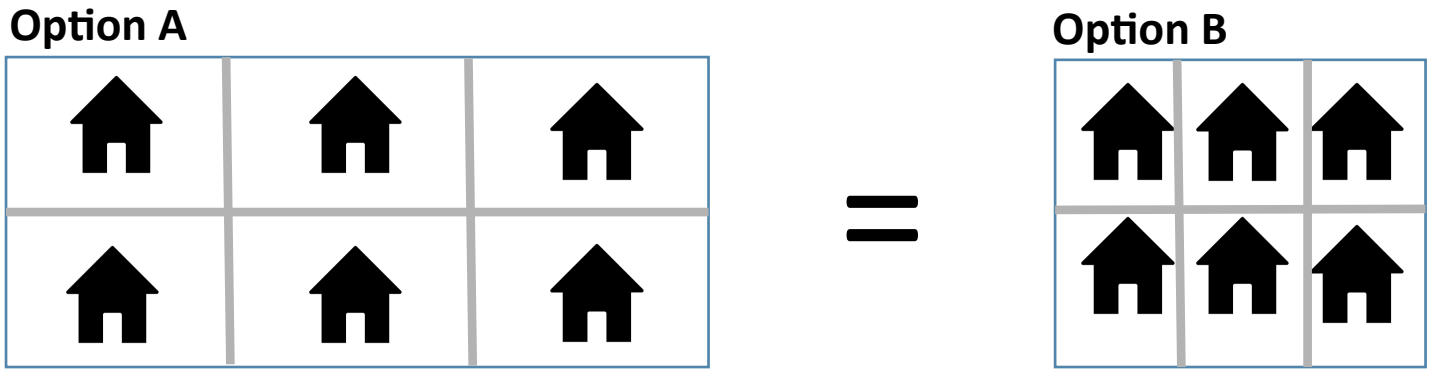
Analyzing the Relationship between Density and Public Costs

The Traditional Fiscal Impact Model Cost Paradigm



- Costs are assumed to be proportional to residents and employees
- Same number of residents = same additional costs regardless of layout

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Services & Infrastructure Cost Categories with Potential to Vary by Density	
Fire	Yes
Police	Not Yet
Schools	Bus transportation
Libraries	No
Hospitals	No
Parks	No
Waste	Collection, not processing
Roads	Yes
Stormwater	Yes
Sewer and Water	Yes

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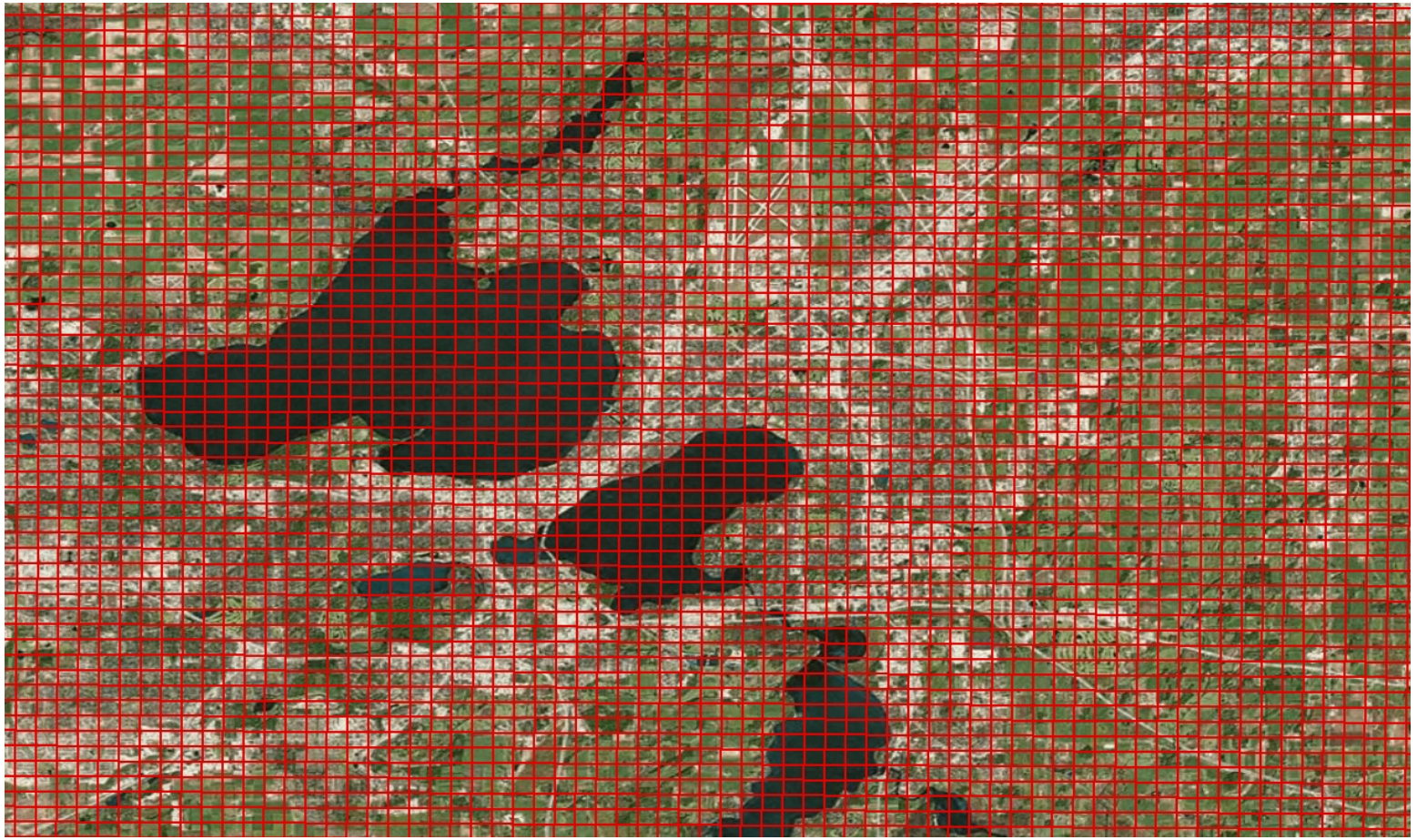
Infrastructure Costs: Roads and Pipes



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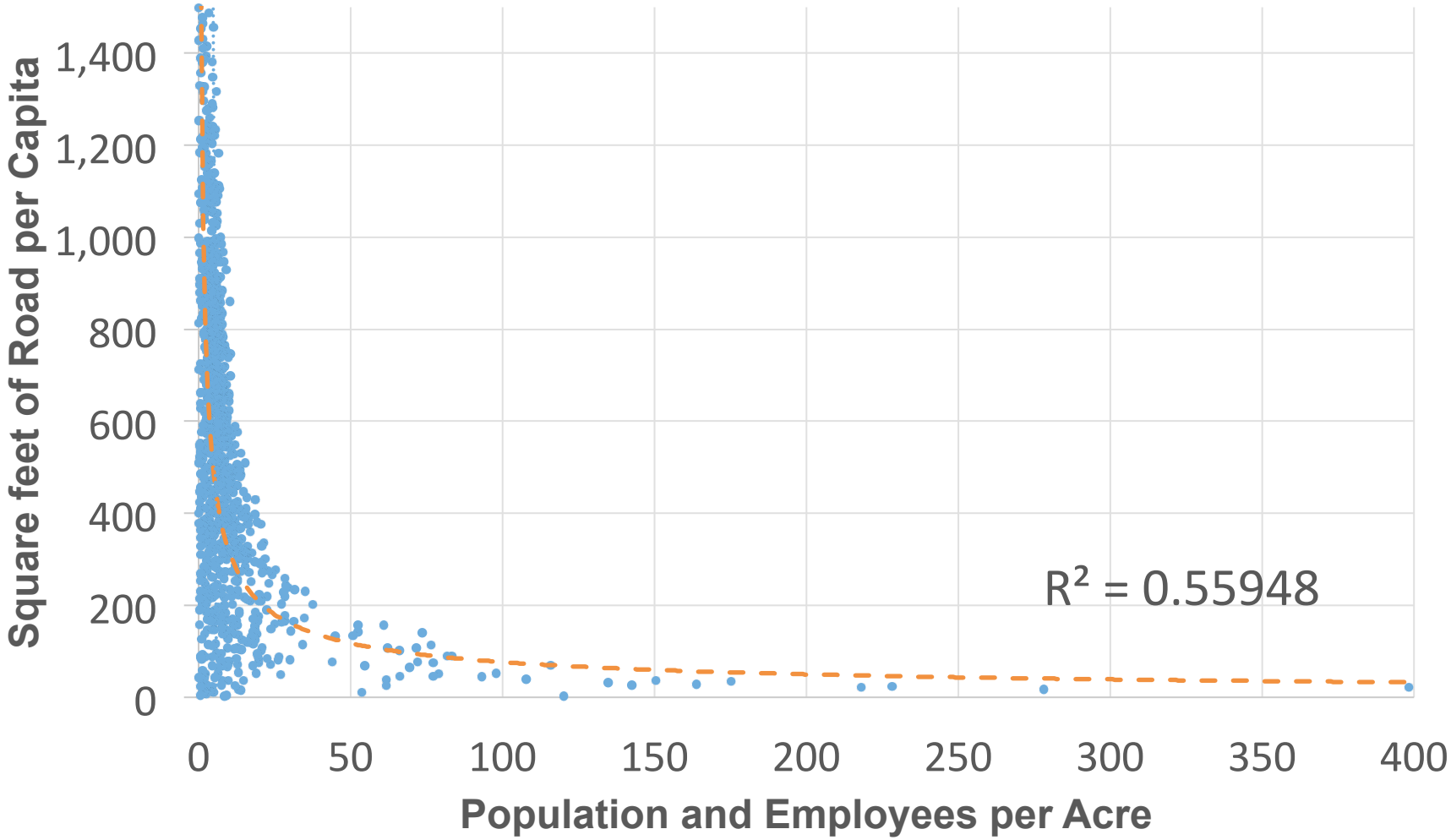
The Raw Data – Each Dot is One Grid Cell



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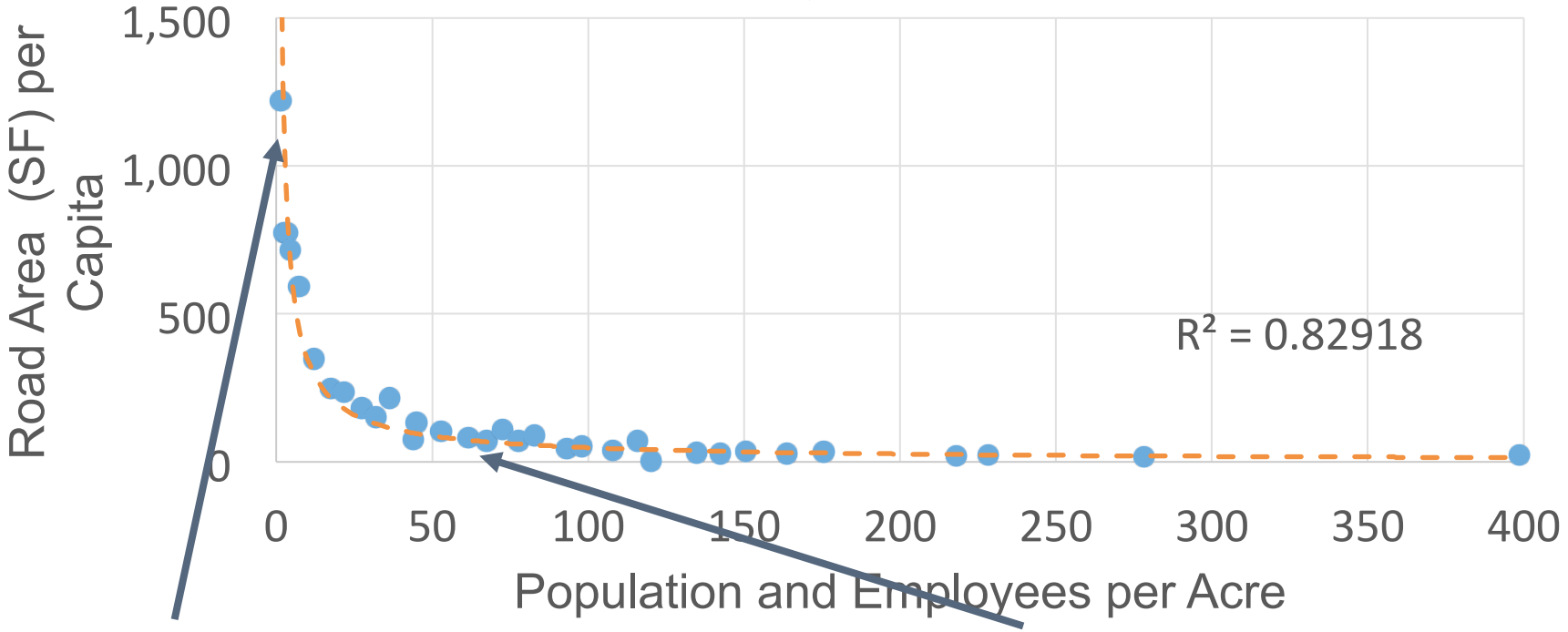
Road Area per Capita Declines as Density Increases – Madison, WI



Suburban Residential

Residents: 178
Employees: 5
Total: 183
Total Res. & Emp Per Acre: 4.6
Total Road Area: 227,408
Road Area per Capita: 1,242 ft.

Downtown Urban

Residents: 2236
Employees: 633
Total: =2,869
Total Res. & Emp Per Acre: 71
Total Road Area: 306,303
Road Area per Capita: 107 SF

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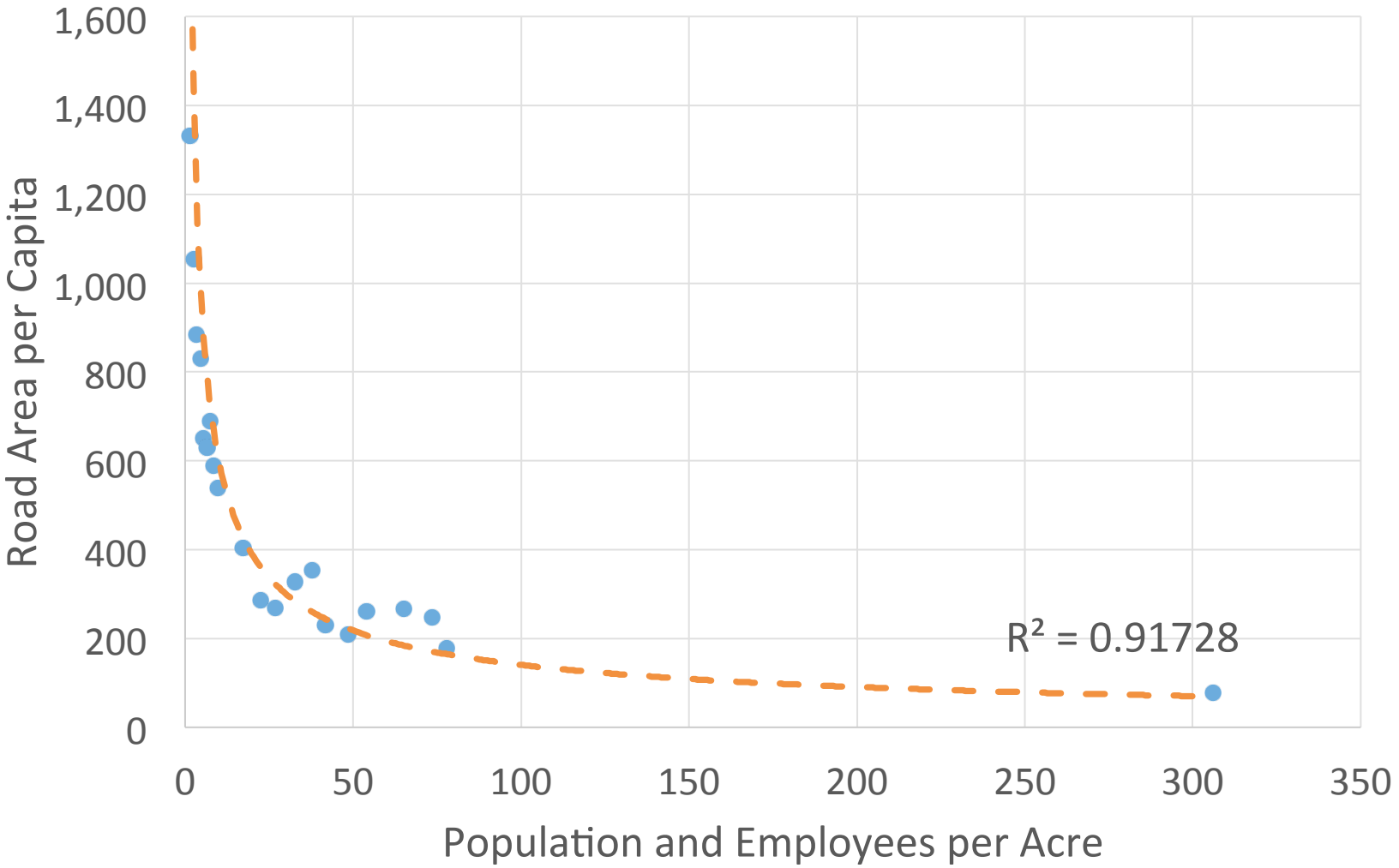
Road Area per Capita Declines as Density Increases – West Des Moines, IA



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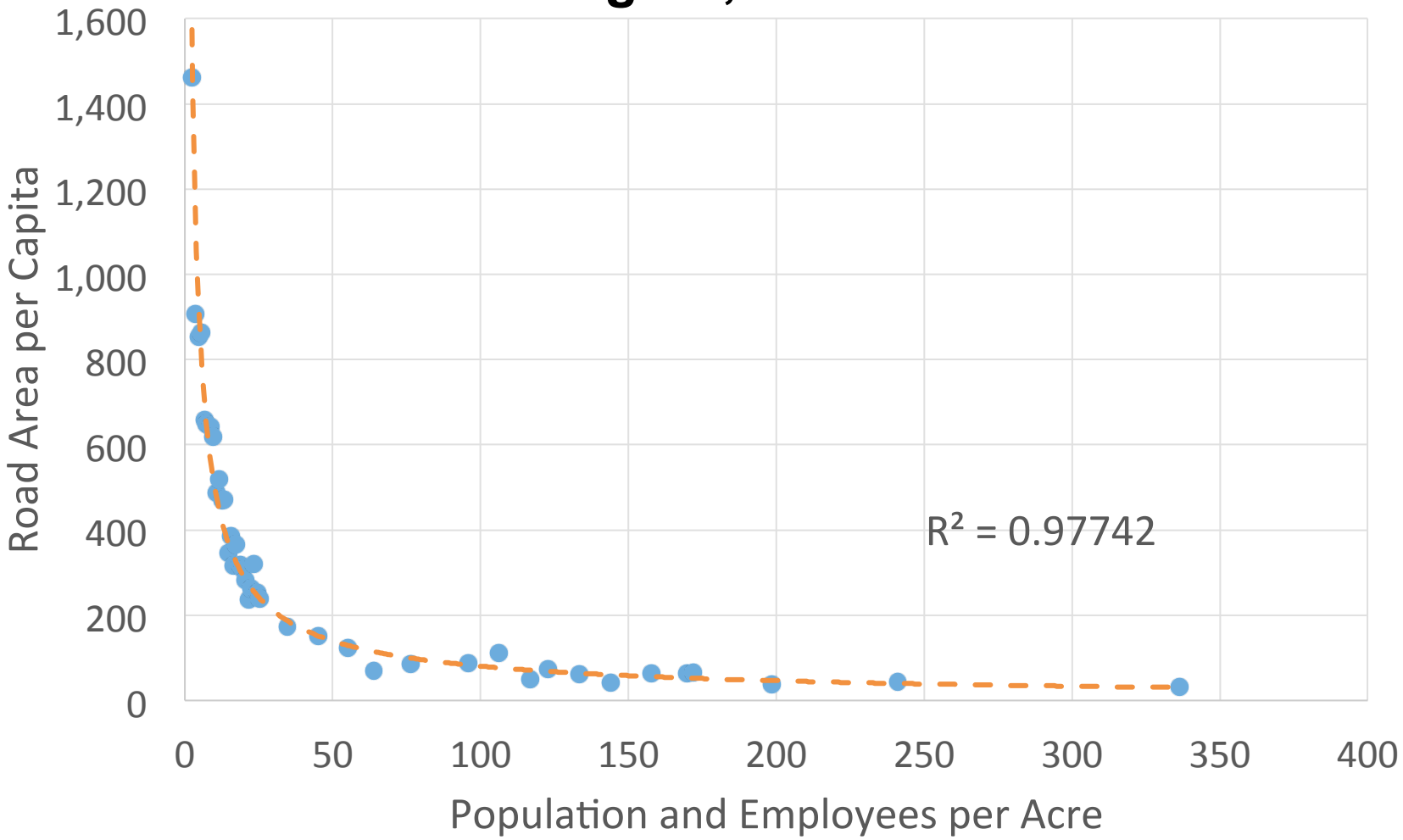
Road Area per Capita Declines as Density Increases – Arlington, VA



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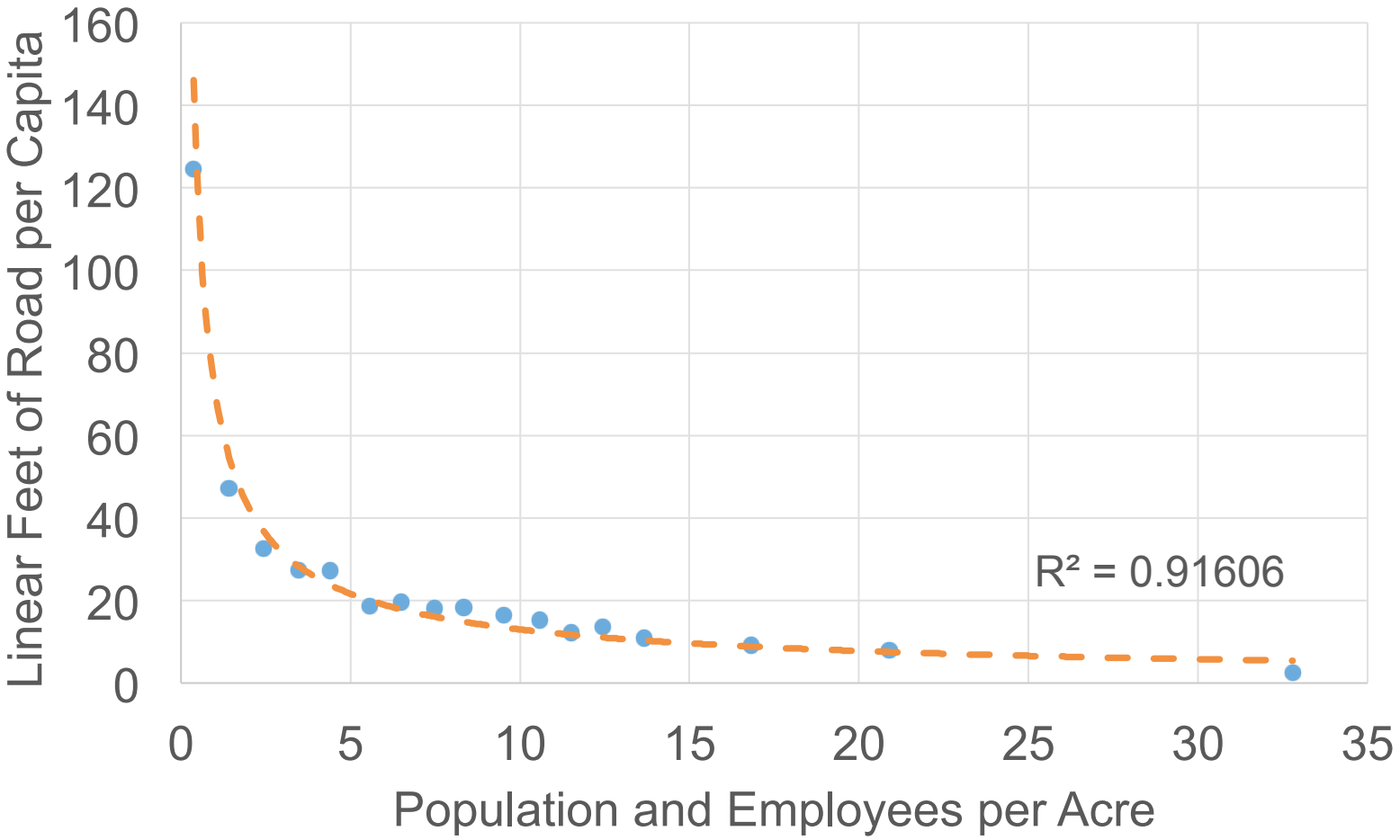
Road Length per Capita Declines as Density Increases – Dona Ana County, NM



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Lane Miles per Capita as Density Increases – Even Across Entire Jurisdictions

Lane Miles per Capita by Jurisdiction

City	Lane Miles	Total Population and Employees	Acres	Pop. And Emp. Density	Lane Miles per Capita
Arlington	916	365,000	16,600	22	0.0025
Madison	1,742	437,000	49,100	9	0.0040
West Des Moines	774	108,892	25,267	4	0.0071

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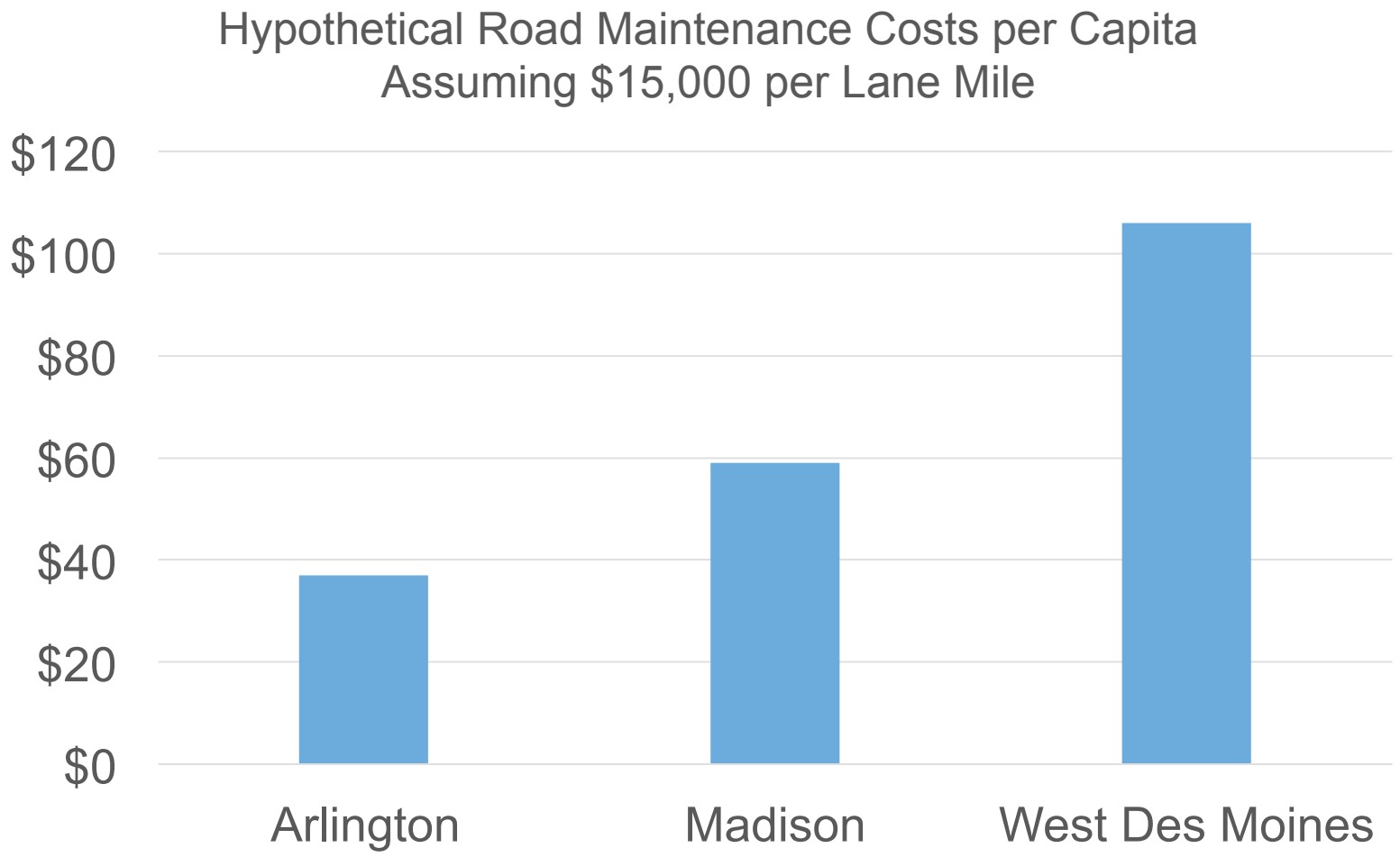
All Else Being Equal, That Translates to Lower Costs per Capita for Areas with Higher Population Density



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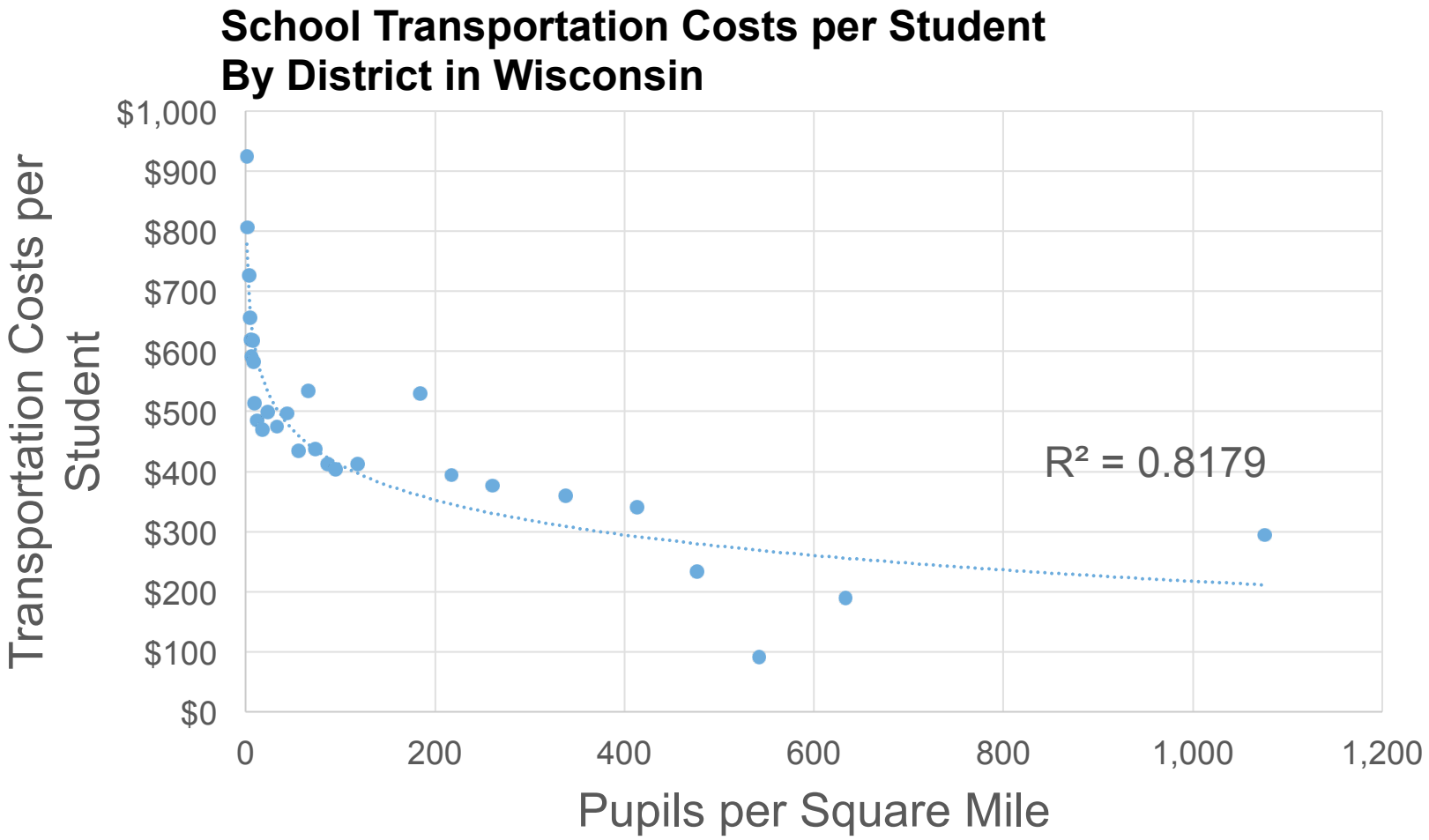
Water and Sewer Pipes

- Tend to follow length of road – meaning water and sewer pipe length per capita will decrease as density increases
- Usually governed by a utility that sets rates based on usage (gallons), ignoring length of pipe to maintain
- But, all else being equal, there will be more pipe to maintain relative to revenue generated in less dense areas
- SGA/RCLCO model works by comparing the ratio of rate revenues to the anticipated pipe maintenance costs in the scenario development to that of the city as a whole

School Transportation Costs are Clearly Correlated with Density



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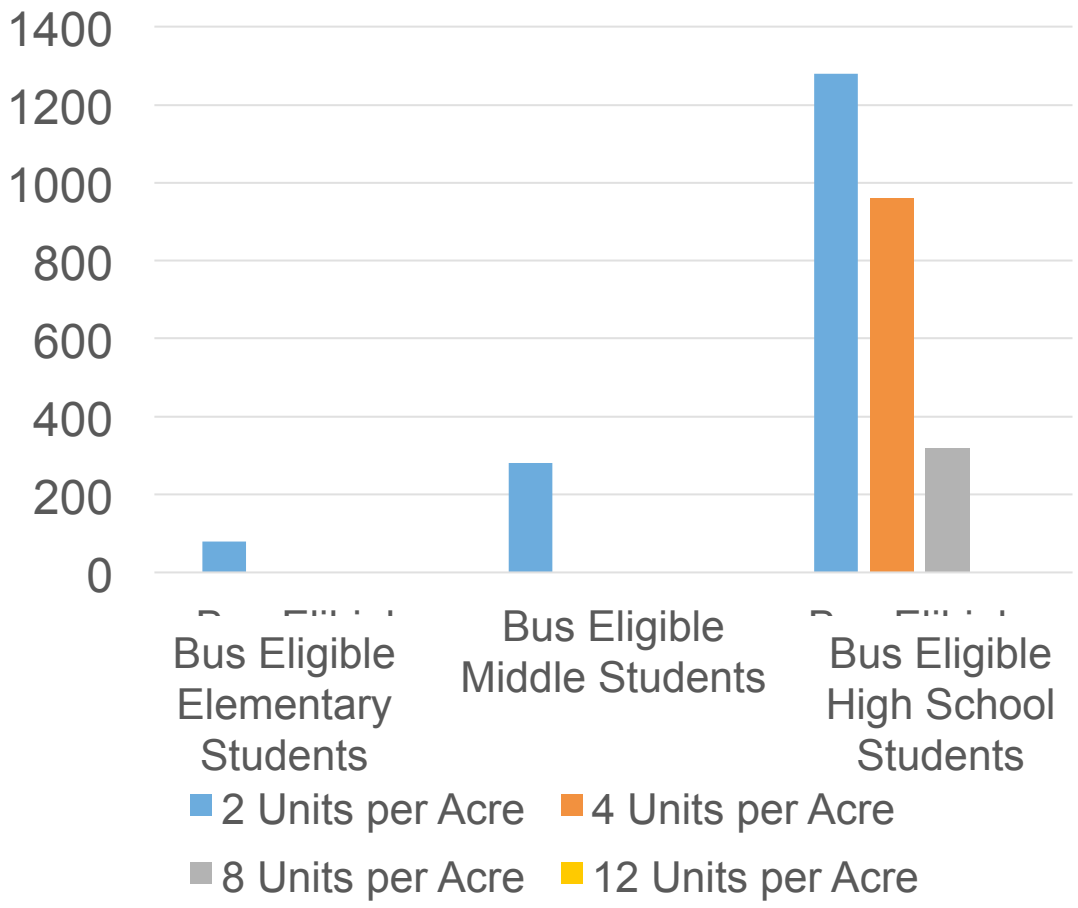
The SGA Model is Based on the Anticipated Quantity of Students in the "Walk Zone"



- Not specific to existing school situation
- Key determinants are size of the schools and radius of the walk zone
- Chart assumes 1-mile walk zone and school sizes of 400, 600, and 1,600

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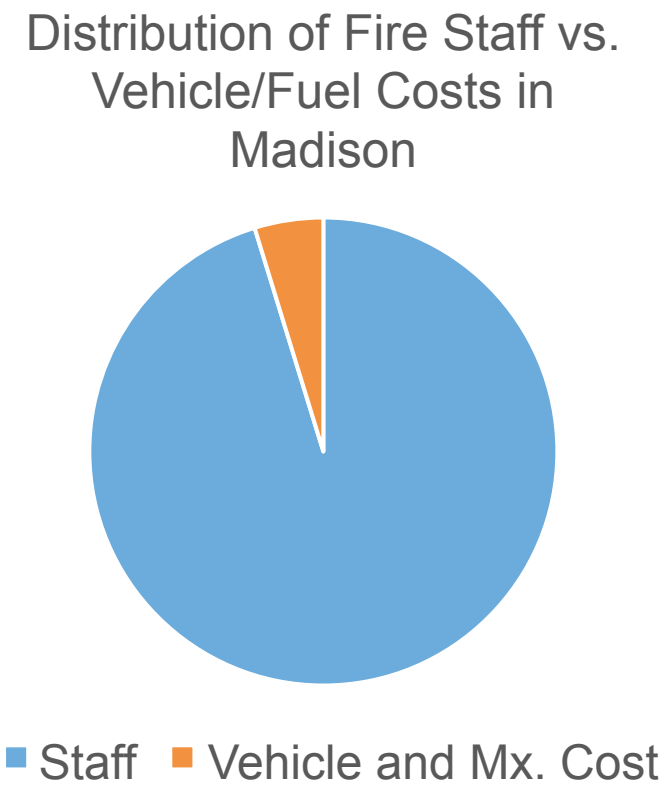
Preliminary Analysis of Fire Shows Less Relationship to Density than Hypothesized



- Determinants of Operating Efficiency
  - Response Shed Size
  - Population Density
  - Rate of Calls per Population
  - Capacity per Fire Engine

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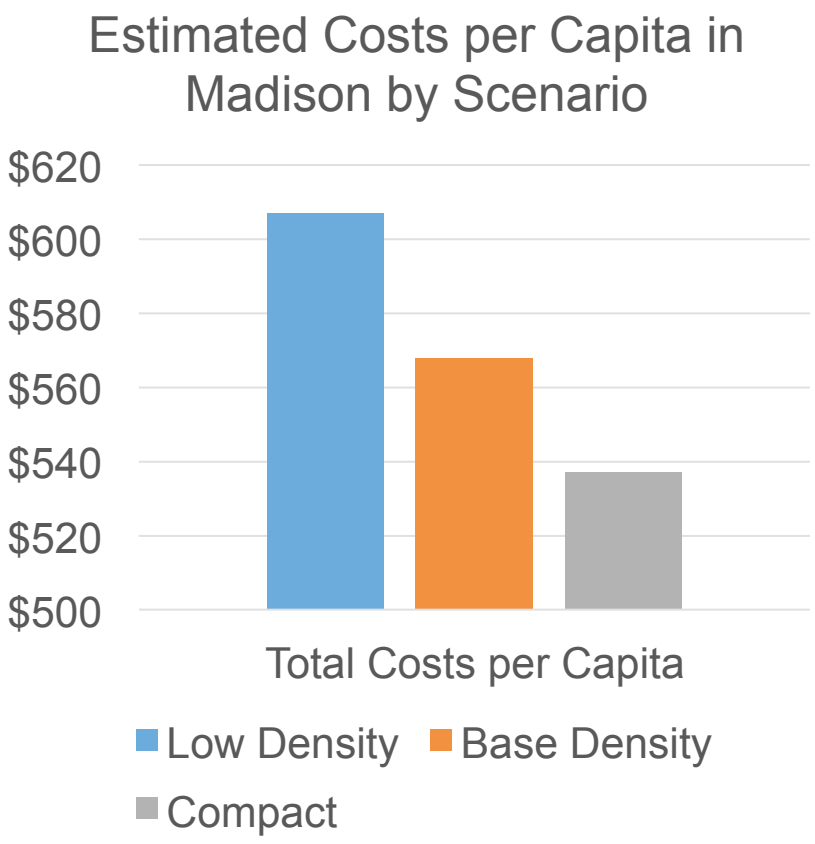
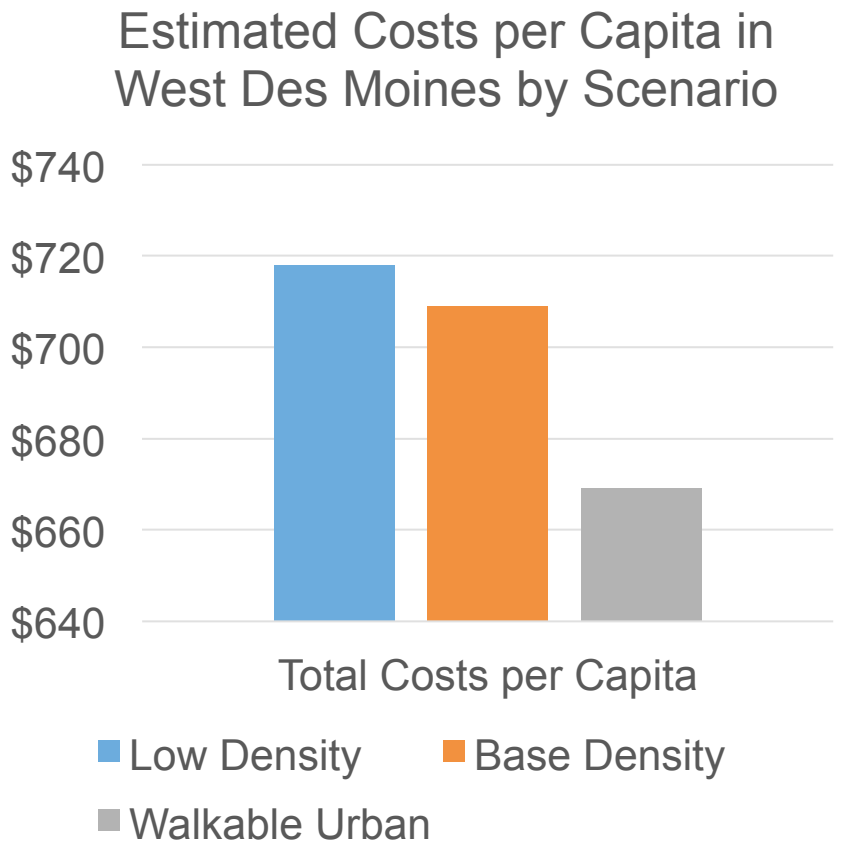
Putting it All Together – Preliminary Results Show Costs per Capita Can Fall by 7% to 12% as Density Increases



Net Residential Density Ranges from 4.1 per Acre to 16.1



Net Residential Density Ranges from 5.5 per Acre to 22.4

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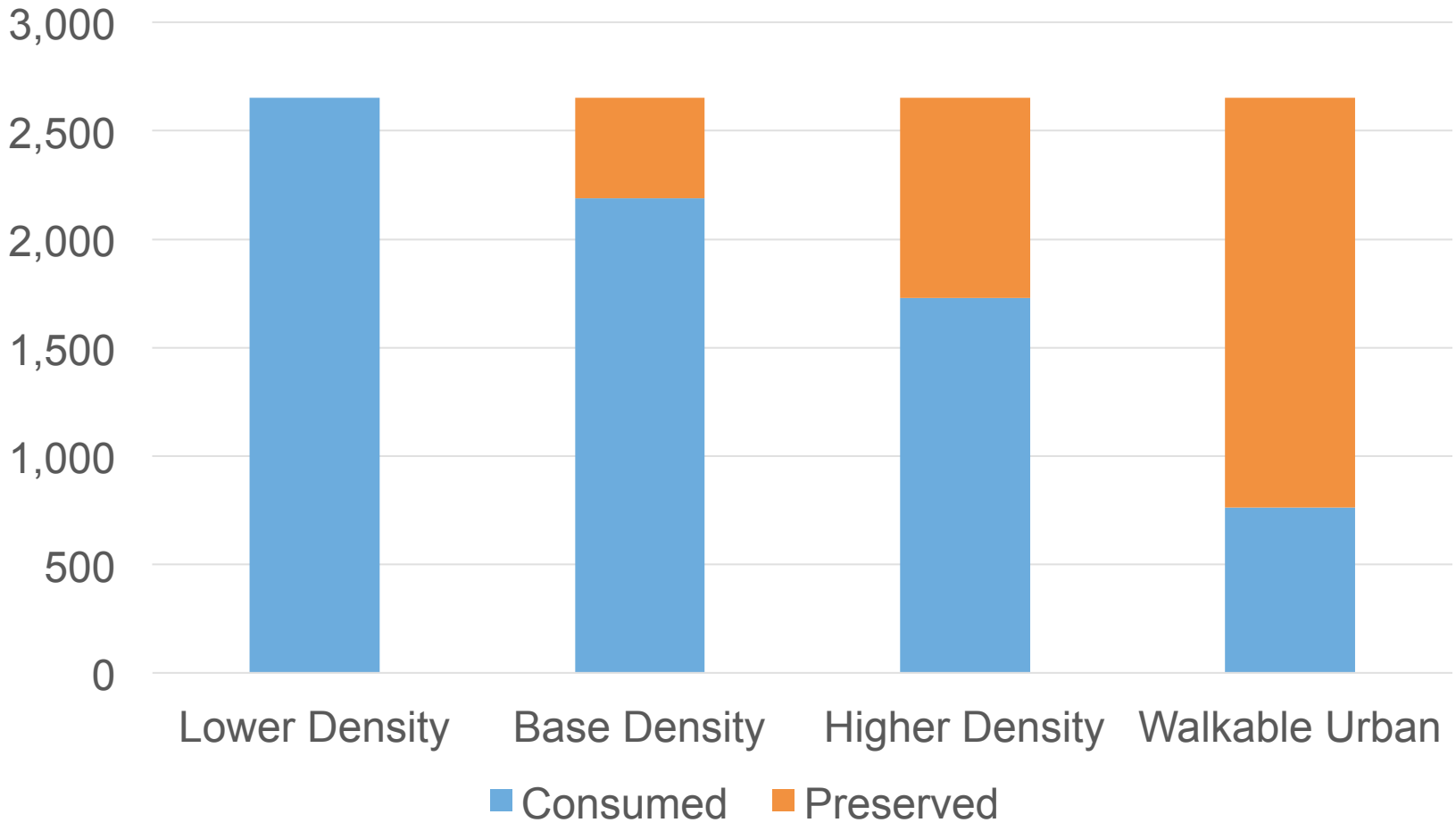
Not Counting the Opportunity Cost of Land Consumption in Low Density Scenarios



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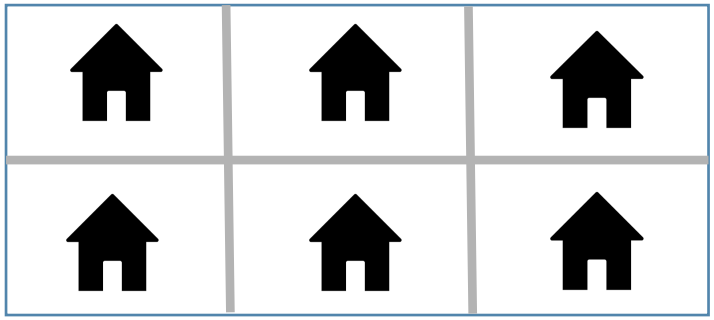
The New Paradigm

Option A Public Costs



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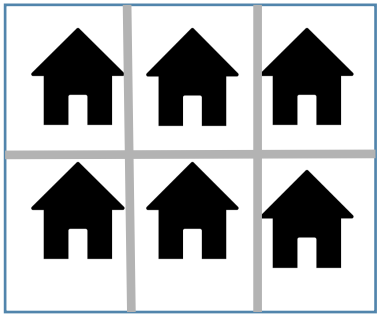
Option B Public Costs



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Areas in Progress/Need for Improvement

- Infrastructure costs: How do usage and quality requirements affect maintenance costs?
- Disaggregating roads associated with employees from residents
- Better data and/or economic model behind solid waste
- Better understanding of school transportation costs with regard to busing for integration/magnet schools, etc.
- Police – is there a connection to density and how to model it?