

Scenario Planning Advisory Committee Meeting #4

July 10, 2023 Web Meeting



Meeting Agenda



- **1.** Project Recap
- 2. PlanRVA Scenario Models
- **3. Models-Drivers Crosswalk**
- 4. Engagement
- 5. Next Steps





Project Recap



4 Driver Categories 11 Integrated Models **Quantitative Results Forces of Change** 222222 TECHNOLOGY ADVANCES OMMUNIT VALUES AGING ECONOMIC GROWTH TRANSPORTATION 111 TRAVEL DEMAND MODEL MODEL ECONOMIC *Ox XXXXX CONOMIC GROWTH SECTORS CLIMATE RESILIENCY HOUSING SCENARIO 1 BUILDING EMISSIONS & ENERGY COMMUNITY HEALTH IMPACTS MODEL 555 In. MODEL LAND USE FORCES ALLOCATION MODEL OF CHANGE SCENARIO 2 MOBILE EMISSIONS MODEL WATER MOBILITY ON DEMAND LOCAL Anx d >>Ox4 SYSTEM LAND COVER RESILIENCY MODEL NUTRIENT MODEL SCENARIO 3 LOADING AGRICULTURAL CLEAN ENERGY TECHNOLOGY GROWTH Plan

4

Project Schedule







Scenario Narratives from SPAC #3

1. Baseline ("Trendline Growth")	2. RVA Sinks (Doomsday)	3. Ecotopia (Resilient Growth)	4. So 20 th Century (New Traditional Growth)	5. Meh and Safe (Balance of Resilient & Conventional Growth)
There is significant regional growth in suburban areas, densifying urban cores and rural growth. Health care dominates employment sectors with strong professional growth as well. Clean energy and technology are adopted based on national trends and settlement is based on adopted Comprehensive Plans.	Through a consecutive series of man-made and natural disasters the region does not have time to recover fully, and due to a lack of affordable housing, safe areas and jobs, both residents and businesses begin to leave the region.	The Richmond region attracts new residents including climate refugees and digital nomads in search of quality community that provides transportation choices, diversity of housing, a no/low carbon footprint lifestyle, in a technology based and entrepreneurial economy.	The region begins a return to earlier decades, with growth fueled primarily by suburban and rural areas, a more professional/service economy, single income families with larger car- centric households and reactive rather than proactive regional responses to the global winds of change.	Responses to change are hyperlocal, with some localities adopting proactive resilient strategies and some staying the course and reacting as needed. Growth is in line with the 2050 Baseline but transportation and housing choices, technology adoption and lifestyles vary widely and reflect each locality's preferred approach.
Medium Growth	Low Growth	High Growth	High Growth	Medium Growth

SPAC #3 – Performance Measure Ideas

Pathways to the Future

- Quality of life
 - Health and wellbeing measures
 - Healthy vs unhealthy people and how these scenarios would affect these measures:
 - Measure through obesity, life expectancy, psychological wellbeing
 - Health care costs
 - "This is RVA, people come here because the quality of life is the bomb! We don't want to blow that up."
- Accessibility
 - To food, healthcare etc.
- Level of public investment
 - The degree to which public investment might need to be increased to realize the vision described in each Scenario Narrative.
- Change in income
 - o Examine incomes spatially
 - Are all incomes improving, or is income gap expanding?
- Displacement
- Asthma Rates/Air Quality
- Land consumption/population density
- Distribution of greenspace
- Change in runoff/flooding based on these scenarios
- Climate exposures (risk factors in each part of the city i.e. flooding, heat island etc.)
- Healthcare provisioning
 - Health opportunity index



PlanRVA Scenario Models







1. Richmond Simplified Land Use Allocation Model (RSLAM)

9. Area Types and

Maximum densities





8. Vacant land

10. Spatial Distribution

7. Accessibility

Scores (HH and

EMP)



1. Richmond Simplified Land Use Allocation Model (RSLAM)(Contd.)

Inputs:

- Jurisdiction Control Totals
- Base Year/2045 Trend TAZ files
- TAZ Scores (Developable Land)
- Current densities (HH & EMP)

Outputs:

- TAZ Data by HH, POP, EMP Classes
- Vacant land







Pathways **3. Transportation Accessibility Model** GIS Travel Demand Model Travel (Bicy Destinations: Access to Jobs cle, Skims (Auto, • Grocery Pedestrian) Stores/Pharmacies Population) • Health Care Accessibility **Model Outputs** Facilities Decay Curves • Schools Access to • Parks Jobs and **Destinations (EJ** Libraries Destinations and Total Government data by TAZ Centers EJ and Total Population

3. Transportation Accessibility Model (Contd.)

Equity and Accessibility				
Access to Jobs	Access to Jobs (EJ)	Access to Destinations	Access to Destinations (EJ)	
Increase in average job accessibility per person	Increase in average job accessibility per person (Total EJ Population within EJ Area)	Increase in average access to destinations per 1000 persons	Increase in average access to destinations per 1000 persons (Total EJ Population within EJ Areas)	
Jobs Per person	Jobs per Person	Weighted Destinations per 1000 Persons	Weighted Destinations per 1000 Persons	



- Tool to Estimate Accessibility : Inverse of Congested travel times skims
 - No-Build: Baseline
 - Build: Scenarios
- From All TAZs
- From EJ TAZs
- Auto, Transit, Bicycle and Pedestrian Modes.

Auto	1.412 * e^-0.061 * minutes
Transit	1.538 * e^-0.029 * minutes



4. Mobile Emissions Model





5. Land Cover Model







7. Water Consumption Model





8. Energy Emissions Model









11. System Resiliency Model

Scenario Specific Input Data from RSLAM Model



miro

11. System Resiliency Model (Cont.)

Natural Hazard Risk Areas

Water Inundation Areas

- o Base 2017 Current 100/500 Year Floodplain
- Baseline 2050 Future 100/500 Floodplain (based on Virginia Coastal Resilience Master Plan (VA CRMP) Graduated Hazard Rasters)
- o Scenarios Future 100/500 Floodplain

• Sea Level Rise Areas

- o Base 2017 0 ft
- Baseline 2050 3 ft (National Oceanic and Atmospheric Administration –NOAA)
- Scenarios Based on Scenarios Narratives (3-10 ft) (NOAA)





11. System Resiliency Model (Cont.)

Wildfire Prone Areas

- **Base 2017** Developed Regionwide Wildfire Prone Areas Index (1-7) based on Nine Historic Data Variables (data by Southern Group of State Foresters – Wildfire Risk Assessment Portal)
 - Burn Probability
 Community Protection Zones
 Wildland Urban Interface (WUI)
 WUI Risk
 Fire type Extreme.
 Wildfire ignition Density
 Char Rate of Spread,
 Char Flame Length,
 Char Fire Intensity Scale

Areas indexed 6 and 7 classified as Wildfire Prone Areas

• Baseline 2050

- From base year calculate land use categories and their corresponding wildfire prone probabilities
- Use RSLAM output for 2050 land use
- Monte Carlo Simulation

• Scenarios

• Same method as used for Baseline 2050



EXERCISE 1.

Discussion: Modeling Levers

- What's missing?
- What is unclear?
- Is there anything the models do that we are not capturing in the scenario narratives?

The suite of **11** integrated Models

Pathways to the Euture





Crosswalk: Model Levers & Scenario Drivers



Community

Community Drivers





Driver Dynamics	Drivers	Model with Levers	Gaps/Notes
Population Dynamics	Population growth/decline In-migration Household Size Educational Attainment Population Diversity Age	RSLAM* RSLAM* RSLAM Qualitative Qualitative Health Model	Educational Attainment (Gap) Population Diversity (Gap)
Settlement Dynamics	Geographic preferences	RSLAM – spatial distribution data	Can include water/sewer service areas
Settlement Supply Dynamics	Local Plans and/or zoning Land availability Redevelopment potential Affordable housing Development Density	RSLAM RSLAM RSLAM RSLAM	TDM and accessibility models can support these levers (i.e., input data)

* Requires external input/assumptions

Community



Community Drivers



Driver Dynamics	Drivers	Model with Levers	Gaps/Notes
Political Dynamics	Land preservation Greenfield development (Other drivers covered in Settlement Demand and Supply dynamics)	RSLAM RSLAM	

Economy

Economy Drivers





Driver Dynamics	Drivers	Model with Levers	Gaps/Notes
Global/National Economy Dynamics	Overall growth/decline in jobs Sector-based growth/decline Business sizes and locations	RSLAM* RSLAM* RSLAM and	
Regional Economy Dynamics	Sector-based growth/decline E-retail Job locations within region	RSLAM* Economic, TDM (?) RSLAM	Economic model can add to performance measures
Employment/ Workforce Dynamics	Job locations within region Extent of telework (local jobs) Extent of telework external to region	RSLAM RSLAM + TDM Qualitative	

* Requires external input/assumptions

Technology

Technology Drivers





Driver Dynamics	Drivers	Model with Levers	Gaps/Notes
Transportation Technology Dynamics	Electric Vehicle adoption CAV adoption Automated freight Parking dynamics	TDM* TDM* Economic and TDM Qualitative	Parking dynamics (Gap)
Transportation Mode Shift Dynamics	Auto ownership by geog. Micromobility Transit Bicycle and Pedestrian High speed inter-city rail	TDM* Accessibility Model TDM Accessibility Model Qualitative	High Speed Inter-City Rail (Gap)
Other Technology Dynamics	Broadband Remote work Robotics and 3D printing Clean energy	Varies Varies Qualitative Building Emissions/Energy	\ Chain of logic with RSLAM / and/or TDM can address Economic model -interpret?

* Requires external input/assumptions

Resilience Drivers







Driver Dynamics	Drivers	Model with Levers	Gaps/Notes
Climate/Planet Dynamics	Pandemic GHG emissions Climate change (flooding) Climate change (heat) Sea Level Rise	Mobile and Building Emissions. Pollutant Runoff, TDM, System Resiliency, Community Health RSLAM	
Environmental Policy Dynamics	Clean energy Clean transportation Sustainable agriculture Environmental regulation	Building Emissions/Energy; System Resil. Mobile emissions Pollutant Runoff, System Resil. Water Cons, Nutrient Load,	Community health model will translate many outputs to additional perf. meas.
Local/Individual Response Dynamics	Personal responsibility Local food supply Water consumption Land conservation Clean energy	Various models depending on logic RSLAM, Pollutant Runoff, System Resil. Water consumption RSLAM Building Emissions/Energy	

EXERCISE 2.

How can we use the results?

- What are ideas to fill the gaps in the modeling levers?
- Revisit performance measures
 - What is important to report and compare?
 - By jurisdiction
 - By geography (e.g., urban/suburban/rural)

The suite of **11** integrated Models









Next Steps

Next Steps



- **1.** Running All Scenarios
- 2. SPAC Meeting # 5
 - Modeling Results
- **3.** Stakeholder Charrette (Fall)