF P&R. However, they do have extensive expertise in transactions with individual parking users.

²⁰ See the March 2015 *Multifamily Park & Ride Pricing White Paper*

²¹ Zirx allows smartphone app users to leave their car with a roaming valet, who then parks the car in a remote lot. The valet later retrieves the car and returns it to the owner when requested.



Luum: (firm contact: Tyler Simpson)

Luum provides a software platform for customers looking to “improve your parking situation, lower your neighborhood or environmental impact, or reduce traffic congestion.” So far their target market has been large institutions such as Children’s Hospital. Parking management is the primary component of their services, and they work with parking garage owners to manage daily parking. Their services also include shuttle management, ride matching, individualized reports on employee commuting methods, and various other TDM services intended to reduce automobile mode share. They charge about \$3 per employee per month for their full package, but that could be less for single services such as parking management alone.

The Luum system could be tailored to manage MF P&R. They are currently in discussions with the City of Seattle and King County. They have recently begun discussing opportunities with private building owners and developers. Luum could be a key partner in the business model development.

6. Next Steps and Further Data Collection

The next phase of the project will focus on developing business models. The following seven objectives have been proposed to evaluate and compare potential business models:

1. Is the model financially self-sustaining?
2. Does the model increase ridership by offering P&R spaces at a price and level of convenience that attracts P&R users?
3. Does the model provide enough incentive (financial or other) to attract multifamily owners?
4. Does the model reduce the need to build new P&R spaces?
5. Does the model promote social equity?
6. Does the model promote shared parking?
7. Does the model catalyze the market for priced parking?

For next steps to refine the areas of opportunity, the following data needs are anticipated:

- Collection of additional P&R user license plate data to improve understanding of P&R catchment areas
- Video counts of cars entering and leaving select MF parking facilities to test assumptions about how parking utilization changes over a 24 hour period
- Jurisdiction-based on-street parking data (if available)
 - Street right-of-way where parking is allowed (to identify the location of free on-street parking versus streets with only travel lanes)
 - Street right-of-way where parking is restricted/paid (currently have for a subset of jurisdictions)
- The initial, GIS-based opportunity mapping results will be refined by zooming in on sites with high potential and ground-truthing the locations with local data and site assessment. This truth-testing is expected to include:
 - Specific site layouts of potential pilot sites
 - Existing parking space utilization data for potential pilot sites
 - Origin-destination GPS data on selected subareas based on potential pilot sites
 - More-detailed amenity data on potential pilot sites beyond current Walkscore index

Next steps concerning market acceptance, regulations, and technology is expected to involve the following:

- Additional interviews with building owners, especially those owners of properties that have been identified as high-priority opportunity sites
- Additional interviews with parking operators, in particular to answer new questions specific to certain business models as they are developed
- Focus groups with potential MF P&R users
- More in-depth discussions with city planning and transportation staff, to be targeted by municipality as locational opportunities become better understood

- Continued discussions with technology providers such as Parkt and Luum
- Interviews with additional technology providers whose relevance to the project may increase as specific business models are further developed
- Development of preliminary financial pro formas for the most likely business model cases

Ultimately, the team intends to narrow down the potential business models to the two most promising to be further developed for possible pilot implementation. Financial pro formas will be fully developed for the two selected business models.