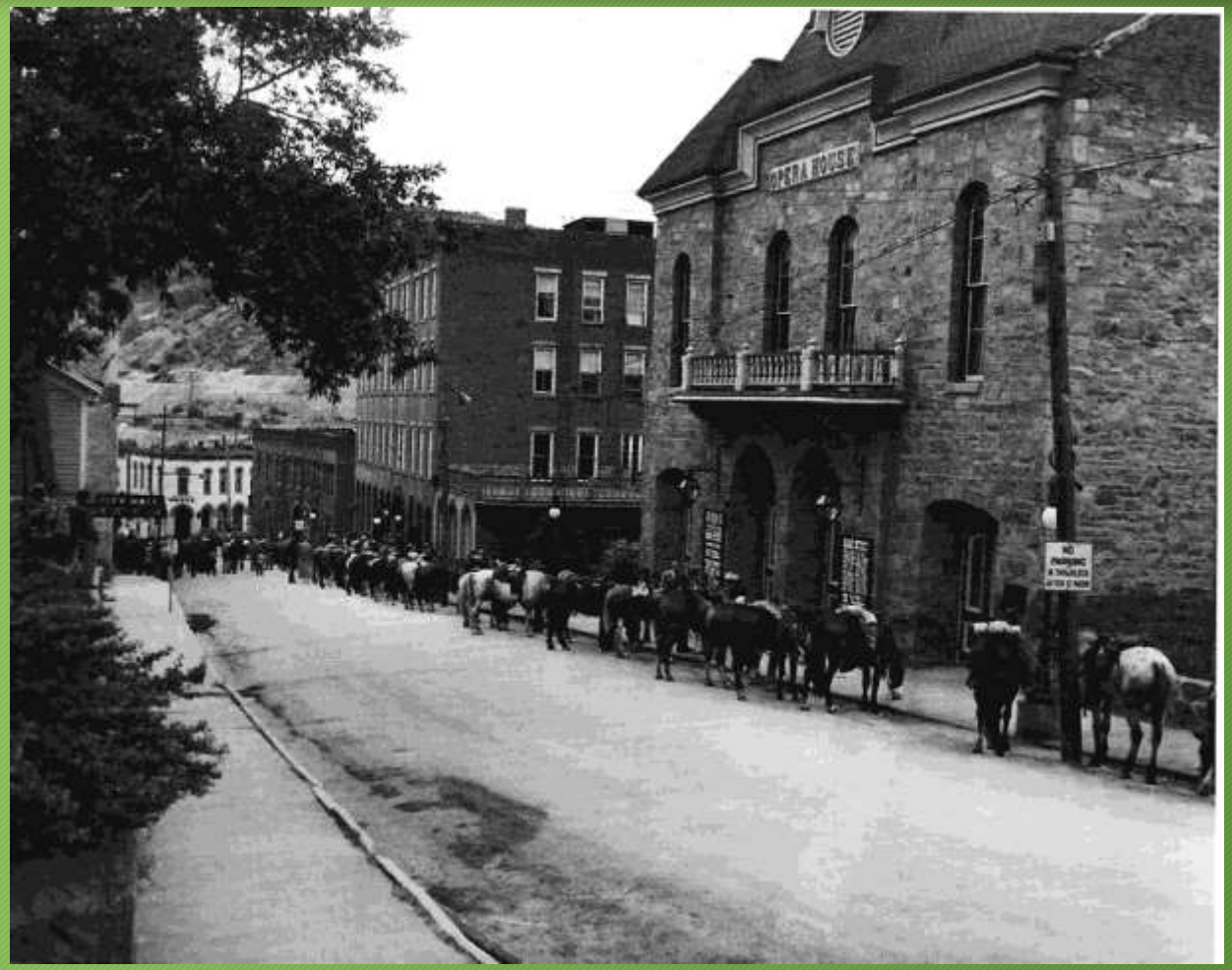
DON’T TRIP OVER PARKING

Karen Hancock, City of Aurora — Moderator
Reid Ewing – University of Utah
Anthony Avery, City of Aurora

Parking Fines—c. 700 BC

King Sennarcherib (705-681 BC)

Washington DC—c.1890



Omaha—c. 1930

Motor Mania—1950

Dowtown Denver—c. 1970

Boondocking—2015

Trip and Parking Generation at Transit-Oriented Developments (TODs) – A Case Study of Redmond TOD, Seattle Region

Guang Tian, Reid Ewing, Rachel Weinberger, Kevin Shively, Preston Stinger, Daniel Rowe, Shima Hamidi

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Introduction

How best to allocate land around transit stations?

large park-and-ride lots

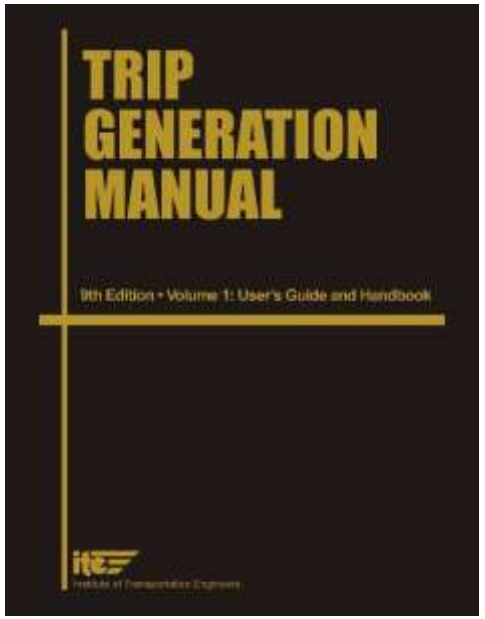
vs.

active uses such as multifamily housing, office, and retail

Redmond TOD, Seattle

In practice

- ✓ Officials usually assuming that TODs require the same number of parking spaces as conventional development and that transit stations require the same number of park-and-ride spaces as non-TOD stations.



In literature

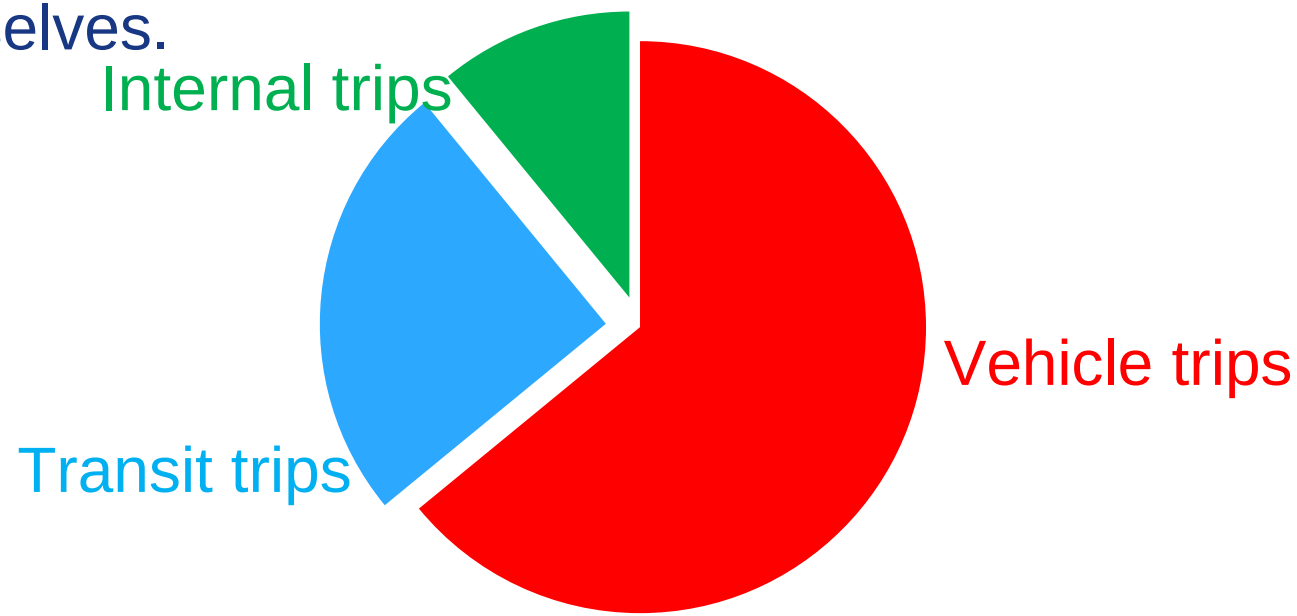
The average trip generation rate in areas with TOD is well below the trip generation rate from the ITE report (*Arrington & Cervero 2008; Cervero & Arrington 2008; Cervero et al. 2004*).

Residents living within TODs are reported to have higher rates of transit trips than who are living outside TOD (*SFBAMTC 2006; Cervero et al. 2002; Faghri & Venigalla 2013; Zamir et al. 2014*), especially for commuting trips (*Arrington & Cervero 2008; Cervero 1994; Lund et al. 2004; Lund et al. 2006*).

By comparing parking generation rates for housing projects near rail stops with parking supplies and with ITE's parking generation rates, Cervero et al. (*2010*) found there is an **oversupply** of parking at TODs, sometimes by as much as 25-30 percent.

Research Question

Much of the travel demand is captured internally and much of the transit demand is generated by TODs themselves.



Because data are difficult and expensive to collect, much of the research on parking at TODs presents more general findings. We know of a very few studies, limited to California, that estimate travel and parking demand for TODs (*Cervero et al. 2010; Handy et al. 2013; Serafin et al. 2010*).

- We want to **test** whether TODs generate as many vehicle trips as the Institute of Transportation Engineers (ITE) Trip Generation manual estimates and need as much parking as the ITE Parking Generation manual suggests.

- We will **develop** numerical models of trip and parking demand and recommendations for land use and parking policies at new TOD developments.

TOD Definition

TODs are widely defined as compact, mixed-use developments with high-quality walking environments near transit facilities (*ITE 2004, pp. 5-7; Jacobson & Forsyth 2008; Renne 2009*).

For our purposes, TODs are developed by a single developer under a master development plan, and can also include a clustering of development projects near transit facilities that are developed by one or more developers pursuant to a master development plan.

Dense

Mixed use

Pedestrian-friendly

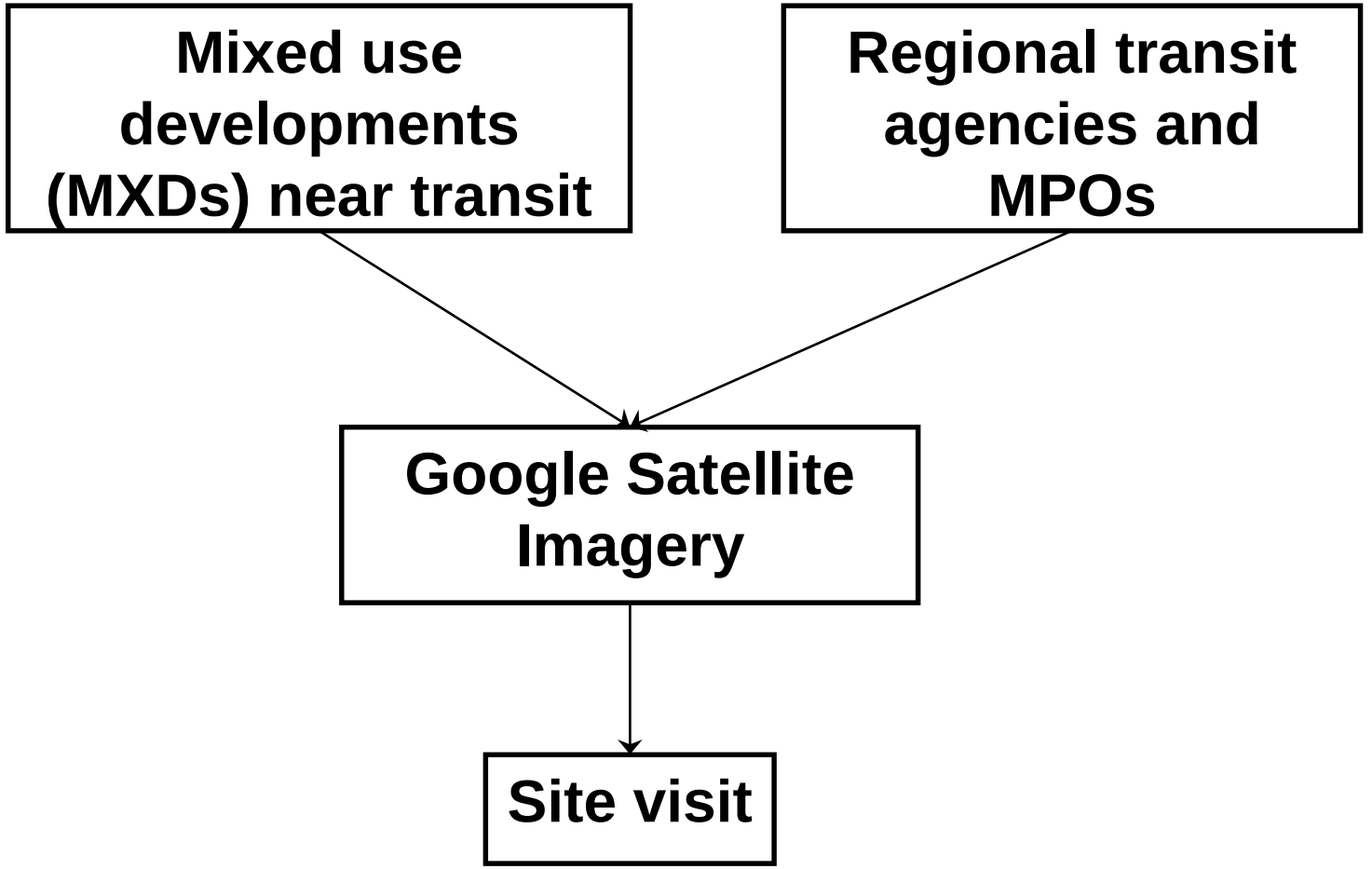
Adjacent to transit

Built after transit

Fully developed or nearly so

Self-contained parking

TOD Selection



Lindbergh City Center
Atlanta

City Creek Center
Salt Lake City

Station Landing
Boston

Redmond TOD
Seattle

Englewood Denver

City College San Diego

Del Mar
Los Angeles

Fruitvale Village
San Francisco

Orenco Station
Portland

Rhode Island Row
Washington, D.C.

A Case Study: Redmond TOD, Seattle

(a) Apartment Building and Park-and-Ride Garage

(b) Apartment Building with Ground Floor Retail

(c) Apartment Building with Underground Parking

(d) Park-and-Ride Garage

(e) Redmond Transit Center

(f) Transit Users

(g) Redmond Edge Skate Park

(h) Unleased Space

(i) Spillover bike parking at the apartment garage

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TABLE 2 Development summary of Redmond TOD project

Land uses	***Description***	***Unit***	***Occupancy****
Commercial	Ground floor	11,740 square feet (sq. ft.)	56.8%
Residential (called Veloce building)	5 stories above commercial	322 units (37 studio units, 173 one bedroom units, and 112 two bedroom units)	96.9%
Parking	***Description***	***Unit***	***Occupancy*** **
Transit Parking-and-Ride	3-level parking structure	383 stalls	96.9%
Veloce development parking	2-level underground parking	415 stalls (66 stalls for retail customers and employees; 379 stalls for residents)	69.6%

*Note: * by May 28, 2015; **: the peak occupancy at May 28, 2015.*

Data Collection

- A full count of all persons entering and exiting the building
- A brief intercept survey of a sample of individuals entering and exiting the building
- Parking inventory and occupancy surveys of all off-street parking accessory to the commercial and residential uses of the building, and the Park-and-Ride garage.

- 7:30 am and 9:00 pm on Tuesday, May 28th, 2015
- Every two hours

Mode Choice and Trip Generation

- Redmond TOD has 1.7 times more trips made by walking and 3 times more trips made by transit than the Seattle regional average.

TABLE 3 Mode share in Redmond TOD

Intercept survey						
Entrance	*Count*	*Mode share (%)*				
		Walk	*Bike*	*Transit*	*Auto*	*Other*
Parking Garage	115	2.61	1.74	0.87	93.04	1.74
Residential North	90	21.11	2.22	65.56	10	1.11
Residential West	124	54.03	0.81	9.68	34.68	0.81
Commercial (West)	99	18.18	2.02	13.13	64.65	2.02
Trip generation counts						
Entrance	*Count*	*Count for modes*				
		Walk	*Bike*	*Transit*	*Auto*	*Other*
Parking Garage	852	22	15	7	793	15
Residential South	173	65	3	65	39	2
Residential North	145	31	3	95	15	2
Residential West	324	175	3	31	112	3
Commercial (West)	446	81	9	59	288	9
Parking Garage Street Exit	41	1	1	0	38	1
Final mode share	**1981**	**18.93%**	**1.67%**	**13.01%**	**64.85%**	**1.54%**

- Based on the ITE's trip generation rates, the Redmond TOD would be expected to generate 1,773 daily vehicle trips (Table 4). The actual vehicle trips we observed on the survey day was 661, which is only 37.3 percent of the ITE's expected value.

TABLE 4 The Comparison of Daily Vehicle Trip Generation between ITE Guideline and Redmond TOD

	Trip generation rate	*Total units*	*Total daily trips*
ITE guideline	-	-	1,773
223 Mid-Rise Apartment	4.31	312	1,344.72
715 Single Tenant Office Building	11.65	1,905	22.19
932 High-turnover (sit-down) restaurant	127.15	2,682	341.02
640 Animal Hospital/Veterinary Clinic	31.45	2,081	65.45
Redmond TOD	-	-	661

Parking Generation

TABLE 5 The Comparison of Parking Supply and Demand Between Redmond TOD Residential and ITE Guideline

Residential				
	Supply		*Peak period demand*	
	Parking spaces per unit	*Total parking spaces*	*Vehicle per unit*	*Total parked vehicles*
ITE guideline: 222 high-rise apartment	2.0	644	1.37	441
Redmond TOD residential	1.19	379	0.86	278
Commercial (occupied space only)				
	Supply		*Peak period demand*	
	Parking spaces per 1,000 sq. ft. GFA	*Total parking spaces*	*Vehicle per 1,000 sq. ft. GFA*	*Total parked vehicles*
ITE guideline	-	51	-	37
932 High-turnover (sit-down) restaurant	14.3	-	10.6	-
701 office building	4		2.84	
640 animal hospital/veterinary clinic	2.3		1.6	
Redmond TOD commercial	3.14	14	1.8	12

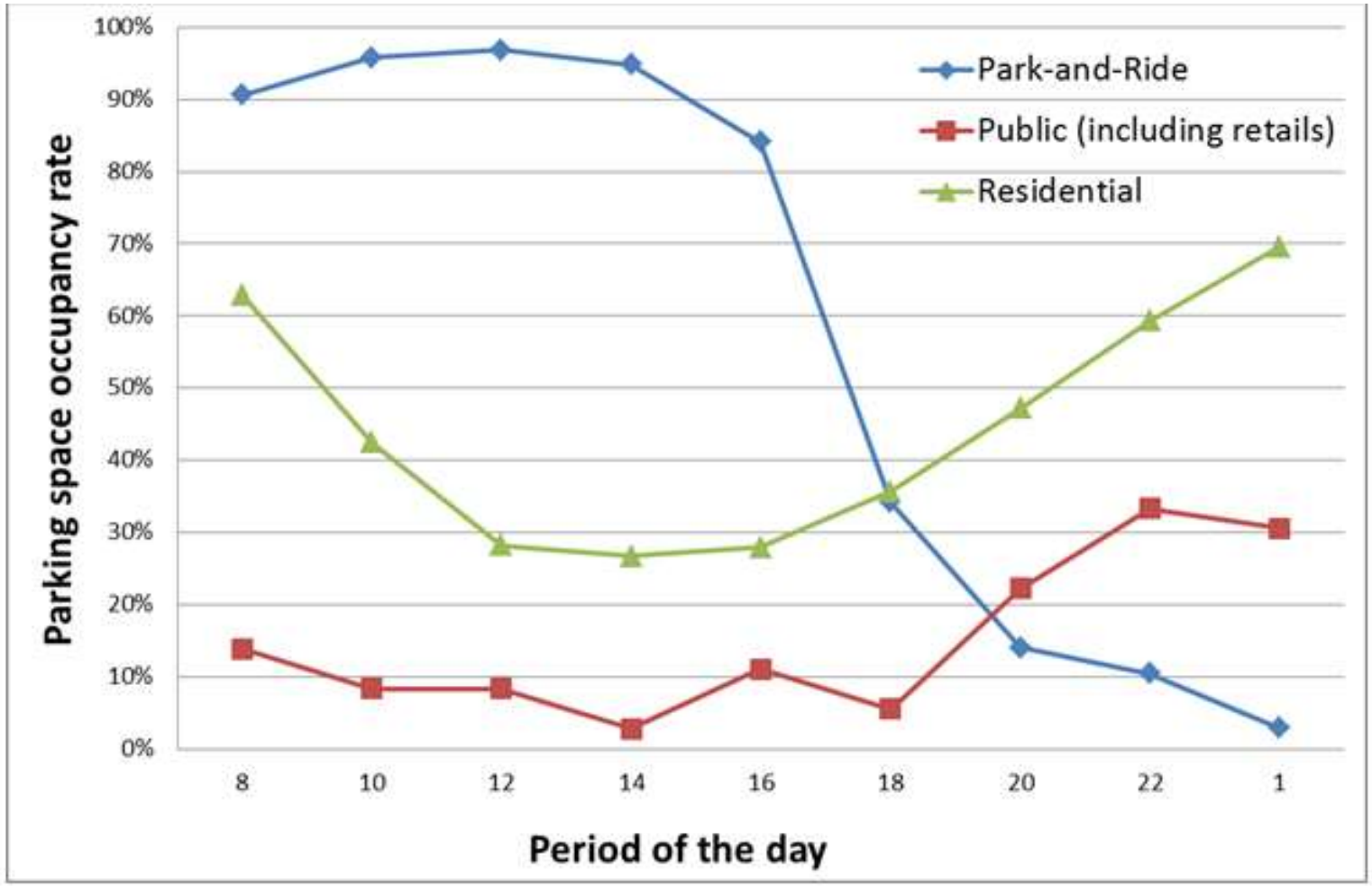

FIGURE 4 Parking Space Occupancy Rate for Different Uses at Redmond TOD

Conclusion

- **Mode choices: Redmond TOD has 1.7 times more trips made by walking and 3 times more trips made by transit than the Seattle regional average.**

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Trip and parking generation: Redmond TOD only generates about 37 percent of the vehicle trips estimated by ITE Trip Generation manual. The actual residential parking demand at the Redmond TOD is only 65 percent of ITE's average. The actual commercial parking demand at the Redmond TOD is only 27 percent of the ITE average.

This is due to mode shifts away from the automobile, and maybe to some degree to internal capture of trips within the mixed use site.

- **Share parking potential: The peak period of transit parking is daytime, while the peak periods of commercial and residential were evening and night.**

There is a real opportunity for sharing parking spaces among these different uses, something which is not realized at present.

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NITC NATIONAL INSTITUTE for TRANSPORTATION and COMMUNITIES

METROPOLITAN RESEARCH CENTER

Department of CITY & METROPOLITAN PLANNING THE UNIVERSITY OF UTAH

Thank you !

MINIMUM RESIDENTIAL PARKING REQUIREMENTS AND THE FISCAL IMPACT ON MUNICIPAL BUDGETS

PRESENTED FOR: RMLUI
MARCH 10, 2016

Presented by Anthony Avery

HISTORY OF AUTOMOBILE PARKING

1768 - 1920

- 1768 – The first steam powered automobile
- 1807 – First combustion engine (hydrogen)
- 1884 – First electric vehicle
- 1886 – First petrol powered automobile
- 1908 – Model T started production

1920 - 1945

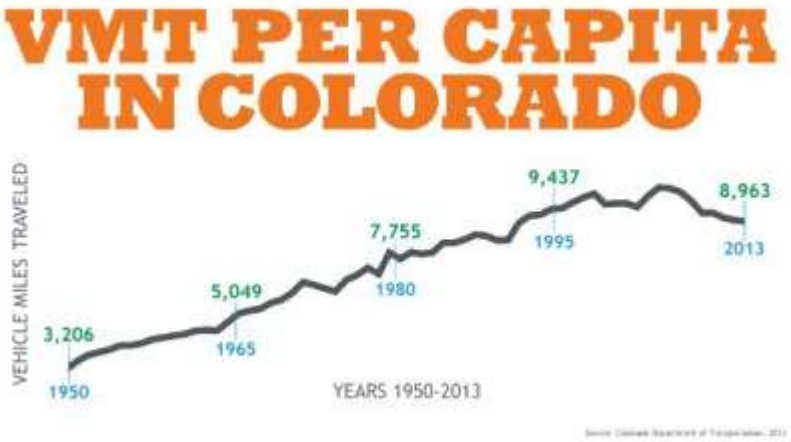
- Motor vehicle technology rapidly evolved
- Reduced prices, the roaring 20's, and more convenience brought car ownership to the masses
- Congestion necessitated parking meters.
  - The first parking meter installed on July 16, 1935 in Oklahoma City

HISTORY OF AUTOMOBILE PARKING

1945 - 2000

- Vehicle ownership boomed
  - 1.16 vehicles per household in 1969
  - 1.89 vehicles per household in 2001
- Parking Minimums
  - Unclear of when first minimums were established
  - Earliest I found for Aurora was 1969

Peak Driving

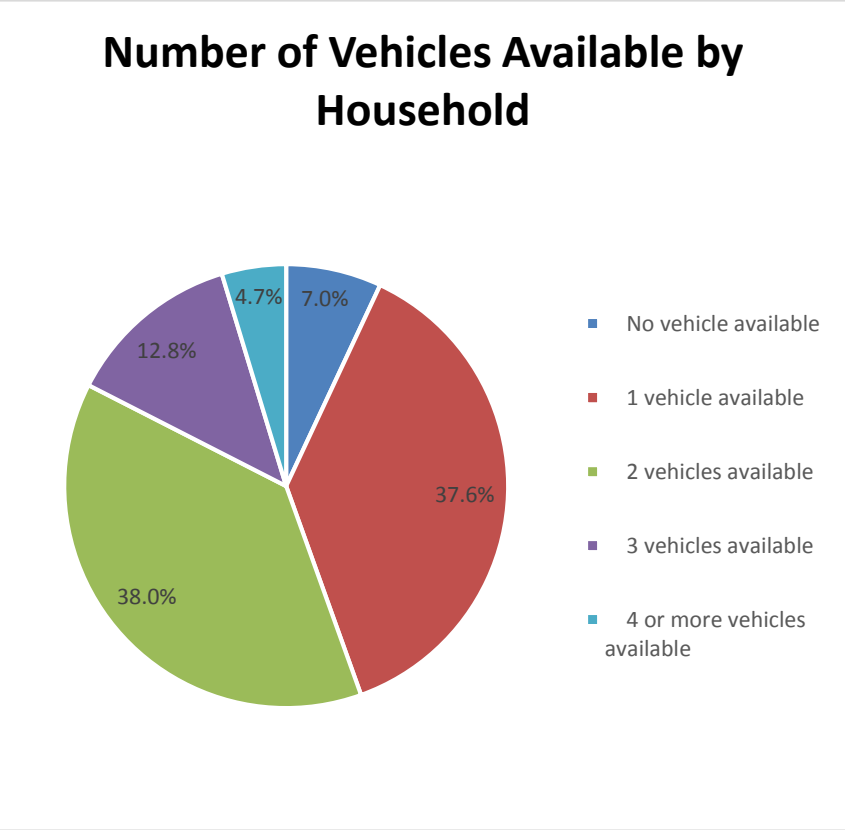


BUSINESS AS USUAL

Current Standards

- Parking *minimums* have often been set to match the *maximum* observed occupancy of **free** parking

Vehicles Available



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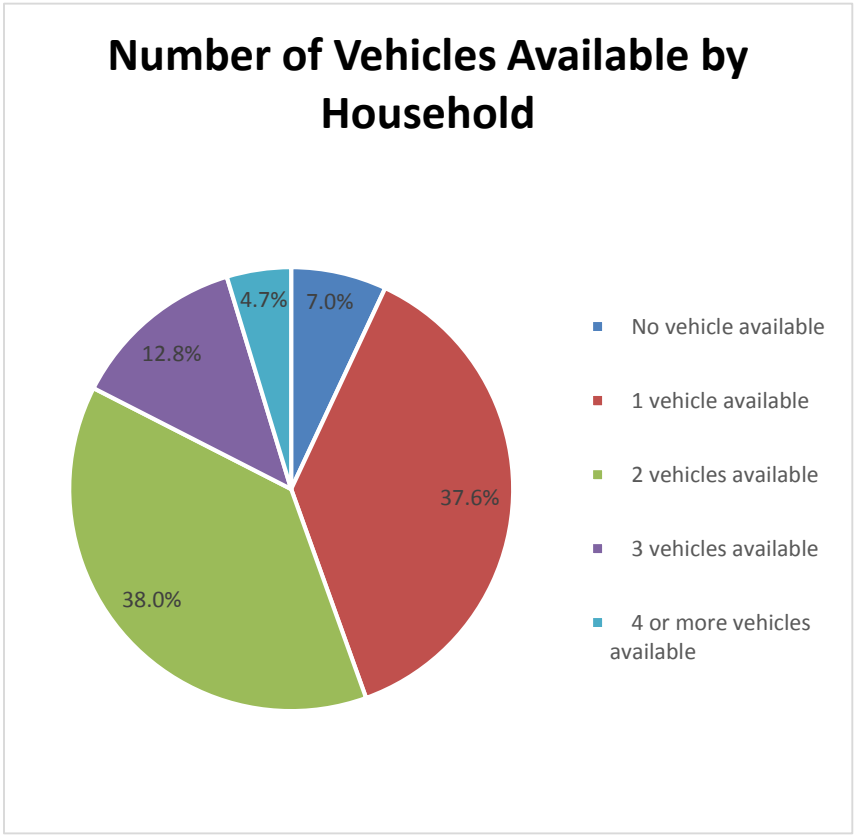
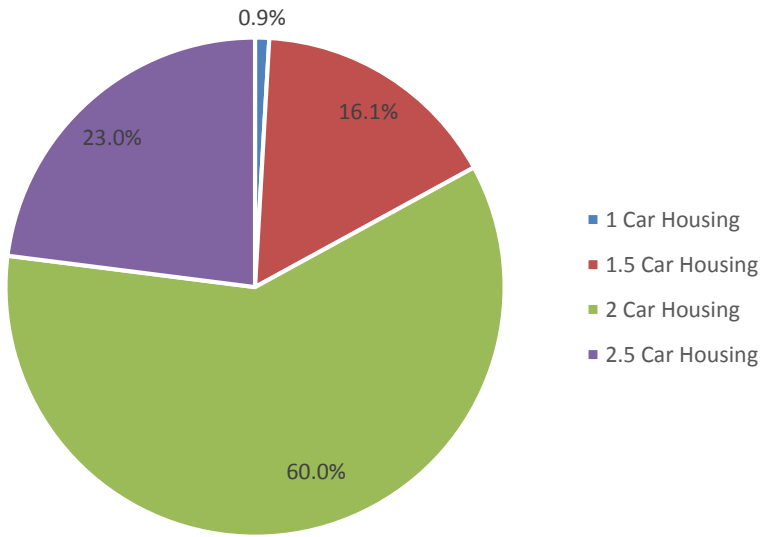


Housing Availability



BUSINESS AS USUAL

Current Standards

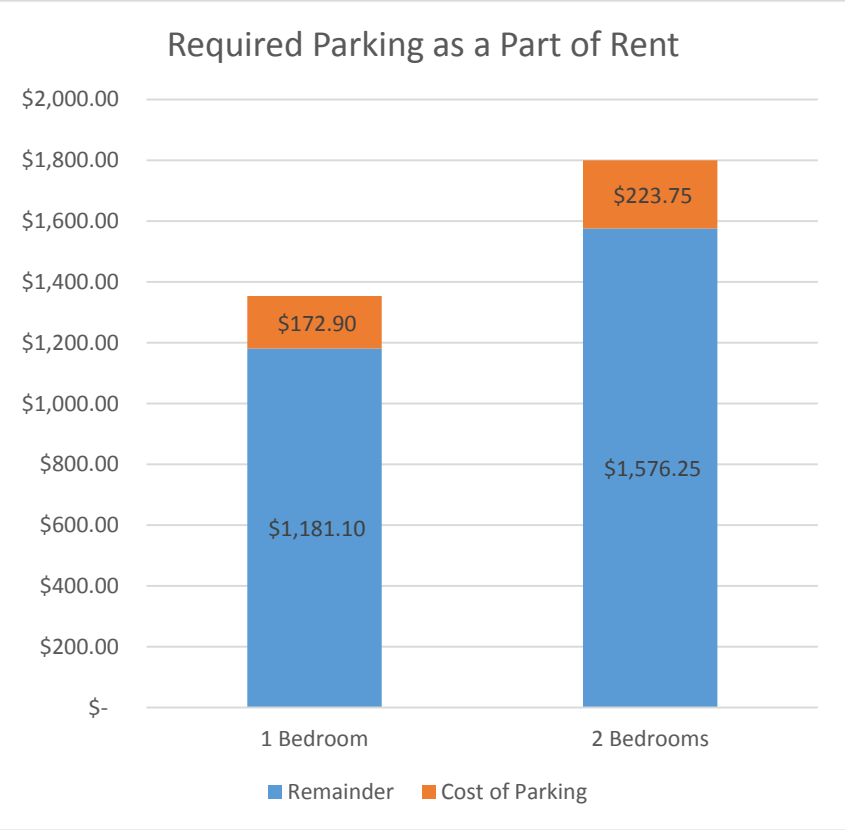
- Parking *minimums* have often bet set to match the *maximum* observed occupancy of **free** parking
- This results in excess parking
  - Minimum required residential parking spaces in Aurora: 426,576
  - Total number of vehicles owned by Aurorans: 211,156[1]

But at what cost?

- Estimated 24-year life cycle cost of a surface parking space is $29,291[2]

BUSINESS AS USUAL

Required Parking



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  - $6 billion in excess residential parking costs
    - $170 monthly per household

BUSINESS AS USUAL

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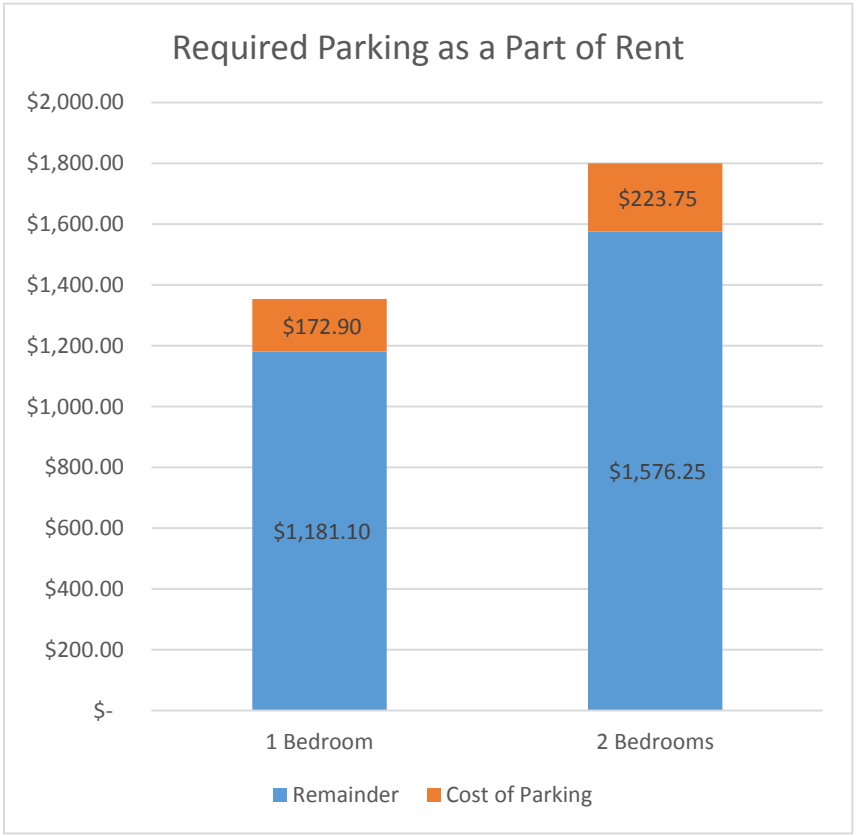
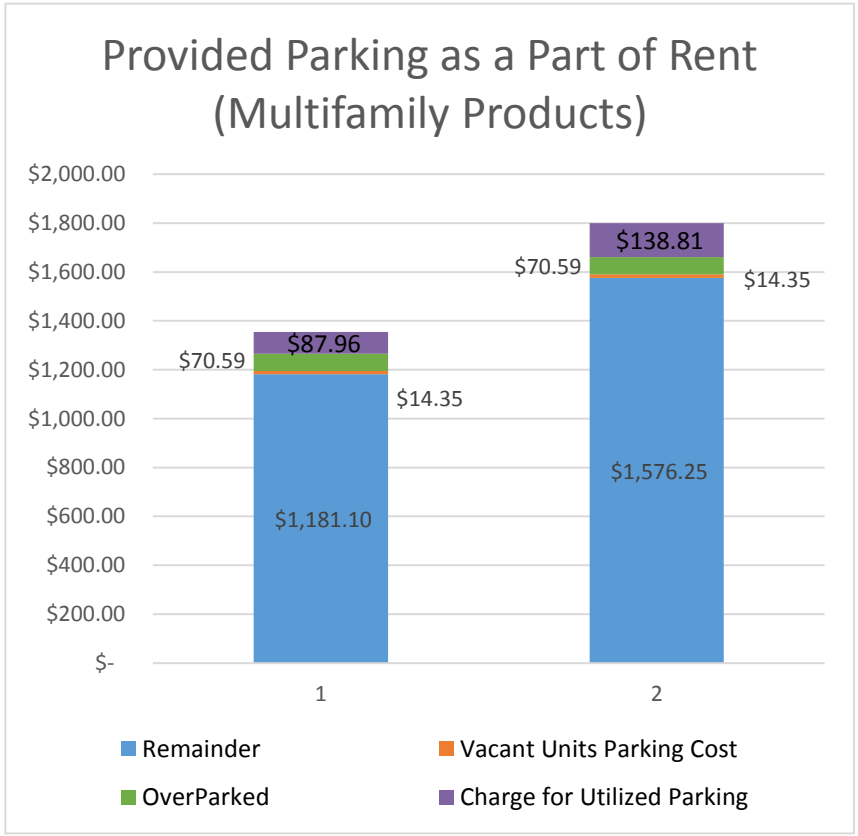


Provided Parking



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  - $6 billion in excess residential parking costs
    - $170 monthly per household
      - $66 per multifamily unit, $302 per single family unit
  - 7% of Aurora households do not own a vehicle
    - Still pay $173 in parking for 1 bedroom, $224 for 2 or 3 bedroom

OPPORTUNITY COSTS

Economic Spending

- If all the extra money paying for building and maintaining excess parking were eliminated, the city could see an increase in economic activity of $250 million annually
  - Just from residential!
  - Sales tax revenue if all money were spent in the city of $9.3 million annually

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Increased Property Taxes

- If all excess residential parking were converted to single family housing at 5 du/acre, an additional 6,107 single family detached houses would be available
  - Approximately $825 million in property value
  - Increasing Aurora's property tax revenue by $7.1 million annually

COMMERCIAL IMPACTS

Land Consumption

- An average retail parking space in Aurora is 574 square feet
  - Includes “Hard Surface” square footage on site plans
  - Includes drive through facilities, drive aisles
- A 20,000 square foot retail user requiring 4 spaces per 1,000 square feet will require 80 spaces
  - 45,920 square feet
  - Consumes an average of 59.2% of the site

ADDITIONAL COSTS

An Aurora Evaluation

- The area bordered by 6th Avenue, I-225, Mississippi Avenue, and Chambers Road (all figures approximate)
  - 1,238 Acres of land
    - 327 acres (26.4%) Parking
    - 255 acres (20.6%) Roads/driveways
    - 125 acres (10.1%) developable
    - 112 acres (9.1%) parks or floodplains
    - This leaves 418 acres (33.8%) currently generating tax revenue

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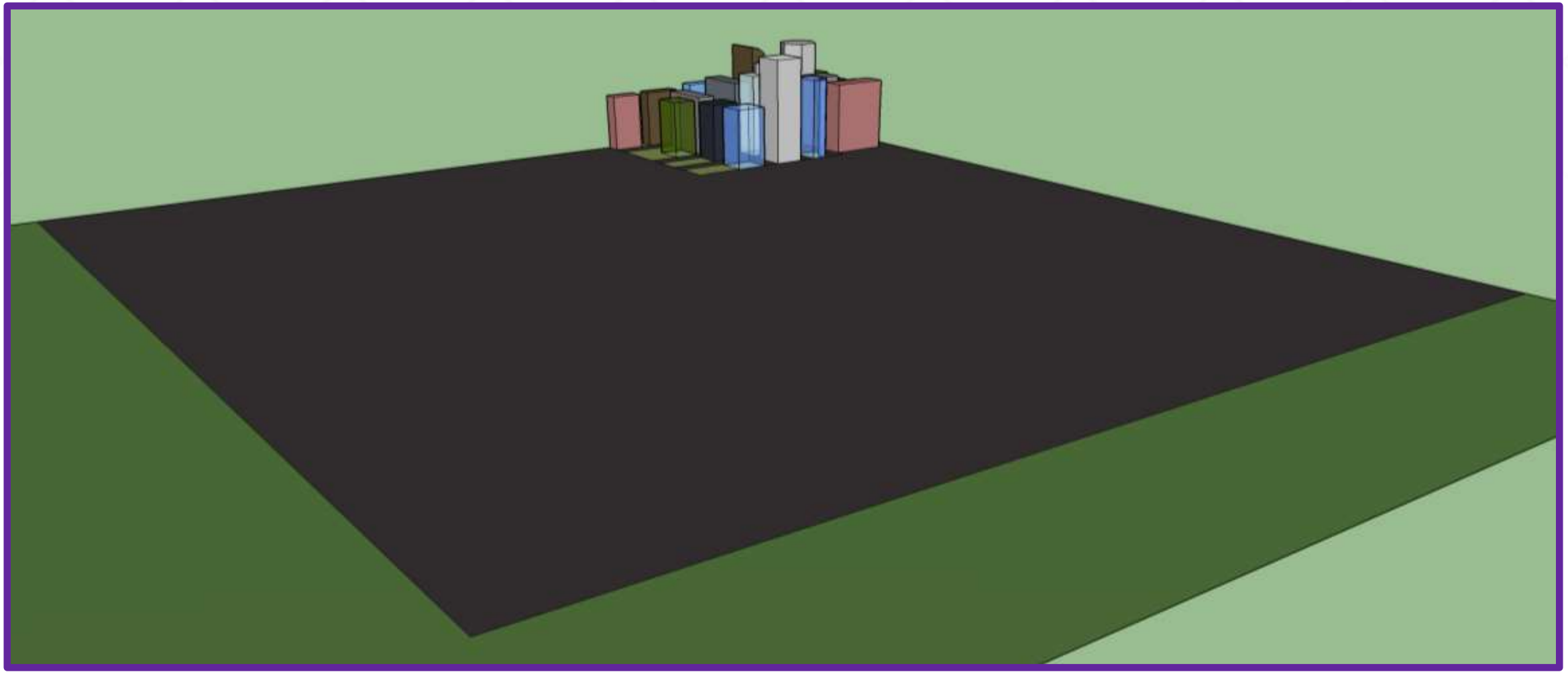
What if?

- What if Denver's 20 tallest buildings had to meet Aurora's minimum parking standards?
  - What if all this parking were provided in a surface lot?
  - What would it look like?
  - How much space would it consume at 320 square feet per space?

DENVER PARKING



DENVER PARKING

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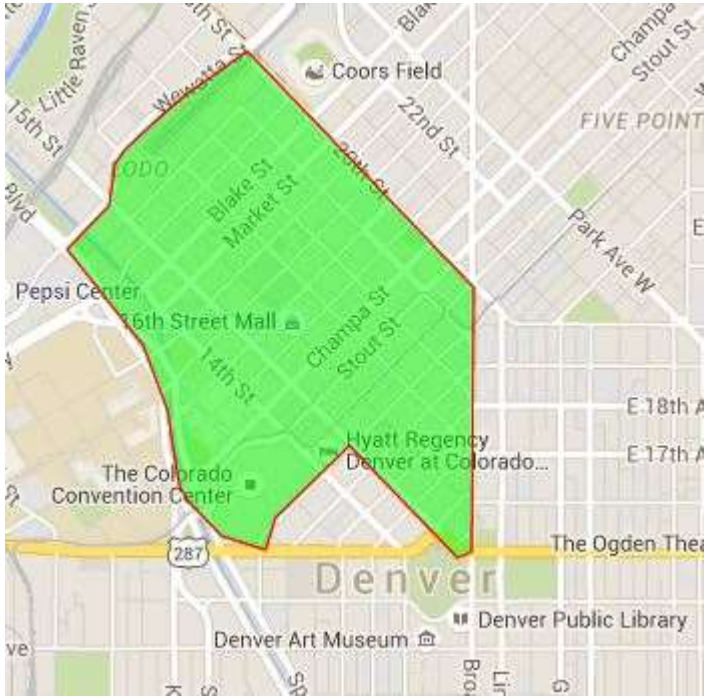

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  - What if all this parking were provided in a surface lot?
  - What would it look like?
  - How much space would it consume?
    - **17,885,992 square feet**
    - **411 Acres**

SUMMARY

Quick Facts

- Monthly rent/mortgage increase devoted to excess parking: $170
- Annual increase in economic activity if all excess parking money went back into the economy: $250 million
- Estimated land area consumed by excess parking: 1,218 acres
  - At 5 du/acre gross, this provides an extra 6,107 dwelling units
- City of Aurora would receive the following to their annual budget:
  - $9.3 million increase in sales tax revenue
  - $7.1 million increase in property tax revenue at standard mill levy
  - This amounts to $149 million in bonding yield at 1.77% for 10 years if a city could capture this value

NEXT STEPS

Code Update Recommendations

- This analysis provides real data to make a parking requirement recommendation.
- Recommendations for Aurora:
  - Minimum off-street parking requirement for residential of 1 space per dwelling unit. No guest parking requirement.
    - Reductions in proximity to frequent transit lines, for providing car share or bike share, secure bike parking, on-street parking on site frontage, structured parking facility. Credit for shared district parking.
  - Maximum lot coverage of 50% for parking. Minimum surface parking standards may be met up to 30% lot coverage, enhancements and incentives must be added over 30% and over 40% lot coverage.
  - Maximum lot frontage of 40% in Subarea A, 50% the rest of the city.
- This provides developers the opportunity to think critically about the amount of parking actually needed on site, thus reducing excess.
- Allows developers to provide adequate parking for their business models but mitigates negative external impacts.

CONTACT ME

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