Parking Generation—
Replacing Flawed Standards with the Custom Realities of Park+

WHITE PAPER SERIES

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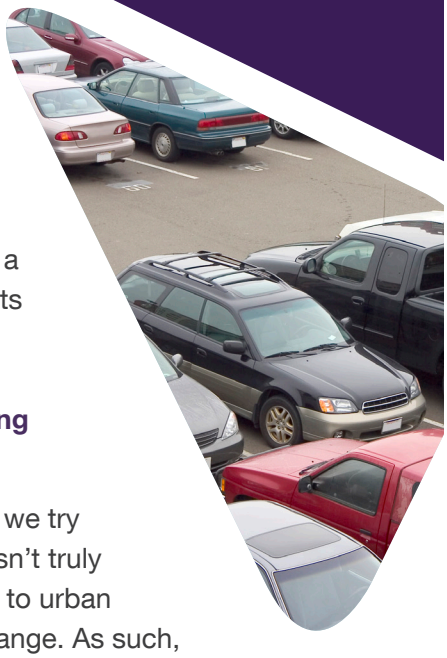
Kimley»Horn
Expect More. Experience Better.

Park+
Unlimited Parking Solutions

Introduction

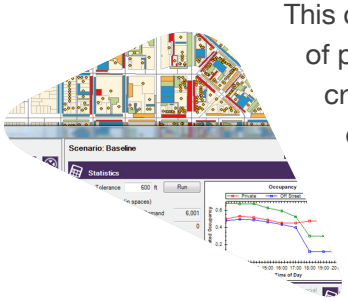
For the longest time, our industry's approach to defining "How much parking?" has been relegated to the use of national parking requirement standards, either from the Institute of Transportation Engineers (ITE), Urban Land Institute (ULI), or local code requirements. Anyone who has read the workings of Donald Shoup, or more recently Richard Willson, knows the fallacy in using these sources when designing downtown or campus parking systems.



National parking requirement standards are based on outdated and under-represented data, which tend to skew wildly from the actual parking needs of a community. In my years as a parking consultant, I've very rarely completed a single downtown parking study where the peak observed parking demands consumed the majority of the total parking spaces. A study completed in Dallas a few years ago yielded some 30,000 empty parking spaces at peak. Similar results were found in Atlanta, Houston, St. Petersburg, Seattle, and the list goes on. **When communities plan downtowns based on outdated suburban design standards, we achieve the same inevitable results—empty, restricted parking areas that deaden the density, walkability, and vitality of urban areas.**

The parking quantity question is always a challenging exercise, especially when we try to solve it using inaccurate data. Most times, we rely on outdated data that doesn't truly represent the real context of our downtowns. As more and more people migrate to urban areas, the dynamics of how they get around and their relationships with cars change. As such, we've seen a drastic downshift in the need to provide parking. But our planning tools have not evolved to better align with this shift.

Equally challenging is deciding how the parking characteristics in one community compares to another community. In reality, it's hard to define how one neighborhood acts compared to another. Here in Phoenix, the Roosevelt neighborhood, home to the area's up-and-coming artists and requisite "hipsters," enjoys a higher amount of transit, walking, and cycling than most other parts of the city. In turn, the overall demand for parking is lessened as area residents and patrons find other ways to access the uses within the area. In my neighborhood, you almost can't survive without the use of a car to work, shop, and play. This variability exists in every city and is the reason it's absurd to continue leaning on archaic, cookie-cutter methods to plan for parking.



This question is the central reason we created Park+ — to find a way to localize the analysis of parking demand and challenge the conventional notion that all parking demand is created the same. Within this white paper we summarize the findings of the first five years of Park+ modeling and define the dynamic nature of each community served. In our time developing, testing, and applying this model, we have encountered an incredible diversity of data and outcomes in each community. In the following sections, we'll walk through those results, as well as the more global movement afoot in our industry.

The Problem with the Standard Approach

Not to belabor the point, but the standard approach hasn't really served the our urban areas well. In reality, the planning guidelines provided by ITE and ULI were never intended to provide guidance for the parking systems in our downtowns and communities. When taken at their true context—at the development or shopping center level—these sources work quite well. In fact, the data in the tables below is likely very indicative of a standalone development; just not one in a highly developed environment.

TABLE 1: ITE/ULI RATES FOR COMMON LAND USES

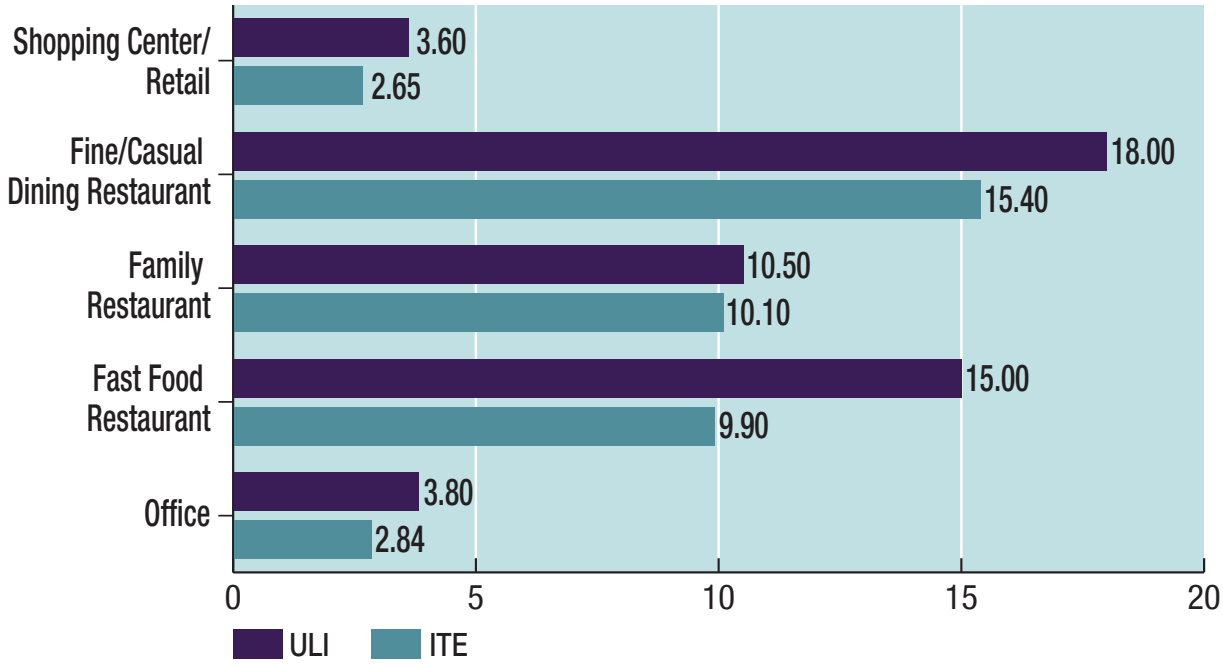
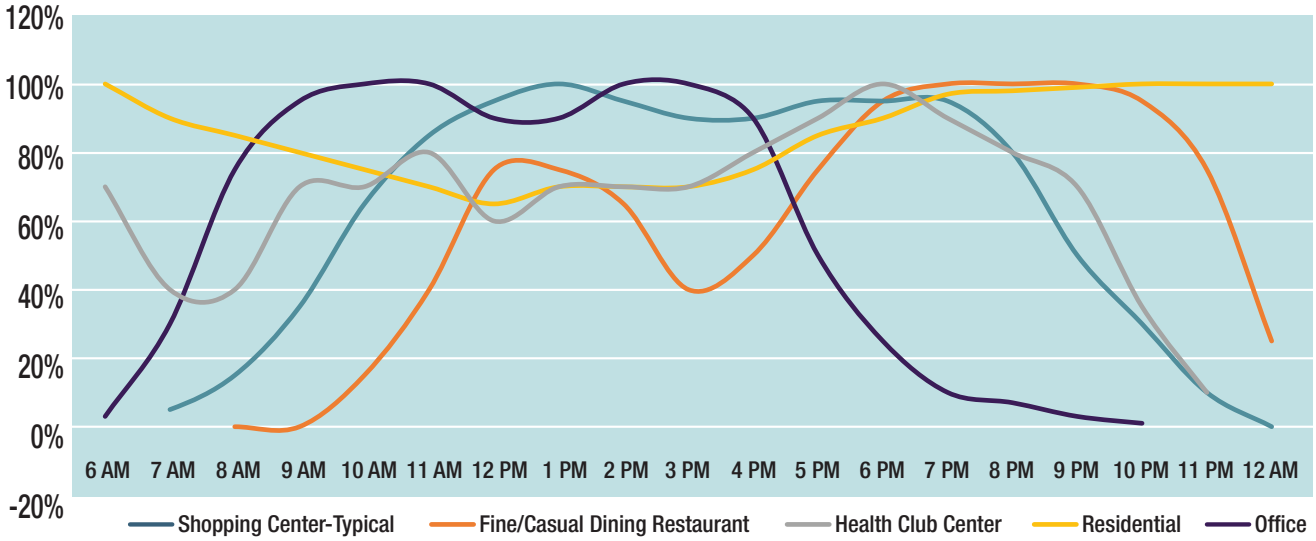


TABLE 2: ULI TIME OF DAY RATES



Unfortunately, those data points are routinely applied in areas they should not be. I've seen exercises where entire swaths of a downtown are planned with these metrics, resulting in over-built facilities. In some cases, it's a lack of understanding of the context the development is occurring in. In other cases, it's a requirement of financial institutions that are backing a development. Whatever the cause, a better understanding of the true dynamics of a development and the area it serves produces better results.

In recent years, urban planners have begun to lean more and more on these decisions as a primary reason that downtowns and communities don't work. One of my favorite terms in the industry is the "parking crater," which was coined by the website Streetsblog and its editor Angie Schmitt. In fact, that website holds an annual March Madness tournament, with a full-on bracket to determine the worst parking crater of that year. The parking crater is a portion of a downtown that has been hollowed out by the presence of large surface parking lots. Whether these are highly or poorly utilized, they deaden a downtown, its walkability, and most importantly its viability.

If asked, many people would say the provision of ample parking makes our cities more desirable. But in fact, ample parking promotes single occupancy vehicle trips and impedes the ability for our communities to develop and grow. Pedestrian walkability, dense design, and connectedness are extremely important for the success of a community. Large areas of parking tend to counter these tenets and disrupt the ability for a community to work properly. This is only exacerbated by the over-provision of parking.

Clearly, something must be done…

Right-Sized Parking

Recently in the planning arm of the parking industry, we've seen a very distinct shift toward finding the right amount of parking for a downtown, campus, study area, development, etc. This movement is aptly dubbed the Right-Sized Parking movement. The name speaks for itself, as the intent is to determine the correct amount of parking to serve an area without over- or under-burdening area patrons.

Too much parking tends to be an expensive endeavor. In today's world where more and more parking is found in consolidated structures, the cost to build a single space can range from $8,000 to $40,000, or more. This price is astronomical and is a primary contributing reason that rents are increasing and the cost of living in urban areas is skyrocketing. In King County[1], WA, a recent study searched to find the answer to the right-size for multi-family housing parking. The result of that large-scale effort was…it depends.

[1] Visit rightsizeparking.org to learn more and to play with their awesome right-size parking calculator

That result may seem nebulous, but in reality it's the most accurate response that could have emerged from such a study. The data indicated that a number of factors—location, access to transit, employment density, walkability, population demographics—were responsible for the parking demand characteristics of a multi-family development. In short, people tended to adapt to their environment, and their driving (and car ownership patterns) adapted right along with them.

Unfortunately, in a lot of those instances, the provision of parking did not adapt. Instead, developers continued to provide parking as if every location was the same, and the result was a high amount of underutilized parking. The data showed that in the heart of Seattle (the most urbanized area in the county), the parking demand was at or below 0.5 spaces per unit. In the far reaches of the county, the ratio was closer to 1.5 spaces per unit.

This analysis has borne some incredible outcomes. First, many developers in the King County area have begun to lessen their parking capacity as a result of this analysis, basically "right-sizing" their supply. That in and of itself is a win and would deem the effort a success. However, the study also pushed communities in the King County area to reassess their parking requirements, helping to define right-sized parking at the review level. Even more incredibly, King County transit has now begun to pursue empty parking spaces in multi-family housing complexes to serve as park-and-ride spaces for transit riders.

It's very exciting to see the results coming out of King County. They spent a tremendous amount of time and effort to collect viable data and determine how their community works. The project was well funded by the Federal Highway Administration and led by a brilliant young planner[2] whose mission is to prove the fallacy of poor parking planning. But how about the communities not funded by FHWA…how do they learn more about the true nature of their parking systems?

Park+ and Right-Sized Parking

Park+ —the Kimley-Horn parking scenario planning tool — was created with the intention of right-sizing parking in the communities we serve. The model is built on an algorithm that matches parking demand with land uses to more accurately depict parking behavior. Previous white papers (xxx) have depicted how this relationship works, but in simplistic terms, we match parking demand to its origin using localized data. The result is a much more accurate depiction of parking demand in the environments our models serve.

The primary output of a calibrated Park+ dataset is a unique set of parking generation characteristics that represent the dynamic nature of a community. These results differ from community to community and are a direct reflection of the areas they serve. The following tables and figures provide a representative sample of parking demand characteristics and geographic demand metrics. These are only representative in nature, but show the varied results that come from Park+ modeling exercises.

[2] Dan Rowe of King County Metro. If you ever meet him at a conference, engage him about parking…you won't be sorry.

• Municipal Parking Characteristics

In the municipal planning world, the provision of parking is often governed by ULI, ITE, and local code requirements. As such, the following table compares the standard values found in the national parking generation manuals with outputs collected in various Park+ communities.

LAND USE TYPE	UNIT OF MEASURE	STANDARD VALUES		PARK+ MODEL COMMUNITY OUTPUTS					
		ULI	ITE	DURHAM, NC 2011	DURHAM, NC 2016	HOUSTON, TX MUSEUM DISTRICT	HOUSTON, TX RICE VILLAGE	ASHEVILLE, NC	TEMPE, AZ
Apartment	per dwelling unit	1.5	1.20	0.54	0.57	0.79	--	1.62	--
Condominium	per dwelling unit	1.7	1.38	--	0.70	2.82	--	1.12	0.58
Retail	per 1,000 SF	3.6	2.65	0.83	0.65	3	0.95	1.22	1.15
Hotel	per room	1.00	0.64	0.33	0.39	--	--	0.60	0.34
Lounge	per 1,000 SF	10	13.30	4.40	5.85	--	--	3.93	--
Office	per 1,000 SF	3.8	2.84	1.37	1.73	0.75	2.28	1.27	0.56
Restaurant	per 1,000 SF	10.50	10.10	5.19	7.00	14.75	10.13	2.05	11.64

In the above table, the results are shown for models built in Durham, North Carolina; Houston, Texas; Asheville, North Carolina; and Tempe, Arizona. The table depicts the difference between communities and the variance when compared against ULI and ITE. The table also shows two data sets from Durham, including an original data set from 2011 and then a recalibration from 2015. The differences between the two models are fairly small, but these differences show how the demand generation for uses can quickly change as a community develops and demands increase.

For the Houston examples, two distinct neighborhoods are shown—the Museum District and Rice Village. The demand generation characteristics are remarkably different and show how the context of an area can greatly influence the way people behave. This is a very stark example of why the application of blanket generation rates throughout a community is a bad idea.

The second table below shows additional communities and the generation rates found in their respective modeling exercises.

LAND USE TYPE	UNIT OF MEASURE	STANDARD VALUES		PARK+ MODEL COMMUNITY OUTPUTS					
		ULI	ITE	ST. PETERSBURG, FL	CAPITAL EAST, MADISON, WI	SALINAS, CA	GILBERT, AZ	CRYSTAL CITY, ARLINGTON, VA	FORT COLLINS, CO
Apartment	per dwelling unit	1.5	1.20	0.44	0.85	1.22	0.82	0.71	1.16
Condominium	per dwelling unit	1.7	1.38	0.41	0.60	--	--	0.63	1.31
Retail	per 1,000 SF	3.6	2.65	0.78	2.70	0.68	0.57	0.36	0.64
Hotel	per room	1.00	0.64	0.31	--	15.35	--	0.71	--
Lounge	per 1,000 SF	10	13.30	4.23	4.79	6.54	8.38	--	5.38
Office	per 1,000 SF	3.8	2.84	1.14	1.55	2.88	2.06	1.36	1.60
Restaurant	per 1,000 SF	10.50	10.10	5.17	6.46	9.96	10.12	--	5.27

• University Parking Characteristics

Unlike municipal settings, there aren't a lot of governing rates for the prediction of parking generation on a university campus. In fact, ITE only provides a generation characteristic for universities based on total population, which is as broad an assessment as one can make when evaluating a campus. That rate (0.33 spaces per school population for a suburban campus and 0.22 spaces per school population for an urban campus) isn't widely used as far as I can tell, leaving academic planners to make their best guess when defining parking supply on their campuses.

The following table summarizes a variety of generation characteristics encountered for the university campuses we've modeled. These campuses vary in scale and context, and that variety is reflected in the rates that represent their users. No comparative rates are defined in this table due to the lack of consistent national planning standards.

	THE OHIO STATE UNIVERSITY	ARIZONA STATE UNIVERSITY	TEXAS A&M UNIVERSITY	WASHINGTON STATE UNIVERSITY	UNIVERSITY OF MEMPHIS	UNIVERSITY OF UTAH	FLORIDA STATE UNIVERSITY
Administration (per 1,000 SF)	0.48	0.73	1.78	0.42	1.44	0.73	--
Office (per 1,000 SF)	1.60	1.89	1.11	1.57	4.41	2.94	2.65
Lab/Research (per 1,000 SF)	1.71	2.02	1.31	1.79	4.66	3.16	2.41
Classroom (per 1,000 SF)	1.83	3.78	4.11	13.51	5.36	9.39	2.52
Library (per 1,000 SF)	2.35	1.54	1.80	2.77	2.42	--	0.79
Student Residence (per dwelling unit)	4.69	0.2	1.06	0.31	0.46	0.21	1.27

Conclusions

We use this data to better understand how developments will work within the fabric of a community, including their inherent parking needs, the ripple effect of the demand they create, and the overall impact that parking demand has on the viability of the community. In addition, we use localized information to understand how to redirect parking demands into other modes of transportation, manage the remaining demands, and mitigate unwanted consequences.

This community-tailored approach is what is needed to complete the re-urbanization of America. King County did an incredible job defining how Seattle and its surrounding communities use parking. That effort has led to a regional re-assessment of the parking provision paradigm. **Our hope is that in each of the communities we work, we can provide that same level of assessment and rethinking, with just a little bit of planning and parking data.**

I hope this white paper has explained in a little more detail the true dynamic nature of parking demand generation. It's an artistic science that evolves as a community evolves.

That's why we created Park+—to provide our clients a flexible tool that could grow and adapt with their changing communities. I expect that as each of our users' communities change, the results and predicting characteristics of Park+ will change with them.

I've been asked by many if I can use data from Park+ to predict how a development will impact parking in another community. My typical answer is to give them a wide range of generation characteristics and the caveat that no two locations are created the same. In recent projects, I've even tried to urge stakeholders to understand that the parking demand in the study area we are analyzing is likely different from adjacent neighborhoods or business districts.

In reality, I hesitate to give this information for fear that it will be used blindly like ITE or ULI. The true nature of parking demand can't be captured in a set of static numbers. Instead, it must be measured in ongoing data analysis, community assessment, and demand analysis. The hope is that we in the parking and planning industry can plan better for our communities by providing the appropriate amount of parking that will support growth and evolution of our communities.