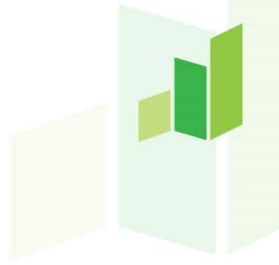


Parking: Designing for a Driverless Future



Session Moderator:
Juan Dorado, AIA
Dekker/Perich/Sabatini, Ltd.

Session Panel:
John Cadenhead, AIA
Powers Brown Architecture

Steffen Turoff, Principal Director of Parking & Mobility Planning
Walker Consultants



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Speakers



Juan Dorado
Project Manager
Dekker/Perich/Sabatini
Ltd.



John Cadenhead, AIA
Director of Design
Powers Brown
Architecture



Steffen Turoff
Principal
Walker Consultants



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Easter morning 1900: 5th Ave, New York City. Spot the automobile.



Source: US National Archives.

Easter morning 1913: 5th Ave, New York City. Spot the horse.



Source: George Grantham Bain Collection.



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The Future is Unknown



Sixty years ago, flying cars captured Americans' imagination. Can we get self-driving cars sooner? – Popular Mechanics



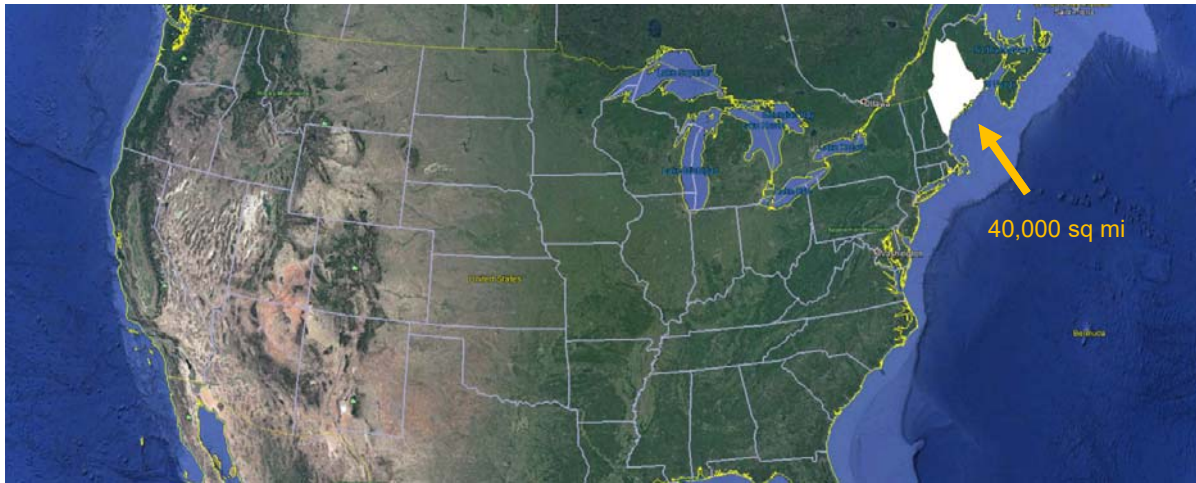
Source: Walker Consultants
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Forces Driving Demand for More Parking...

- Market – ‘you can’t build what you can’t park’
- Financial Institutions
- Zoning Ordinances
- How has parking been traditionally provided in viewing current and past trends for parking?
- In what regions of the country do we consider this to be more of an immediate consideration?



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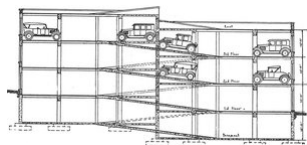
3.3 spaces per car = approx. 40,000 square miles

In other words... Maine

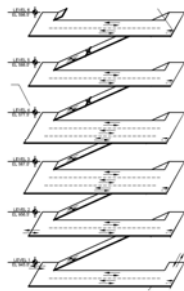


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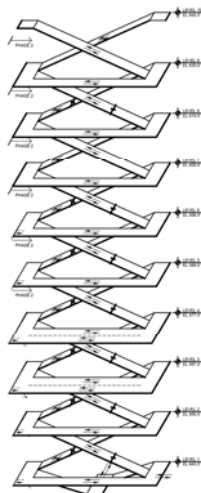
So can we make it more efficient? ✓



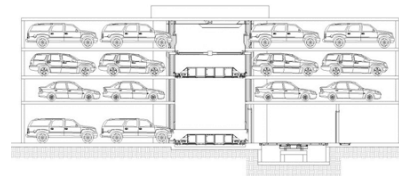
1919 Patent for
d'Humi Garage



310 sf / space



340 sf / space



250 sf / space



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How does this effect your project?

- Looking at how parking has been traditionally provided in the past, how do we see this effecting future trends?
- What does parking typically effect regarding the design of the building and site layout and why is that important?



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But... Other factors are reducing the demand for parking...

- Shared-use – It’s already happening.

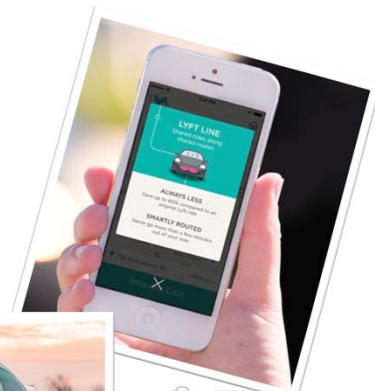


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Adaptive Reuse
But AV’s are not the only “driver” of reduced parking demand

Evolution of Parking Demands

- Carsharing Services (Uber, Lyft, Juno, etc.)
- Millennial driving habits
- Autonomous vehicles
- Trend towards pedestrian/bicycle friendly communities



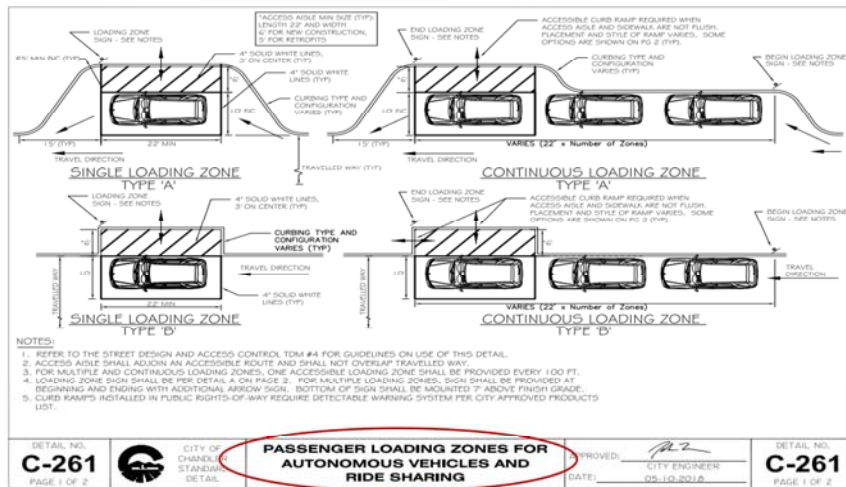
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For Example...

- Summit, NJ's ride-sharing partnership in lieu of building a much needed parking garage
- Buffalo, NY eliminates minimum parking requirements
- Santa Monica eliminates minimum parking requirements on new downtown developments
- DC reduces parking requirements at new buildings near metro and bus lines
- Chandler, AZ: 'first in nation to include AVs and Ride-sharing in zoning code.'
- There are others...



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City of Chandler approved standard detail

Demand for drop-off and pick-up areas increase = reduced demand for parking



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City of Houston
Off Street Parking Ordinance
Central Business District

Existing CBD

Proposed CBD

- EADO
- Midtown

Railroads

Abutting Property Line

Scale: 0 0.50 1.00 Miles

Source: City of Houston, Planning & Development Department

City of Houston expansion of CBD
No more off-street parking requirements in Midtown & EADO

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COMMERCIAL REAL ESTATE DEVELOPMENT ASSOCIATION

CRE.Converge
Deals. Connections. Trends.

#creconverge

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Technological Factors Reducing the Demand for Parking...

- Autonomous Vehicles – It will happen.

Technology	First Year of Commercial Availability	Years to reach 25% of population
Energy	1870	~48
Telephone	1876	~38
Radio	1897	~35
Television	1926	~28
PC	1975	~20
Mobile Phone	1983	~15
The Web	1991	~10
Smartphone	2005	~8

TECHNOLOGY ADOPTION RATES HAVE STEADILY DECLINED OVER TIME.

Source: Pew Research Center, asyngo.com

...AVs by 2030?

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States with Autonomous Vehicles Enacted Legislation and Executive Orders

Legend

Enacted Legislation	Blue
Executive Order	Green
Both	Yellow
None	Grey

States with Enacted Autonomous Vehicles Legislation

Remember Maine?

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Different Endpoints for Passenger & Vehicle...

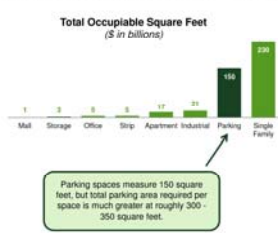
- Vehicles can be parked (charged) blocks or miles away
- Reduced premiums for convenient locations
- Vehicles can remain in continuous motion – automobiles currently sit idle for 94% of the time. (occupying only 1 of their 3.3 spaces)

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The Coming Revolution in Transportation - October 2017 13

Parking Needs Will Decline

No Parking Here: The approximately one billion parking spaces in the U.S. account for 15-30% of urban land area. Some experts suggest that parking needs could decline by as much as 90% upon mass adoption of driverless vehicles. However, many will still own vehicles, so an ultimate 50% reduction in 30 years seems like a reasonable outlook for real estate investors to consider. The impact will be highly asset-specific, but the surge of new land should negatively impact values where higher-and-better uses are lacking. A handful of municipalities have already lowered or eliminated parking requirements in response to lower parking needs.



Parking Space Forecasts

- Each ride-sharing vehicle could replace up to a dozen regular cars. If an entire city was shifted to autonomous cars, it would need a staggering 90 percent less parking than it needs today.
- Of the 83,000 parking spaces in downtown Atlanta, driverless cars could allow for a reduction of between 40% and 80%.

Recent Parking Requirement Changes

- Buffalo is the first major city to eliminate minimum parking requirements
- Santa Monica eliminates minimum parking requirements on new downtown developments
- DC reduces parking requirements at new buildings near metro and bus lines

Source: Company reports. www.greenstreetadvisors.com © 2017, Green Street Advisors, LLC. Use of this report is subject to the Terms of Use listed at the end of the report.

Parking Requirements will Decline. How much???

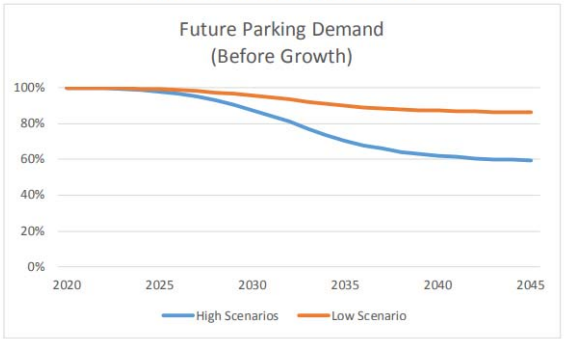
Some studies predict up to a 90% reduction in parking demand mostly without citing a timeline. Lets call it 50% in 30 years.

'50% reduction in 30 years seems like a reasonable outlook for real estate investors to consider.'

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Greatest Impact Will Be in Dense Urban Areas and Those With High Parking Costs

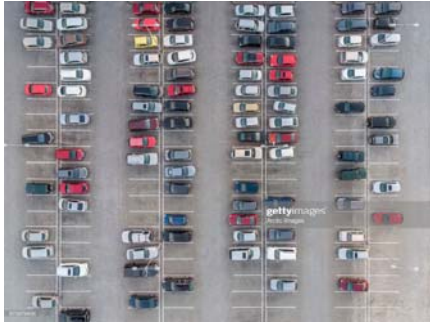
15% -40% Decrease in Parking Demand*



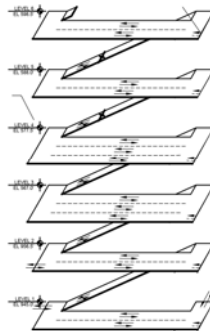
2020-2040 Market Penetration Timeline

Source: Walker Consultants Projection. Please silence all cell phones. This session is being recorded.

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Surface



Structured



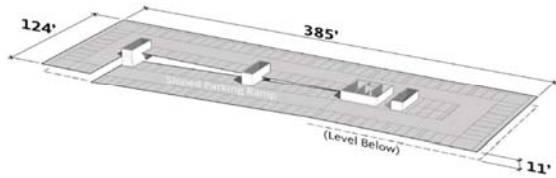
Podium

Reduction of parking space

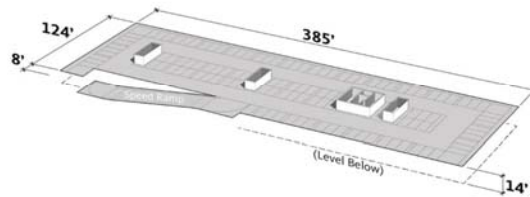
Varies by type of Garage



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Approx. \$16,500 / space



Approx. \$19,800 - / \$23,100 space (20 – 40% premium)

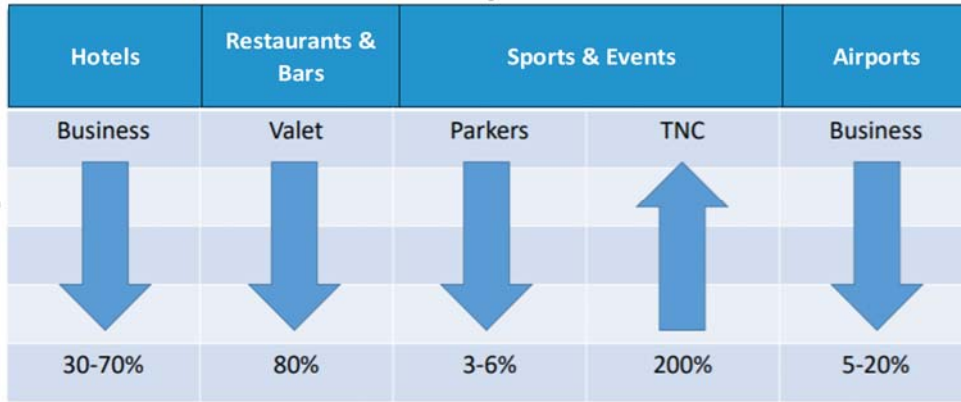
Future - proofing

Comes at a higher 'up-front' cost.



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TNC impact on parking today = Curb congestion in these locations



Source: Walker Consultants
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TABLE 1: POTENTIAL SECTOR IMPACT—EXCLUDING PUBLIC TRANSPORTATION PREMIUM EFFECTS

SECTOR	POSITIVE/NEGATIVE	POTENTIAL IMPLICATION ON REAL ESTATE VALUES
Towers/Datacenters	↑↑	Increased data demand from vehicles and riders
Office (Central business district)	↑	Improved accessibility to have employees in one location
Hotel (Destination/resort)	↑	Increased time and purchasing power
Retail (Destination/entertainment)	↑	Improved density at desirable centers; increased time and purchasing power
Retail (Convenience/commodity)	↓	Less need for physical proximity
Residential (Suburban/further from city centers)	↑	Improved access increases values
Residential (Single family and apartments)	↑ ↓	Mixed/uncertain net impact
Industrial/Logistics	↑ ↓	Impact depends upon the fit within the new supply-chain configuration
Self Storage	↓↓	Less parking required at home and in commercial buildings; results in emergence of shadow supply
Billboards	↓↓	Highway billboards lose audience as riders face inward

Source: Brookfield Investment Management as of September 30, 2017.



AUTONOMOUS VEHICLES AND THE POTENTIAL IMPACT ON REAL ESTATE 5

Potential impact on Real Estate Sectors

Some are obvious and some...



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TABLE 1: POTENTIAL SECTOR IMPACT—EXCLUDING PUBLIC TRANSPORTATION PREMIUM EFFECTS		
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Brookfield AUTONOMOUS VEHICLES AND THE POTENTIAL IMPACT ON REAL ESTATE 5


Potential impact on Real Estate Sectors

Some are obvious and some are not.

What about when the industrial sector catches up with available technologies?






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Remember this? ←

What about this? →






+




Potential impact on Real Estate Sectors

Impact of automated parking technologies and AV's on the Industrial Real Estate Sector

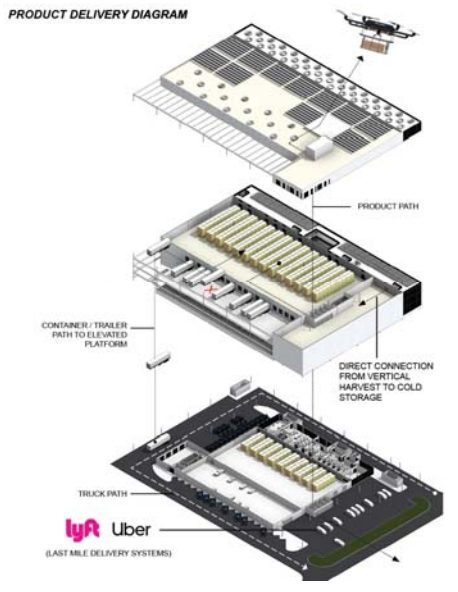
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AN ABUNDANCE OF VERTICAL WALL SURFACES WITH MINIMAL REQUIREMENTS FOR PENETRATION PROVIDE OPPORTUNITIES FOR URBAN FARMING.
0.1 ACRES = 5 ACRES OF PRODUCE ANNUALLY




TRUCKS AUTOMATICALLY DOCK AT ELEVATED PLATFORMS
DAYLIGHT IS ALLOWED THROUGH GLAZED OVERHEAD DOORS
PRODUCT STORAGE
DRONE DELIVERY PAD
FARMERS MARKET SITE

PRODUCT DELIVERY DIAGRAM



Uber (LAST MILE DELIVERY SYSTEMS)

Potential impact on Real Estate Sectors – Industrial
Impact of automated parking technologies and AV's on the Industrial Real Estate Sector

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60 DOCK DOORS



= 16.82 acres + 60 dock doors

VS



= 3.83 acres + 96 dock doors

Potential impact on Real Estate Sectors – Industrial
Impact of automated parking technologies and AV's on the Industrial Real Estate Sector





96 DOCK DOORS

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Adaptive Reuse

Three-Level Progression of Steps for Design of New Garages for Adaptive Reuse



Easy (<10% Cost Premium)

- Provide for increased car charging stations
- Placing ramps on the exterior
- Increase the floor-to-floor height
- Use removable spandrels
- Design for future expansion up to 30% of building height



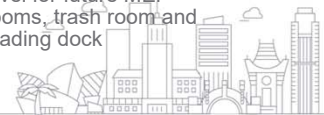
Medium (10%-25% Cost Premium)

- Use medium span construction (30' x 35') to accommodate future increased floor loading
- Increase site setbacks to allow for future architectural treatment
- Design for future expansion between 30% and 50% increase in building height
- Design the top level for conversion to an assembly space or green roof



Difficult (>25% Cost Premium)

- Provide express ramps and flat floors
- Design for future expansion of 50% or greater increase in building height
- Use short span construction (30' x 30') and design for 125 psf LL
- Provide a basement level for future MEP rooms, trash room and loading dock



Source: Walker Consultants



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Speakers



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Project Manager
Dekker/Perich/Sabatini Ltd.



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Director of Design
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Principal
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Submit questions on the app or [slido.com/code #NAIOP2019](https://slido.com/code/NAIOP2019)



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Up Next - Networking Break from 11:30 – 11:45
in the Exhibit Hall.

The next session block starts at 11:45.



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