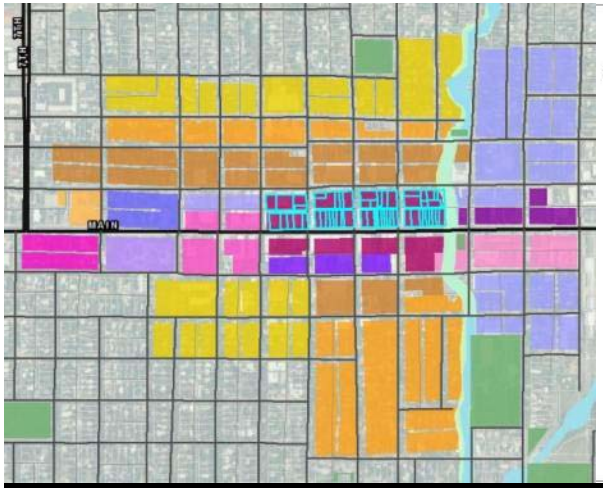
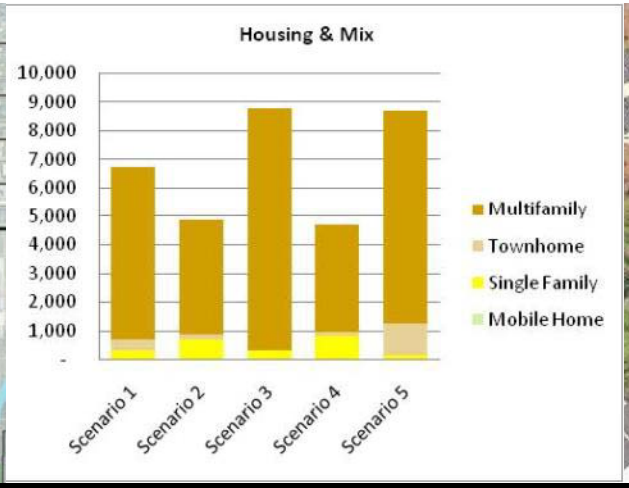




Climate Smart Communities and Envision Tomorrow

Using Scenario Planning to Create Sustainable Places

June 12, 2012

FREGONESE ASSOCIATES

www.frego.com

ENVISION Tomorrow
suite of urban and regional planning tools

Scenario Planning

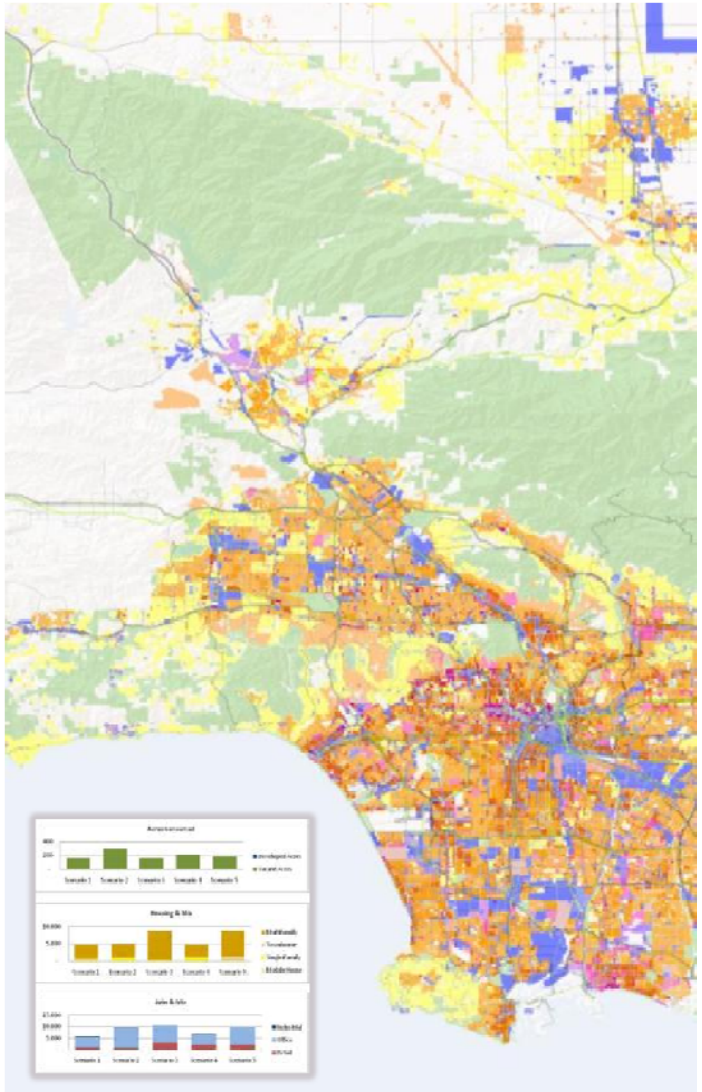
- Helps address the future
- Compares choices and consequences
- Develops strategies to optimize outcomes
- Allows you to discover new strategies

What is Envision Tomorrow?

- Suite of open source planning tools:
  - Prototype Builder
    - Return on Investment (ROI) model
  - Scenario Builder
    - Extension for ArcGIS
  - 18 modules or "apps" under development

ENVISION Tomorrow

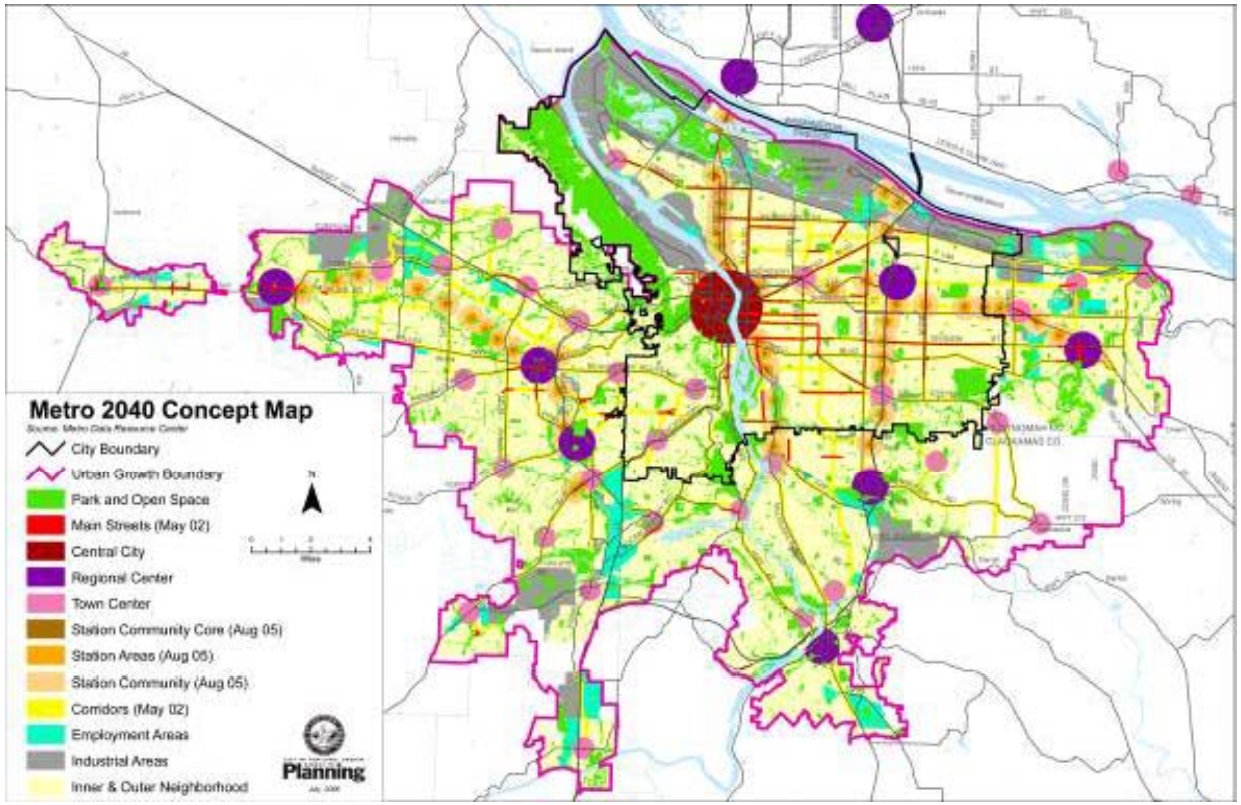
suite of urban and regional planning tools



Where Did Envision Tomorrow Come From?

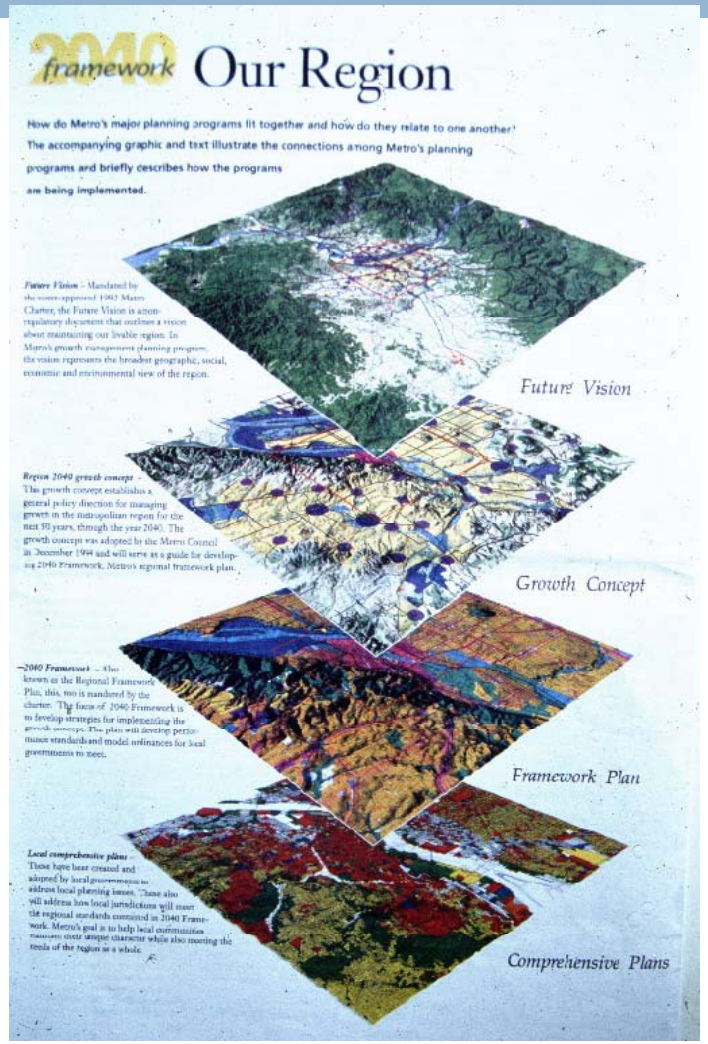
Metro 2040 Growth Concept

- The 2040 Plan was one of the first regional land use – transportation scenario plans in the country!

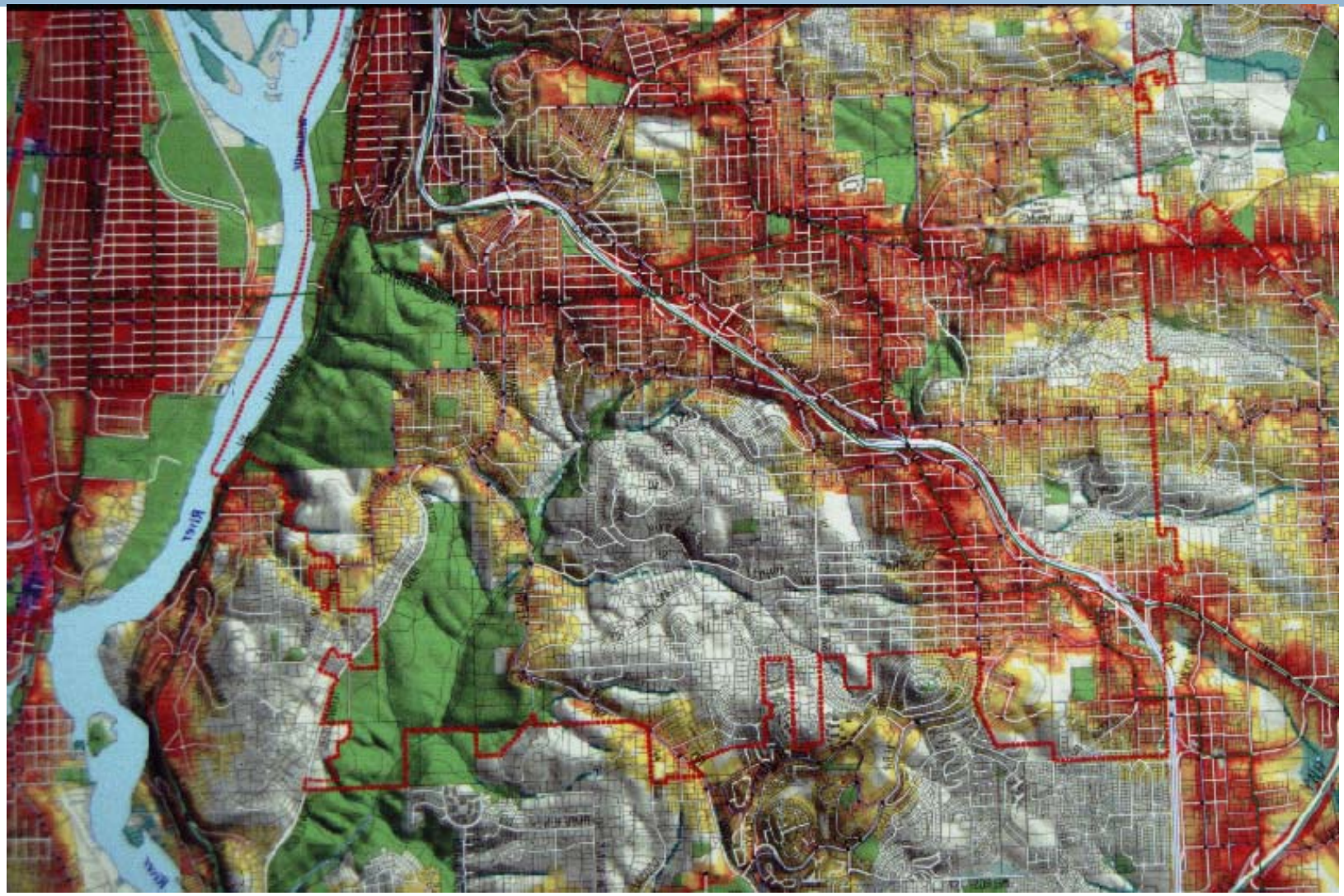


The 2040 Growth Concept

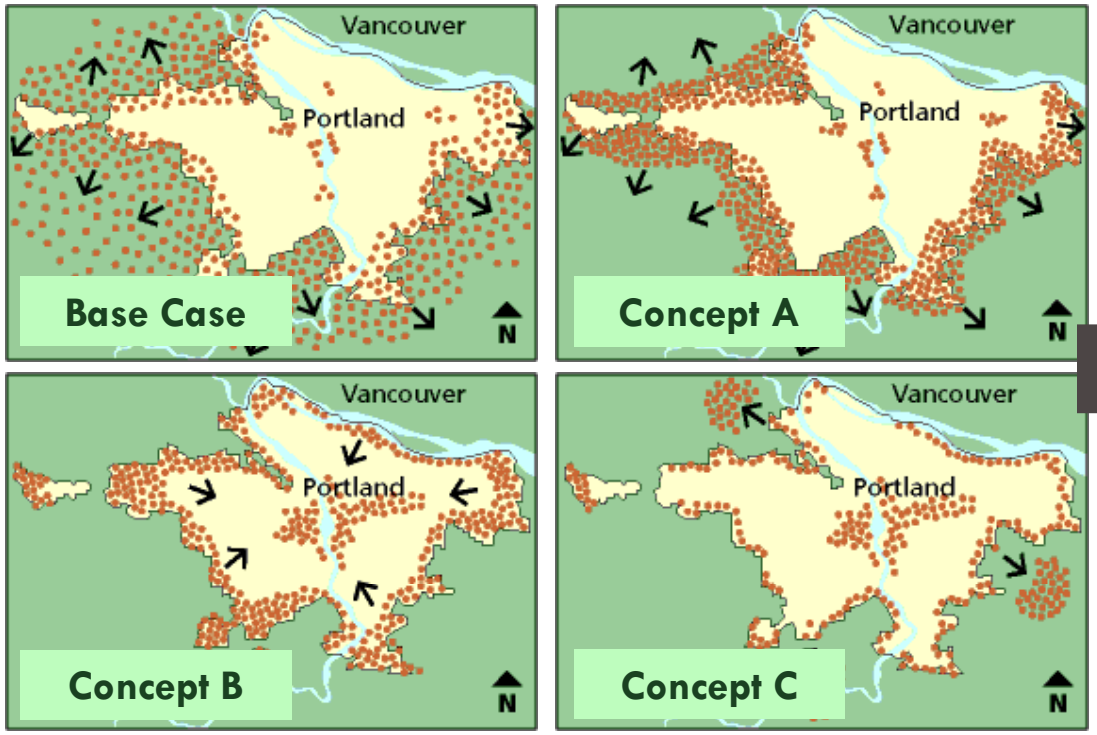
- Five Years of Work
- Advanced Computer Modeling
- Extensive Public Involvement



Metro developed GIS based land use modeling for use in scenarios



Concepts for growth 1992-1995



The region's adopted blueprint for growth and development

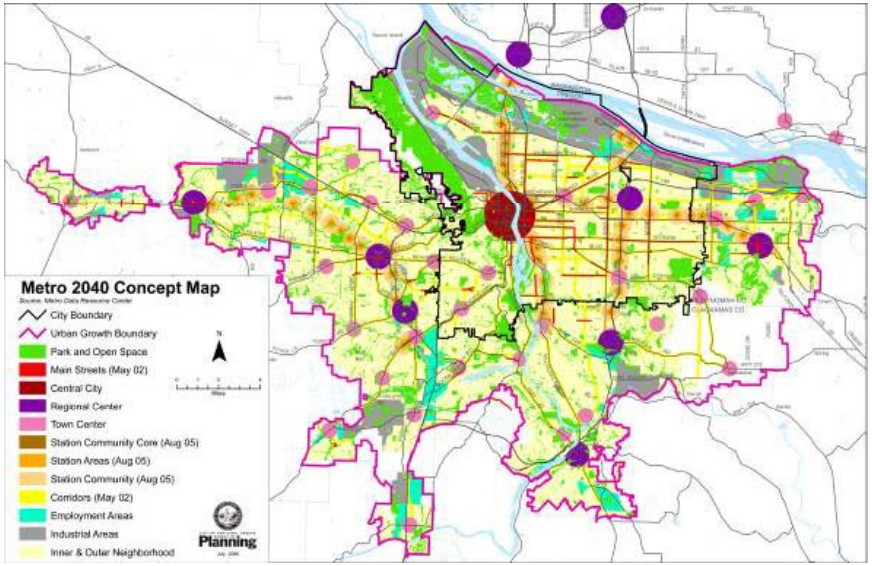
Building Blocks

- Centers

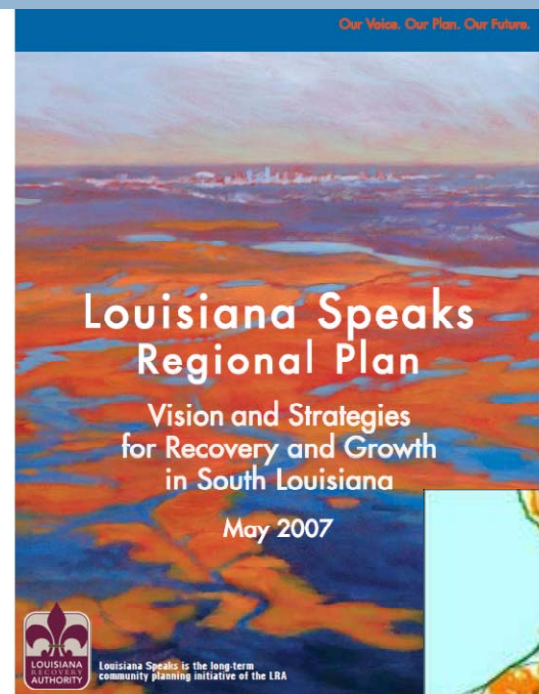
Central City

Regional Center

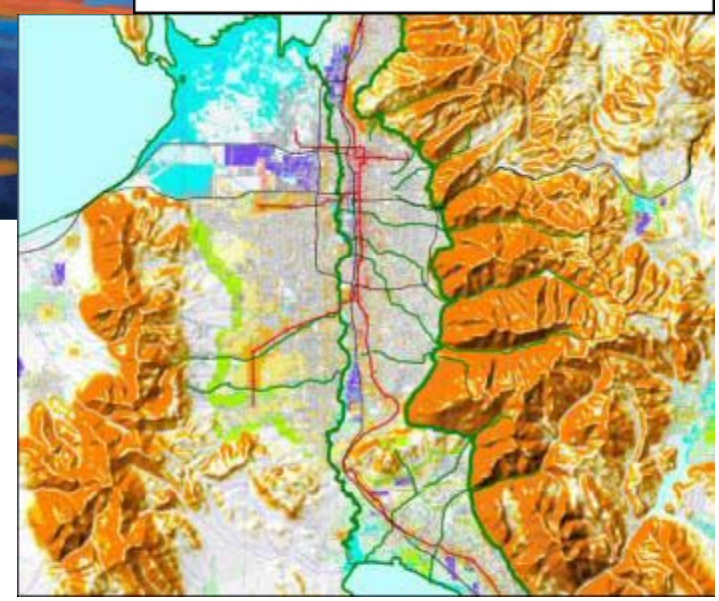
Town Center



Used widely since 1998



Envision Utah How we grow matters.



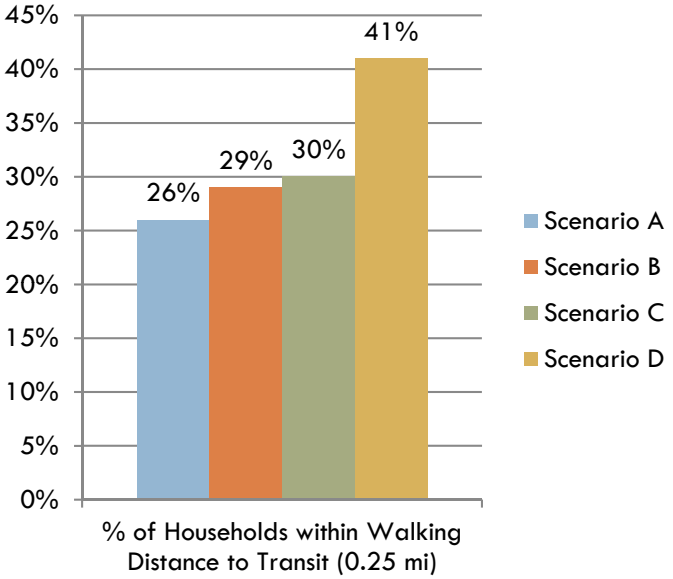
COMPASS BLUEPRINT

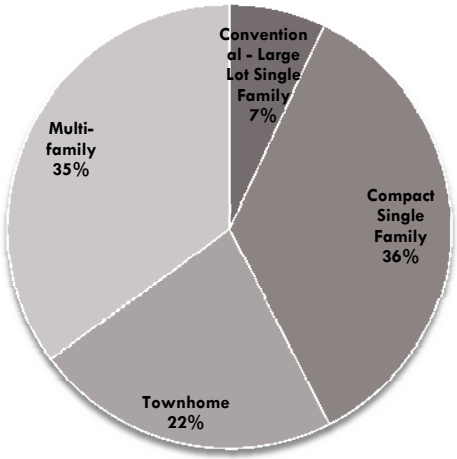
Who is Using Envision Tomorrow?

- **Portland Metro**
- Southern California (SCAG)
- Chicago (CMAP)
- City of Portland
- Wasatch Front Regional Council
- City of Indianapolis
- Seven California Central Valley COGs
- Sonoran/Lincoln Joint Venture
- Mid-America Regional Council (Kansas City)
- City of Dallas
- City of Tucson
- And many others…

App Development and Research Partners

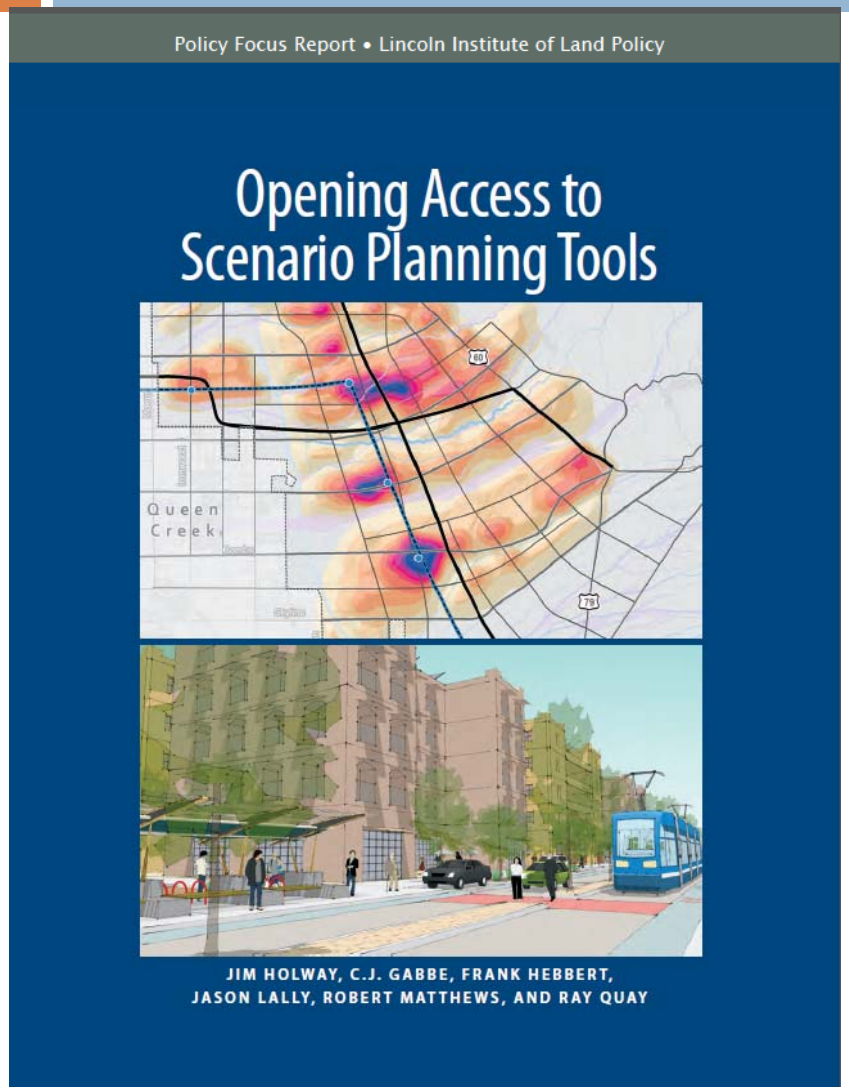
- Apps:
  - Household travel behavior (7Ds)
  - Housing + Transportation + Energy Costs
  - Transportation Safety
  - Health Benefits & Active Transportation
  - LEED-ND
  - Redevelopment Timing:
    - Building age & value depreciation
  - Impact of Public Investments on Development
    - Transit, streetscape, parks etc
  - Housing Growth Model
    - Trend-based land growth model

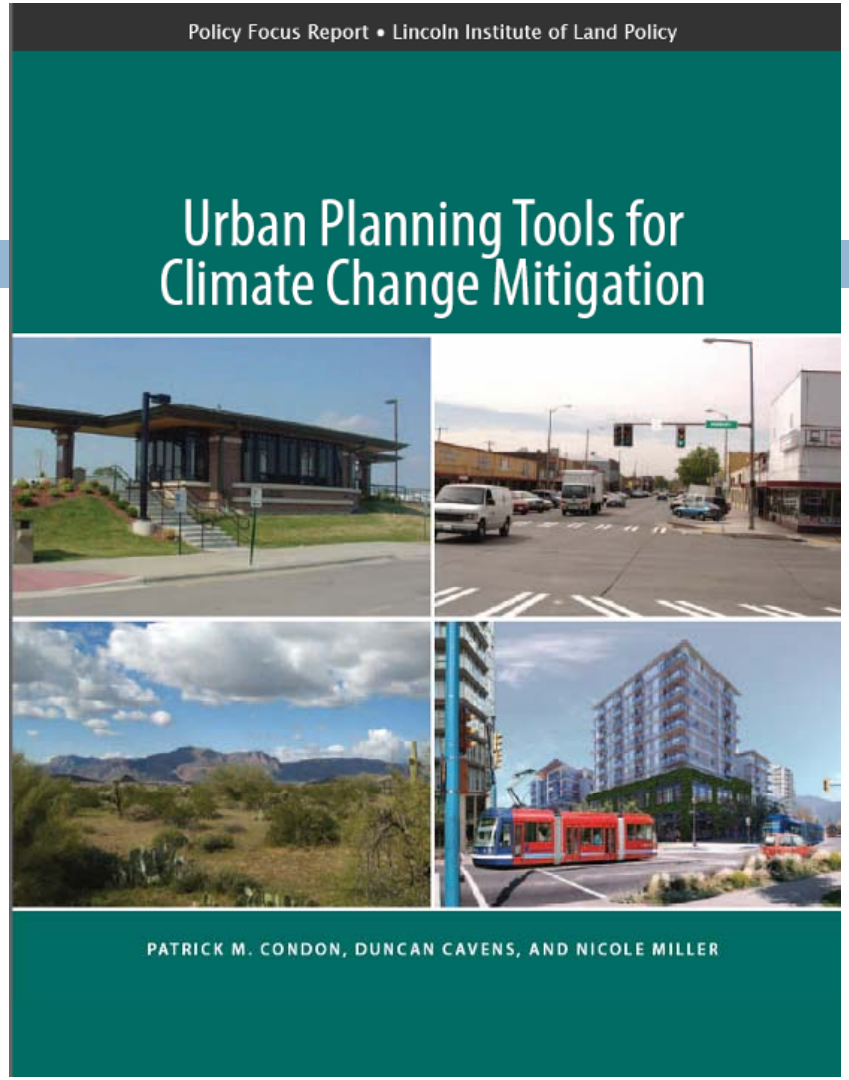




- Partners
  - University of Utah
  - University of Texas – Austin

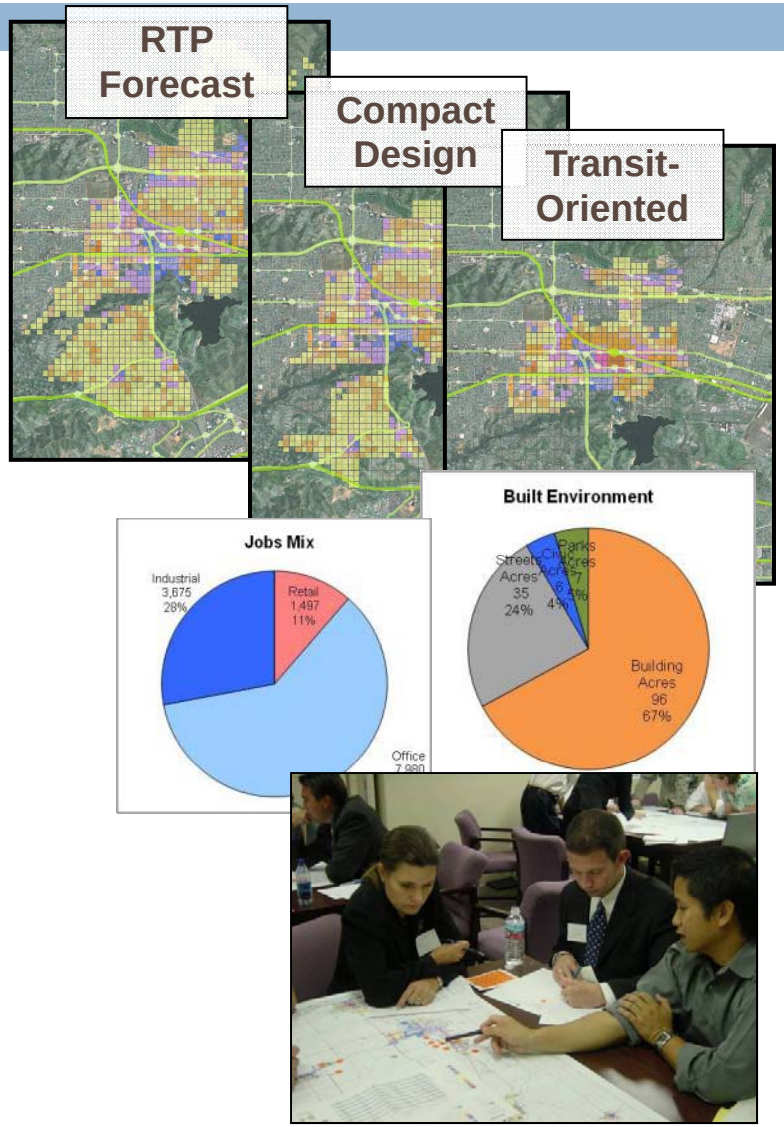
Lincoln Institute of Land Policy





Opportunity for Portland Metro Today

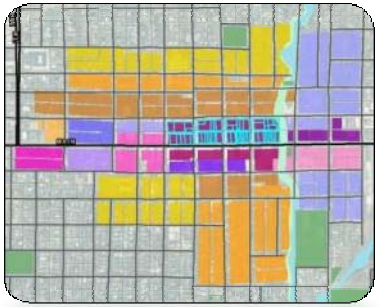
- **Links with and enhances existing models**
- **Create regional scenarios quickly**
  - Ties directly to existing models
- **Excellent tool for local planning**
  - Brings new tools and techniques to local governments, even with limited staff.
- **A range of performance measures**
- **Ongoing performance monitoring and data tracking**
  - Both local and regional – same dataset



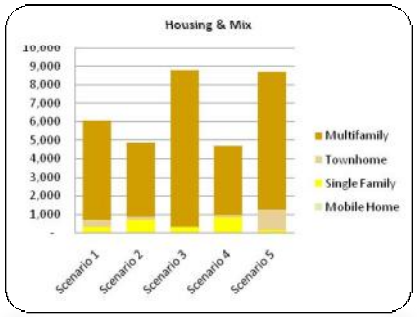
Scenario Building Process

Building Types

Development Types



Scenario Development



Evaluation

1

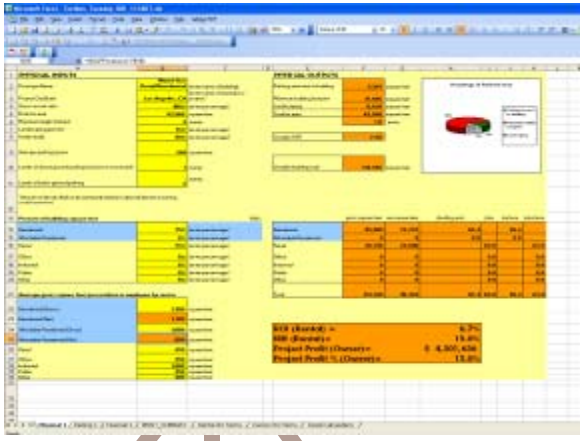
Step 1: Model a library of building types that are financially feasible at the local level.

Create Prototype Buildings

Why start with buildings?

- *Easily modeled & lots of existing data*
  - Density and Design
  - Rents and Sales Prices
  - Costs and Affordability
  - Energy and Water Use
  - Fiscal Impacts
- *This methodology evolved from the original Metro "Park-o-Matic"*

Use ROI Model…



…to Create a Range of Buildings

What can we test using building prototypes?

- Allows us to estimate:
  - FAR based on zoning standards
  - Parking standards and configurations
  - Calculate full cost of construction including hard costs, soft costs, financing etc.
  - Estimate income from achievable rents and sales prices
  - Measure Return on Investment and Internal Rate of Return

Quick Start Guide

ROI_Model_FregoEnvisi

Home | Insert | Page Layout | Formulas | Data | Review | View | Add-Ins | Acrobat

Paste | Cut | Copy | Format Painter | Clipboard | Arial | 10 | Font | Wrap Text | Merge & Center | Alignment | General | Number

O20

ENVISION Tomorrow
suite of urban and regional planning tools

FREGONESE ASSOCIATES

Envision Tomorrow™ Return on Investment Model

Version 3.1 Updated February 16, 2012

What is the ROI Model?

Do you want to examine redevelopment potential in your city? Do you want to study the relationship between land use regulations and the current development market?

The ROI Model is a versatile, easy-to-use tool that can be used to test the physical and financial feasibility of a proposed development or existing development regulations. The ROI Model considers a range of factors including parking, height and use requirements, costs associated with construction, fees, rents and subsidies. The ROI Model allows you to model single-use and mixed-use buildings at a range of scales.

Quick Start Guide

A few quick and easy steps will get you started at modeling prototype buildings and testing land use regulations.

1. Save this file with a new name.

2. Gather data for use in the ROI Model.

- Existing land use regulations (e.g. parking requirements, height limits, landscaping, setbacks)
- Local estimates for construction costs, rents, sales prices, and land values
- Local tax rates

3. Work through the Physical, Parking, Financial and Fiscal Impact tabs.

Using the data you have gathered, enter data into the pink Input Cells of each Input Tab in the ROI Model: Physical, Parking Layout, Parking, Basic Financial, Advanced Financial, Affordable Housing (optional) and Fiscal Impact. If you have questions, the Envision Tumorrow user manual as well as embedded comments (hover over cells with a red corner for more information) are available to provide answers to common questions.

TAB Color Definition	
Input Tab	
Output Tab	
Reference Tab	

CELL Color Definition	
Input Cell	
Header Cell	

Quick Start Guide | Physical | Basic Financial | Advanced Financial | PRINT_SUMMARY | Rental Pro Forma | Owner

Ready

Prototypes Based on Market Research: Allows for "Reality-based Visualizations"

Use Prototypes for Reality-based Visualizations and 3D Modeling

Beaverton Civic Plan

Canyon Road

Barbur Concept Plan

13th Avenue – Perpendicular Main Street

Barbur Concept Plan
Scenario 1: Commercial Investments

Barbur Concept Plan
Scenario 1: Commercial Investments

Barbur Concept Plan
Scenario 2: Main Street

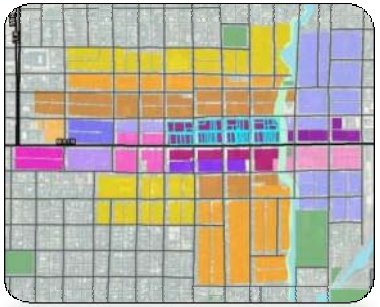
Barbur Concept Plan
Scenario 3: Moderate Mixed Use

Barbur Concept Plan
Scenario 4: Higher Intensity Mixed Use

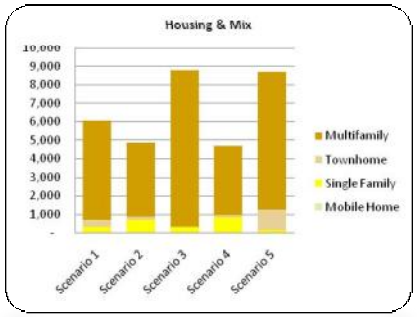
Scenario Building Process

Building Types

Development Types



Scenario Development



Evaluation

2

Step 2: Define the buildings, streets and amenities that make up all the "places" in which we live, work and play.

Development Type Mix

A Variety of Buildings, Streets and Amenities Create a "Place"

Regional Commercial District

Urban Neighborhood

Suburban Neighborhood

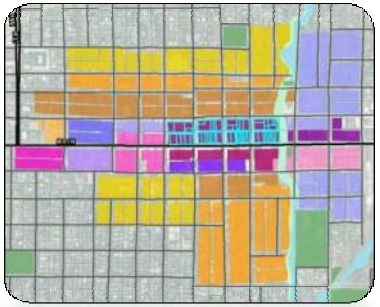
Development Types are Scalable from Parcels to Districts

- Include one or many building types depending on scenario planning geography
- Parcels, Census Blocks, uniform grid

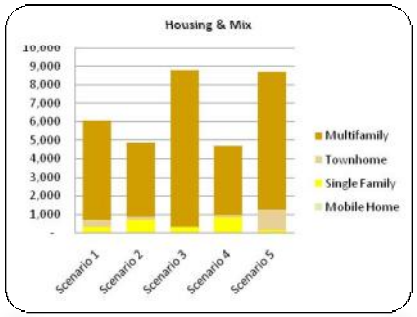
Scenario Building Process

Building Types

Development Types



Scenario Development



Evaluation

3

Step 3: Painter future land use scenarios to test the implications of different decisions or policies.

Scenario Builder:

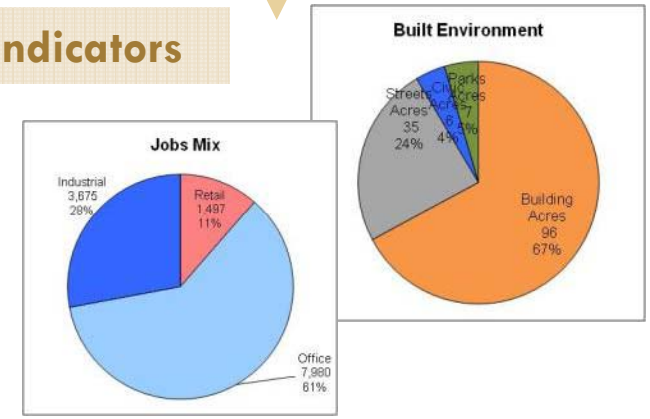
Scenario Painter for ArcGIS

- Quickly paint scenarios using financially feasible building blocks
- Compare multiple scenarios across variety of indicators
- Track progress in real-time

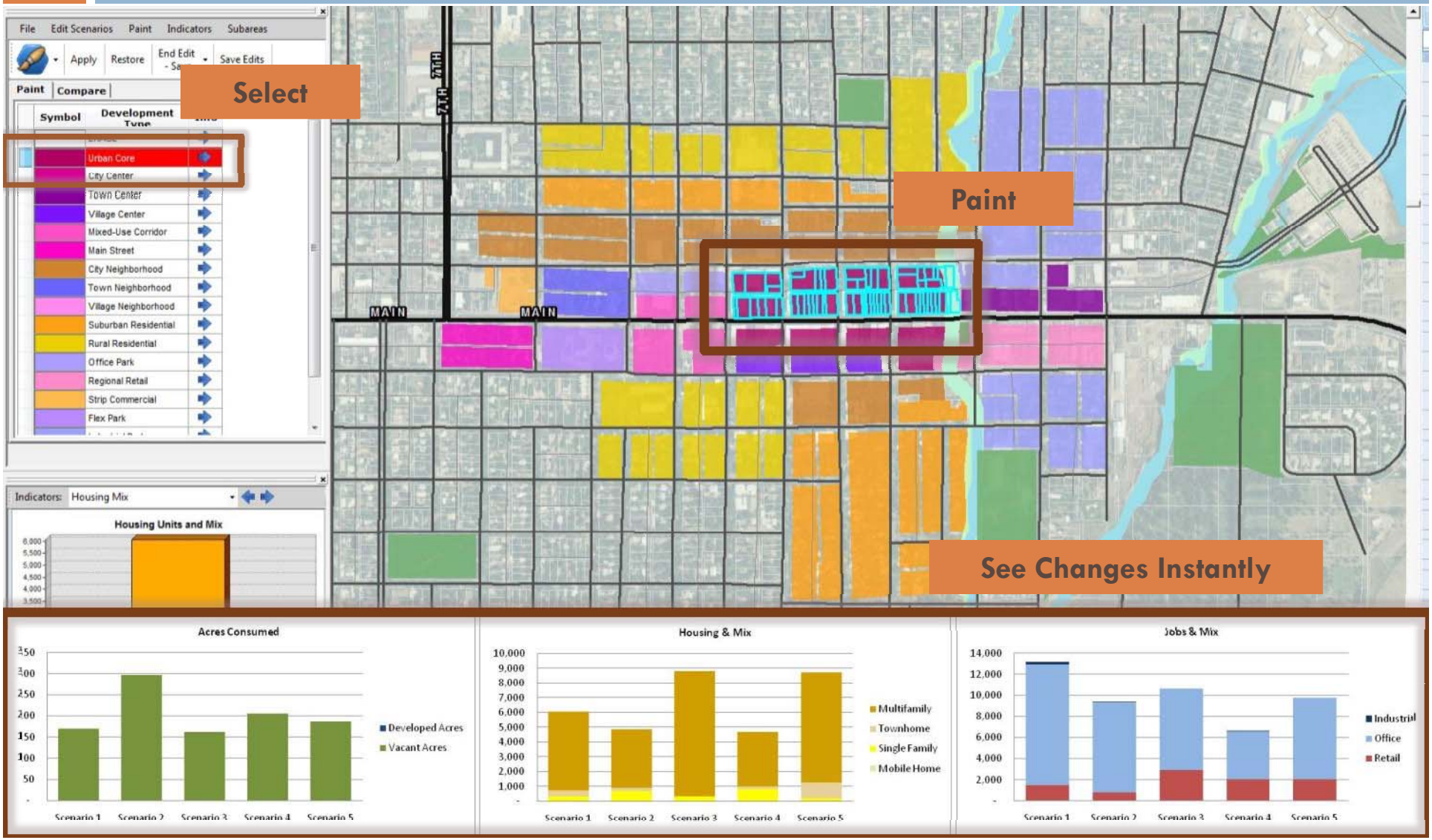
Buildings

Scenarios

Indicators



Real-time Scenario Building and Evaluation

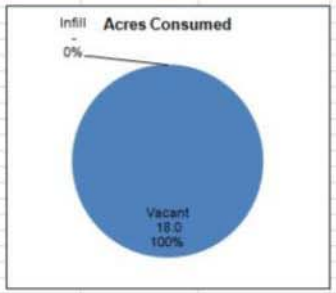


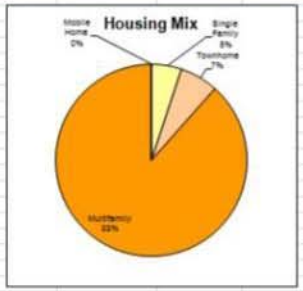
Monitor Indicators in Real-time

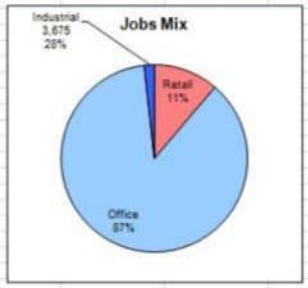
Detailed Tables

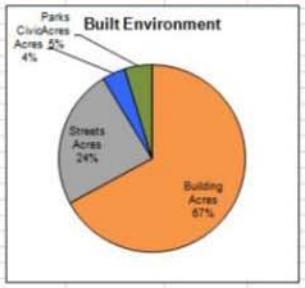
Enter Scenario Name or Theme	Acres Consumed			Total Acres	Total Housing Units	Housing Mix				Total Jobs	Employment Mix			Built Environment			
Dev type	Total Vacant Acres	Total Developed Acres	Discounted Developed Acres (*Redev %)			Single Family	Townhome	Multifamily	Mobile Home		Retail	Office	Industrial	Building Acres	Streets Acres	Civic Acres	Parks Ac
Urban Core	13.6	-	-	13.6	2,179	-	-	2,179	-	11,838	888	10,950	-	9.26	3.40	0.54	
City Center	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Town Center	3.4	-	-	3.4	343	-	-	343	-	121	121	-	-	2.32	0.85	0.14	
Village Center	3.2	-	-	3.2	132	-	-	132	-	113	113	-	-	2.17	0.80	0.13	
Mixed-Use Corridor	5.7	-	-	5.7	149	-	-	149	-	199	199	-	-	3.80	1.42	0.23	
Main Street	4.0	-	-	4.0	2,567	-	-	2,567	-	-	-	-	-	2.65	0.99	0.16	
City Neighborhood	24.5	-	-	24.5	344	-	344	-	-	-	-	-	-	16.44	6.14	0.98	
Town Neighborhood	4.0	-	-	4.0	50	-	50	-	-	-	-	-	-	2.67	1.00	0.16	
Village Neighborhood	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Suburban Residential	35.9	-	-	35.9	210	210	-	-	-	-	-	-	-	24.07	8.62	1.44	
Rural Residential	34.3	-	-	34.3	100	100	-	-	-	-	-	-	-	22.96	8.23	1.37	
Office Park	1.9	-	-	1.9	-	-	-	-	-	487	-	487	-	1.30	0.47	0.08	
Regional Retail	5.6	-	-	5.6	-	-	-	-	-	98	98	-	-	3.74	1.28	0.22	
Strip Commercial	2.1	-	-	2.1	-	-	-	-	-	62	62	-	-	1.42	0.49	0.08	
Flex Park	3.7	-	-	3.7	-	-	-	-	-	27	-	-	27	2.51	0.86	0.15	
Industrial Park	27.5	-	-	27.5	-	-	-	-	-	201	-	-	201	18.42	6.32	1.10	
Totals	169.5	-	-	**169.5**	**6,073**	310	394	5,370	-	**13,145**	1,480	11,437	228	**114**	**41**	**7**	
			0%			5.1%	6.5%	88.4%	0.0%		11.3%	87.0%	1.7%	67.1%	24.1%	4.0%	
			0%		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	

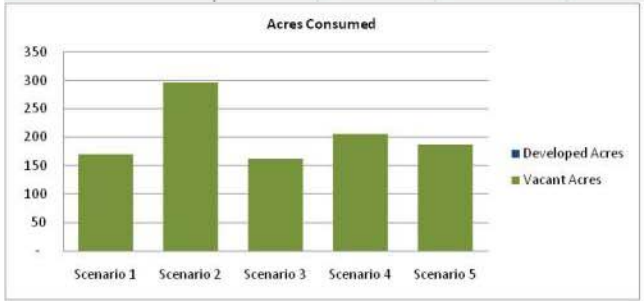
Quick Reference Graphs

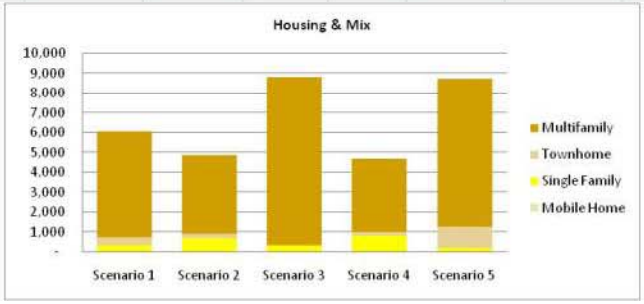


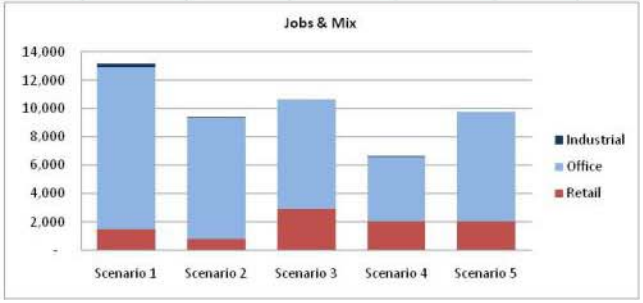






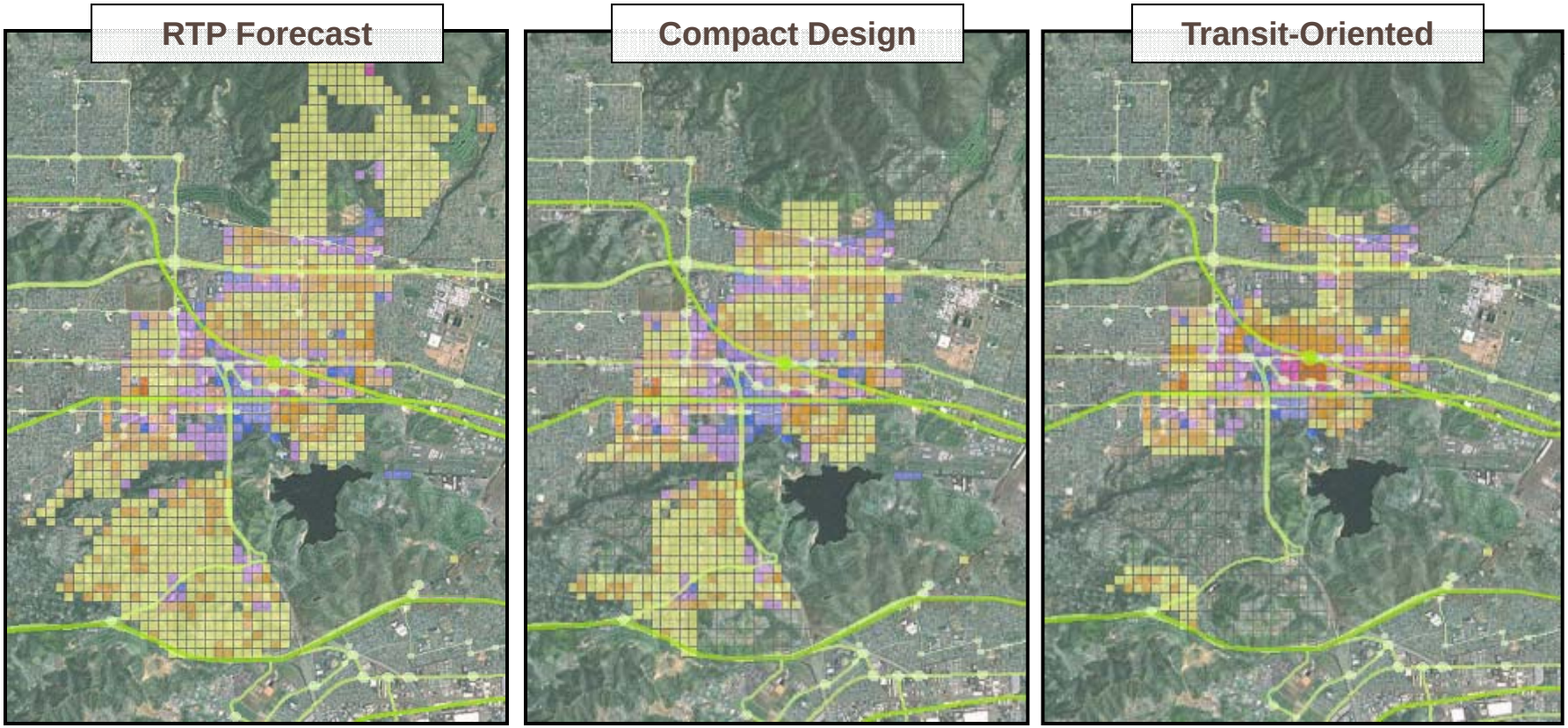




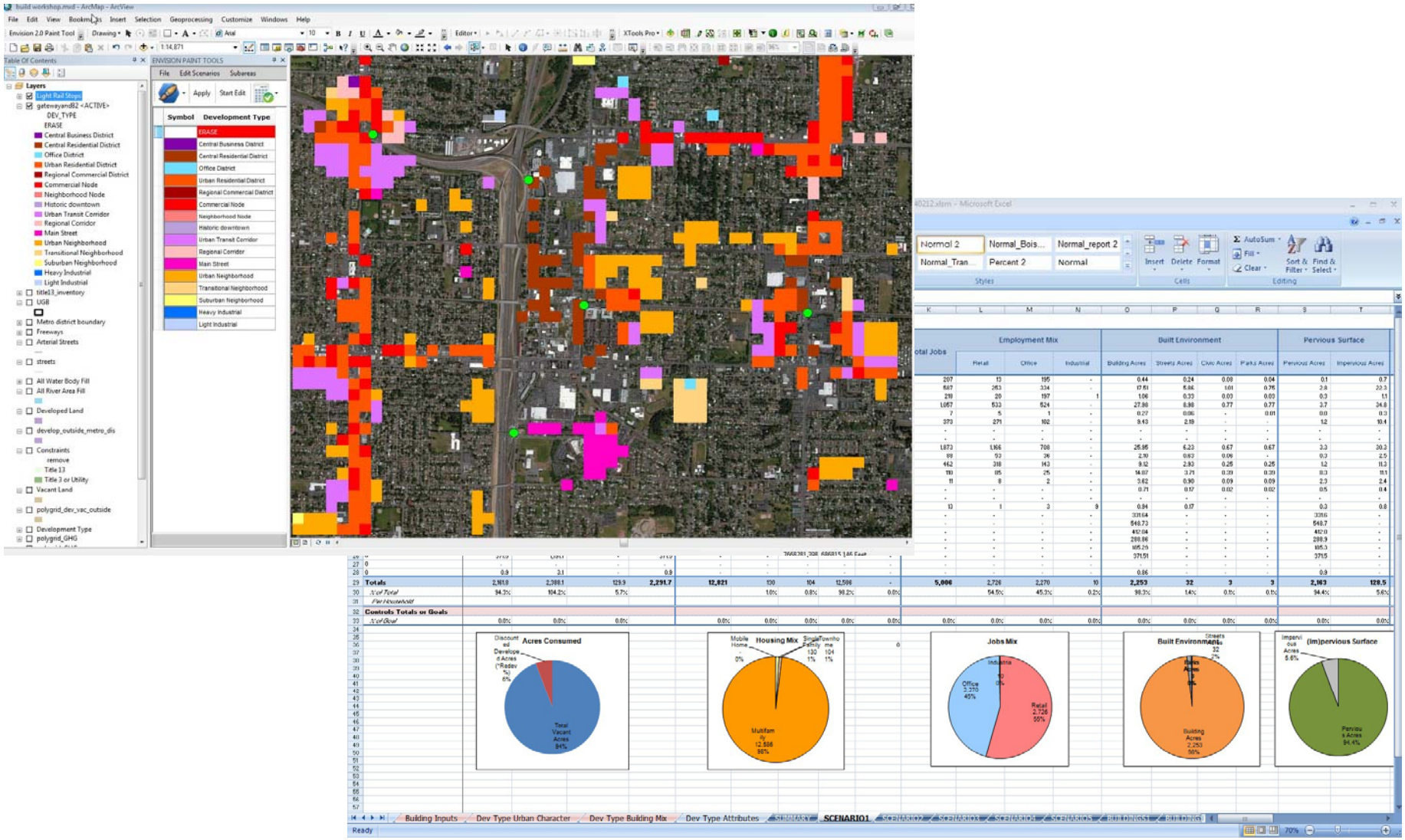


Design and Test Multiple Scenarios

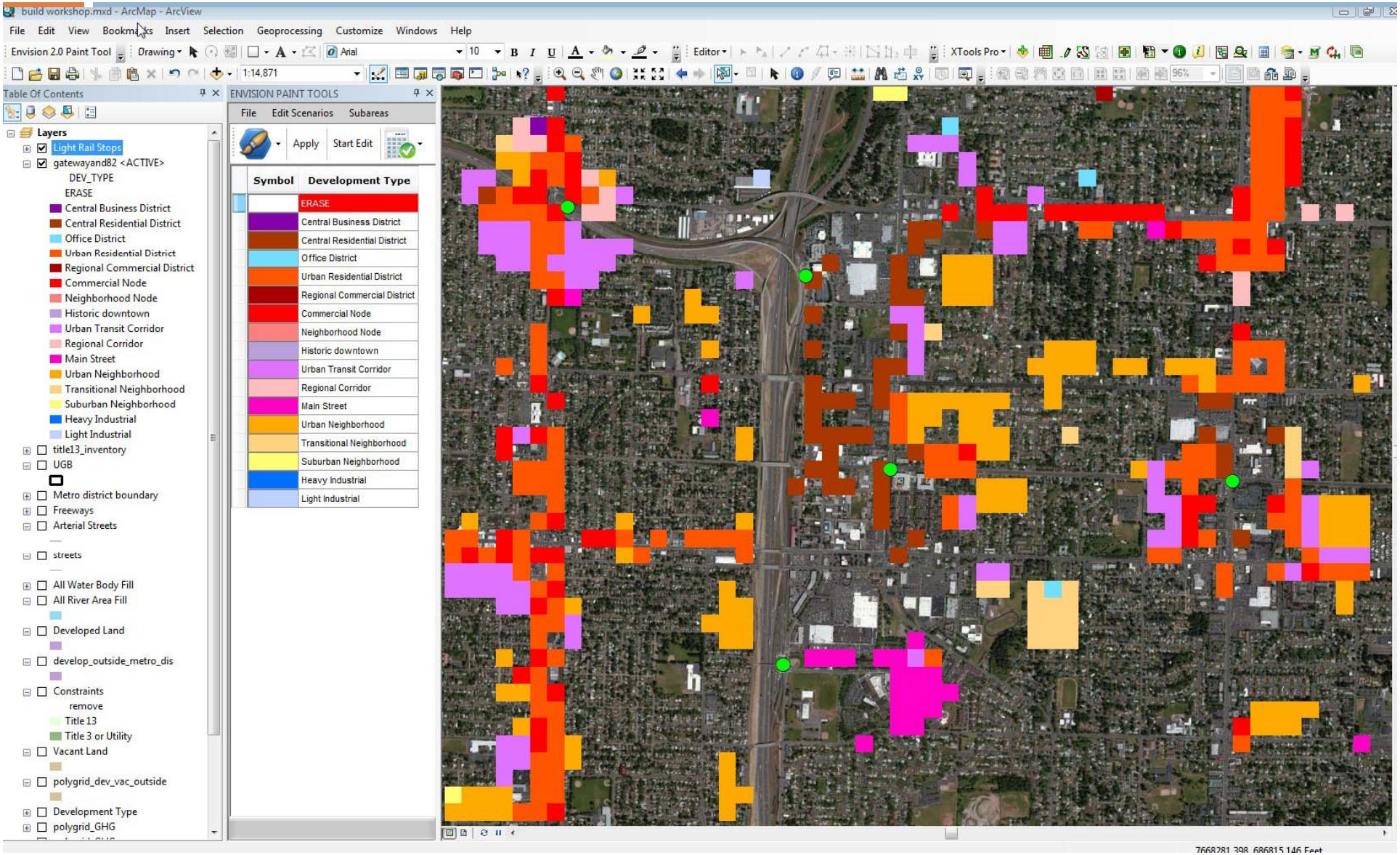
- Test land use policies
- Experiment with new development patterns



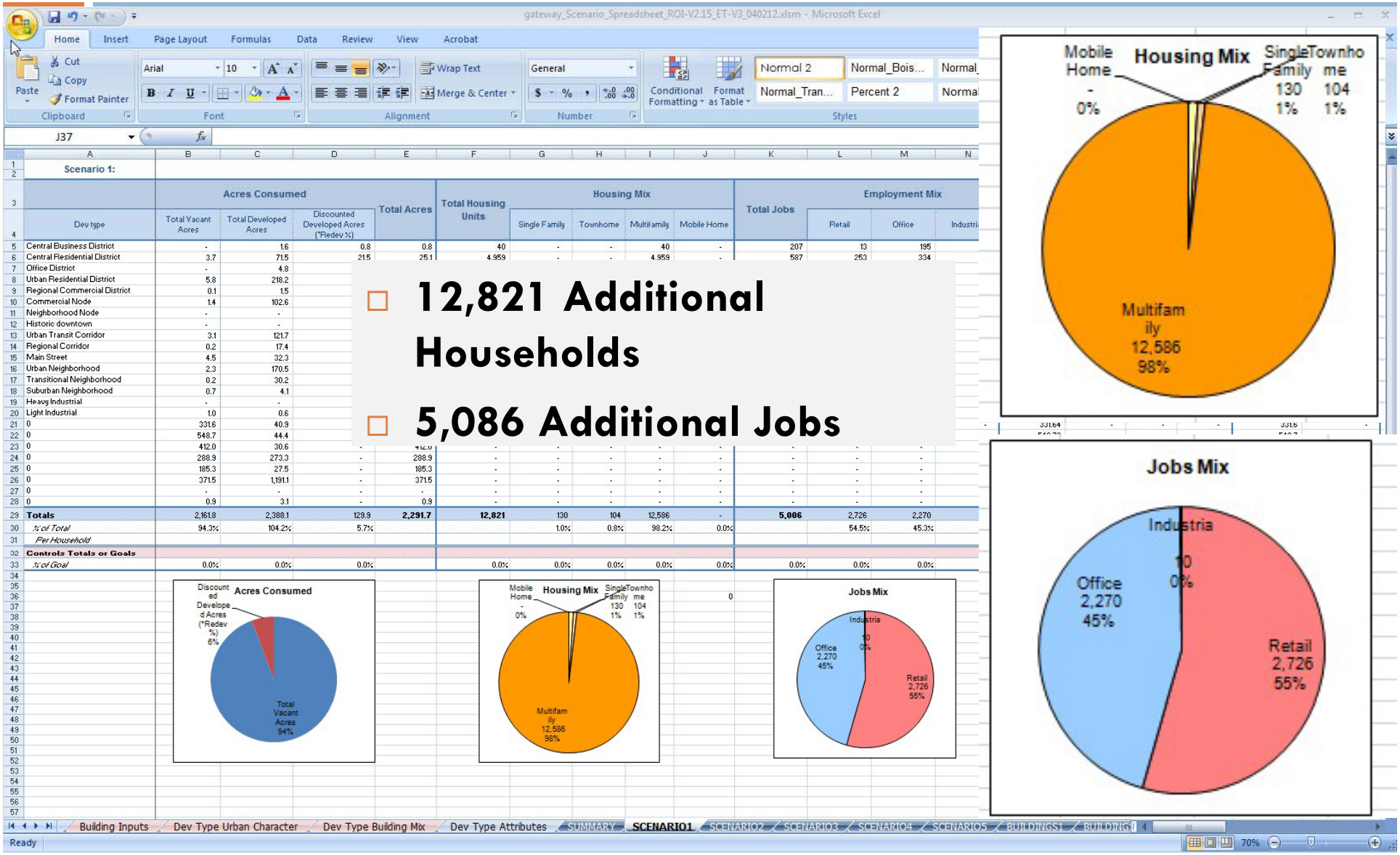
Example – Testing Job Growth In Gateway



Gateway Regional Center: Reference Case – Land Use Delta

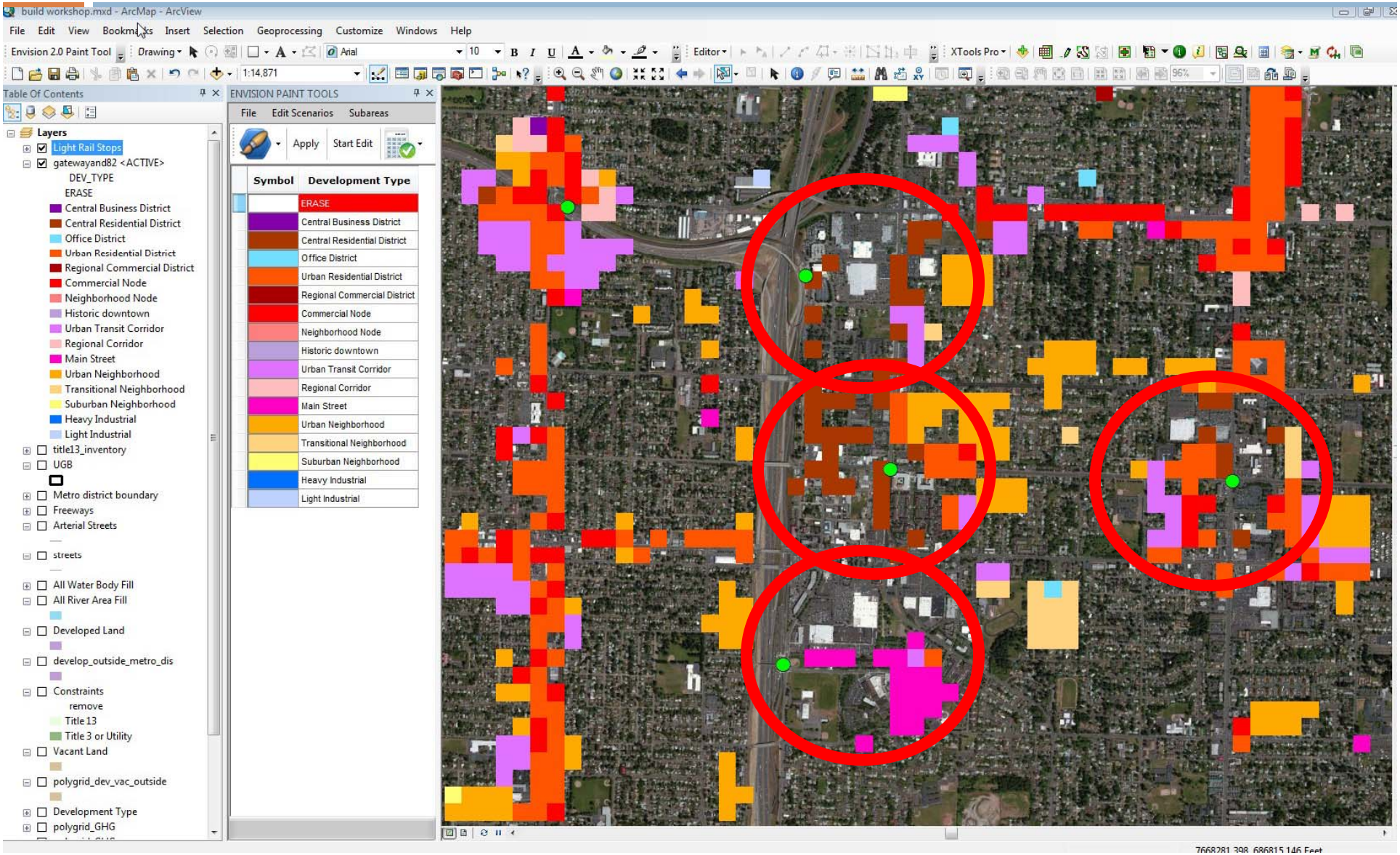


Gateway Regional Center: Reference Case Scenario Spreadsheet

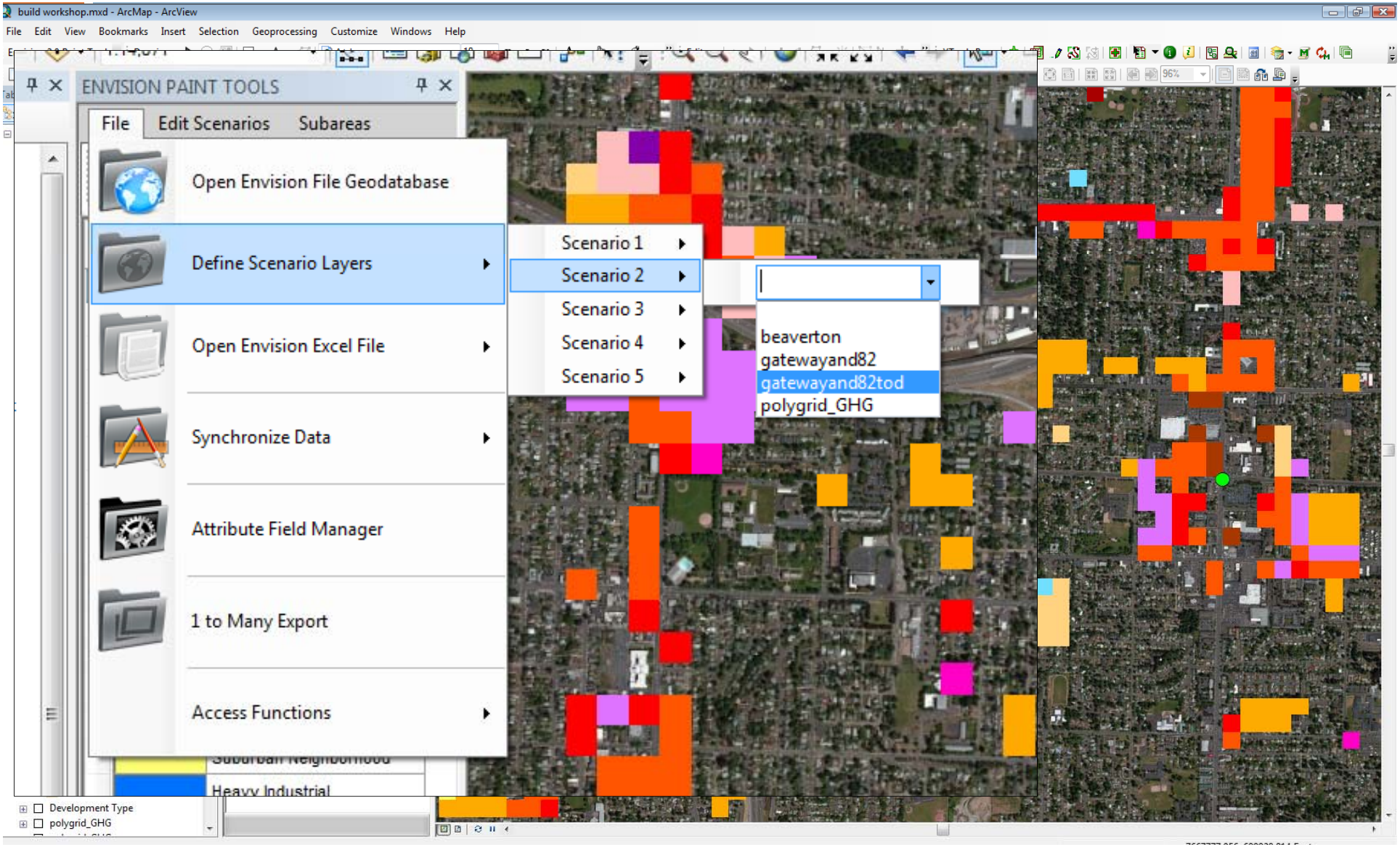


- **12,821 Additional Households**
- **5,086 Additional Jobs**

Gateway Regional Center: Test Scenario – Increased TOD



Gateway Regional Center: Test Scenario – Increased TOD



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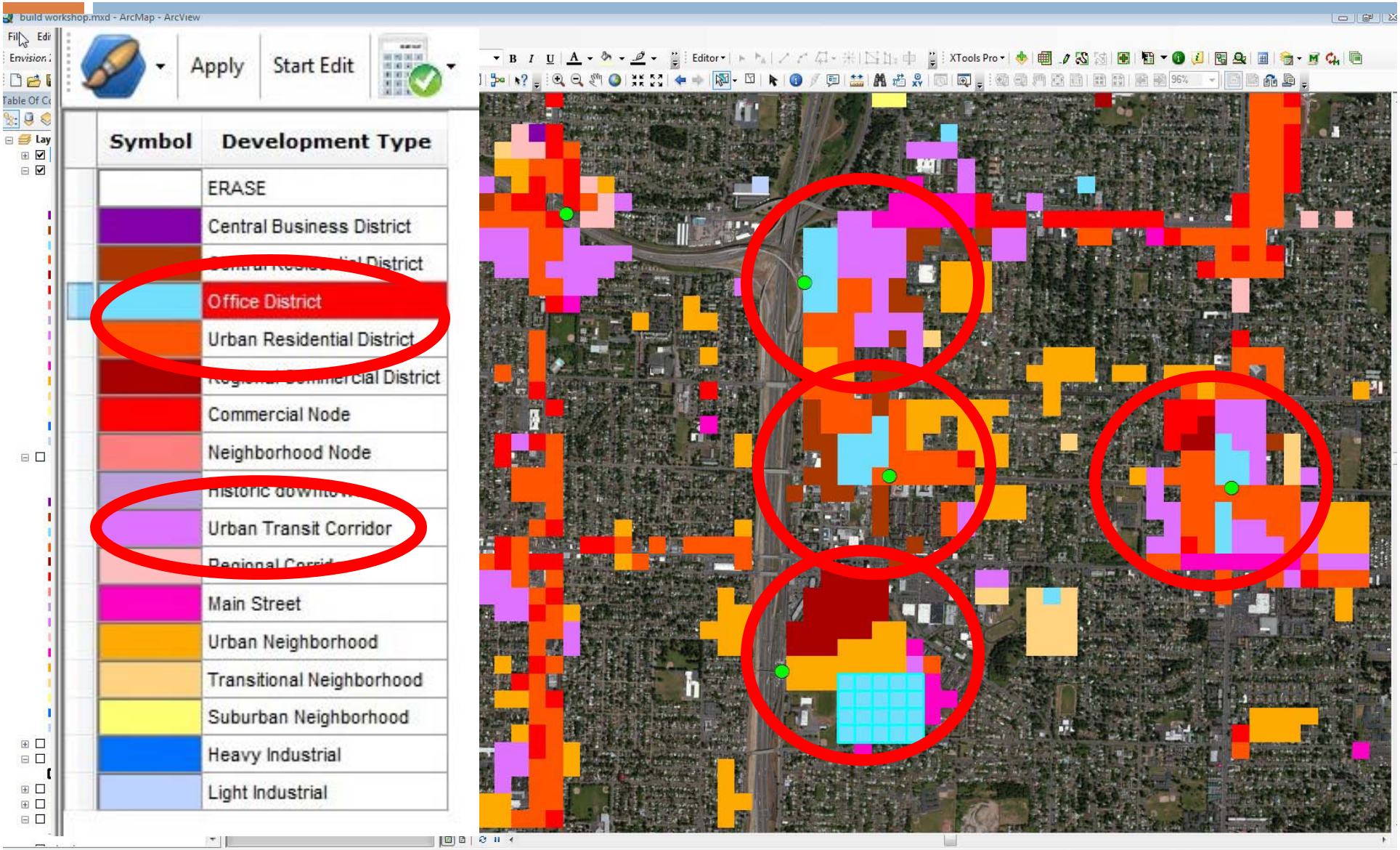
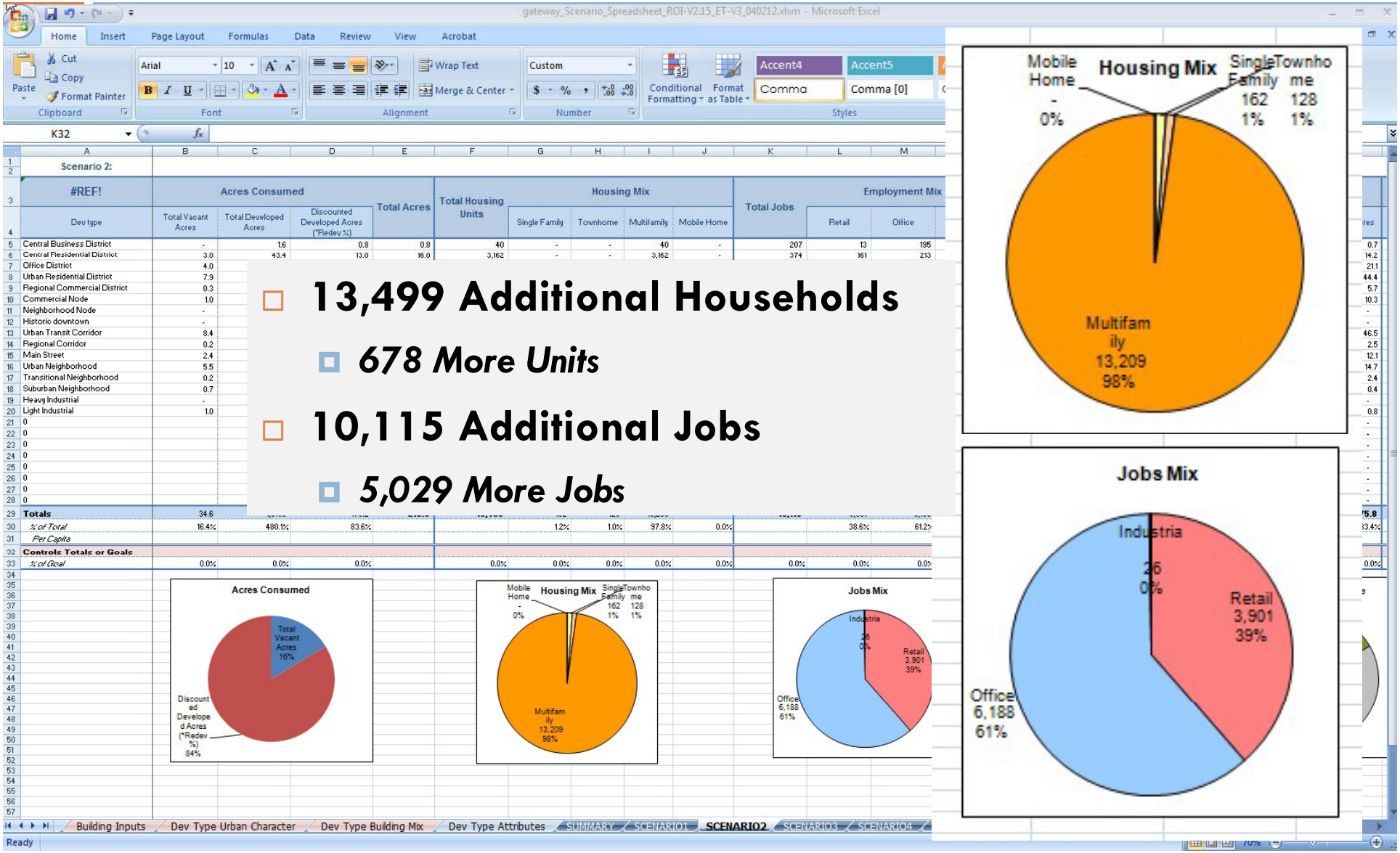


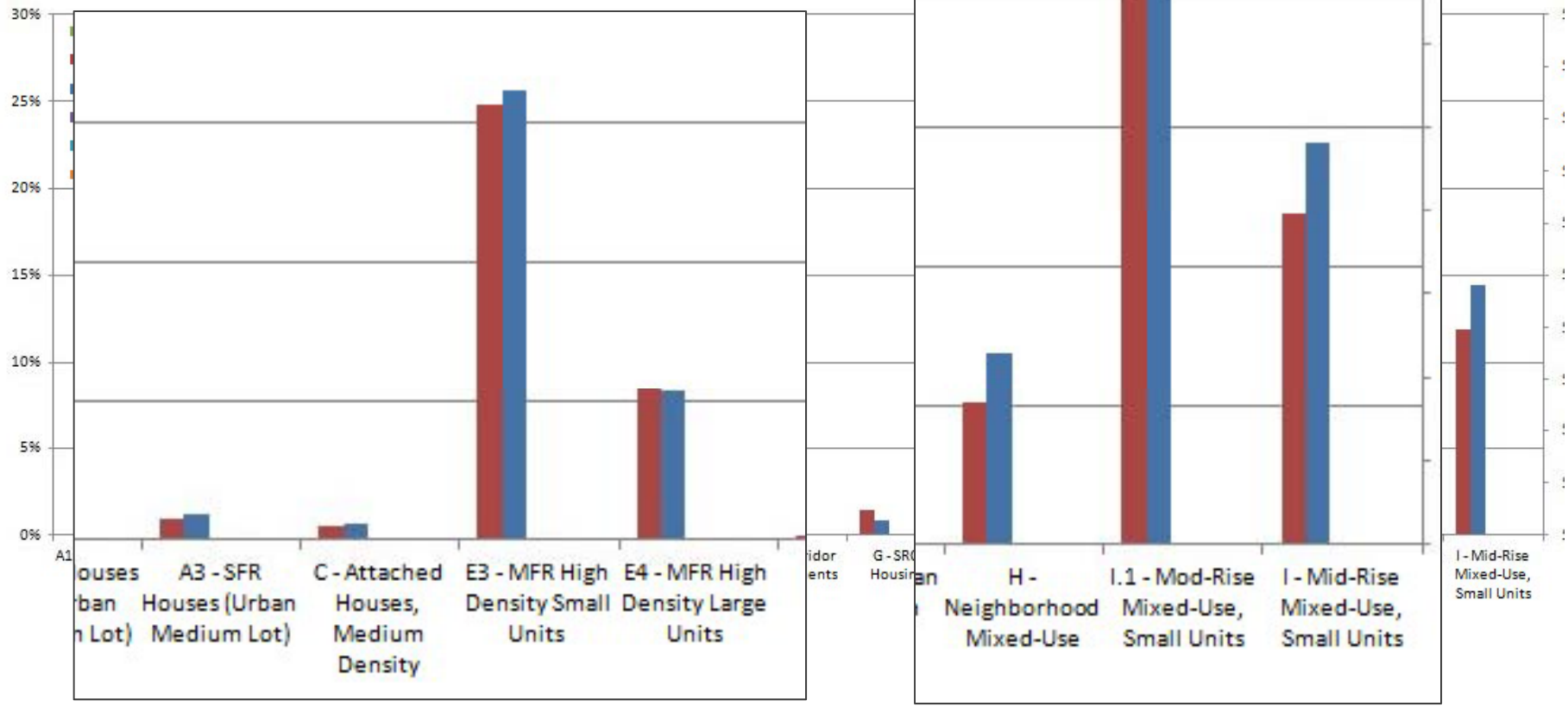
Gateway Regional Center: Test Scenario – Increased TOD



- **13,499 Additional Households**
  - ***678 More Units***
- **10,115 Additional Jobs**
  - ***5,029 More Jobs***

Comparison – Housing Units Change by Development Type

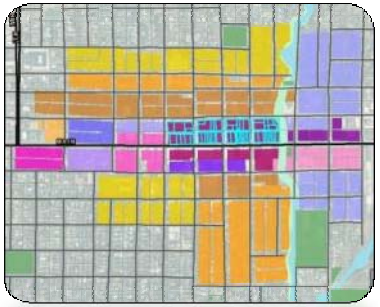
B	C	D	E	F	G	H	L
Existing		Scenario 1		Scenario 2		S	Scenar
		1,523	12%	1,951	14%		-



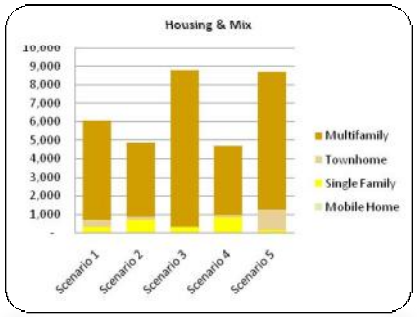
Scenario Building Process

Building Types

Development Types



Scenario Development



Evaluation

4

Step 4: Compare the scenarios and monitor the impact of land use decisions in real-time.

Scenario Indicators

- ***Anything we can know about a building, we can know about a scenario…***
  - Housing and Jobs: mix and density
  - Land Consumption: vacant, agricultural, infill
  - Housing Affordability
  - Employment Profile: sq ft, jobs, income
  - Resource Usage: energy and water
  - Waste Production: water, solid, carbon emissions
  - Fiscal Impact: local revenue and infrastructure costs

Superstition Vistas

Final Report & Strategic Actions

Full Report from the Consulting Team to the Steering Committee

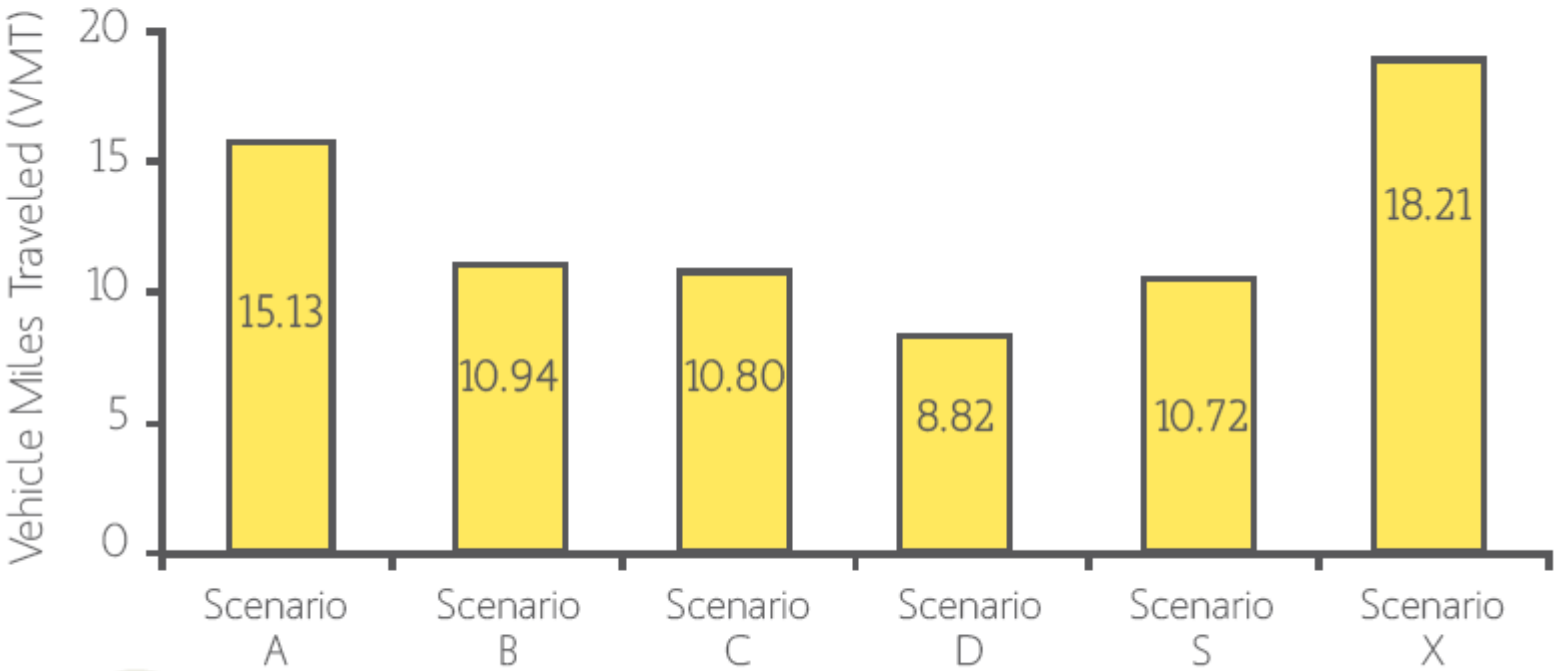
A Vision for 21st Century Opportunities

Spring 2011

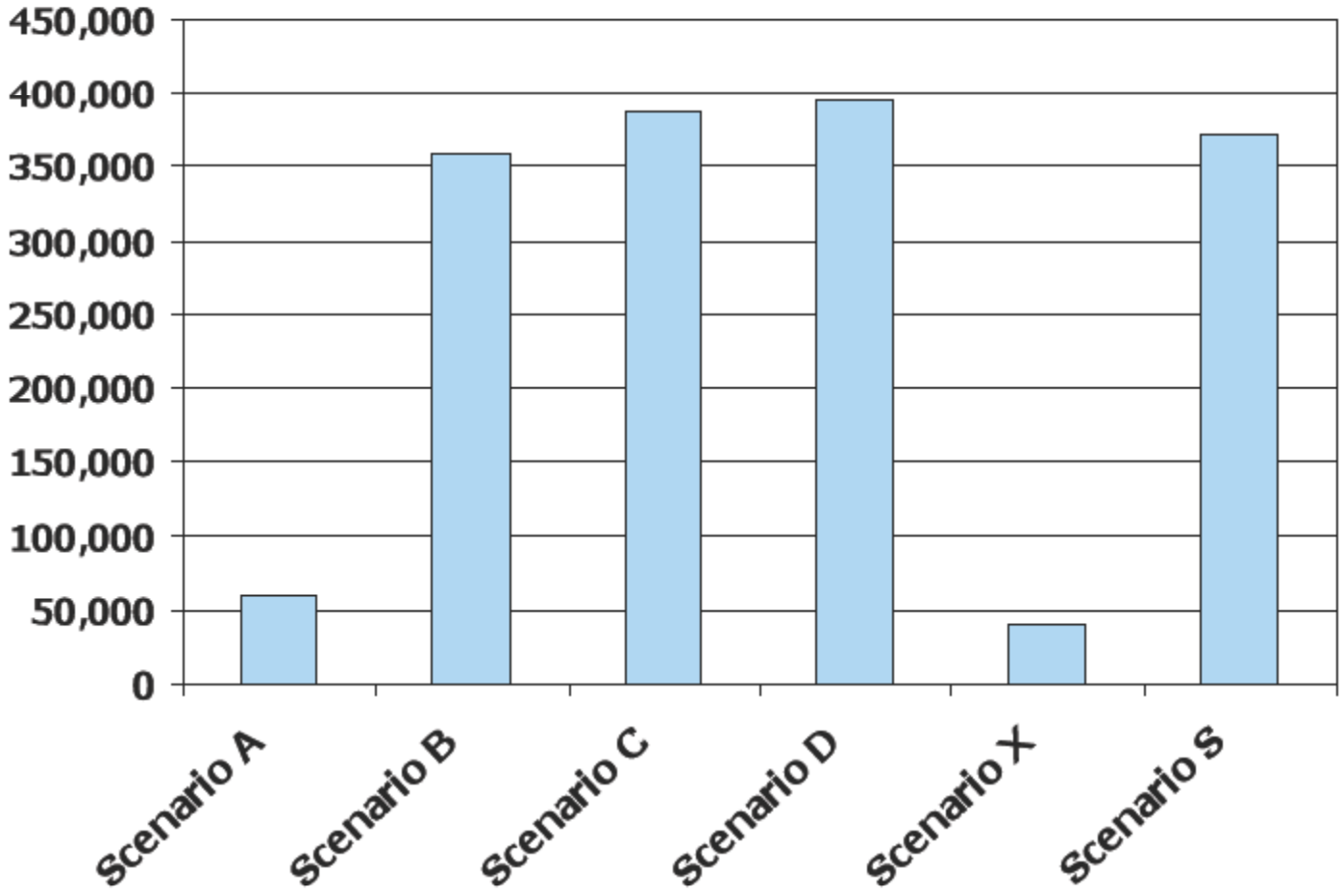
Land Developed per Capita (acres)

Source: Fregonese Associates

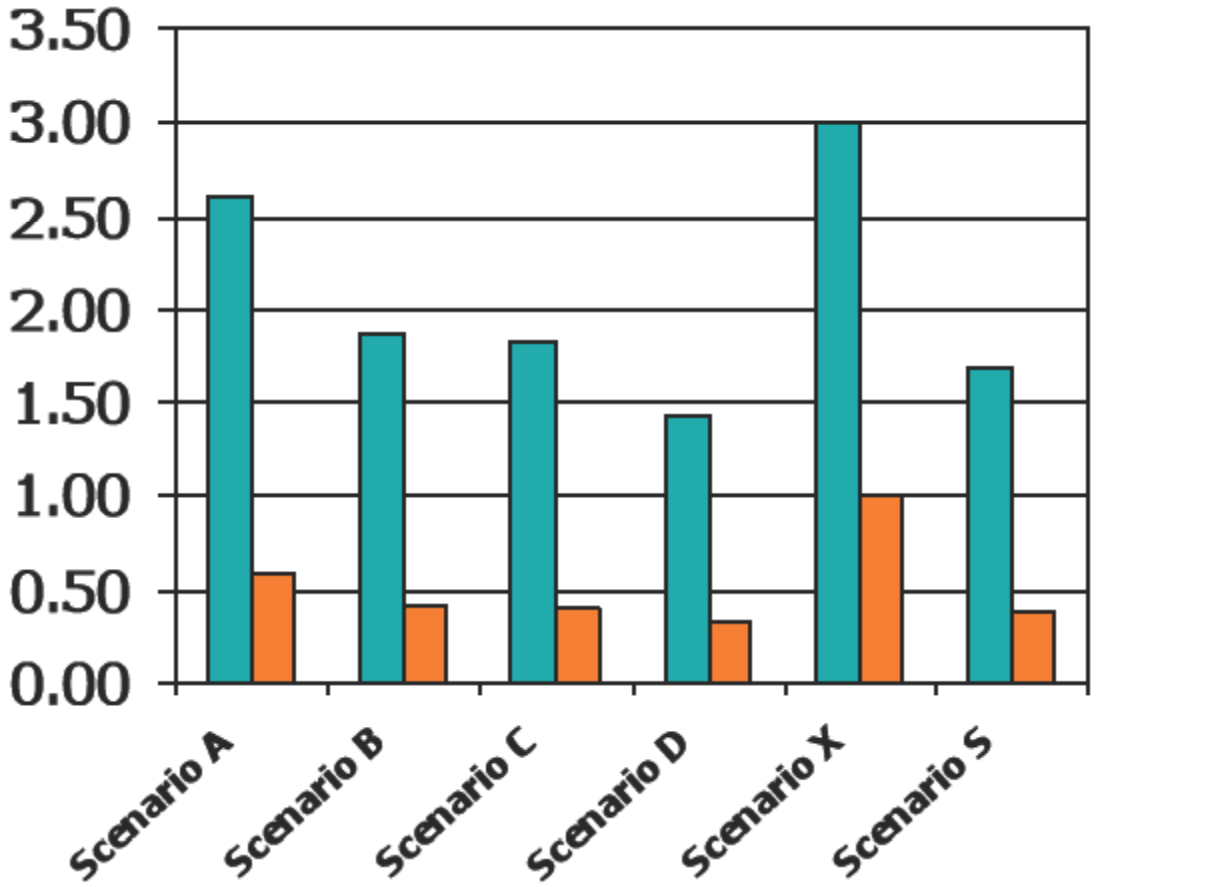
Miles Traveled per Capita



Daily Transit Ridership



Transportation Emissions: Tons of CO2 per Year

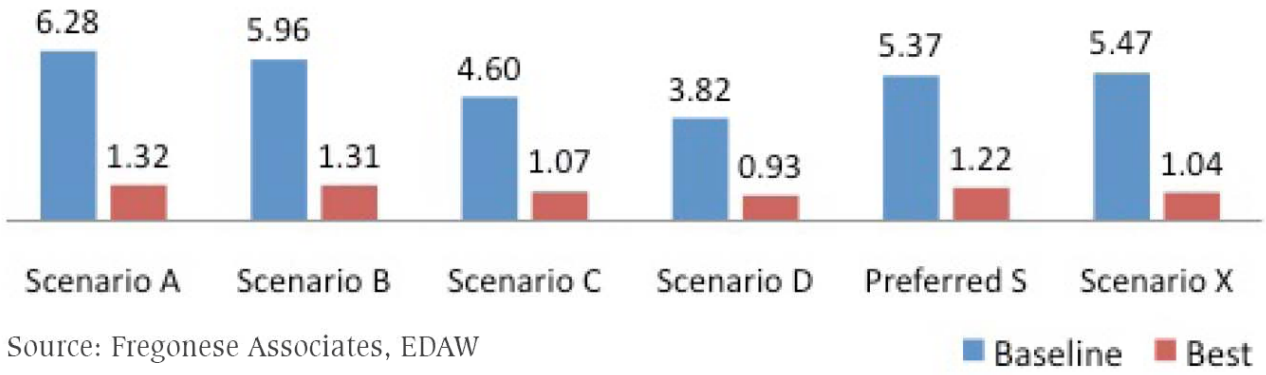


Source: Kimley Horn, Fregonese Associates

Fleet 1: 22.5 MPG, 0% Electric

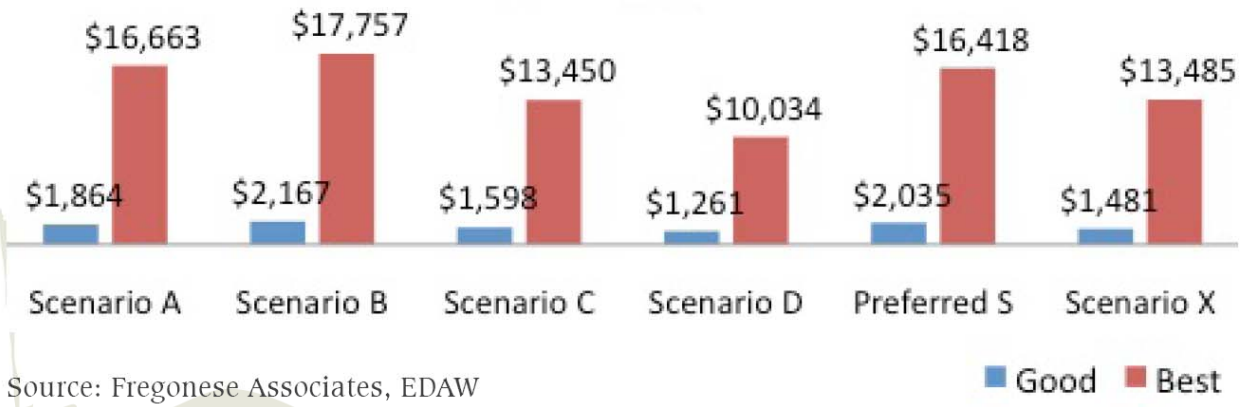
Fleet 4: 60 MPG, 20% Electric or Renewable Fuel

Building CO2 Emissions per Capita (tons/yr/capita)



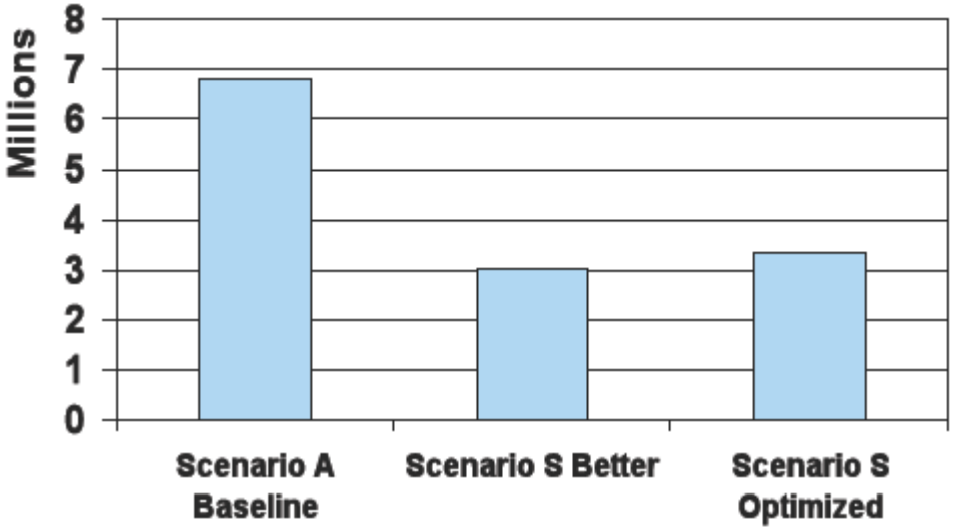
Source: Fregonese Associates, EDAW

Building Efficiency Improvement Costs per Capita ($/yr/capita)

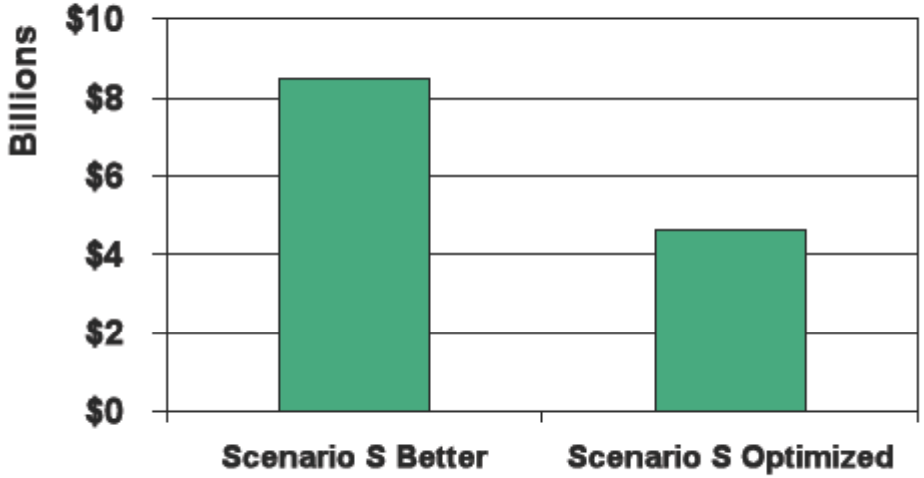


Source: Fregonese Associates, EDAW

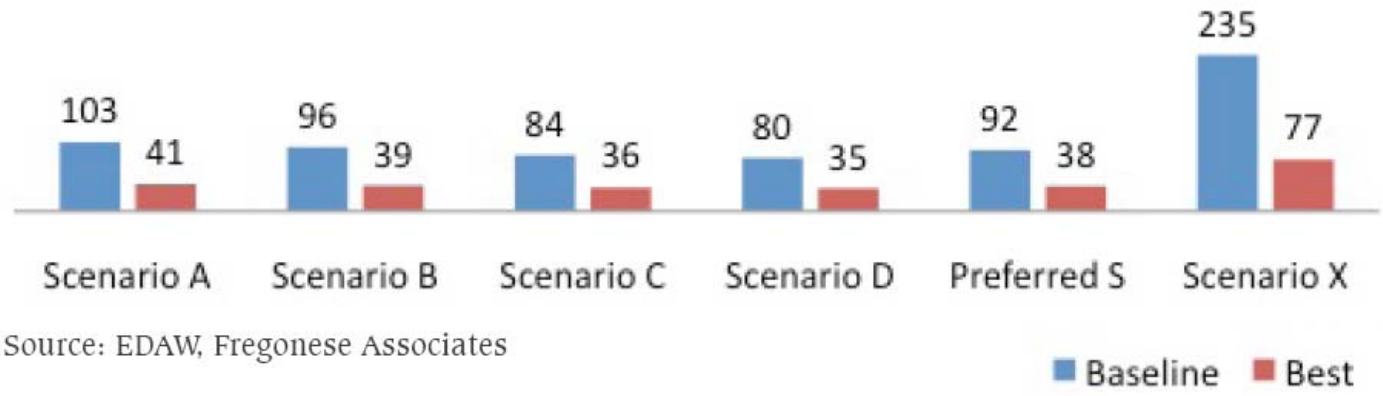
CO2 Emissions Comparison (lbs/yr)



Optimizing Energy Efficiency Costs

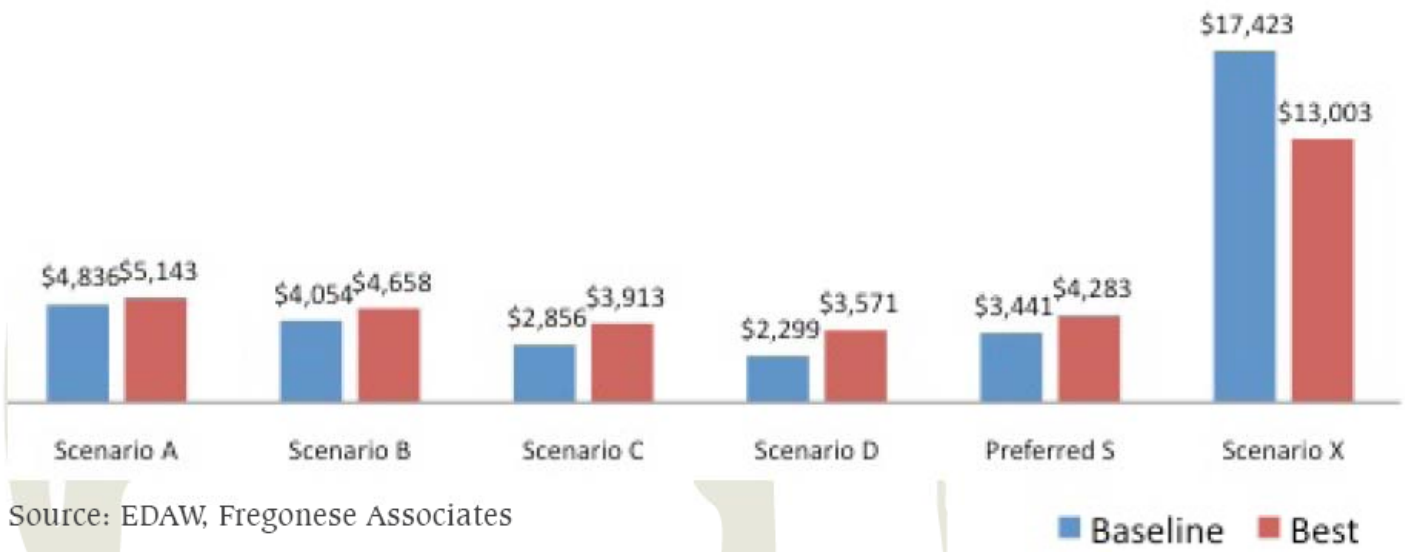


Total Water Demand per Capita (gal/day/capita)



Source: EDAW, Fregonese Associates

Total Water Demand Cost per Capita ($/year/capita)



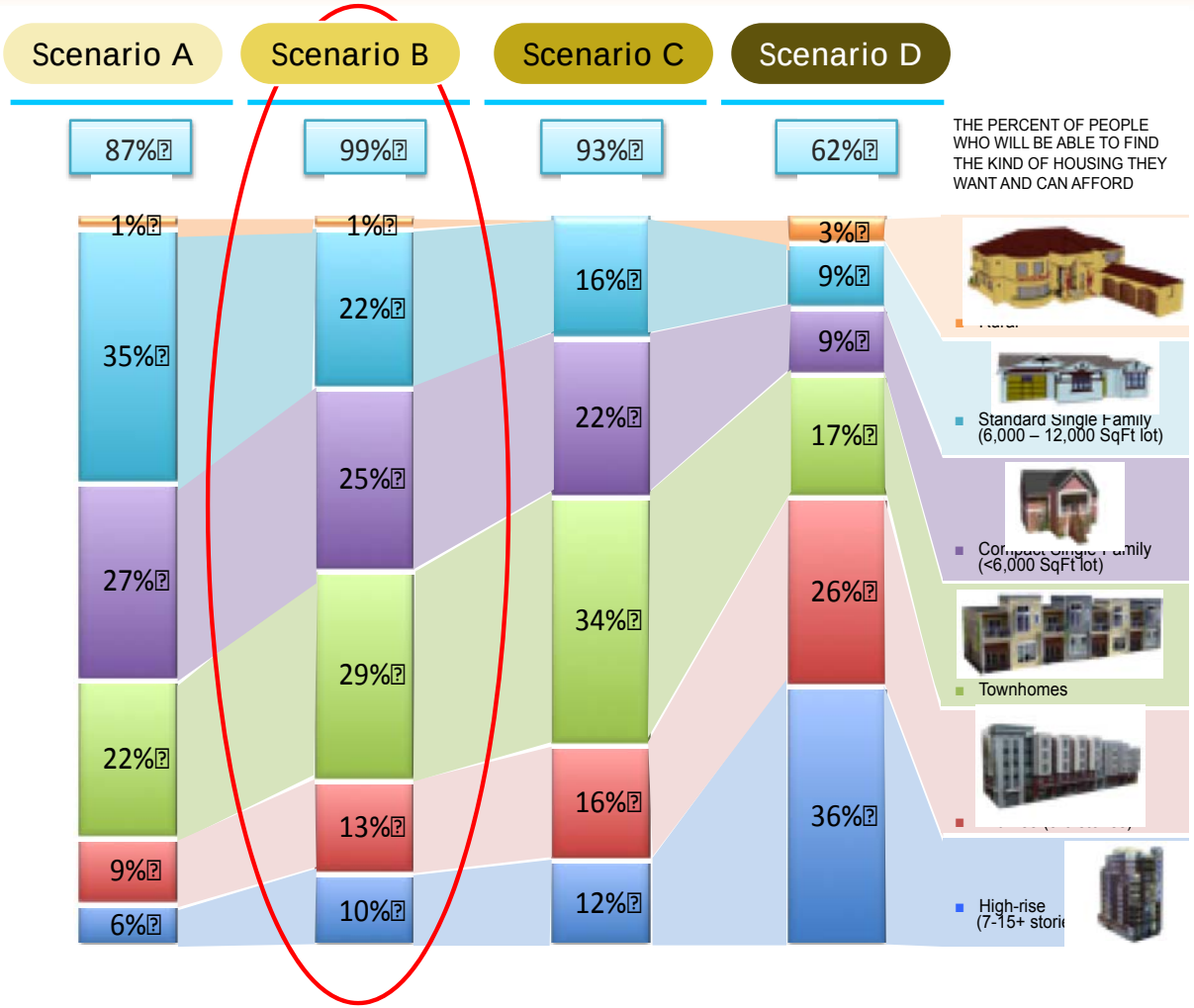
Source: EDAW, Fregonese Associates

OUR GREATER SAN DIEGO VISION

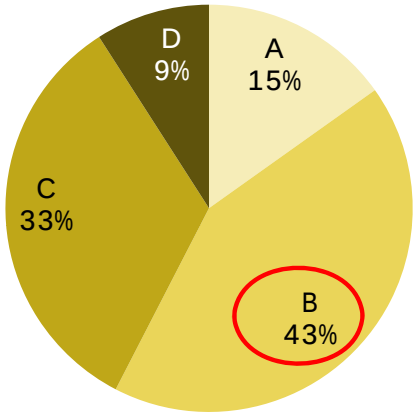
San Diego Values and Priorities Results

June 14, 2012

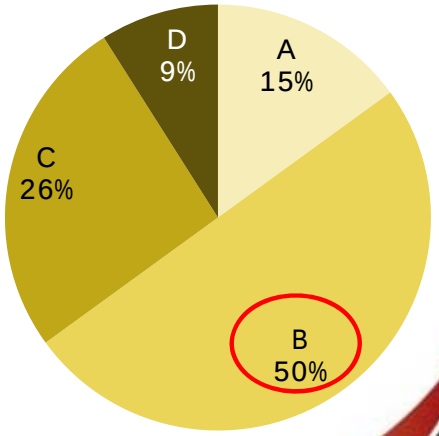
Mix of Housing Preferences



Choosing Tool



Scientific Study



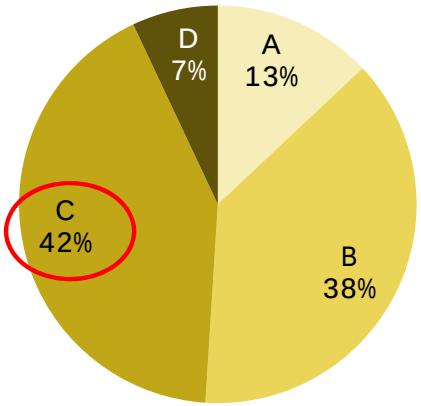
BASE: Choosing Tool (n=18,023); Scientific Study (n=533)

Q310. One of the biggest differences among the scenarios is the extent to which they provide the mix of housing experts project San Diegans will want and afford over the next forty years. Considering the mix of housing and the ability for consumers to find the type of housing they want in each of the four scenarios, select which one you think is the best for the future of the region.

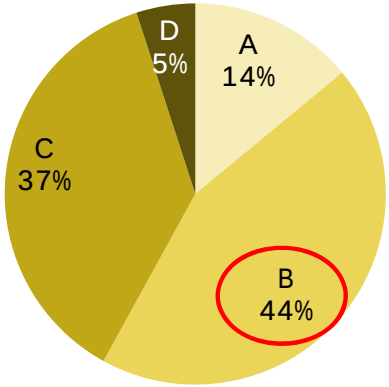
Housing Impact Preferences

Scenario A	Scenario B	Scenario C	Scenario D
The housing mix follows past growth trends. Most people live in single family homes.	The mix of housing matches what people are projected to want.	The mix of housing shifts towards townhomes and compact development.	Most new housing is multifamily, and much of that is in high-rise buildings in very urban environments.
HOUSING COST PER SQUARE FOOT			
$$$	$$$	$$$	$$$$
PERCENT OF COUNTY URBANIZED IN 40 YEARS			
17.9%	17.4%	16.1%	17.5%
OUTDOOR WATER CONSUMPTION (gallons per day/household)			
207	196	157	214
GROWTH ON AGRICULTURAL LAND (acres)			
10,582	4,623	1,521	11,340

Choosing Tool



Scientific Study



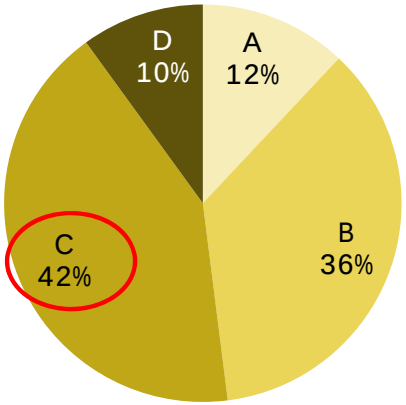
BASE: Choosing Tool (n=17,989); Scientific Study (n=533)

Q315. The mix of housing provided over the next forty years also impacts each of the factors below. After considering these factors, please select again which scenario you think is the best for the future of the San Diego region.

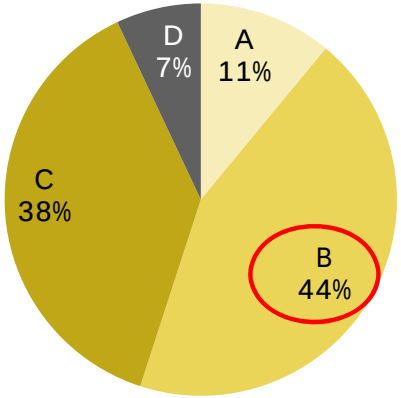
Quality of Life Impact Preferences

Scenario A	Scenario B	Scenario C	Scenario D
Much housing growth happens in bedroom, auto-oriented communities.	Shopping, parks, transit stops, and other amenities are close to home.	Shopping, parks, transit stops, and other amenities are close to home.	Most growth happens within existing communities, primarily in the city of San Diego.
PERCENT OF SAN DIEGANS WITHIN WALKING DISTANCE OF PUBLIC TRANSPORTATION			
26%	29%	30%	41%
DAILY COMMUTE TIME (minutes)			
00:57	00:55	00:54	00:56
GREENHOUSE GAS EMISSIONS (million tons per year)			
116	113	112	115
IMPACT TO EXISTING NEIGHBORHOODS & COMMUNITIES (percent of growth that is infill)			
11%	29%	34%	49%

Choosing Tool



Scientific Study



BASE: Choosing Tool (n=17,966); Scientific Study (n=533)

Q320. How growth is organized affects the kinds of communities we live in, how long we have to travel, our carbon footprint, and how we get around. Consider the growth patterns in each of the scenarios and their impacts and select which one you think is the best for the future of the San Diego region.

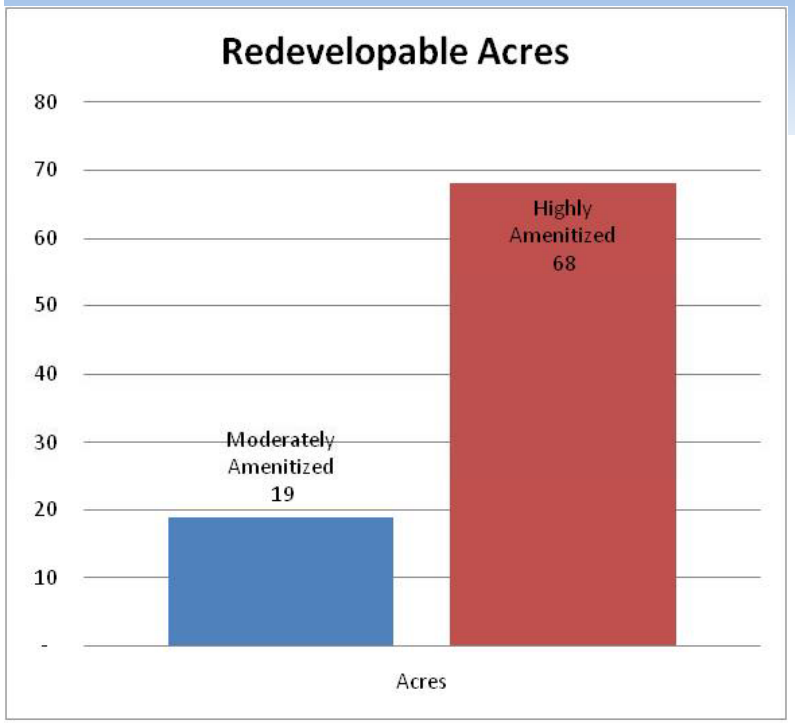
The Impact of Public Amenities on Development Feasibility

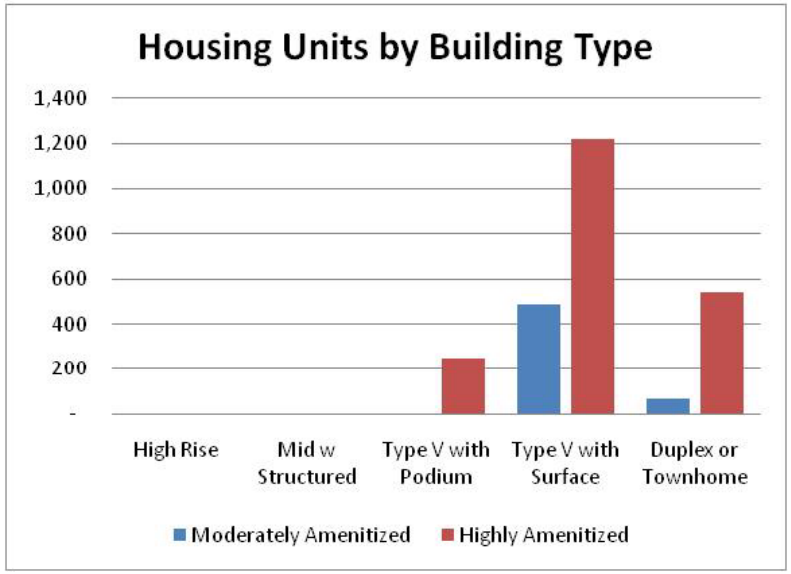
Initial Findings

October 8, 2010

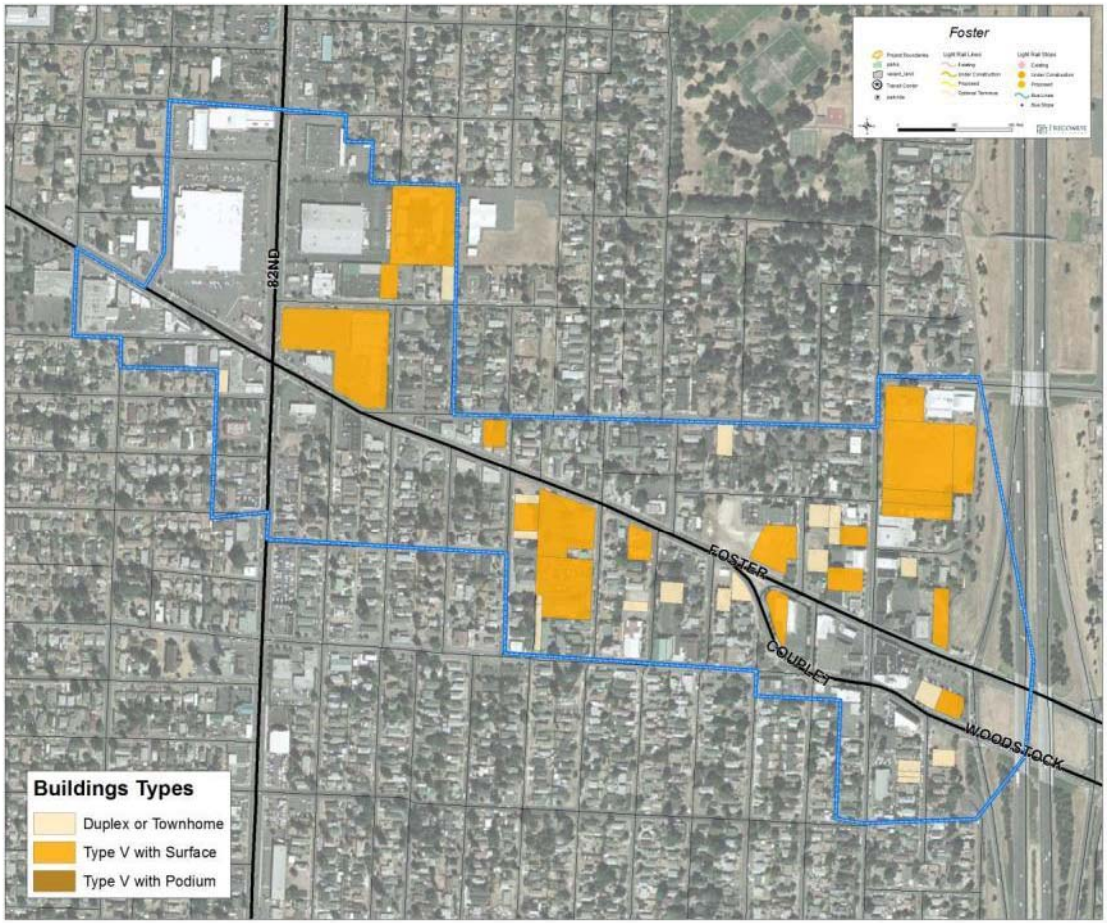
Fregonese Associates

Foster between 82nd Ave and I-205

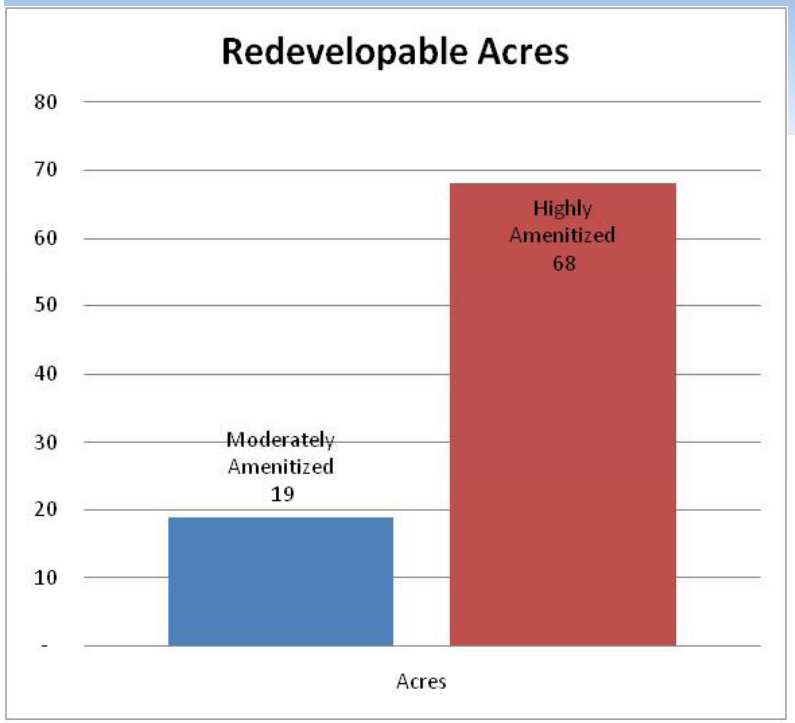


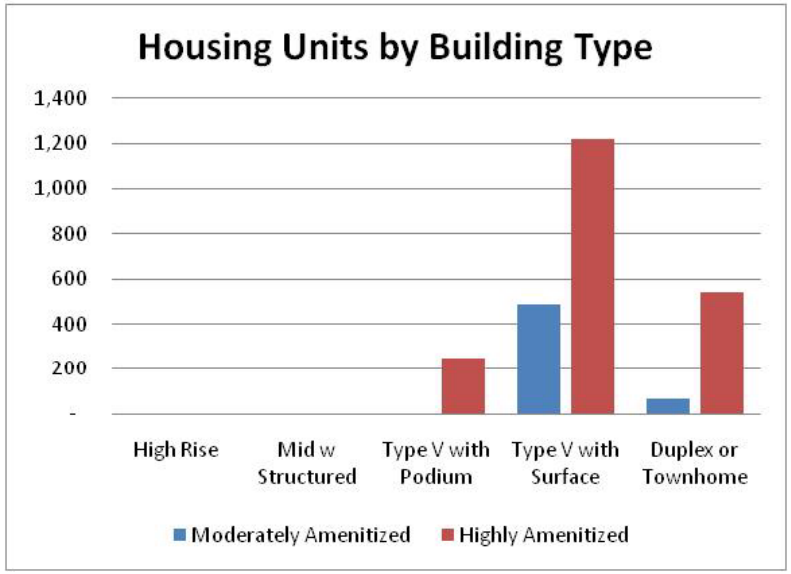


Redevelopable Parcels Under Current Conditions:
Moderately Amenitized

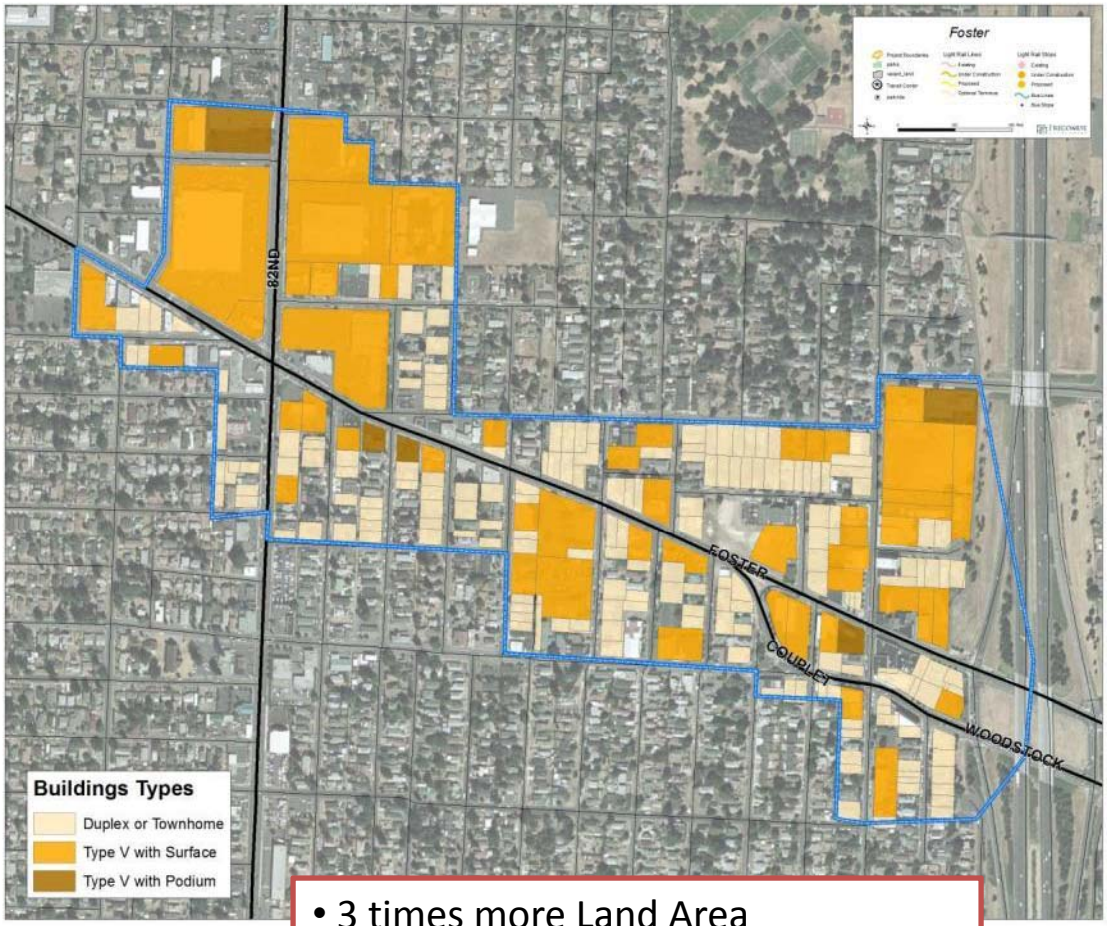


Foster between 82nd Ave and I-205





Redevelopable Parcels:
Highly Amenitized

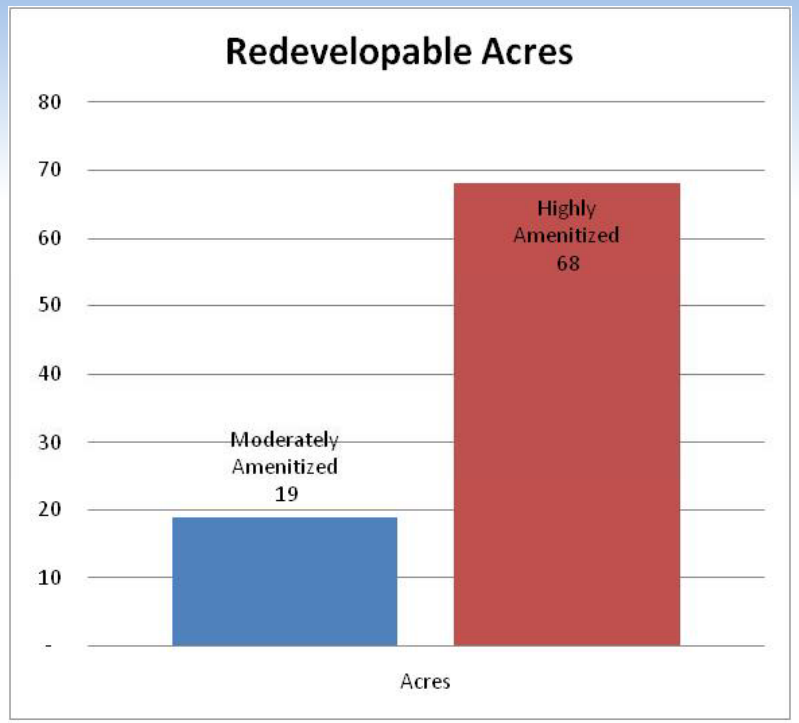


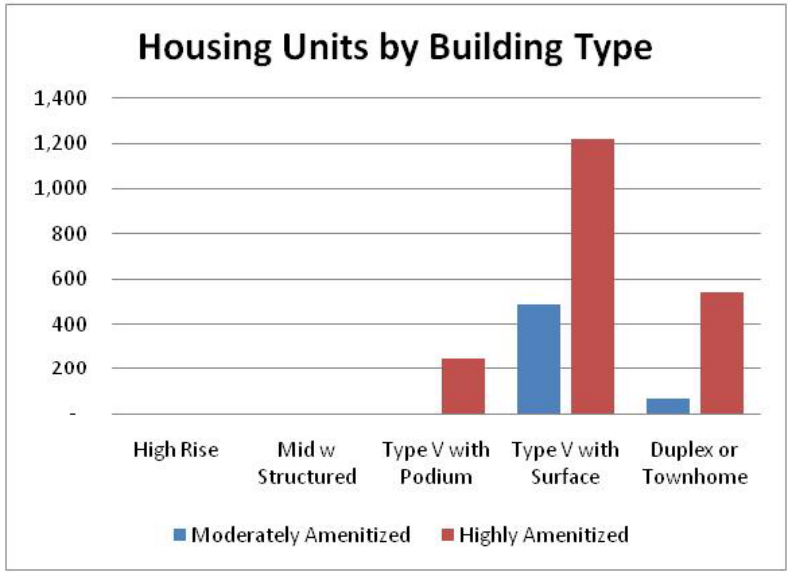
- 3 times more Land Area
- 4 times more Units
- Large increase in townhomes and Type V with surface

Foster between 82nd Ave and I-205

Foster Conclusions

- Adding a full package of amenities to a moderately amenitized area has even more significant impact
  - Land is less expensive
  - Buildings and improvements are of lower value
- Land area available for redevelopment expands dramatically
  - 19 acres to 68 acres
  - 260% increase
- Since land values are relatively inexpensive, the Type V with Surface parking building type performs the best
  - This is because structured or podium parking as to the cost of construction
  - While it is not as dense as a podium style building, it is inexpensive to construct and still quite dense
- The added redevelopable area greatly expands opportunities to develop Type V with Surface parking, and even enables the construction of some Type V with Podium





Foster at 84th Ave
SPACE AGE
UNLEADED 28 9 9/10
PLUS 29 9 9/10
SUPER 30 9 9/10
VOCHO'S
503-890-1493
OPEN
TALLER MECANICO VOCHO'S
Existing Conditions

Foster at 84th Ave
Initial Public Improvements

Foster at 84th Ave
Public Improvements and
Resulting Private Investment

Multnomah Village

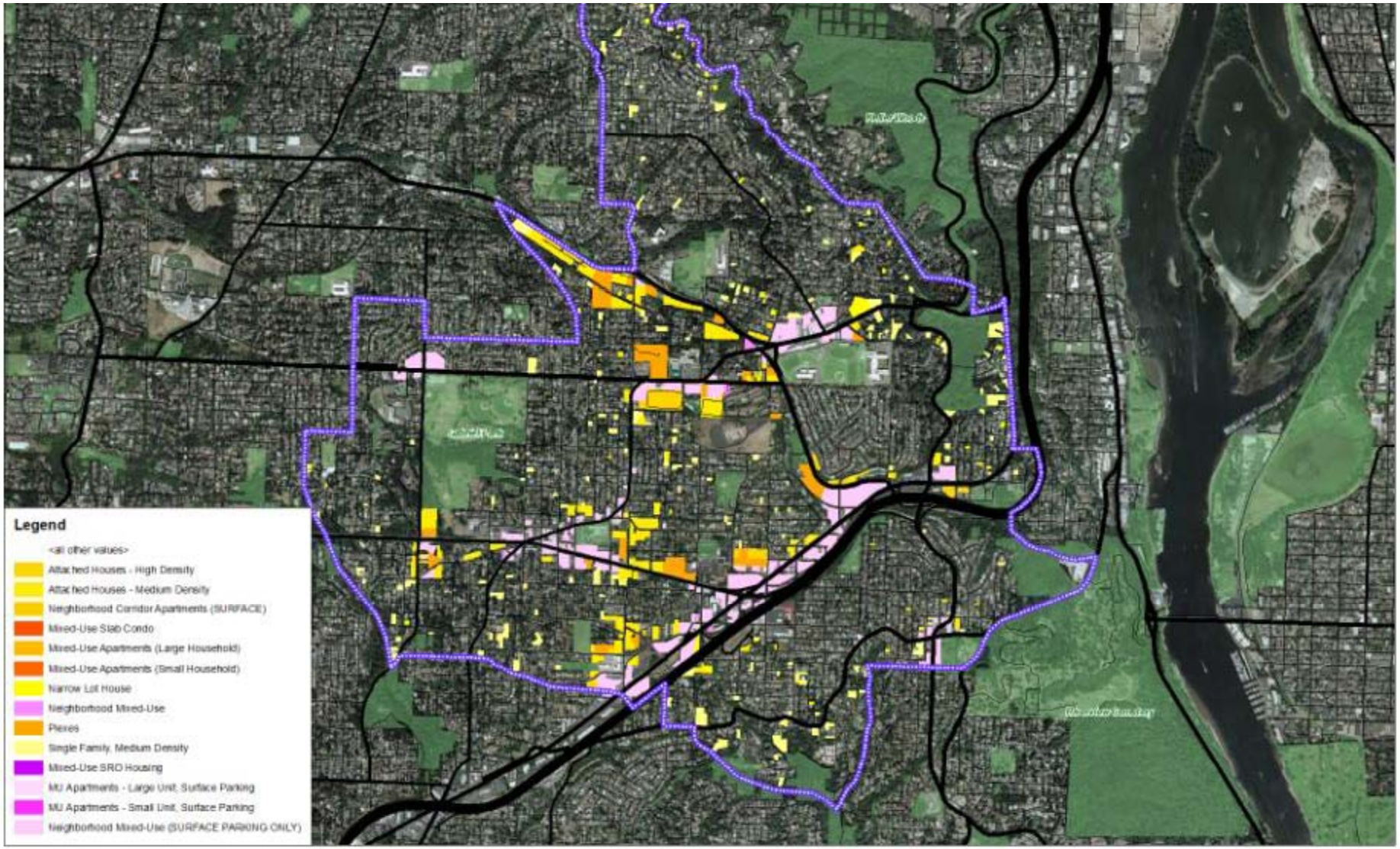
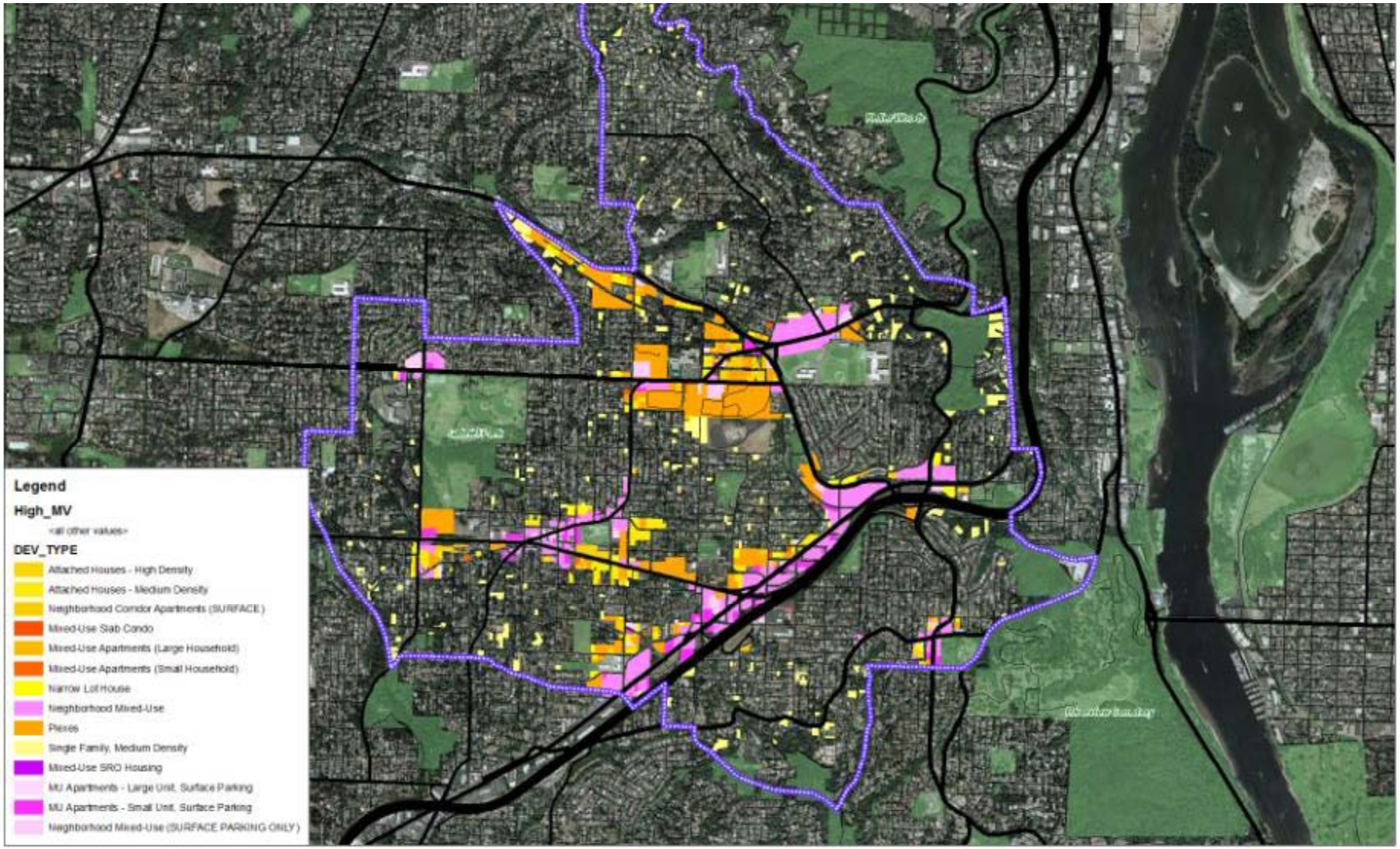
- **Current amenity level is 80%**
  - Rents: $1.43 / sq ft
    - 800 sq ft = $1,144
  - Price: $200 / sq ft
    - 1,200 sq ft = $240,000

- **At 100% Amenity:**
  - Rents: $1.79 / sq ft
    - 800 sq ft = $1,432
  - Price: $250 / sq ft
    - 1,200 sq ft = $300,000

Multnomah Village: Maximum Land Cost by Building

Building Name	Existing	90%	100%
Attached Houses - High Density	$34.51	$52.78	$71.06
Attached Houses - Medium Density	$39.50	$58.89	$78.38
Neighborhood Corridor Apartments (SURFACE)	($9.96)	$7.44	$24.78
Mixed-Use Slab Condo	($805.45)	($641.60)	($475.75)
Mixed-Use Apartments (Large Household)	($196.90)	($151.74)	($105.39)
Mixed-Use Apartments (Small Household)	($206.79)	($159.01)	($109.36)
Narrow Lot House	$30.66	$41.33	$51.98
Neighborhood Mixed-Use	$18.86	$60.39	$102.69
Plexes	$25.93	$42.29	$59.18
Single Family, Medium Density	$23.57	$31.67	$39.75
Mixed-Use SRO Housing	($127.65)	($127.65)	($127.65)
MU Apartments - Large Unit, Surface Parking	($11.66)	$11.75	$35.05
MU Apartments - Small Unit, Surface Parking	($15.67)	$10.29	$36.40
Neighborhood Mixed-Use (SURFACE PARKING ONLY)	$71.35	$105.13	$138.67

Multnomah Village: Existing Conditions



Multnomah Village: Highly Amenitized