

GIS Tools for Planning Healthy Communities

Doug Walker



making a world of better places

communityviz[®]



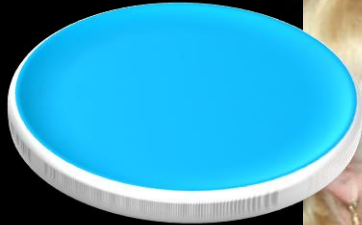
POWERED BY
esri



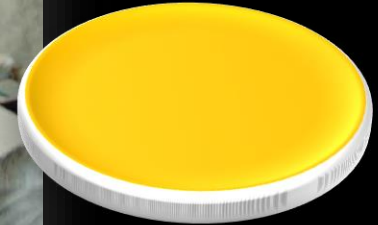
communityviz[®]

Software for Planners

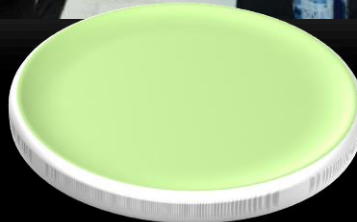
Analyze



Visualize



Engage

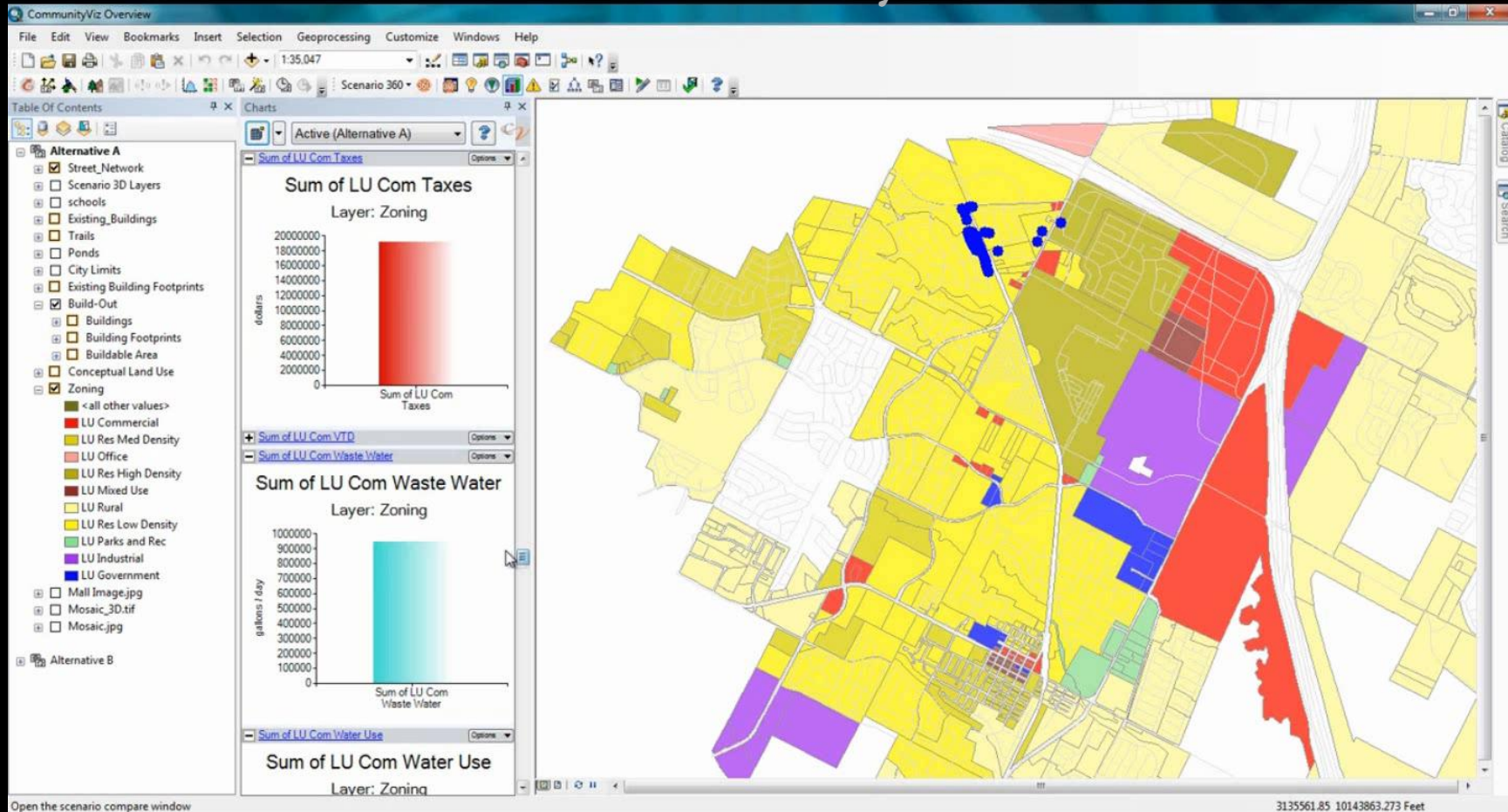


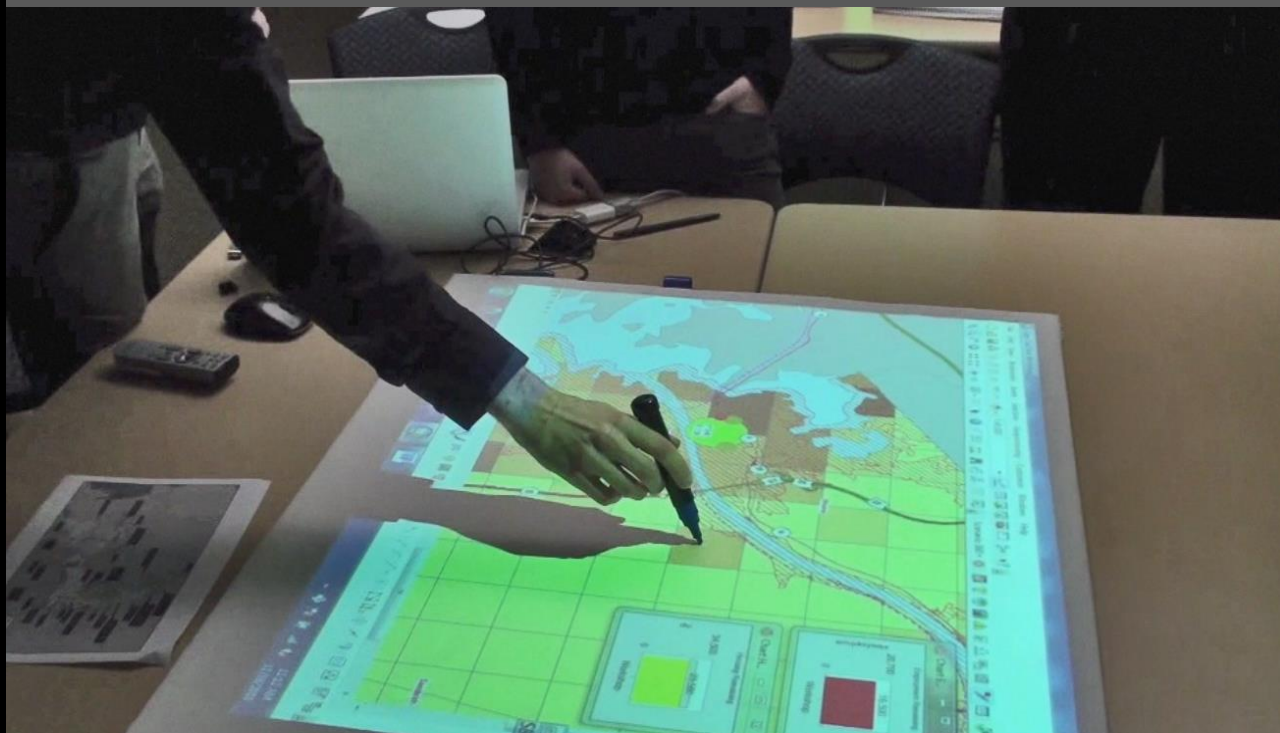
What *If*...?

Geodesign

- Sketching (“design”) + geography
- Express and share ideas for future plans
- Interact with models in real time to discover implications
- Learn and contribute







Applications

Air Quality

Energy

Livability

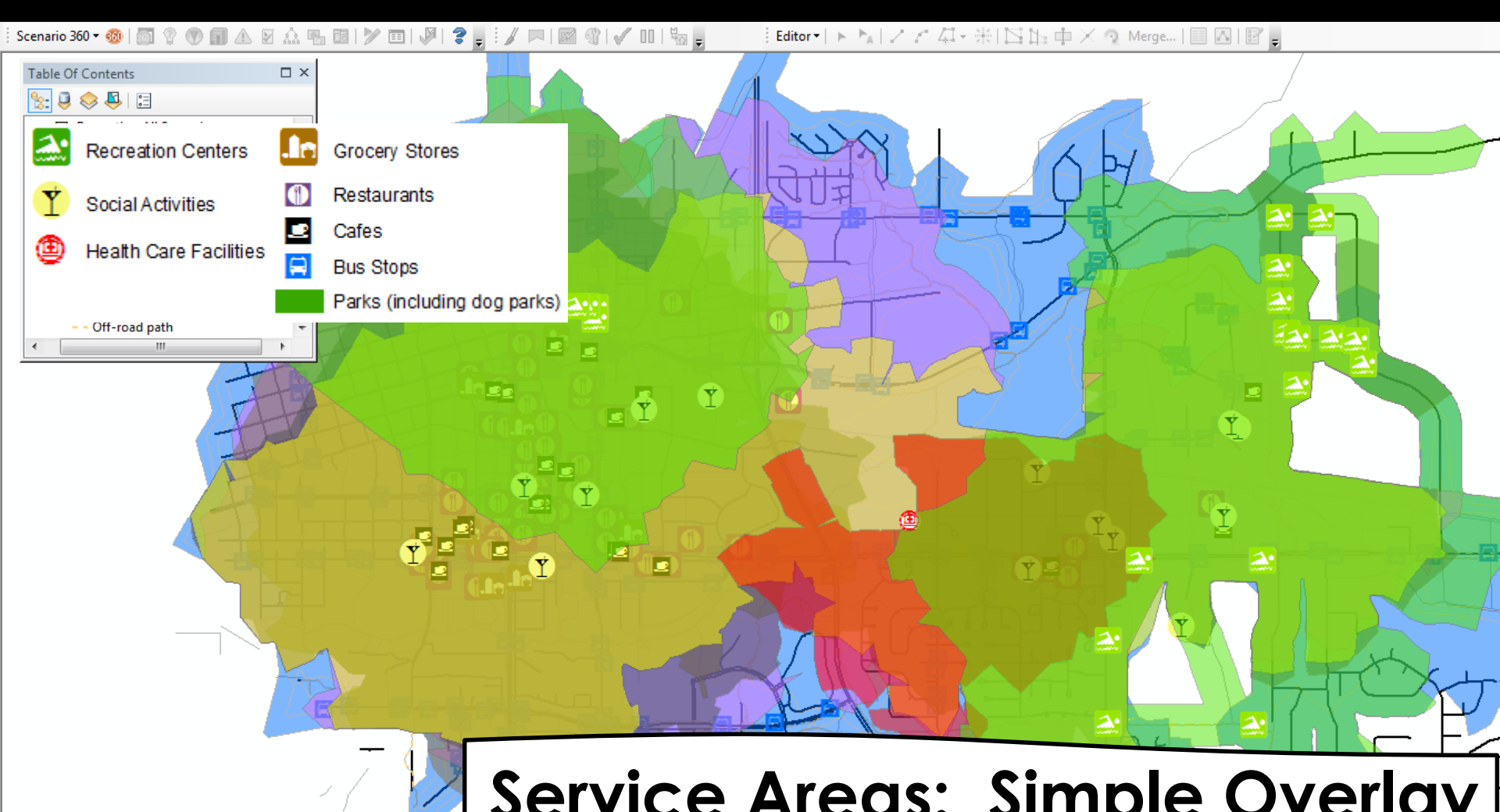
Community Values

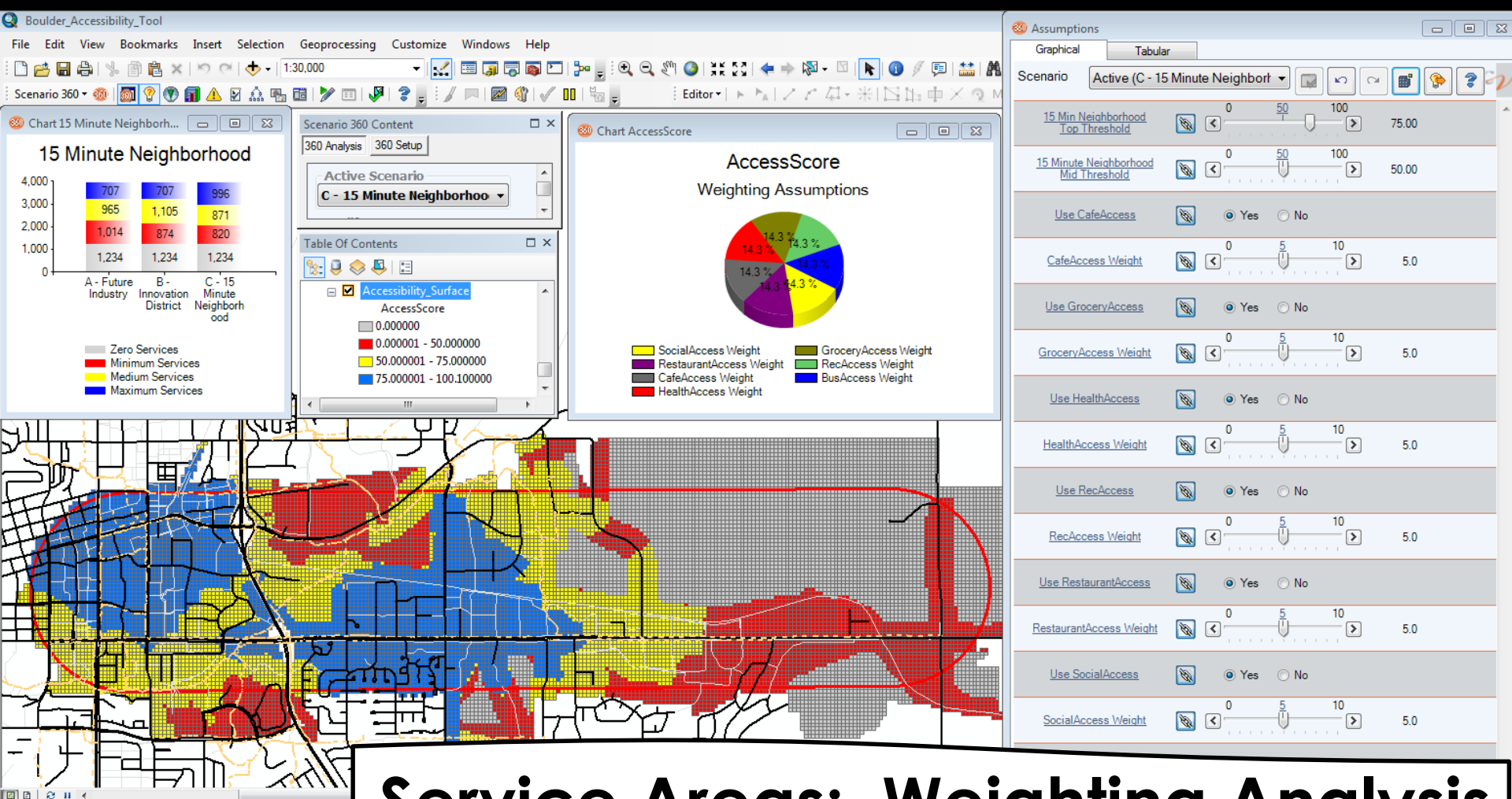
Health!

A red oval outline is drawn around the word "Health!".

Health!

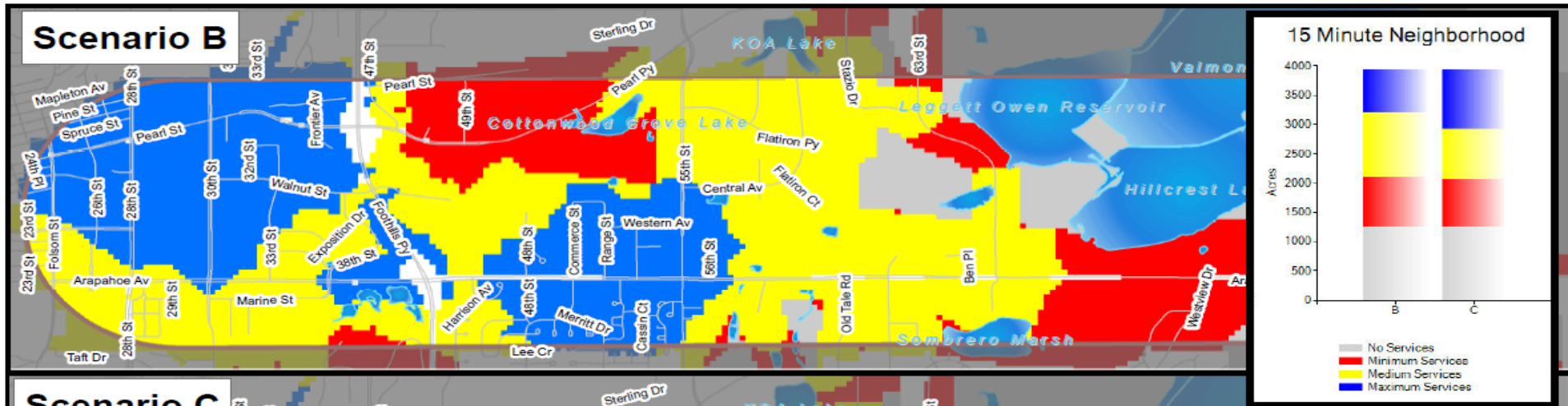
15-Minute Neighborhoods



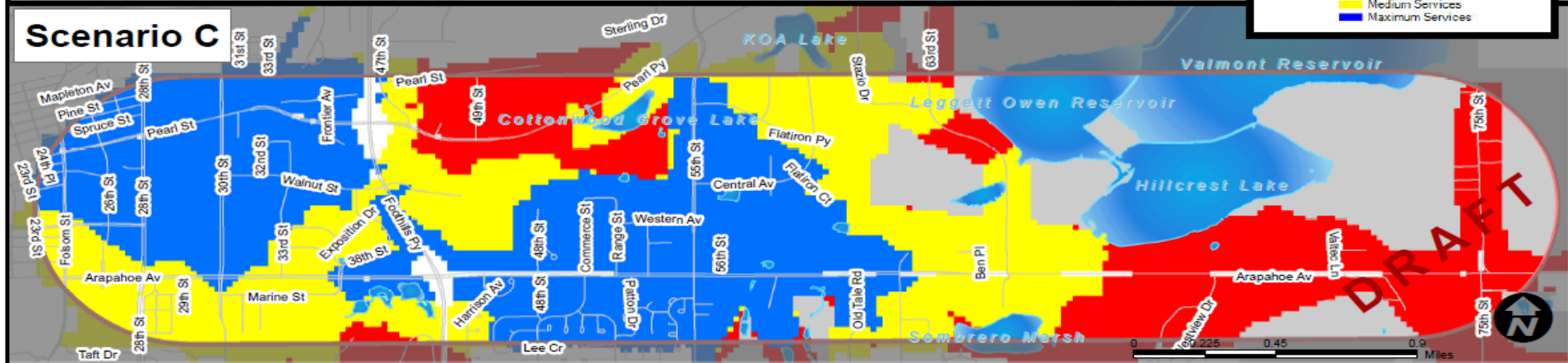


Service Areas: Weighting Analysis


Scenario B



Scenario C



Legend

-  Study

Accessibility Score

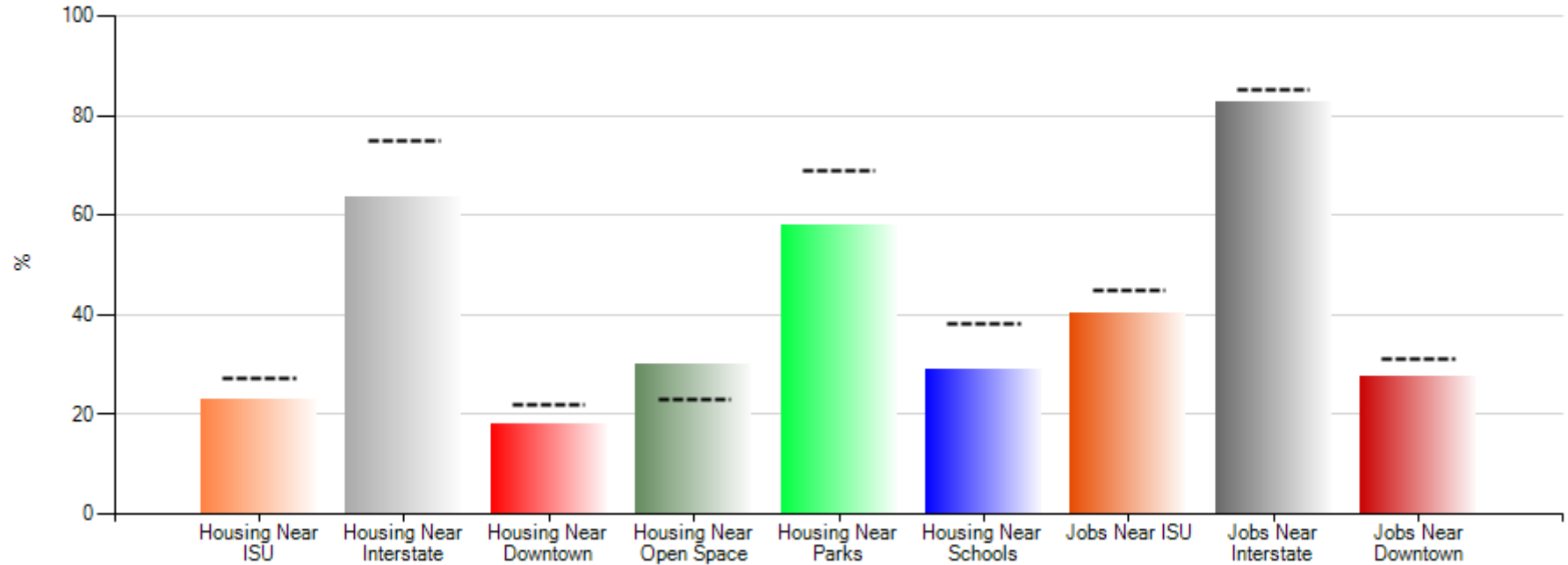
- | |
|---|
| Max Services within 15 Min Walk Zones (Score 75 to 100) |
| Med Services within 15 Min Walk Zones (Score 50 to 74) |
| Min Services within 15 Min Walk Zones (Score 1 to 50) |
| No Services within 15 Min Walk Zones (Score 0) |

Scenarios: 15-Minute Neighborhoods



New
interchange
connecting to

Performance Dashboard



Geodesign for Accessibility

Quantitative Health Impact Assessment



WHAT QUESTIONS CAN WE ANSWER?

Conventional HIA

- Will building sidewalks near schools encourage kids living nearby to walk to school?
 - Literature says yes

Quantitative HIA

- Which sidewalks?
- How much additional walking?
- Is this a cost effective strategy compared to alternatives?

HOW CAN WE ANSWER THESE QUESTIONS?

Regression Modeling

Use demographic, socioeconomic, and built environment variables to predict health outcomes



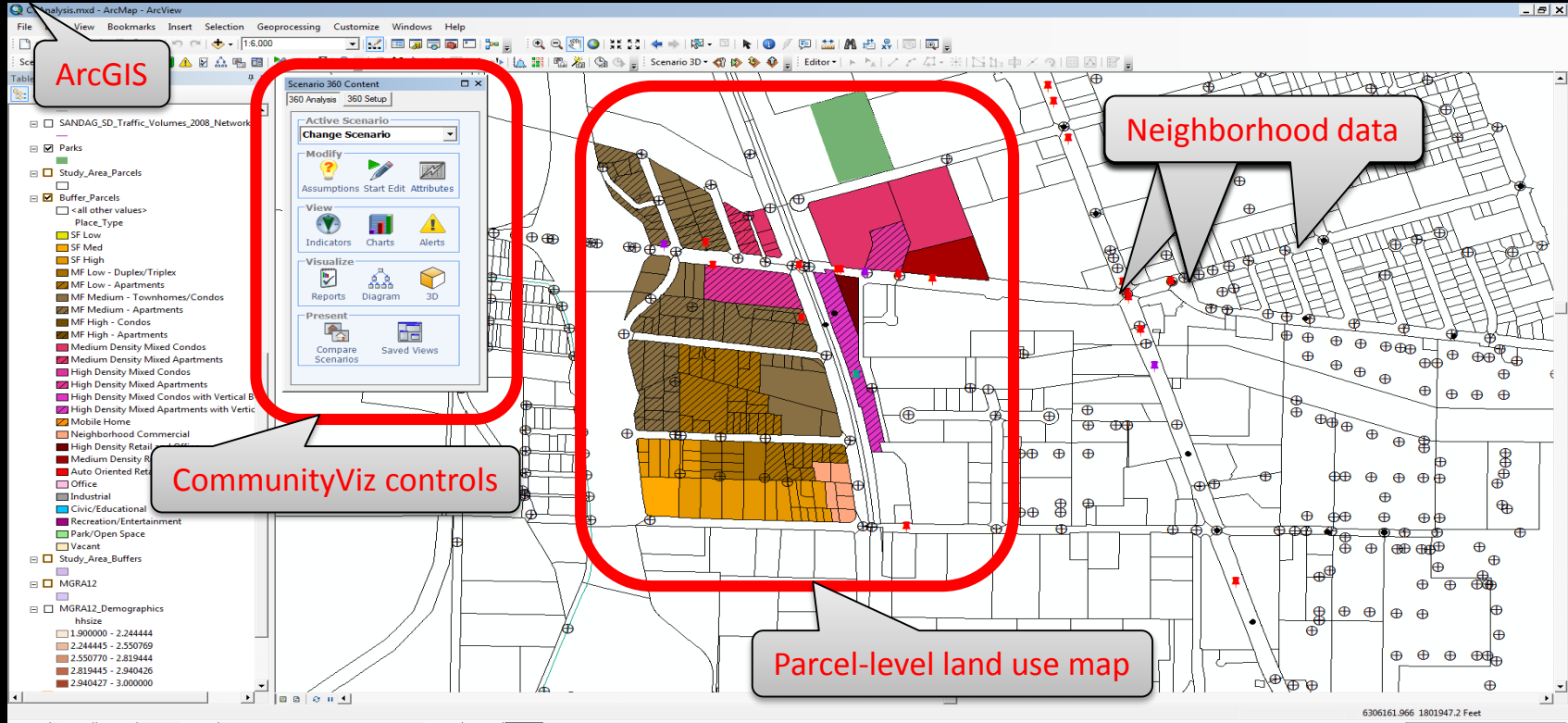
Implement Models in CommunityViz

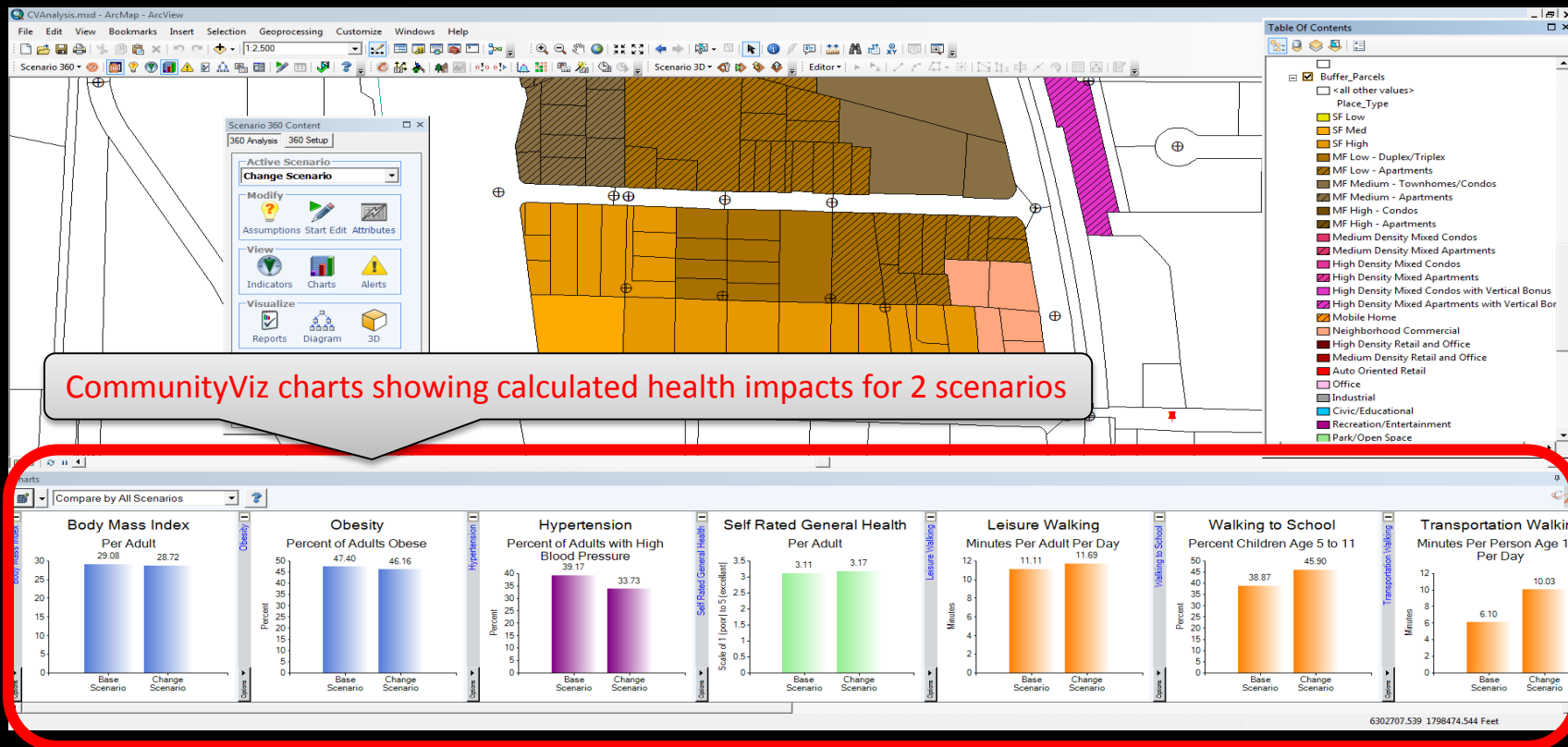


Geodesign

User sketches potential changes to built environment within CommunityViz and receives near-real time effects on health outcomes

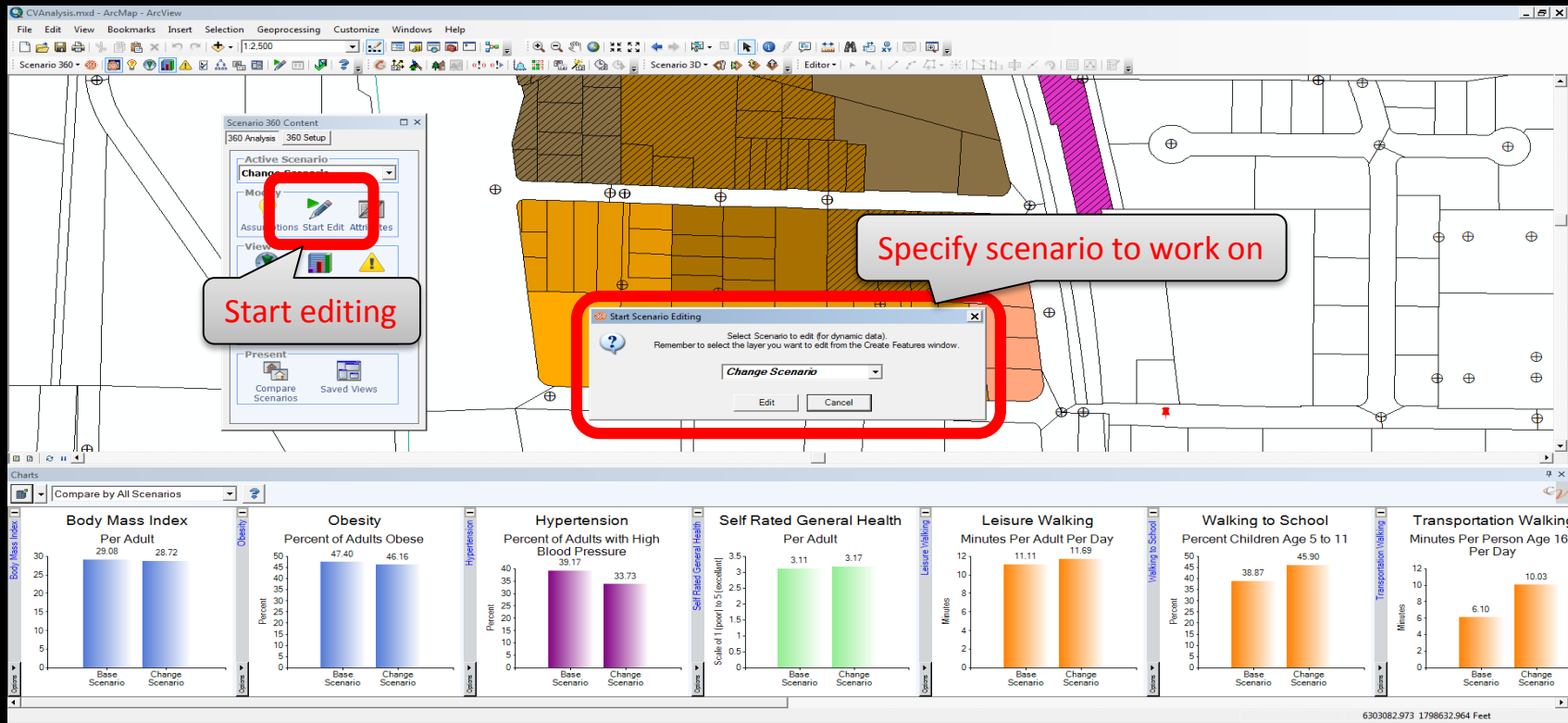
Start with ArcGIS map of the area...



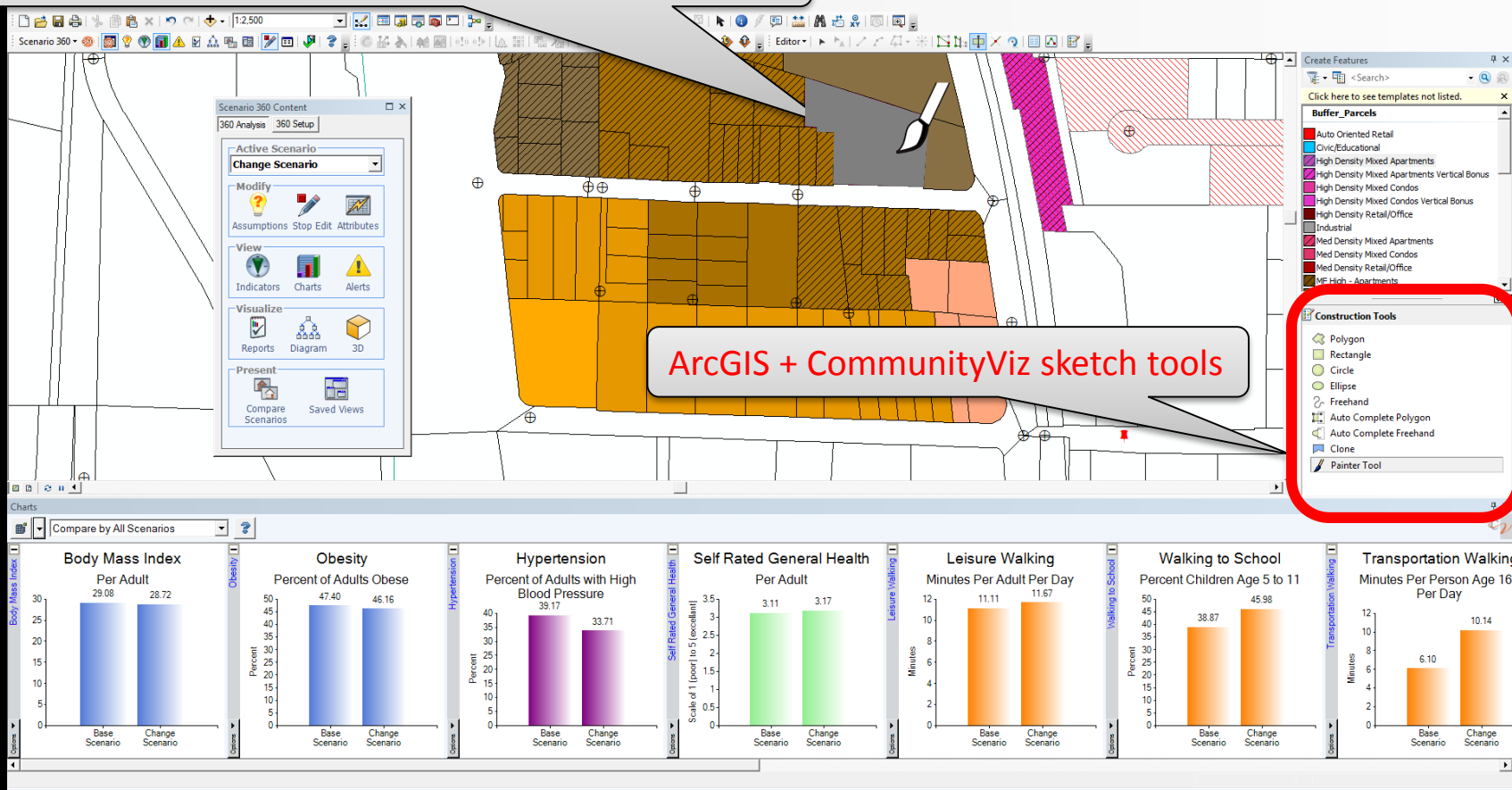


RESULTS ARE PRELIMINARY AND FOR ILLUSTRATIVE PURPOSES ONLY

EXAMPLE 1: LAND USE CHANGES



Use CommunityViz “paint brush” to apply land uses



Scenario 360 Content

360 Analysis 360 Setup

Active Scenario

Change Scenario

Modify

Assumptions Stop Edit Attributes

View

Indicators Charts Alerts

Visualize

Reports Diagram 3D

Present

Compare Scenarios Saved Views

Calculations in progress

Scenario 360 - Dynamic Update

Updating CivicFloorArea (Change Scenario)

Cancel

Create Features

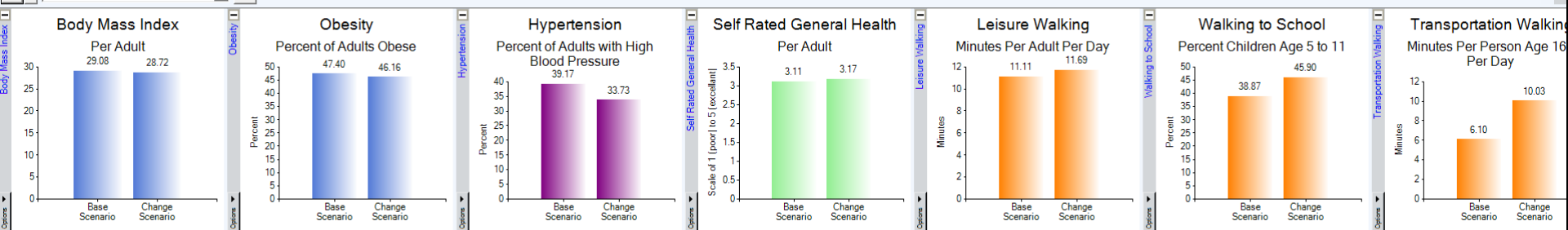
Click here to see templates not listed.

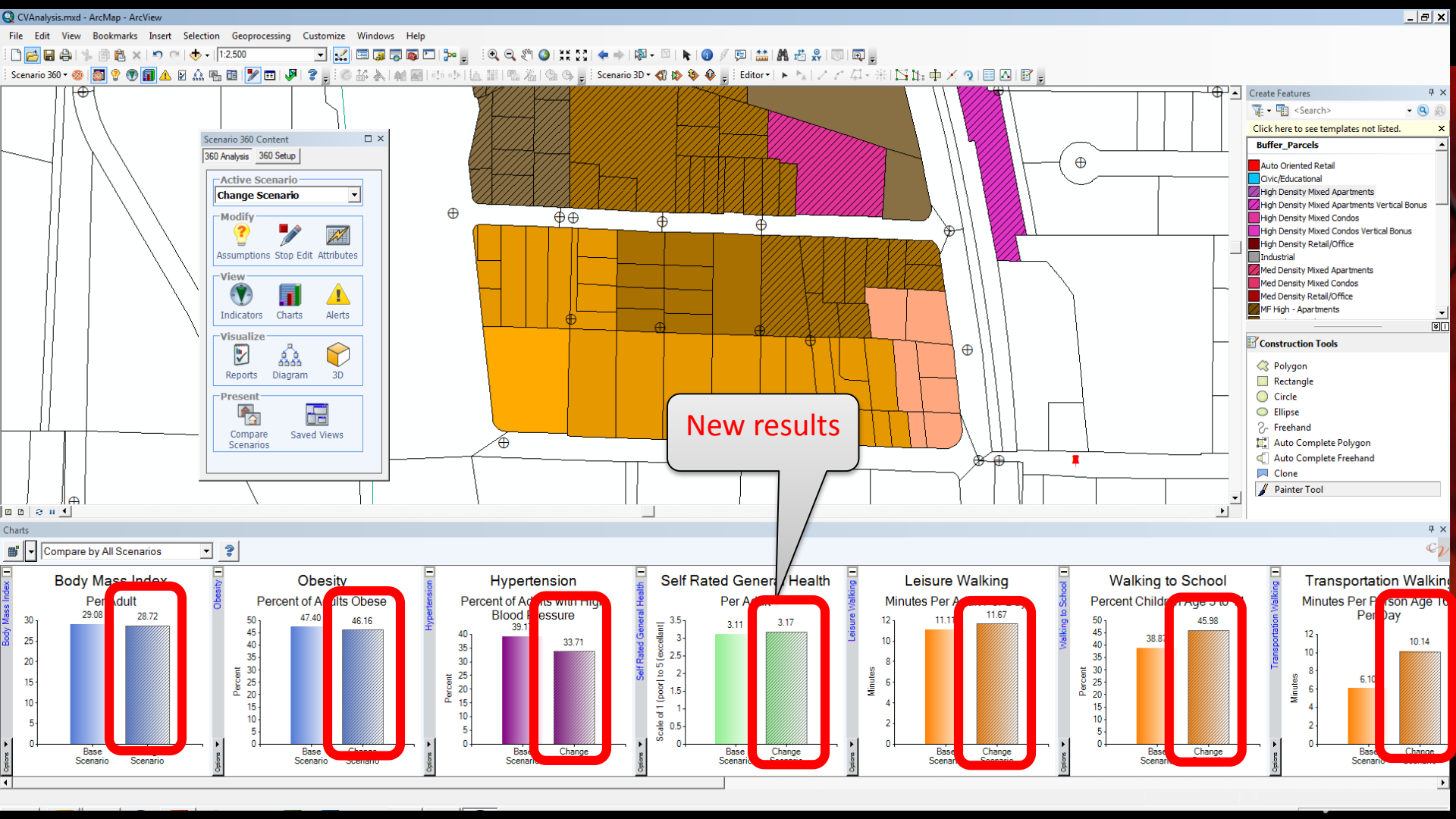
Buffer_Parcel

- Auto Oriented Retail
- Civic/Educational
- High Density Mixed Apartments
- High Density Mixed Apartments Vertical Bonus
- High Density Mixed Condos
- High Density Mixed Condos Vertical Bonus
- High Density Retail/Office
- Industrial
- Med Density Mixed Apartments
- Med Density Mixed Condos
- Med Density Retail/Office
- MF High - Apartments

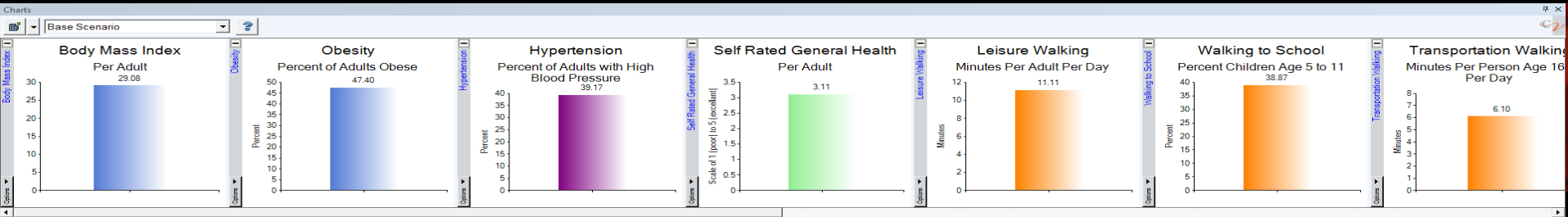
Construction Tools

- Polygon
- Rectangle
- Circle
- Ellipse
- Freehand
- Auto Complete Polygon
- Auto Complete Freehand
- Clone
- Painter Tool

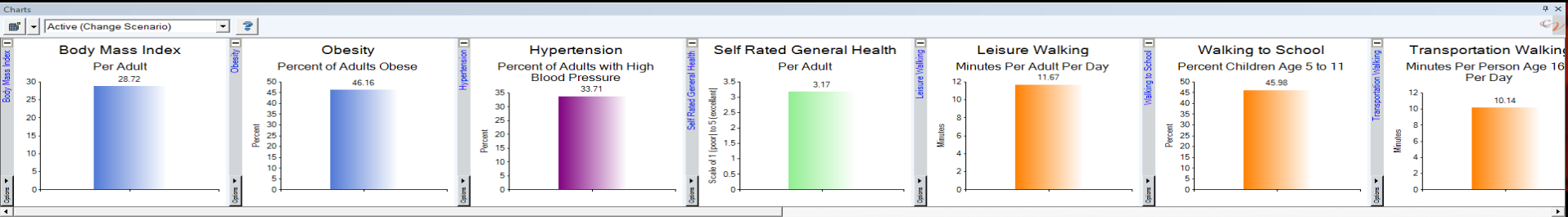




Base Scenario



Change Scenario



EXAMPLE 2:
CHANGES TO FOOD LOCATIONS

Add features
(e.g., grocery stores)

CVAnalysis.med - ArcMap - ArcView

File Edit View Bookmarks Insert Selection Geoprocessing Customize Windows Help

Scenario 360 - 1:2,500

Scenario 360 Content

360 Analysis 360 Setup

Active Scenario

Change Scenario

Modify

Assumptions Stop Edit Attributes

View

Indicators Charts Alerts

Visualize

Reports Diagram 3D

Present

Compare Scenarios Saved Views

Farmers_Markets

New Farmers Market

Food_Locations

New Fast Food Location

New Grocery Store

Transit_Stops_2ft_Buffer

New Transit Stop

Construction Tools

Point

Point at end of line

Clone

Painter Tool

Create Features

<Search>

Click here to see templates not in use

SF Low

SF Med

Vacant

Farmers_Markets

New Farmers Market

Food_Locations

New Fast Food Location

New Grocery Store

Transit_Stops_2ft_Buffer

New Transit Stop

Construction Tools

Point

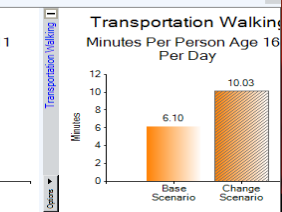
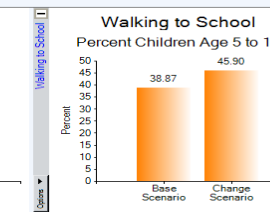
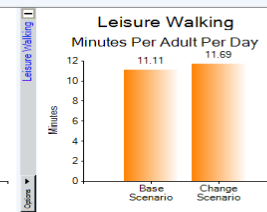
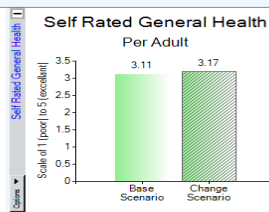
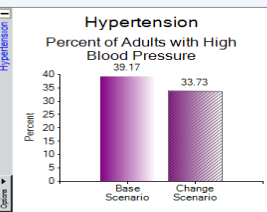
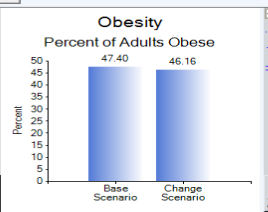
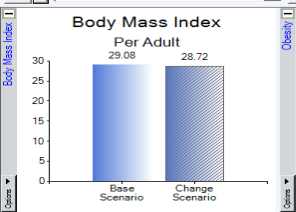
Point at end of line

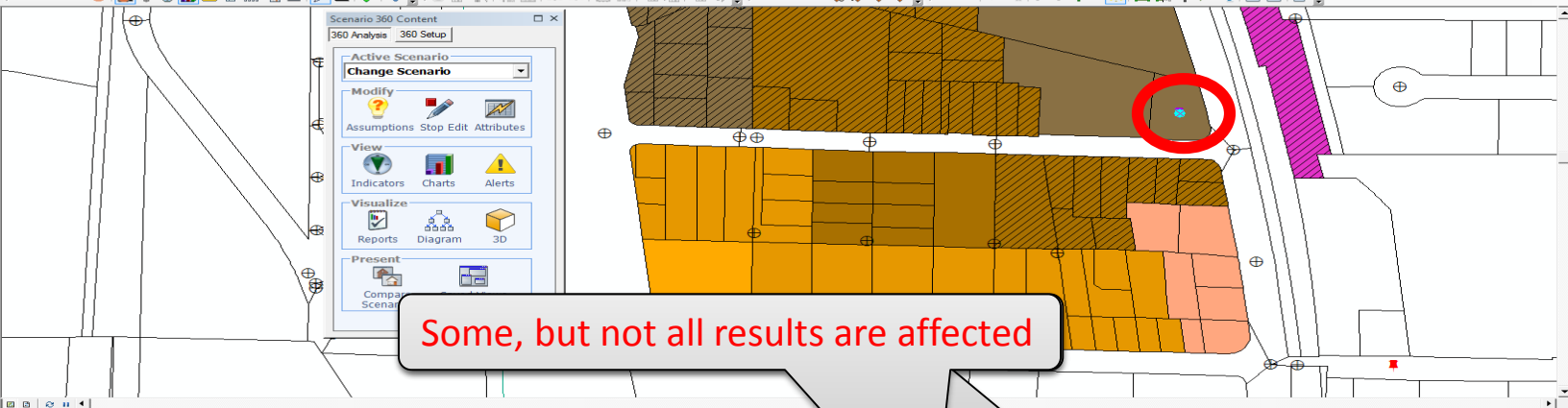
Clone

Painter Tool

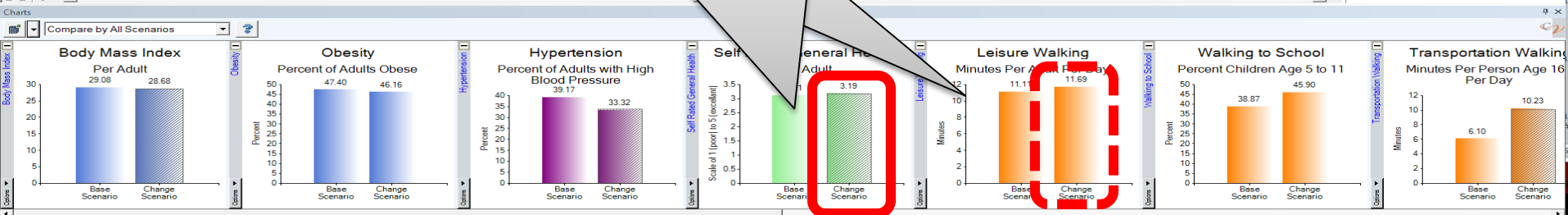
Charts

Compare by All Scenarios

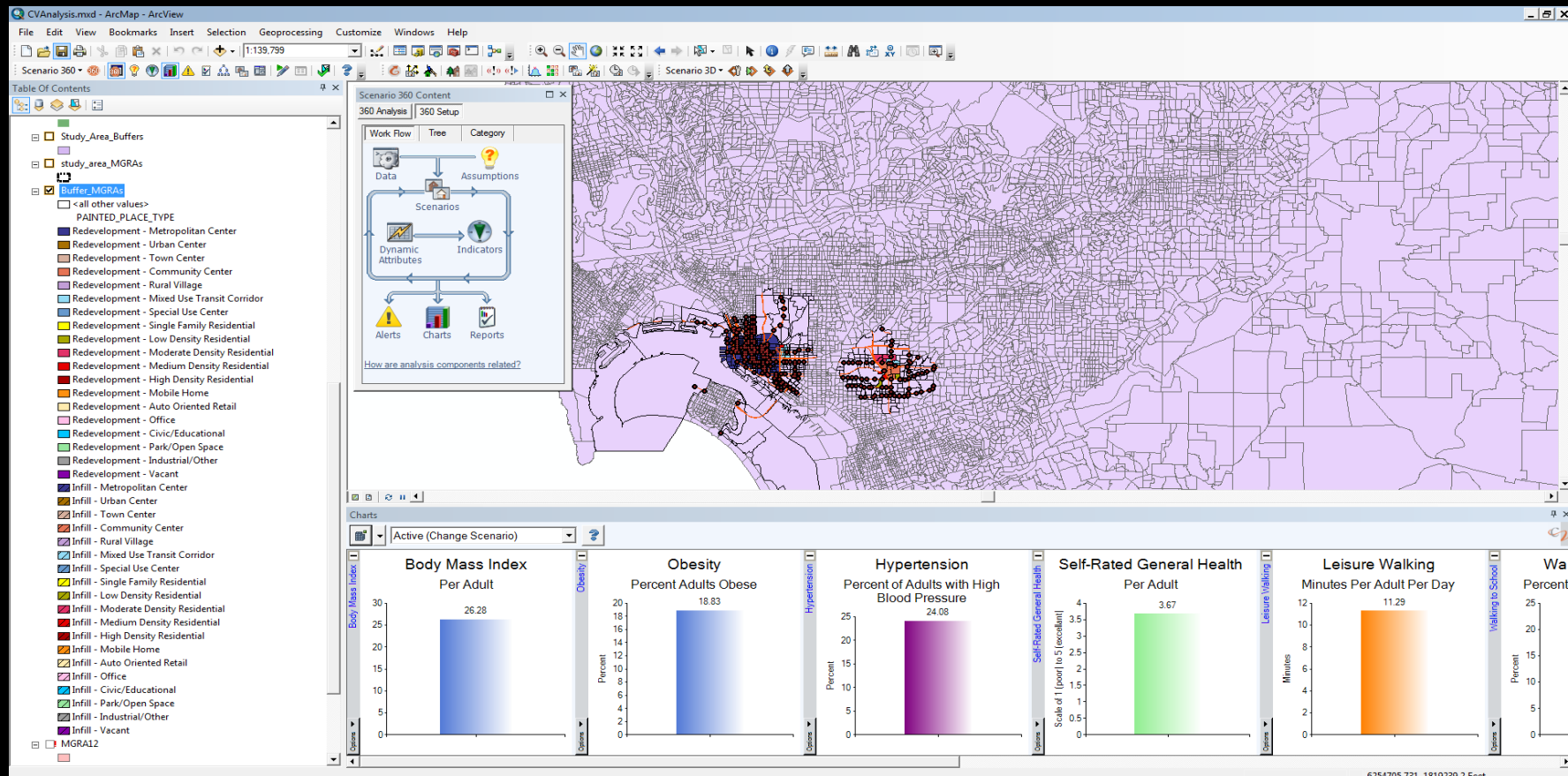




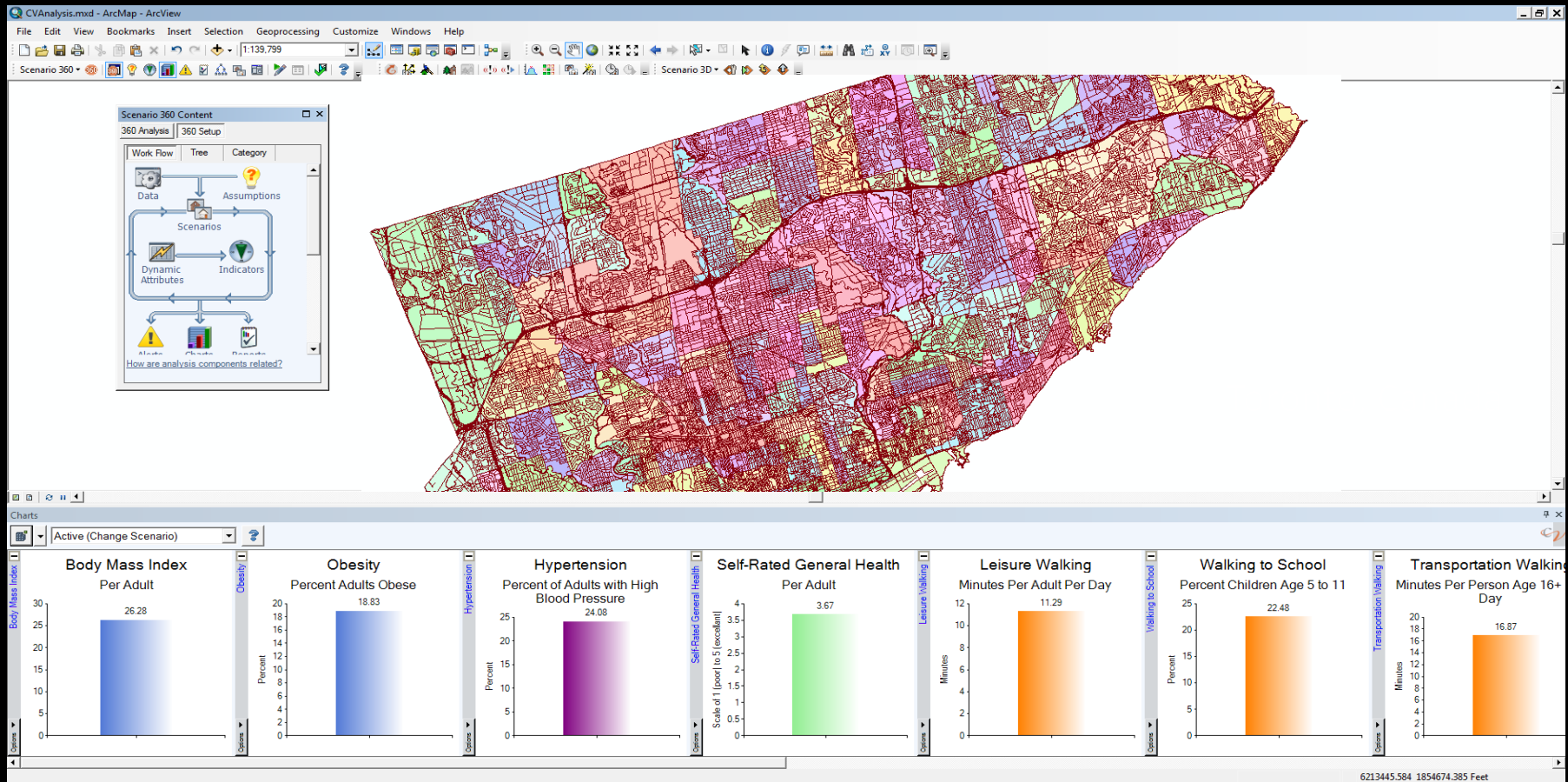
Some, but not all results are affected



Similar methods—replacing parcels with place types—used at regional scales



Once created, an analysis is transportable to other locations



6213445.584 1854674.385 Feet

Regression Modeling

```
graph TD; A[Regression Modeling] --> B[Implement Models in CommunityViz]; B --> C[Geodesign]; C --> D[Health Impacts Widely Included in Planning Decisions];
```

Implement Models in CommunityViz

Geodesign

Health Impacts Widely Included in Planning Decisions

Two More Examples

Hazard and Disaster Planning
“Healthprinting”

Assumptions

Graphical | Tables

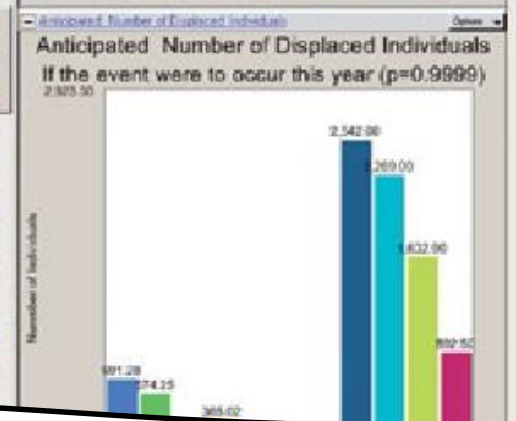
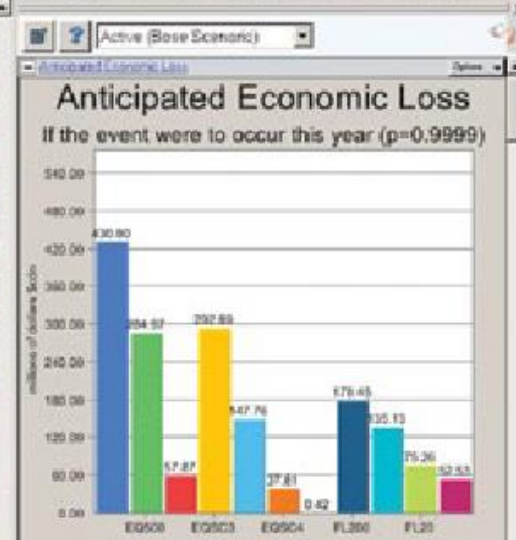
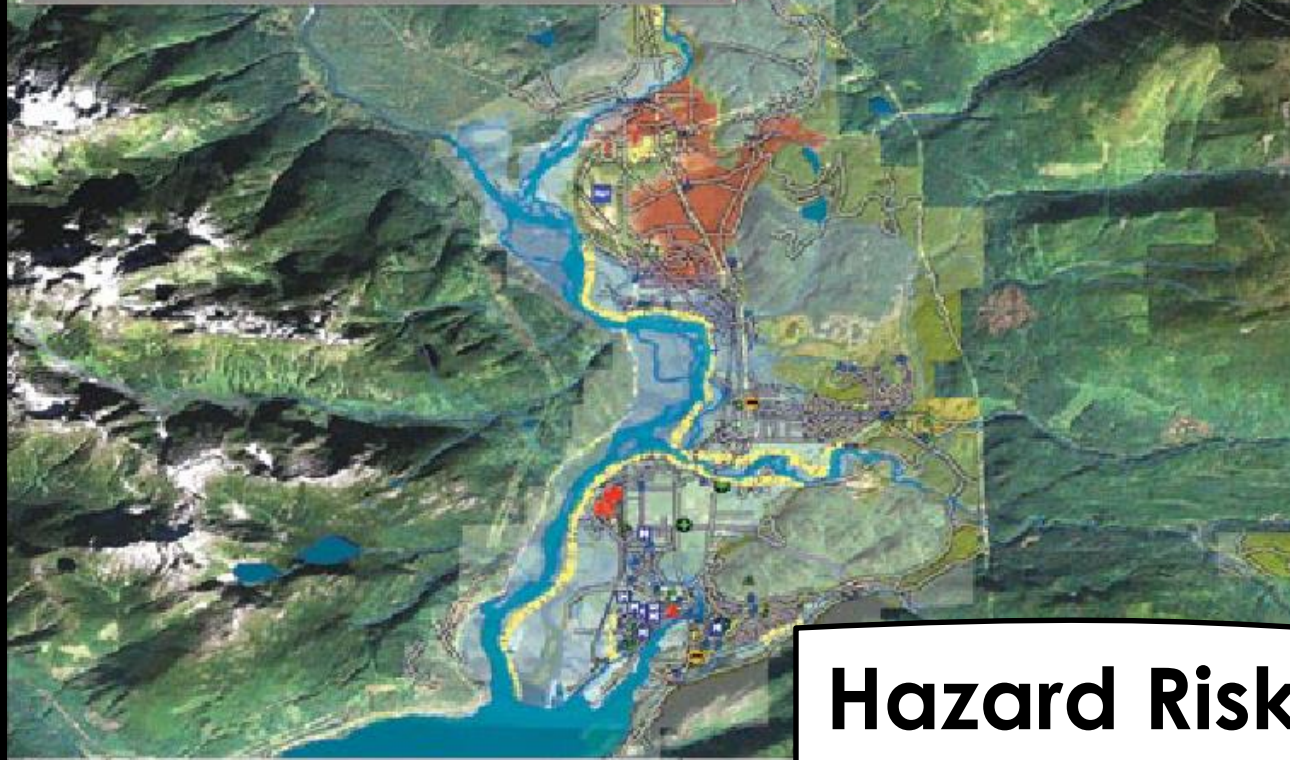
Scenario: Active (Base Scenario)

TimeScale: 1986 2000 2046 2009 year

Planning Horizon: 30 1000 30

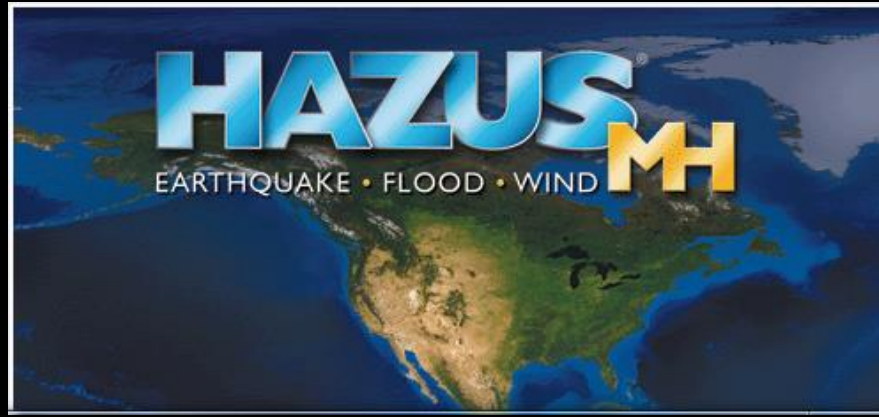
Calculate Risk: Foundation Conditional Probability

Conditional Probability: ☒ Yes ☐ No

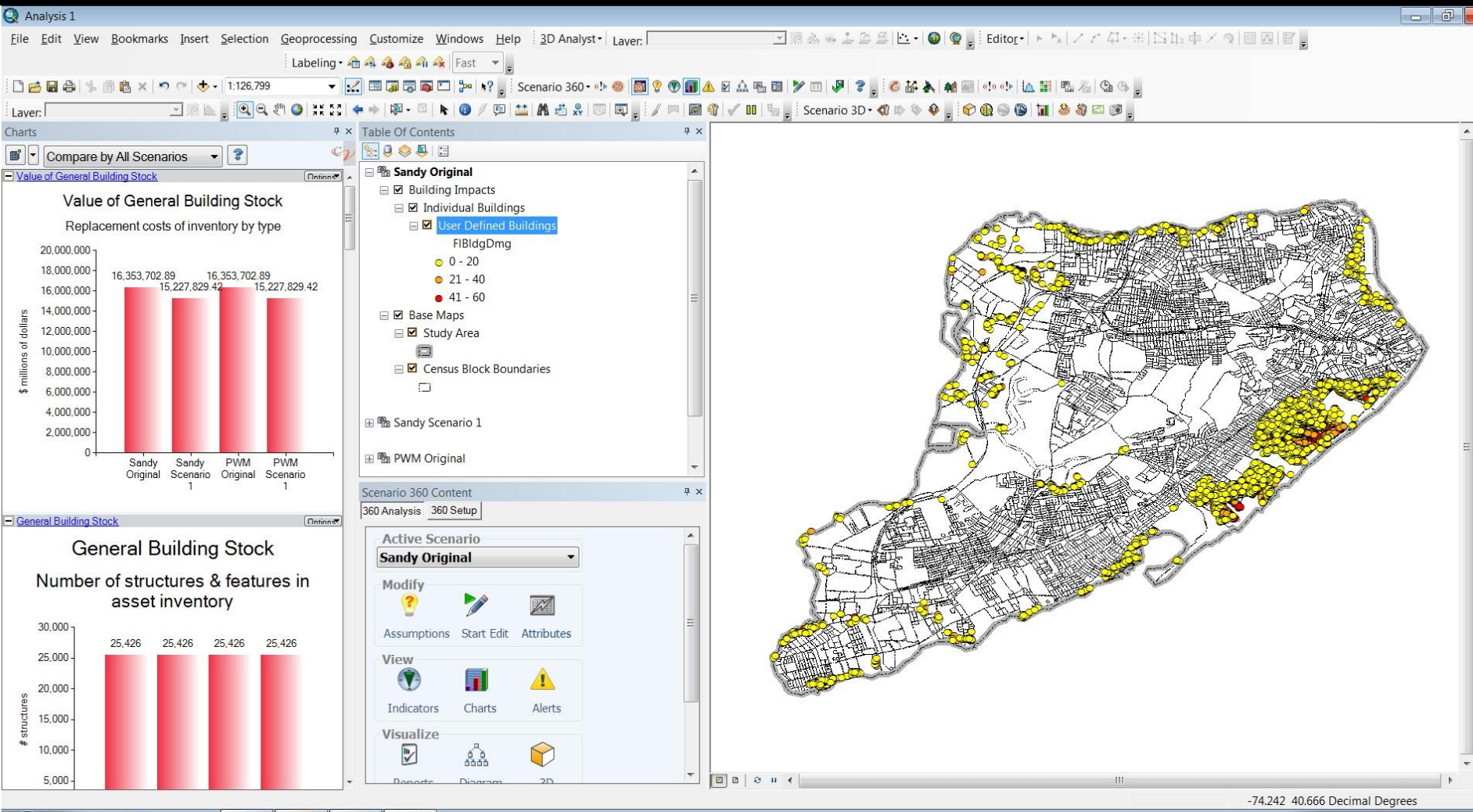


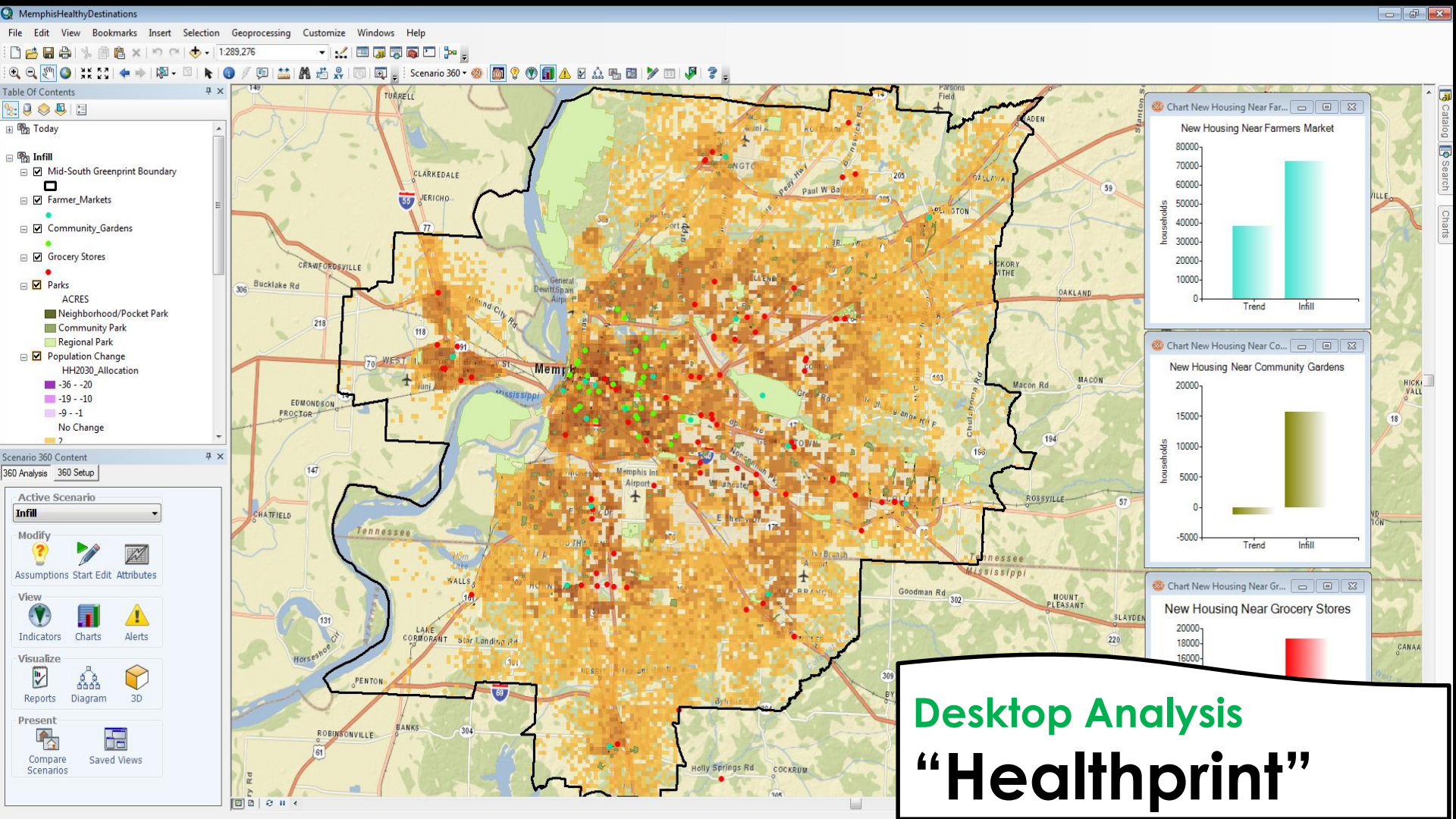
Hazard Risk Assessment

Disaster Risk Reduction/External Models



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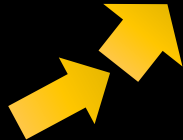


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Desktop Analysis

ArcGIS for Desktop



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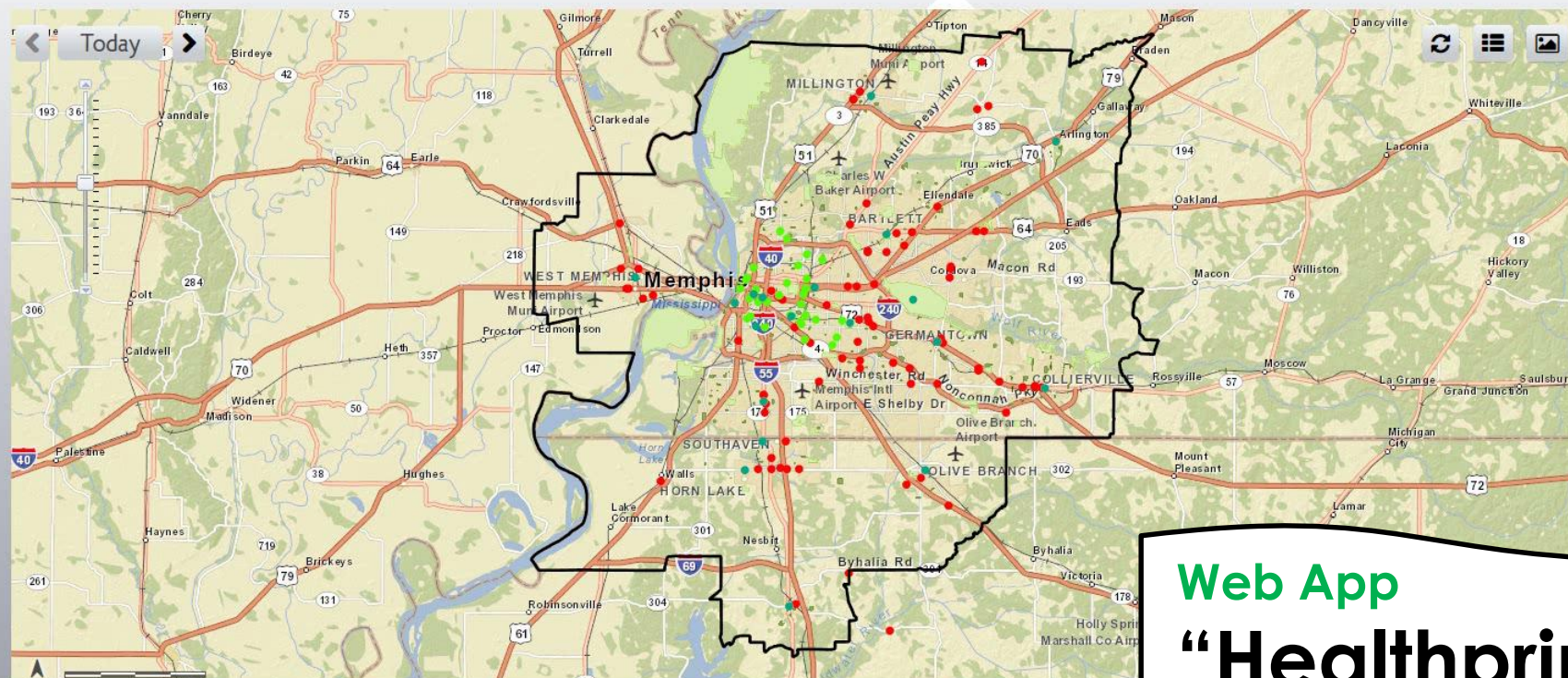
Web Application

ArcGIS Online

Memphis Greenprint

a CommunityViz Web App

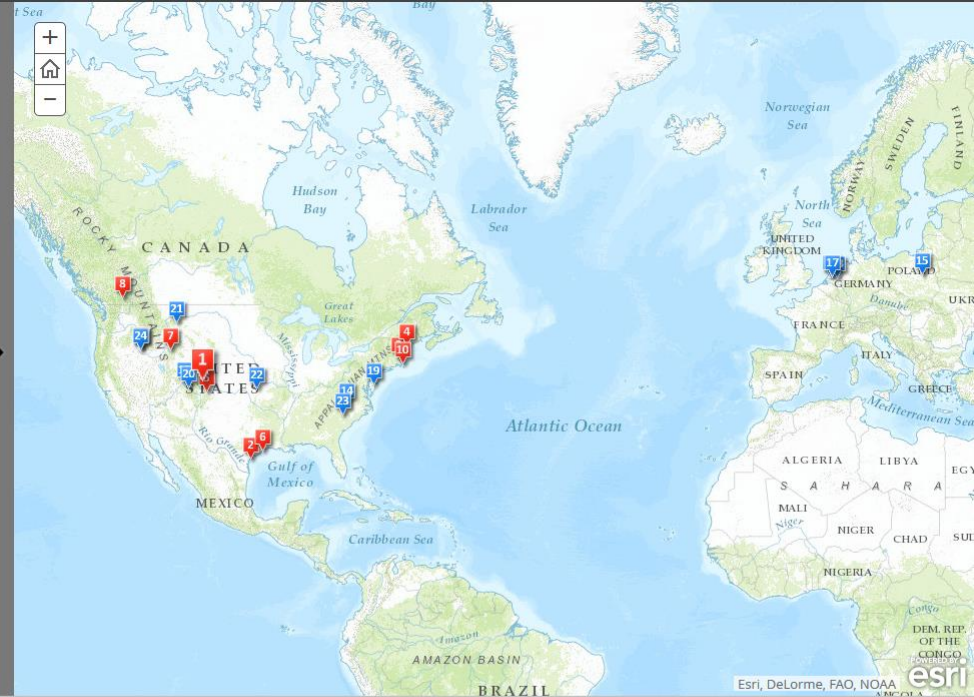
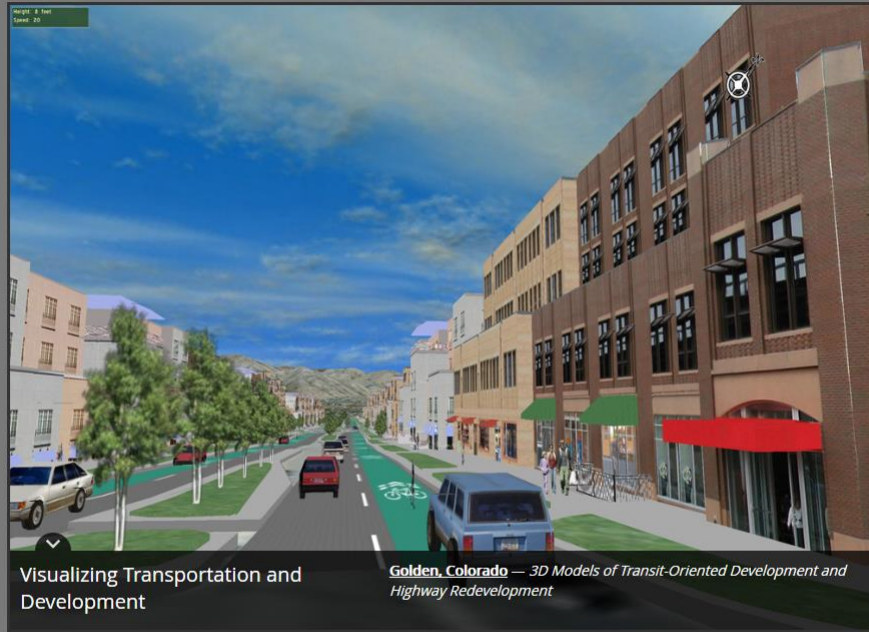
Map	Indicators	Assumptions	Description
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Web App

“Healthprint”

Visit Our Story Map



<http://placeways.com/communityviz/casestudies.html>

GIS for Planning Healthy Communities

Community form affects public health and human services

Plans for the future of a community can affect future health

GIS-based geodesign tools like CommunityViz are widely used by community planners

New technology is making it easier for planners to incorporate health considerations into their decisions

Doug Walker
doug@placeways.com

