Scenario Planning Best Practices: Applying Exploratory Scenario Planning to Evaluate Transportation Projects in Hampton Roads

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The HRTPO is the Metropolitan Planning Organization for Hampton Roads
- Comprised of 15 Localities
- Transit Agencies
- Federal and State Agencies
- Virginia General Assembly Members

Home to 1.7 Million People
- Military
- Port of Virginia
- Tourism
Adopted July 2016
Last Amended: October 2018
Effective until June 2021

Need for Scenario Planning
FHWA Scenario Planning Workshop

- November 2016
- Forum to share noteworthy practices and key recommendations for scenario planning
- Set the stage for the 2045 LRTP Scenario Planning effort

- MPO Peers
- Virginia Peers
- Technical Experts
- Regional Stakeholders participation
SCENARIO PLANNING CONSIDERATIONS

Regional Economic Drivers
- Military
- Port
- Tourism
- New Industries

Multimodal Connectivity and Technology
- High Capacity Transit Corridors
- Passenger Rail
- Active Transportation
- Connected and Automated Vehicles
- TNC/Ride Sharing

Resiliency/Geographic Considerations
- Sea Level Rise and Storm Surge
- Coastal Resiliency
- Flooding Resiliency

Demographic Considerations
- Aging Population
- Millennials
- Alternative Growth Scenarios

Funding
- Hampton Roads Transportation Fund
- Transportation Revenues
- SMART SCALE
SCENARIO PLANNING TYPES

Long-Range Transportation Planning

Predictive Planning

Trend Lines, Expected, Probable or Baseline

Scenario Planning

Normative: What SHOULD Happen?

Identifies Preferred Scenario: Prescriptive

Exploratory: What COULD Happen?

Explores Uncertainties: Opportunities, Risks, Plausible Futures
where

do we go

from

here?
Regional Connectors Study (RCS)

- Evaluate the “feasibility, permitability, and transportation benefits” of “regional connectors” for potential inclusion in the 2045 LRTP
- Establish a regional long-term vision that investigates innovative transportation options that:
  - Connect the Peninsula and the Southside
  - Enhance Economic Vitality
  - Improve the Quality of Life
- Scenario Planning a key aspect
Objectives

• Establish Framework for Scenario Planning that helps the region prepare for possible futures (which will drive 2045 LRTP and Regional Connectors Study)
  • Regional Priorities, Drivers, Trends
  • Transportation Vision for 2045
  • Regional Goals/Preferred Outcomes for 2045
• Preference is to Analyze 3 Scenarios
• Evaluate Candidate Projects that do well across “Plausible/Alternate” future scenarios

Major considerations in designing our process

• Scenario Planning tools/models transferable to other/future planning efforts
• **Objective, data driven process**
  • Utilize updated Regional Travel Demand Model
  • Utilize updated Project Prioritization Tool
Scenario Planning from an MPO Perspective

• Federal Guidelines
• Three C’s: Continuing, Cooperative, and Comprehensive
• Regional Stakeholder Input
• Public Input

Decision Points and MPO Approval Process

• Scenario Planning Framework
• Candidate Projects
• Evaluation Methodology - HRTPO Project Prioritization Tool
• Analysis Results
• Fiscal-Constraint

Challenges

• 2045 LRTP and RCS: separate development timelines
• Regional Coordination and Input
  • RCS committees comprised of 7 Localities
  • LRTP comprised of ALL 15 Localities
Plausible Futures vs One Prescribed Future

2045 Baseline Scenario

2045 Alternative Scenario 1

2045 Alternative Scenario 3

Preferred Scenario
EXPLORATORY SCENARIO PLANNING

- Plausible Futures vs One Prescribed Future
- Identify projects that fare best
  - Most cumulative benefit regardless of alternative future scenario

Evaluate and Rank Projects Across All Scenarios

2045 Baseline Scenario
2045 Alternative Scenario 1
2045 Alternative Scenario 2
2045 Alternative Scenario 3

Most Robust Projects
MODELING THE SCENARIOS

Land Use Model

Travel Demand Model

TREDIS Model

Land Use Indicators

Transportation Indicators

Economic Indicators

Project Prioritization Tool

Project Utility

Economic Vitality

Project Viability

HRTPRO Regional Scenario Planning
# Regional Scenario Planning Framework

## Regional Place Types
- Virtual 2015 (Base Year)
- Virtual 2045
- 2045 Greater Growth

## Scenario Narratives
- Drivers
- Themes

## Greater Growth Control Total
- Employment Growth in addition to 2045 Baseline
**Regional Land Use Data**

- Maintain Regional Land Use Data
  - Initiated 2011
  - Common land use classification system (Major and Minor Regional Codes)
  - Data Provided by Localities
  - Consistent with Comprehensive Plans
  - Updated with LRTP cycle (2016)
    - Transportation Analysis Zones (TAZ) Boundaries and Allocation Process
  - Coordinated with localities to address data gaps/oddities (2018/2019)
Develop a unified set of Place Types that describe regional development patterns

- Existing and Future Place Types defined using Regional Land Use Codes (Minor)
- Control Totals for reconciling Place Types densities
  - Approved 2015 and 2045 Transportation Analysis Zone (TAZ) Data
Establish the baseline scenario
Identify the “storylines” for alternative scenarios
Affirm the scenarios with regional stakeholders
Define drivers within the major parameters:
  • Demographic/location drivers
  • Economic drivers
  • Technology drivers
Quantify the drivers for each alternative scenario
Develop a narrative for each alternative scenario

Note: Scenarios should be distinct from one another
Drivers should represent **highly impactful and highly uncertain factors**, for which we can provide (and possibly vary) assumptions in the scenarios.

Need some fluidity as we evaluate scenarios.
SCENARIOS: SPATIAL THEMES

Greater Growth on the Water
What happens if jobs focus on the waterfront, housing choices are varied, and transportation technology adoption is moderate?

Greater Growth in Urban Centers
What happens if jobs and housing focus in urban areas, with greater multimodal availability and high adoption of connected vehicle technology?

Greater Suburban/Greenfield Growth
What happens if jobs and housing are developed in dispersed activity centers, with a higher level of truck transportation and high adoption of autonomous vehicle technology?
SCENARIO NARRATIVES

Greater Growth on the Water

Growth in water-oriented activity. Port of Virginia becomes even more competitive with freight more multimodal. More dispersed housing locations. Moderate assumptions for CAV adoption and network adaptation.

Greater Growth in Urban Centers

Significant economic diversification. Low space requirements per job. Large role for “digital port.” New professionals prefer to live/work in urban settings. High level of CV adoption and low auto ownership/high TNC mode.

Greater Suburban/Greenfield Growth

Growth is suburban/exurban, but growth includes walkable mixed use centers. Port of Virginia becomes even more competitive. “Digital port” brings additional jobs. Housing is more suburban. High level of AV adoption and network adaptation.

WHAT THESE WILL HELP US TEST

Test greater cross-harbor travel in particular.

Test more urban and multimodal travel patterns.

Test more overall regional travel.

NOTE: Sea Level Rise assumed as 3 ft. in all Scenarios
Establish a Control Total for the “Greater Growth” Alternate Scenarios to stress test transportation alternatives

The overall goal is to provide differentiation between the scenarios

- Too little growth could dilute differences between scenarios
- Too much growth with widespread, severe congestion could mask differences between scenarios (i.e. anything added to the network will also become congested)

Believable narratives – plausible growth
HRTPO Regional Scenario Planning

Where we are:

- Task 4: Evaluate Existing Regional Conditions
- Task 5: Model 2045 Baseline Scenario

Scenario Planning Framework:

- Modeling Tools
- Regional Place Types
- Scenario Narratives
- Greater Growth Control Totals

Completed:

- Task 1: Build the Base Data, Models and Scenarios
- Task 2: Define Alternative Future Scenarios
- Task 3: Define Measures of Success

Tasks in Progress:

- Task 6: Build 2045 Alternative Scenarios
- Task 7: Evaluate the Scenarios
- Task 8: Evaluate the Candidate Projects
- Task 9: Report Results

Updated Regional Travel Demand Demand Model
COORDINATION AND INPUT

- Stakeholder Interviews
- (2) Public Surveys
- (2) Workshops
- (7) Webinars
- Technical Questionnaire on Potential Scenario Drivers
- Emails, Conference Calls, Meetings between Locality Staff/HRTPO/HRPDC/RCS Consultants

Scenario Planning Framework Reviewed and Approved by:
- Long-Range Transportation Plan Subcommittee
- Transportation Technical Advisory Committee
- Regional Connector Study Working Group
- Regional Connector Study Steering Committee
- HRTPO Board

Public Review and Comment Period
- July 3-17, 2019
SCENARIO PLANNING OUTCOMES

Evaluate and Rank Project Across ALL Scenarios

- 2045 Baseline Scenario
- Greater Suburban/Greenfield Growth
- Greater Growth in Urban Centers
- Greater Growth on the Water

Most Robust Projects

Scenario Modeling Tools
- Land Use Model
- Travel Demand Model
- Economic Model

Project Evaluation and Ranking Across Scenarios (LRTP and RCS)
- Project Prioritization Tool
- Other Performance Measures

Fiscal-Constraint Applied to Most Robust Projects
- Long-Range Transportation Revenues
- Project Costs
**Key Takeaways**

- Establish Objectives/Outline Early
- Ensure Stakeholders have good understanding of Exploratory Scenario Planning
- Regional Input – Early and Continuous
- Develop Tools that are Transferable
- Approvals at Critical Milestones
- Budget Appropriate Staff Time