Integrated Asset Management: Dealing with Neglected Infrastructure and Vacant Properties in Legacy Cities

Conference on Innovations in Collaborative Modeling

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Kellogg Center, MSU, East Lansing, MI

Presentation Outline

- Challenges in Legacy Cities
- Land Use & Infrastructure Solutions
- Saginaw Green Zone Case Study
- Using Modeling in Integrated Decision Making
- Next Steps

History: LegacyCities

Outmigration

- Suburbanization mid- to late-20th century
- Poorest residents less mobile

Blight

- High urban unemployment and poverty rates
- Foreclosure, abandonment, and dilapidation

Infrastructure & Vacancy

- Expensive, high-capacity infrastructure for now sparse populations
- Hazardous 20-60% urban residential vacancy

Two Municipal Dilemmas

1. Infrastructure repurposing

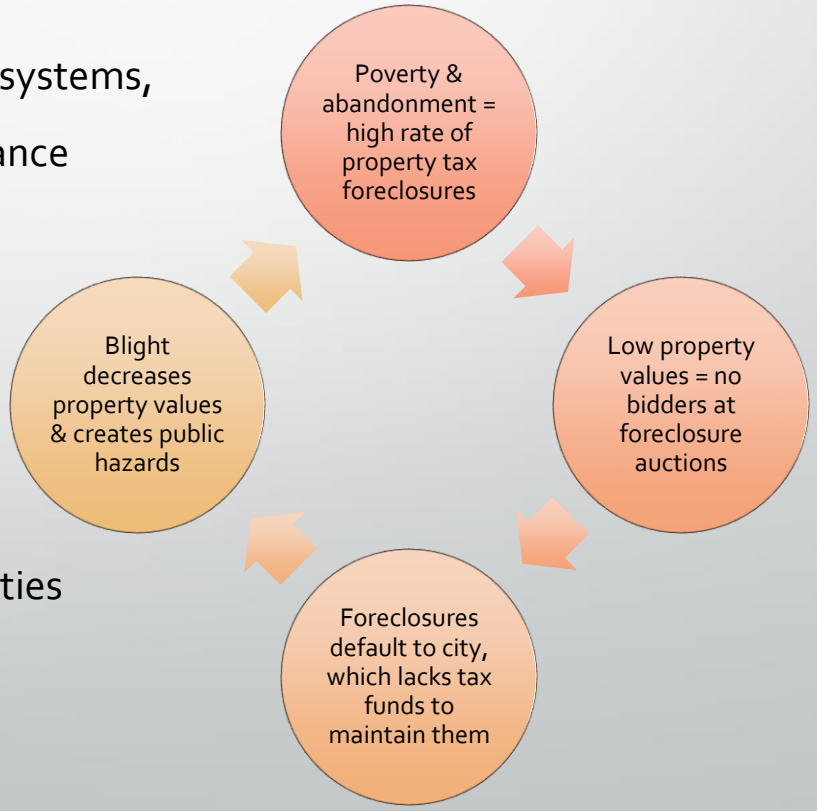
   How to make service delivery more efficient to serve a smaller, more dispersed population?

   - e.g. street lighting, sewer systems, road and sidewalk maintenance

2. Land repurposing

   What to do with thousands of abandoned properties?

   - Aim to boost property values, create safer communities



Infrastructure Repurposing Options

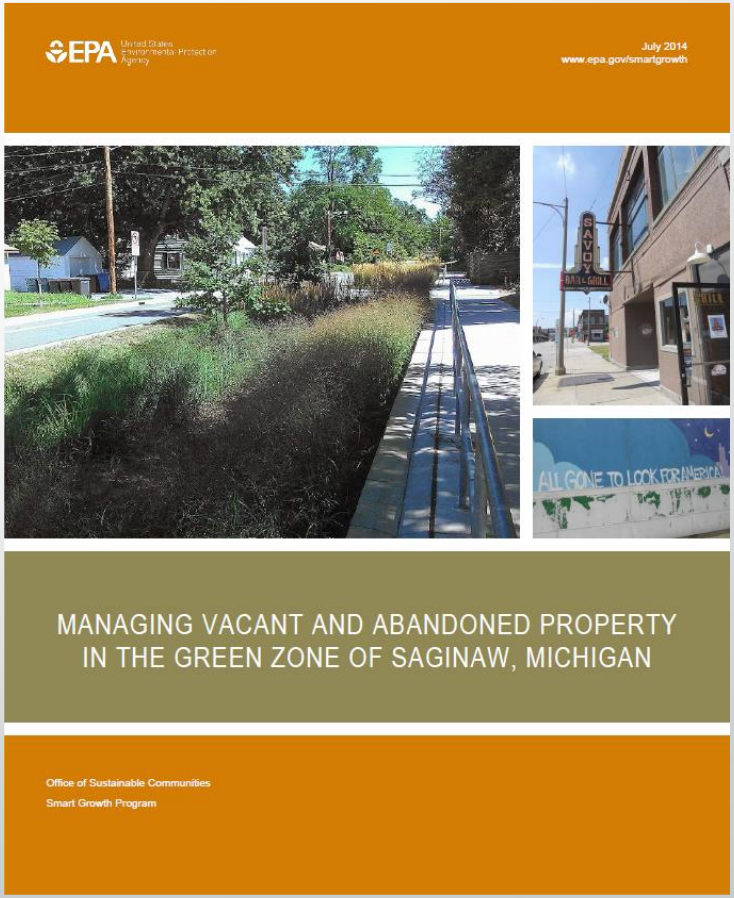
Option	Example(s)	Advantages	Disadvantages
Invest in new, more efficient infrastructure	• Cluster sewage systems • Single-operator trash collection	• Low future costs	• High upfront cost • Difficult to revert
Right-size existing services	• Gravel roads • Planned disrepair of sewer sections	• Low future costs • Reversion feasible	• High upfront cost • Negative impact on some residents
Planned shrinkage	• Incentives for resident relocation	• Low future costs • Density may attract development	• Political and legal resistance
Zoning changes	• Urban-rural demarcation line	• Permanently inhibits sprawl	• Political and legal resistance • Negative impact on some residents

Land Repurposing Types

Option	Advantages	Disadvantages
Open space	• Low cost/maintenance • Non-contiguous land OK	• No productive use
Parks and recreational area	• Moderate maintenance • Encourages walkability	• Some upfront costs • Contiguous land only
Community gardens	• Fresh, healthy food for locals • Fosters sense of place	• Community maintenance difficult to ensure • Land may be contaminated
Commercial agriculture	• May create local jobs • Removes public responsibility	• Detracts from "residential" • Pesticide and water use • Contiguous land only
Alternative energy	• Environmentally friendly	• High upfront costs • High security & maintenance • Contiguous land only
Green infrastructure	• Moderate maintenance • Walkability/attractiveness • Environmentally friendly	• Land may be contaminated • May inhibit/remove roadways

Saginaw Green Zone

- City of Saginaw, MI, has lost 50% of its population over the past 40 years, and 25% of its land is vacant.
- Saginaw Green Zone (350 acres with highest concentration of vacancy) was designated as Green Reserve Area.
- Worked with EPA Smart Growth to identify strategies to stabilize neighborhood and envision a new economic future.



Source: EPA

Source: EPA

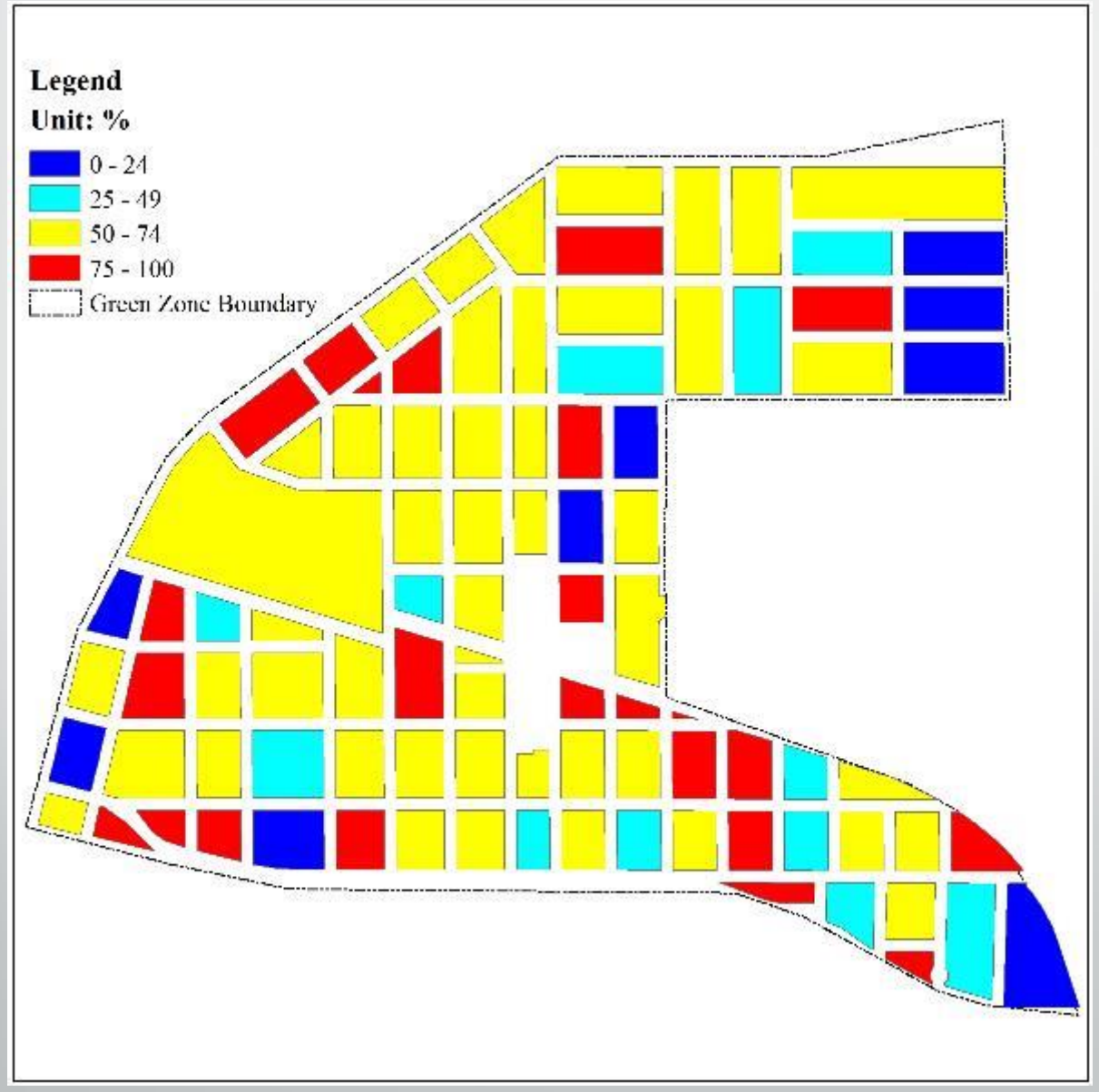
Source: SRA International

Scoring Matrix

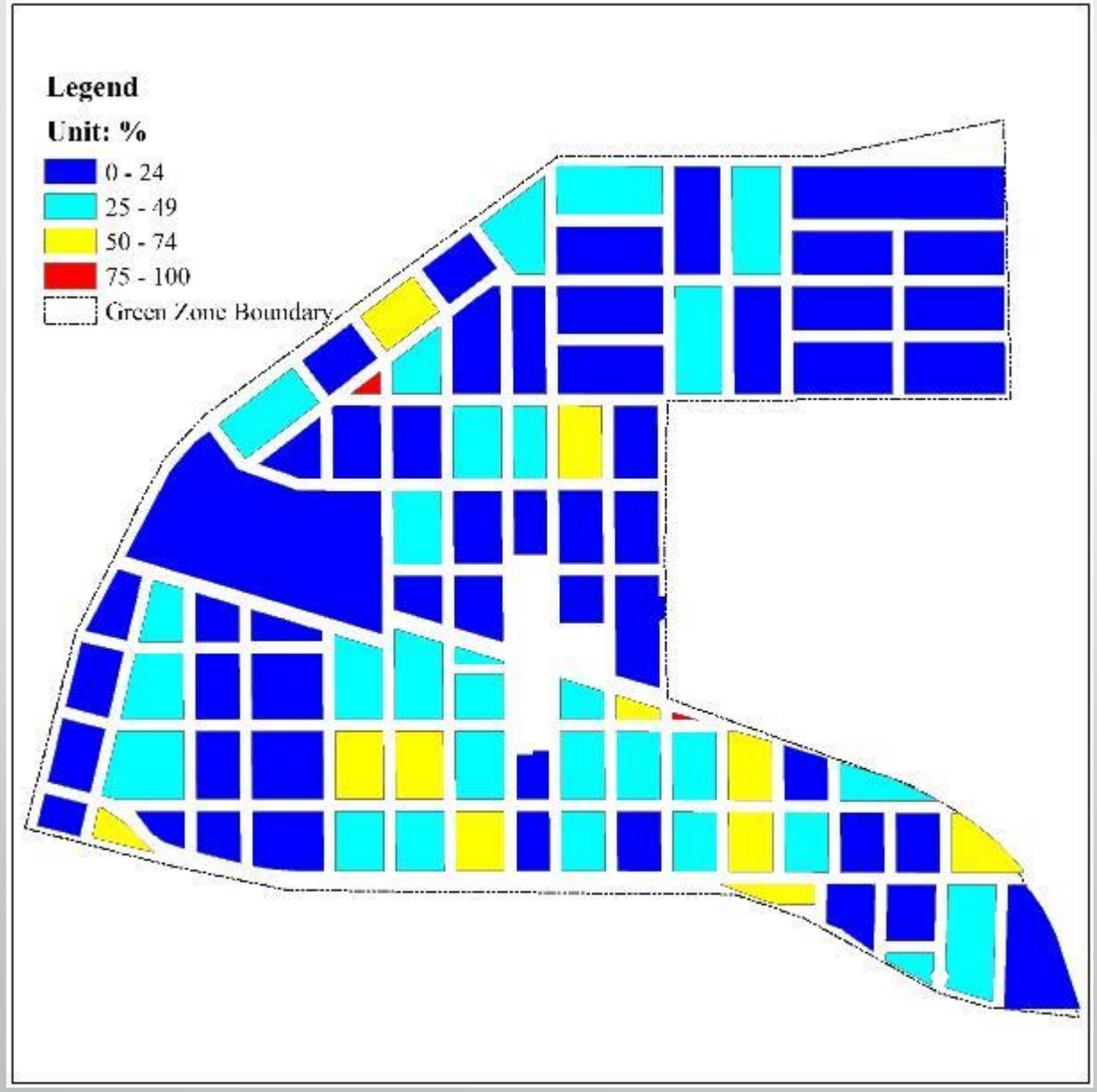
Criteria				
Occupancy	<25%	25-49%	50-74%	75-100%
score:	0-24	25-49	50-74	75-100
Private Ownership	<25%	25-49%	50-74%	75-100%
score:	0-24	25-49	50-74	75-100
Sewer Size	S<=12"	12"<S<=24"	24"<S<=36"	36"<S
score:	25	50	75	100
Consumption	0<=F<=1	F>1		
score:	(F^3)*100	100		
Street Class	Off Road	6-7	4-5	1-3
score:	0	10-20	30-60	80-100

Criticality Score = αOccupancy + βOwnership + σSewer Size + δConsumption + τStreet Class

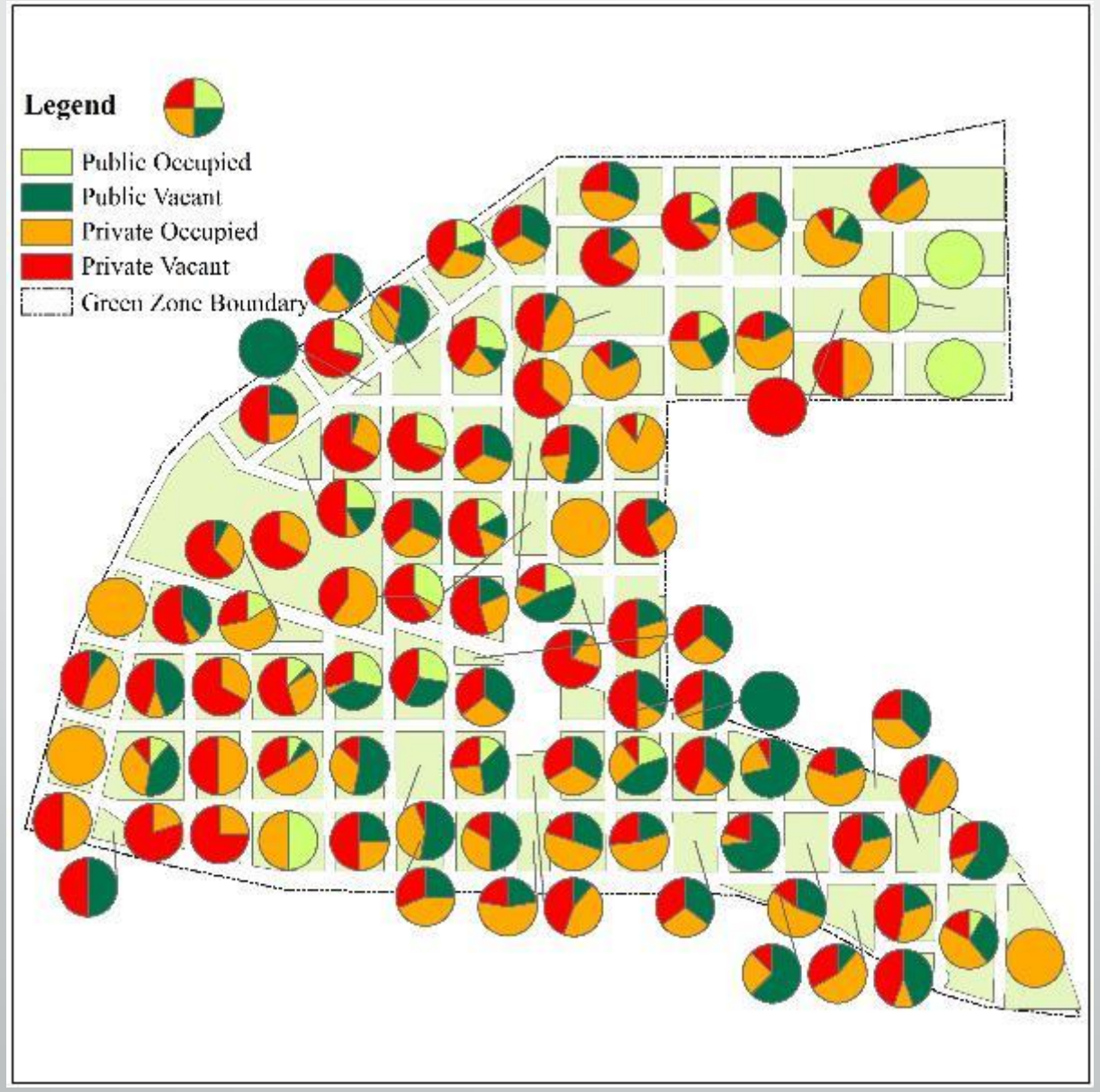
Land Use: Vacancy Rates



Land Use: Ownership Rates



Land Use Greening Decisions



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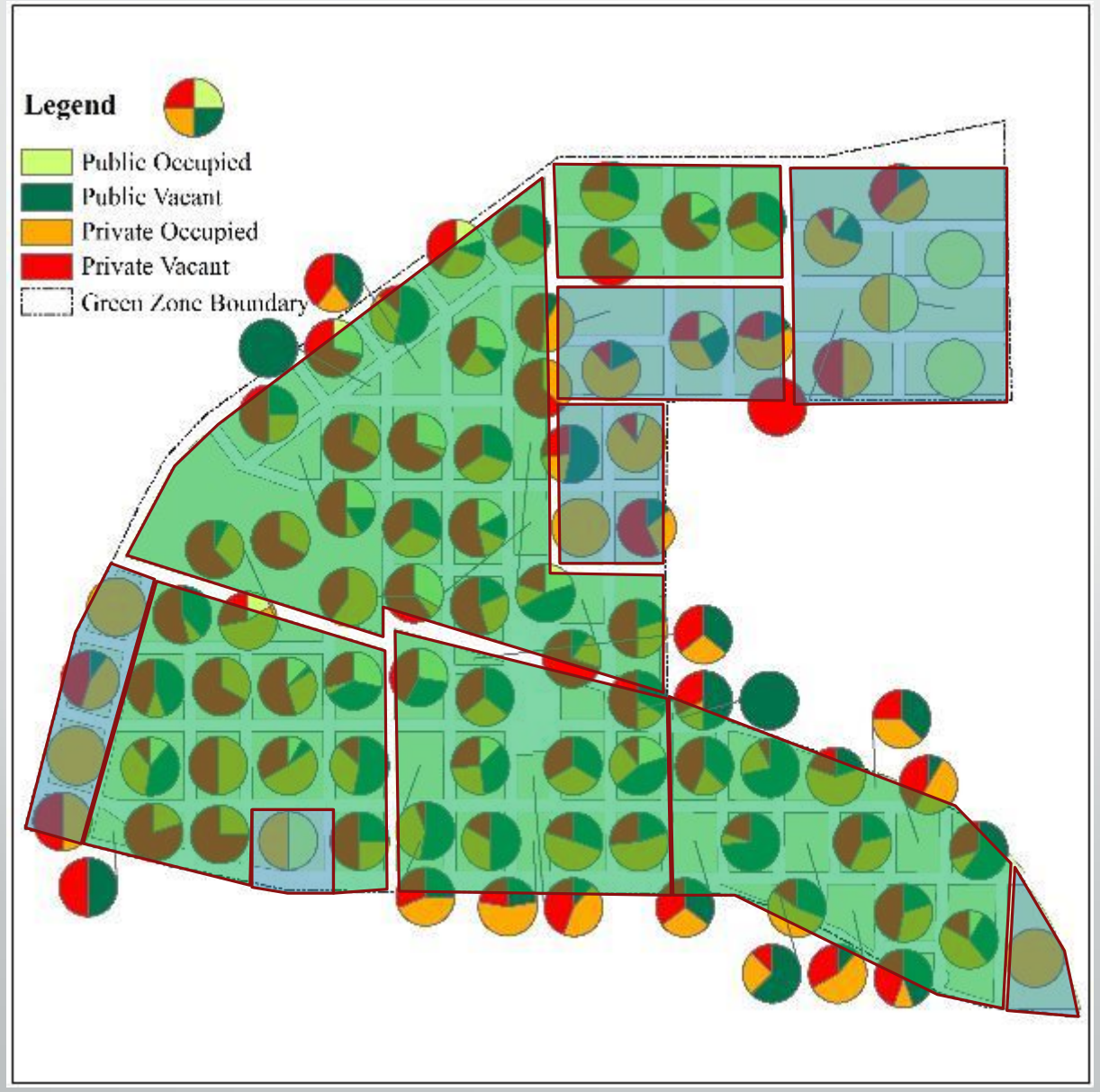

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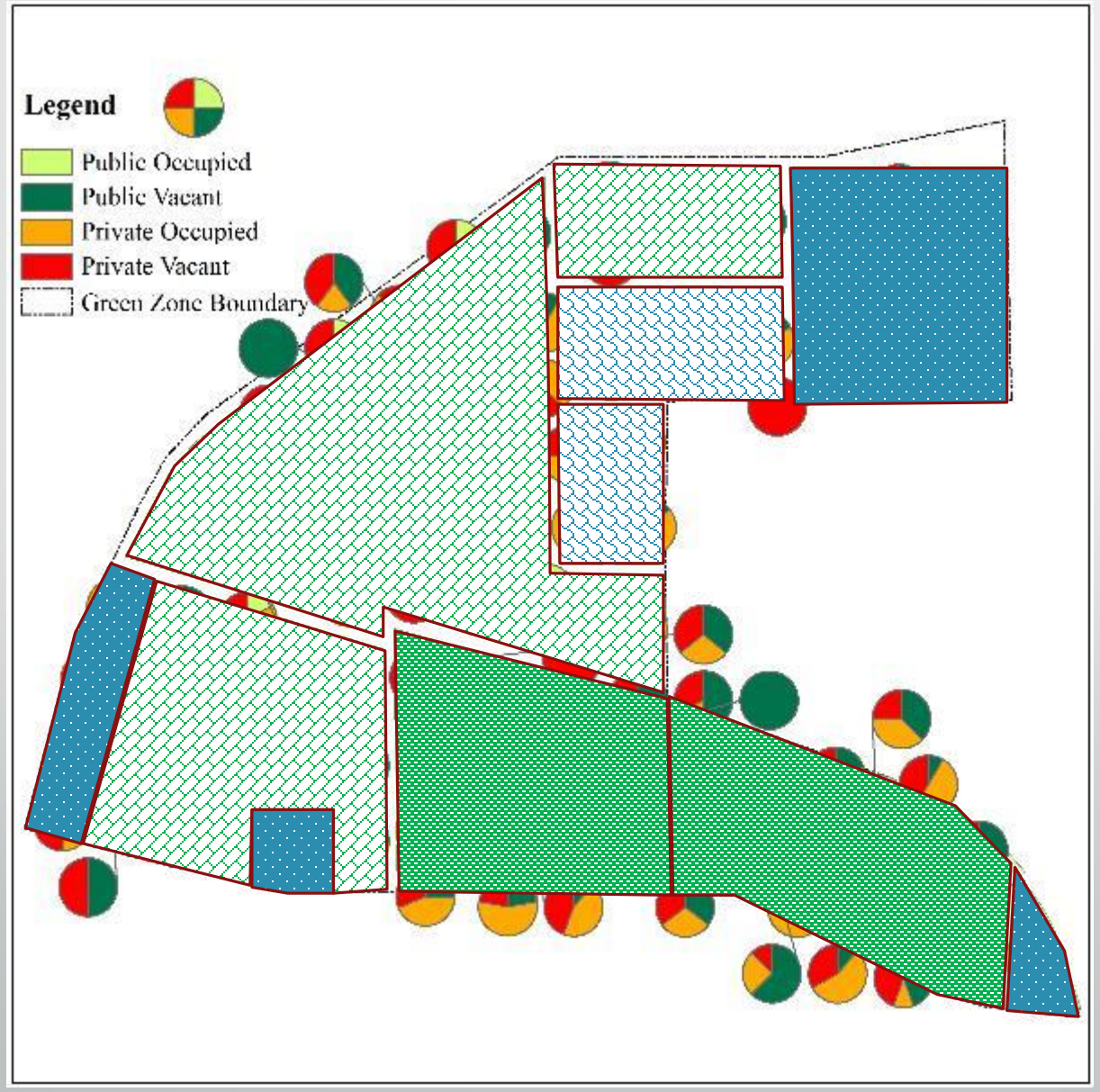

Infrastructure: Sewer Size

Infrastructure: Sewer Consumption

Infrastructure: Street Class

Infrastructure: Probability of Failure

Infrastructure Sewer Decisions

Risk = Probability of Failure * Criticality Score * Cost

Infrastructure Sewer Decisions

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Infrastructure Sewer Decisions

Risk = Probability of Failure * Criticality Score * Cost

Next Steps

- Other Variables
  - Political/institutional factors
  - Social factors & public involvement
  - Environmental factors
  - Cost factors
- Variable Weights
- Iterative Decision Making Over Time

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