

Connecting Scenario Approaches with Scenario Tools

Matt Noonkester, AICP

City Explained, Inc.

TRB Conference: Use of Scenario Planning in
Transportation Planning

Portland, OR — August 16, 2016

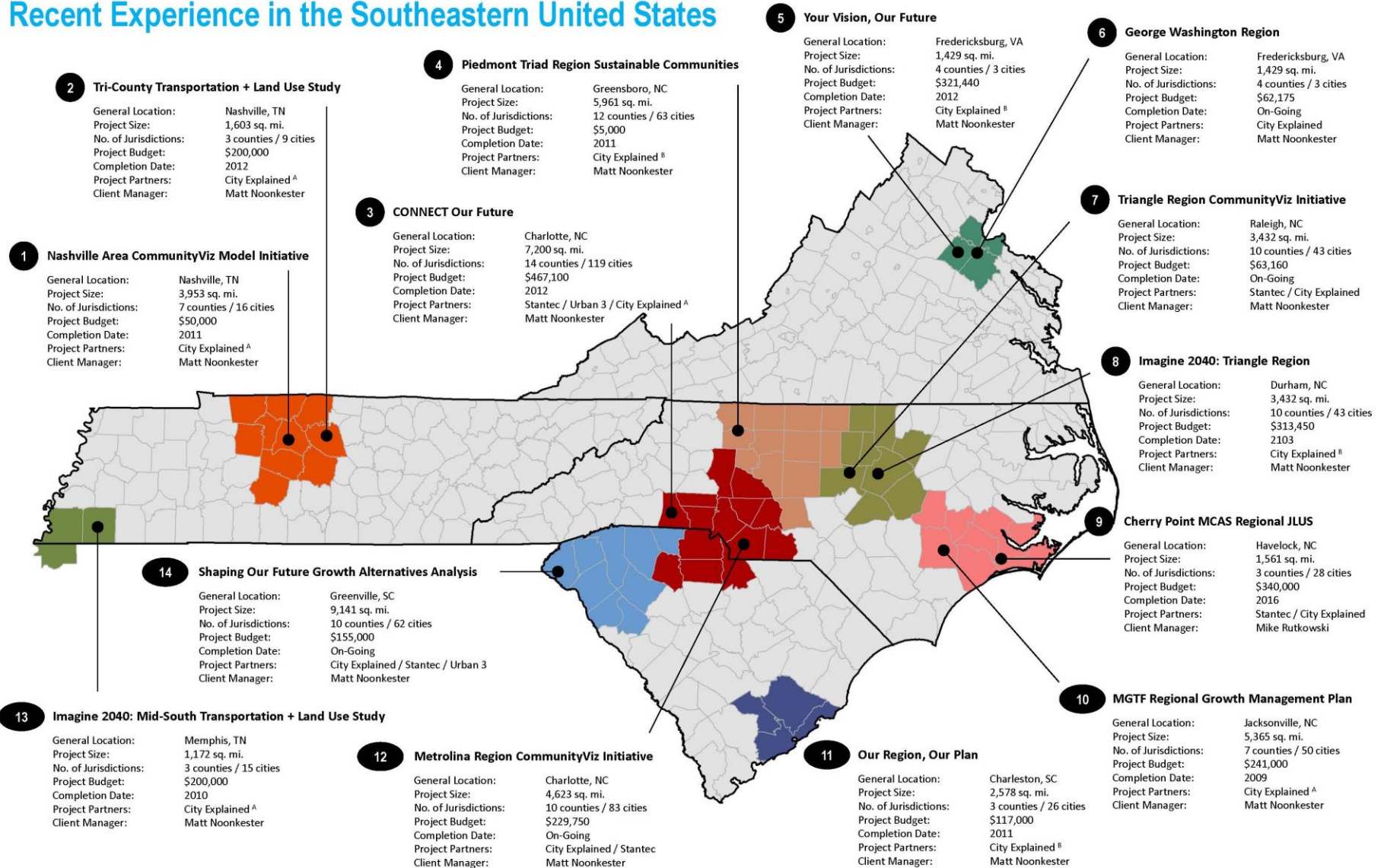


— A Very Quick Introduction —

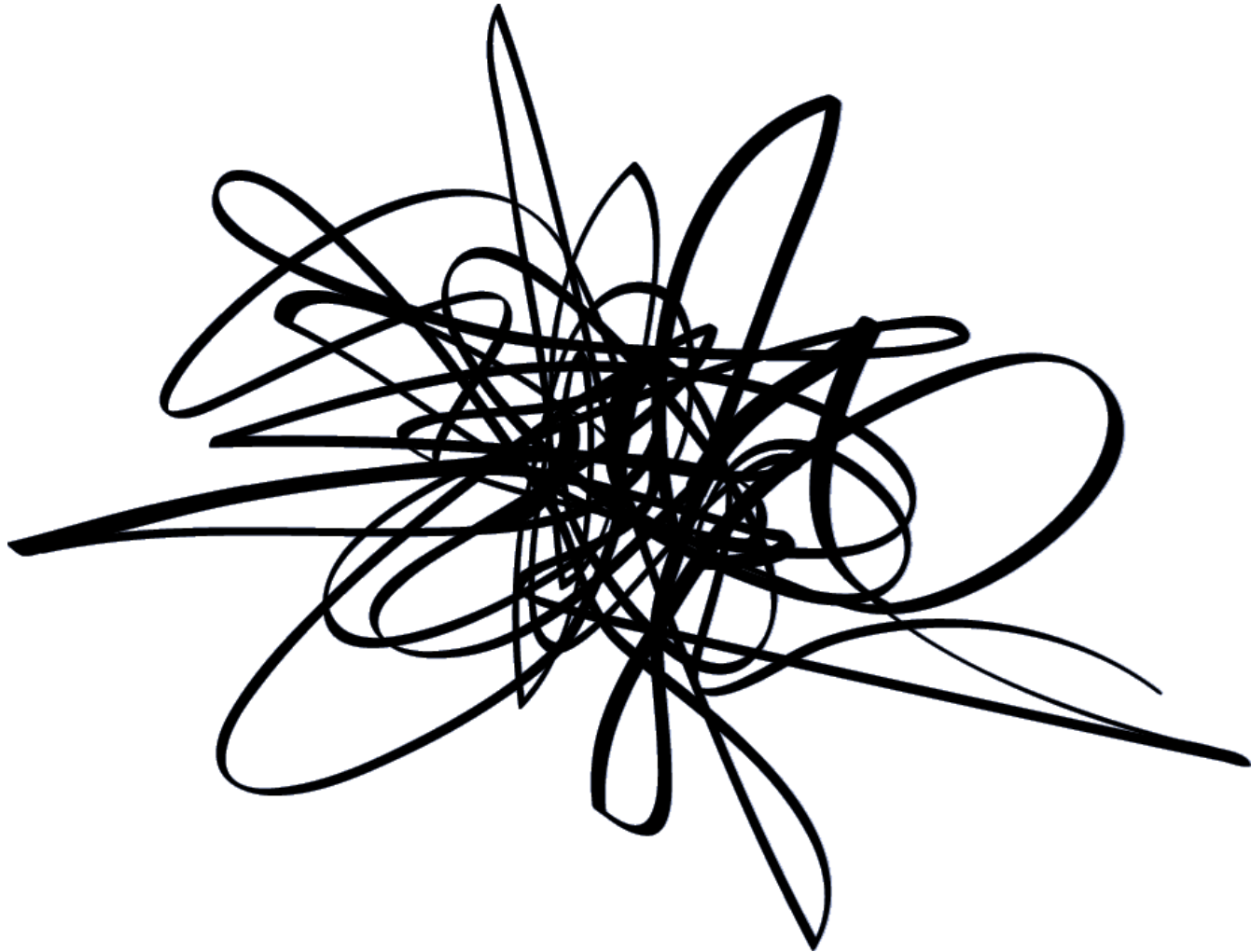


Lean On Our Experience

Recent Experience in the Southeastern United States



Our Typical Scenario Planning Process



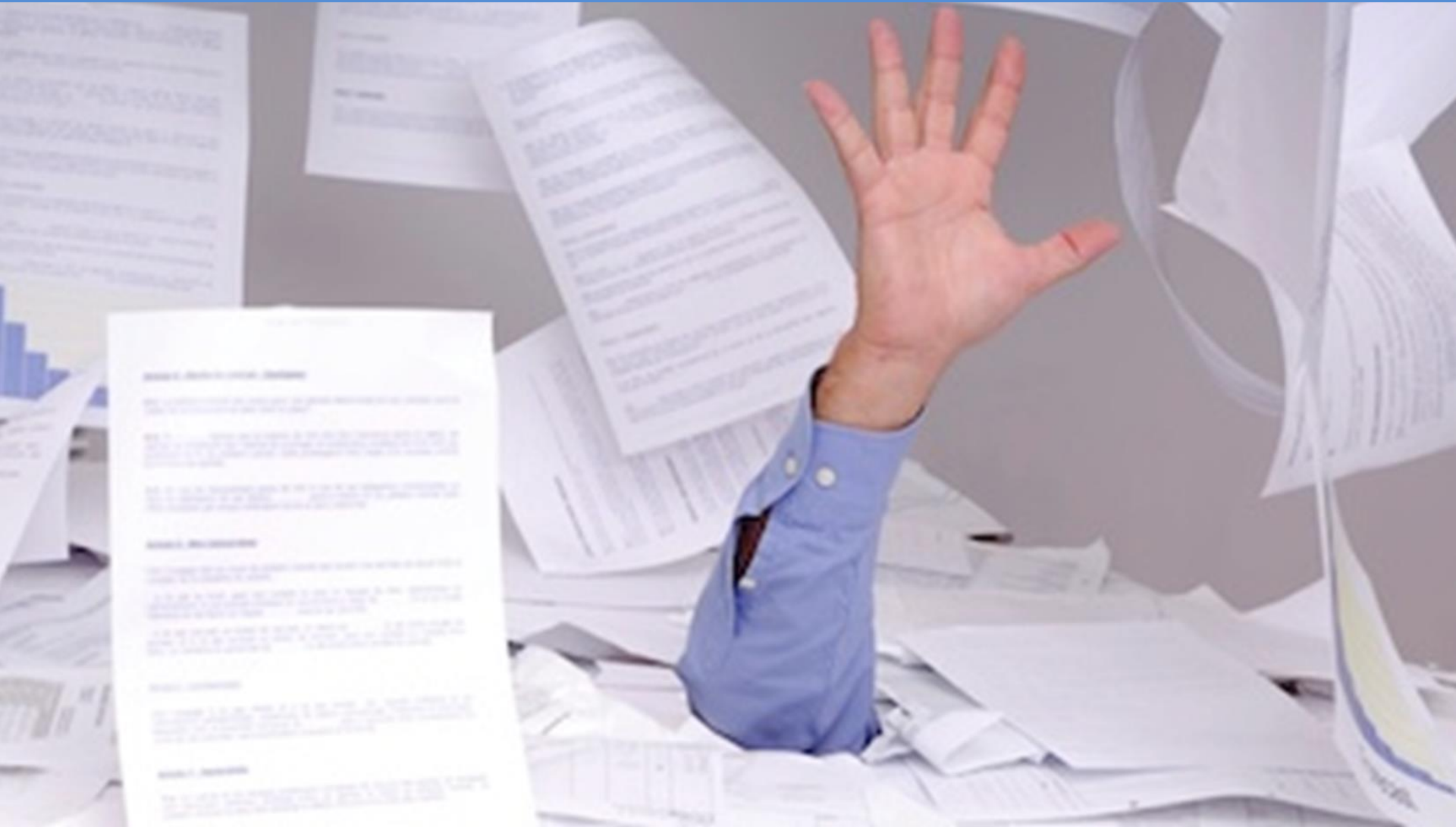
We Generate Data



But I Do Have a Scenario Planning Nightmare



But I Do Have a Scenario Planning Nightmare



CommunityViz Software



www.communityviz.com

- Regional Travel Demand Models (CUBE or TransCAD)
- Market Study & Economic Assessment Models
- Various Spreadsheet Input / Output Tools (Microsoft Excel)
- 3D Visualization Software (ArcGIS 3D Analyst / City Engine)
- Online Polling Software

& Several Complementary Tools

*Purpose &
Applications*

*Planning
Complements*

*General
Requirements*

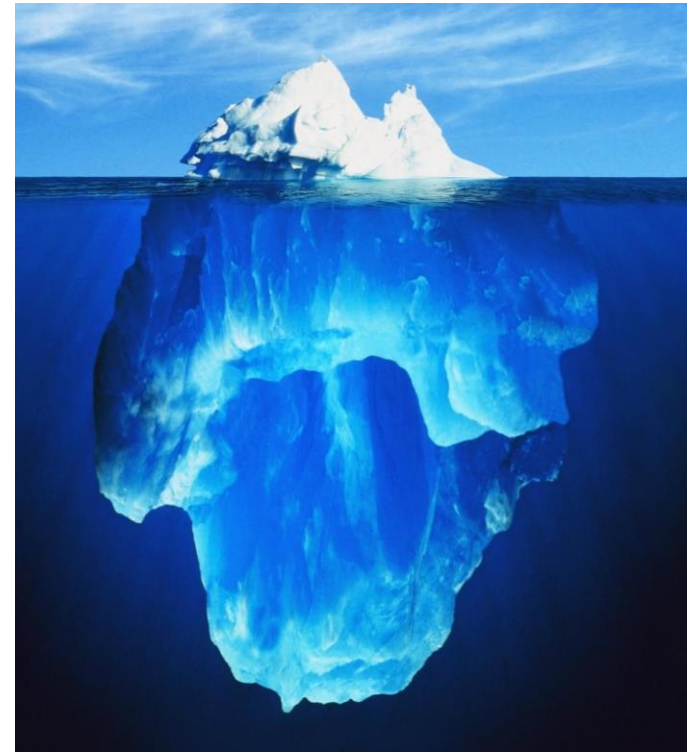
*Cost, Time
& Skills*

Purpose & Applications



A New Area of Emphasis for Us

- Data Collection Protocols
- Keep Local Governments Unique, but Allow for Multi-Jurisdictional Planning Opportunities
- Always an Eye Toward the Quilting Exercise
- Other Partnering Projects
- Parting Gifts & Clear Roles for Implementation



Community-Based Regionalism

PLAYING IN A VIRTUAL SANDBOX

Scenario planning offers an overall process, analysis tools, and partnering strategy to share information and make more-informed decisions about the future.

Participants will be asked to contemplate their vision of the most livable study area, and the project team will measure their impacts and evaluate the trade-offs associated with competing scenarios. The scenarios themselves are fictitious stories about the future. They are not forecasts or predictions, but possible futures that could come to pass based on what already exists, emerging trends, or the community's desires to change course for the future. The essential requirement of any growth scenario is that it be plausible, within the realm of what exists or what could be.

Information from the scenario planning process will be shared with key decision-makers and project implementers to develop a shared vision, preferred growth scenario map, and supporting recommendations for the forthcoming Loudon County Comprehensive Plan Amendment.

01 Where are we now?

- community assessments
- participant values and preference
- key decision criteria/performance measures for evaluating choices
- past trends
- previous commitments
- market realities



02 How do we make decisions?

- scenario testing software
- anticipated growth totals
- statistical models
- forecasting tools



03 Where are we going?

- evaluate conditions at build-out of the study area based on currently adopted plans



05 How do we get there?

- goals, strategies, and actions
- agendas and priorities
- documentation



04 Where do we want to be?

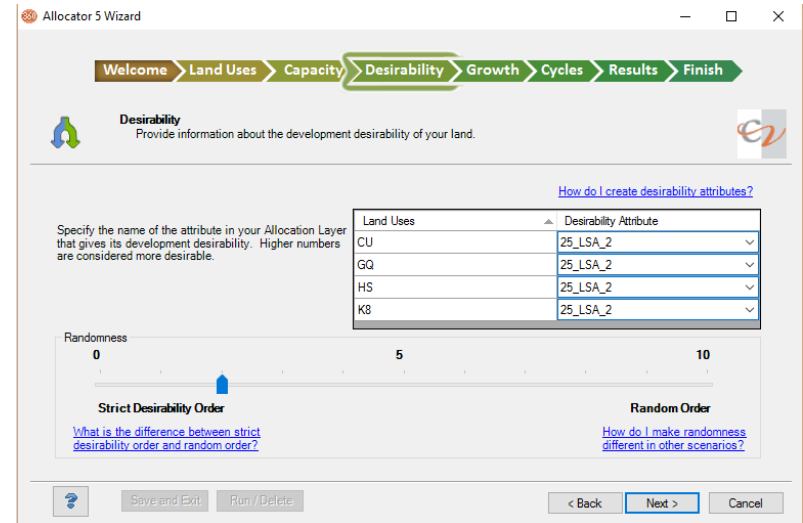
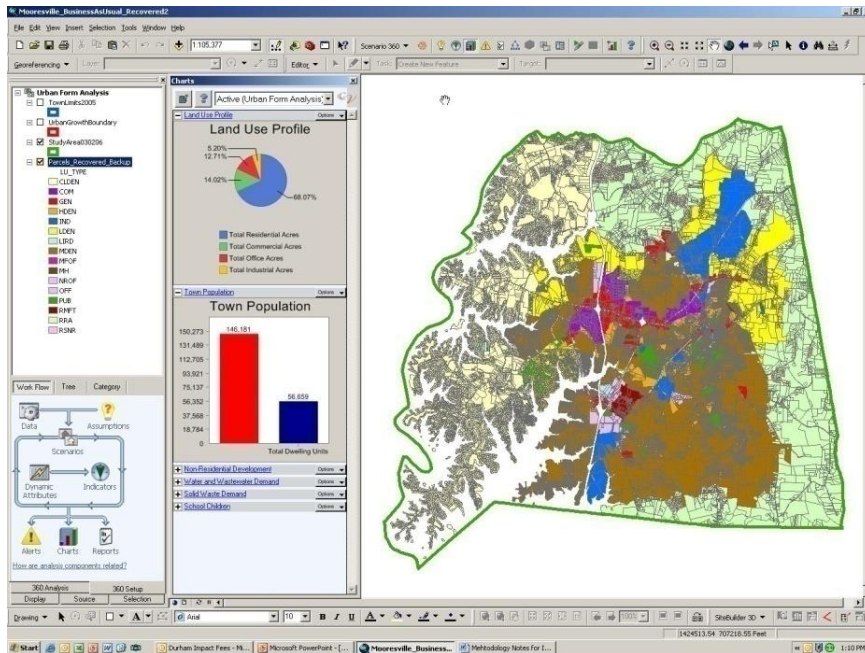
- vision statements
- evaluate alternative futures
- growth scenarios report card (trade-offs)
- preferred growth scenario



CommunityViz Software

What is it?

A decision support software that evaluates competing future growth scenarios under consideration by a community or region (functioning as an extension of ArcGIS).

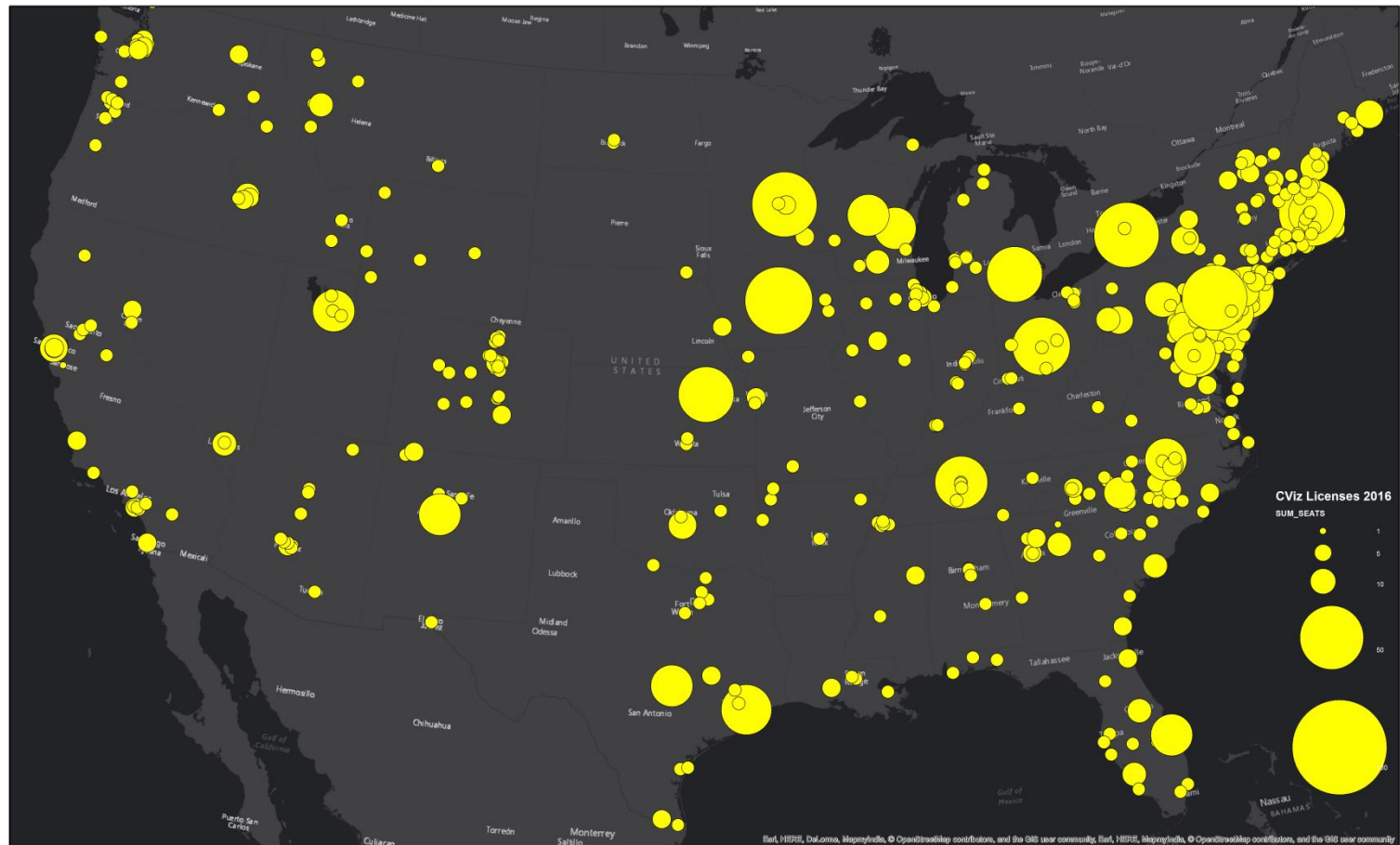


Benefits:

- Time Savings
- Capture Local Context
- Normalized Methodologies
- Quick Updates
- Open-Source Tool
- Very Affordable to Develop

CommunityViz Software

CommunityViz Licenses in the Contiguous United States 2016



Bottom-Up Approach



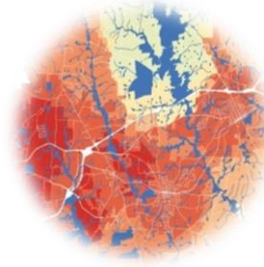
Carrying Capacity Analysis

The area of a parcel identified with one or more development constraints (e.g., SWIM buffers, recorded easements, etc.). These areas are 'off the table' for allocating new growth in subsequent phases of the model.



Development Status Assignments

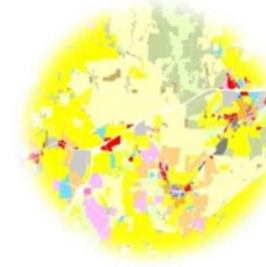
The assignment of development status to parcels in CommunityViz tells the model which set of equations to use for estimating development yield (build-out potential), and whether new growth is allowed in the parcel.



Land Suitability Analysis Calculations

LSA measures the attractiveness of individual parcels to accommodate new development. Physical features prevalent in the study area were layered on a parcel map, and calculations performed to determine either percent overlap or physical proximity (as appropriate) for each of the physical features in relation to the individual parcels.

A numeric score between 0 – 100 was used to rank parcels in the study area from least- to most-suitable for development.

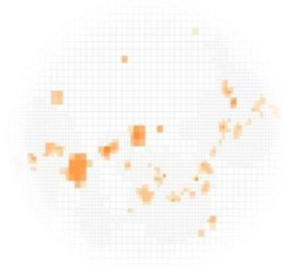


Place Type Assignments & Build-Out Estimates

Place types were used to describe land use and urban form characteristics in the study area.

Build-out potential estimates the development yield for each parcel based on its assigned development status, place type, & values assumed in the general development lookup table.

Values generated for build-out potential become the 'supply' for allocating future year growth in the study area.



Growth Allocation

Growth allocation was performed using build-out potential and land suitability statistics calculated for parcels in the study area.

Turning the Software Dial



So Many Applications

**Socio-
Economic
Data**

**Military
JLUS
Studies**

**Infrastructure
Investment
Strategy**

**Congestion
Management
Process**

**Watershed
Plans**

**Fiscal
Impact
Analysis**

**Long Range
Transportation
Plans**

**Environmental
Screening**

**Comprehensive
Plans**

**Site
Selection
Analysis**

Planning Complements



Model Plug-Ins & Interactions

- Growth Forecast Models
- Development Lookup Tables
- Government Revenue Models
- Cost of Service Models
- Travel Demand Models (TransCAD or CUBE)
- Air Quality Lookup Tables
- Trip Generation Lookup Tables
- Synchro Software
- NEPA Alternatives Analysis
- 3D Visualization (ESRI 3D Analyst or City Engine)

GROSS REVENUE RESULTS

Figure 2: Gross Revenue Results (Figure 1 of 3)

Revenue Results

Loudoun County, VA Scenario Planning Study

					REVENUES	
Category	Unit of Measure	Real Prop Value (per SF)	Source	GF Prop Tax RATE (per\$100)	GF Real Pr Rev per Unit SF	
NR1	RETAIL	Suburban Commercial	1000 SF	\$204 [b]	\$1.135	
NR2	OFFICE	Suburban Office	1000 SF	\$163 [c]	\$1.135	
NR3	INDUSTRIAL	Flex/Light Industrial	1000 SF	\$87 [c]	\$1.135	
NR4	DATA CTR	Data Center	1000 SF	\$219 [c]	\$1.135	
NR5	HOTEL	Suburban Hotel	1000 SF	\$100 [b]	\$1.135	
NR6	SpActCtr	Special Activity Center				
NR7	RETAIL	Compact, Walkable Commercial	1000 SF	\$204 [b]	\$1.135	
NR8	OFFICE	Compact, Walkable Office	1000 SF	\$178 [d]	\$1.135	
MU1	MU	Urban Mixed Use, Tall Buildings	varies*			*
R1	SFD	Single Family Detached	DU	\$676,000 [c]	\$1.135	
R2	SFA	Single Family Attached	DU	\$460,000 [c]	\$1.135	
R3	MF	Suburban Multifamily Attached	DU	\$275,000 [c][e]	\$1.135	
R4	MF	Suburban Multifamily Attached, Stacked	DU	\$339,000 [c]	\$1.135	
R5	MF	Urban Multifamily Attached	DU	\$300,000 [d]	\$1.135	

General Requirements



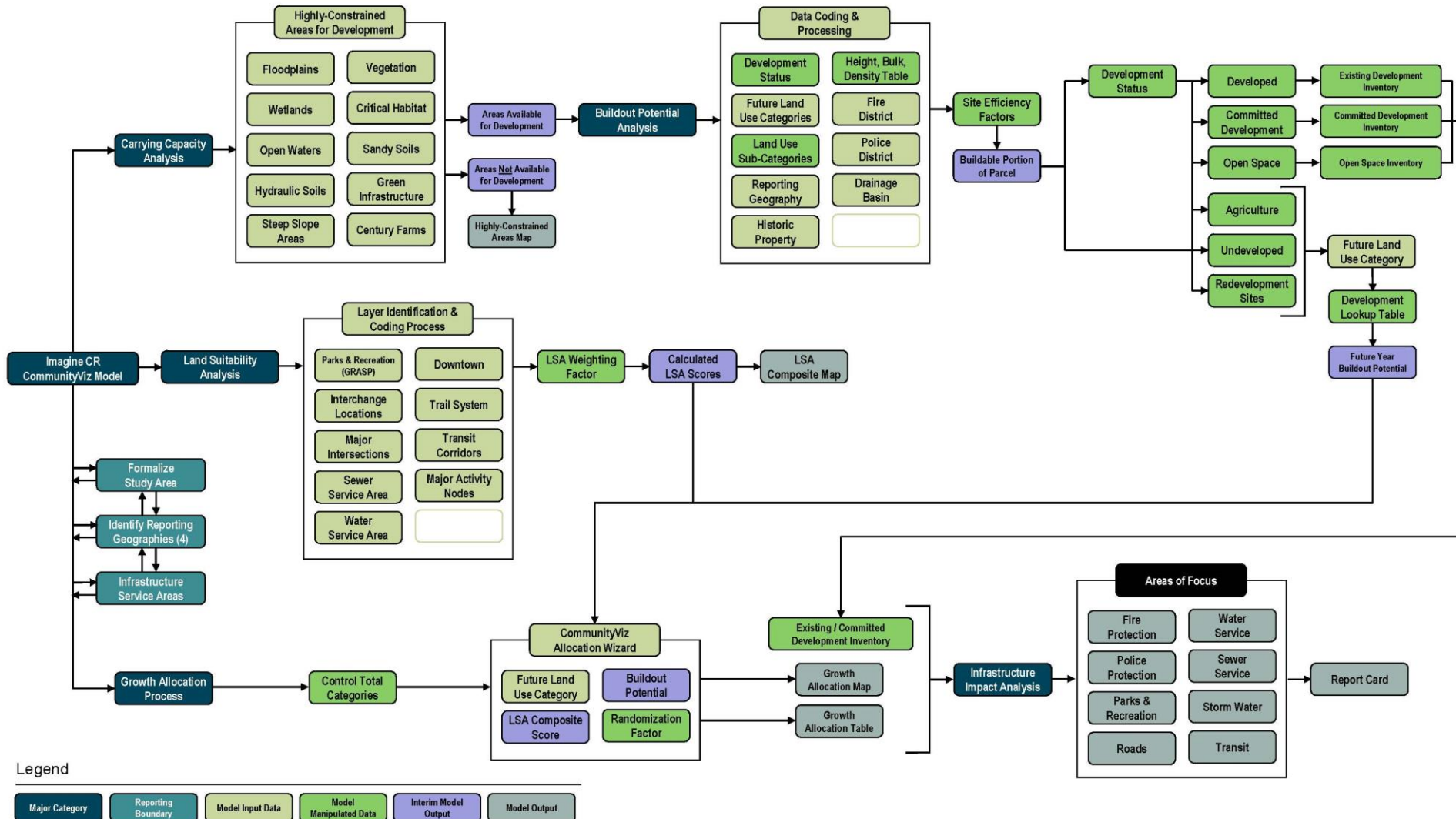
The Options Are Nearly Limitless



Plan Your Work — Work Your Plan

Cedar Rapids Scenario Planning & Infrastructure Investment Analysis

CommunityViz Model Process Diagram



Data Requirements

80%

Readily Available Data

20%

Newly Created Data

20%

**Time Spent Collecting
Readily Available Data**

80%

**Time Spent
Creating New Data**

Data Needs Wish List

Carrying Capacity

- Wetlands
- Water Bodies
- Steep Slope Areas
- Permanent Conservation Areas
- Existing Rights-of-Way
- Others?

Build Out Potential

- Parcel/Grid/Building Footprints
- Development Status Assignments
- Land Use Assignments
- Development Lookup Table (H/B/D)
- Watershed Boundaries
- Site Validation Studies
- Aerial Photography

Land Suitability Analysis

- Major Roads
- Interchange Locations
- Major Intersections
- Water/Sewer Service Areas
- Development Activity Nodes
- Transit Corridors & Stations
- Floodplains
- Others?

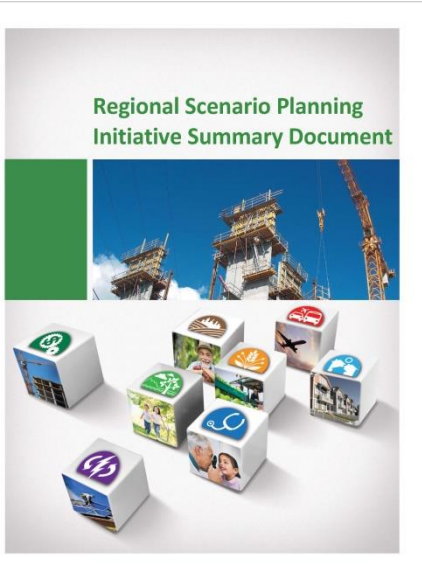
Growth Allocation

- Control Totals by Category
- P/HH & Employee Space Ratios

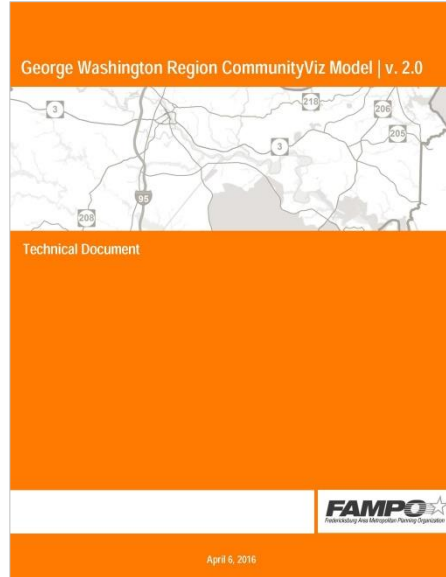
Reporting

- Study Area Boundary
- Planning Jurisdiction Boundaries
- Traffic Analysis Zones

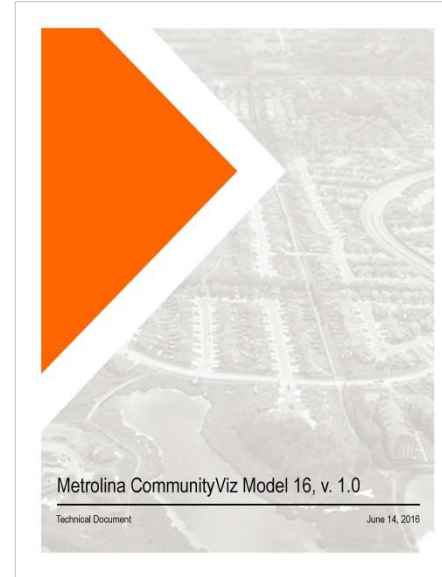
Software & Hardware Requirements



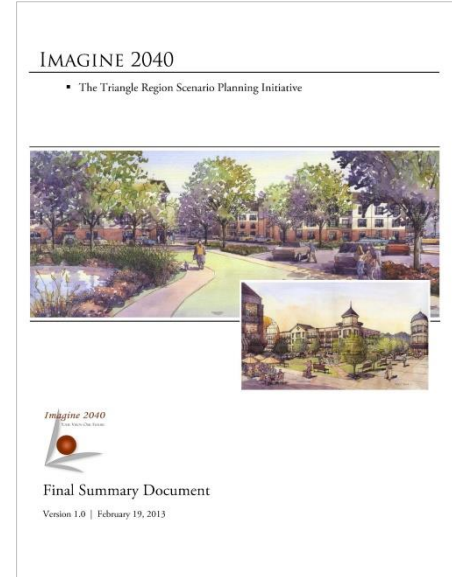
CONNECT Our Future
Scenario Planning
Summary Document



George Washington
Region CommunityViz
Model Technical
Document



Metrolina
CommunityViz Model
Technical Document –
Initial Draft



Imagine 2040 Final
Scenario Planning
Summary Document

Hardware Requirements

Table B1: Basic System Requirements for Running CommunityViz Software

System Requirement	Minimum	Preferred	Ideal
RAM	512 MB	1 GB	1+ GB
Processor	750 MHz	1 GHz	2+ GHz
Available Hard Disk Space	1 GB	5 GB	5+ GB
Three-Button Standard Mouse	Yes	Yes	Yes
Dedicated Graphics Card, Minimum Texture Memory	32 MB	64 MB	128+ MB

at least one Scenario 360 formula). Non-dynamic data is stored in the analysis outside of the geodatabase. Data layers that are dynamic may refer to one or more other data layers outside the analysis geodatabase for computing attribute or indicator values.

Map Feature

for dynamic attributes, which update automatically every time the assumption values change. Assumption values may be numeric, text or a yes/no format.

Assumptions may also be fixed or variable. A fixed assumption may not be changed in the analysis, and will affect all growth scenarios the

Software Requirements



CommunityViz v. 5.1



ArcGIS®

ArcGIS Desktop v. 10.3/4

(Required)

ArcGIS Spatial Analyst

(Recommended)

ArcGIS 3D Analyst

(Optional)

ESRI City Engine

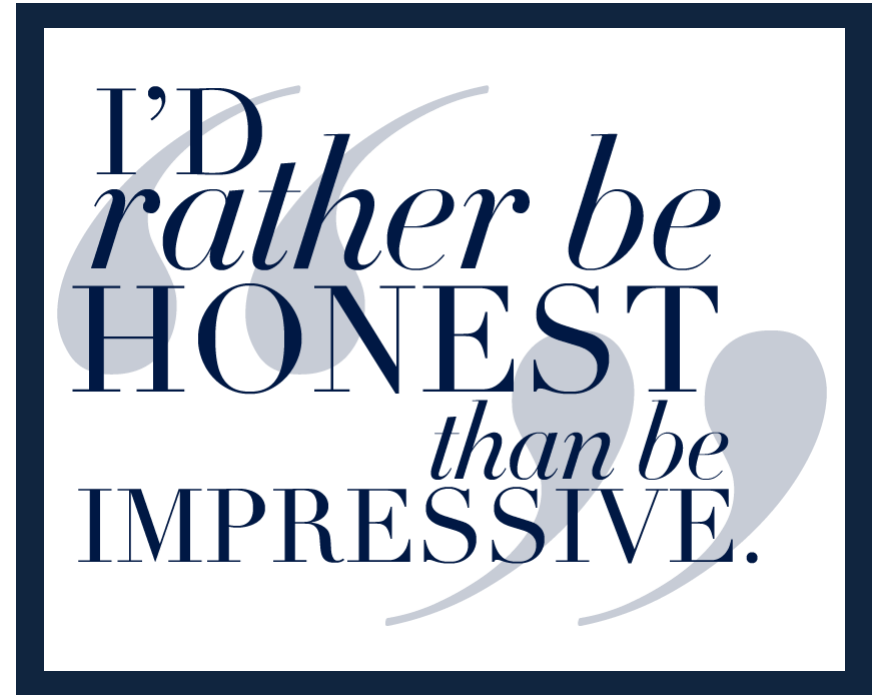
(Optional)

Cost, Time & Skills



Give It To Me Straight

- What does the software cost?
- What can I do in-house? Will I need a consultant?
- How does this impact a typical project budget?
- What kind of time commitment are we talking about to set up, apply & maintain a model?
- Describe the ideal person to work with CommunityViz.
- How do I learn more?



Anything I Missed?

