maximize2040

A PERFORMANCE-BASED TRANSPORTATION PLAN

for a greater Baltimore Region

Preparing for an Uncertain Future:

Scenario Thinking for a Greater Baltimore Region

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BRTB

Maximize2040 is an initiative of the Baltimore Regional Transportation Board, the metropolitan planning organization for the Baltimore region.

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SCENARIO THINKING: THE STATUTORY FRAMEWORK

Moving Ahead for Progress in the 21st Century (MAP-21) is the federal law that establishes the requirements of, and authorizes the funding for, federal surface transportation programs. MAP-21 is the basis of Federal Highway Administration and Federal Transit Administration regulations and policies. These regulations and policies guide how federal agencies, states, transit providers, and local jurisdictions plan, fund, and implement projects.

Under MAP-21, metropolitan regions develop long-range transportation plans. *Maximize2040: A Performance-Based Transportation Plan* is the long-range transportation plan being developed for the Baltimore region. This region covers Anne Arundel, Baltimore, Carroll, Harford, and Howard counties and Baltimore City. The federally designated organization driving this process is the Baltimore Regional Transportation Board (BRTB). Members of the BRTB include the chief elected officials of the region and representatives from state agencies.

In developing *Maximize2040*, the BRTB must:

- Involve partner agencies and interested parties in a continuing, cooperative, and comprehensive planning process.
- Select the major transportation projects that will best meet federal, state, and regional requirements and policies over the next 25 years.
- Do this within a fiscally constrained plan—one where estimated costs do not exceed forecasted revenues.

MAP-21 gives metropolitan regions the option of considering multiple scenarios in developing their long-range transportation plans. For regions that utilize a scenario approach, MAP-21 encourages consideration of such factors as distribution of population and employment, potential revenues, and potential regional investment strategies.

SCENARIO THINKING: HOW CAN WE BETTER PREPARE FOR THE FUTURE?

The Baltimore region has several challenges to consider as it plans for the transportation system of 2040:

- aging infrastructure
- population and employment growth projections
- environmental concerns
- funding issues
- equity concerns

Issue: Within the transportation planning framework (including federal, state, regional, and local requirements and policies), and accounting for regional challenges, how can the region make effective transportation investment decisions over the next 25 years? Which mix of long-term transportation investments will best enable the region to meet future challenges? – ***The last thing we want is to plan for projects that will be ineffective or irrelevant as a result of future changes***.

SCENARIO THINKING: A DIFFERENT APPROACH

One of the goals of *Maximze2040* is "Promote Informed Decision Making." This goal is consistent with MAP-21's emphasis on performance-based planning and programming. That is, monitoring the performance of transportation systems to make sure the region is getting the best "bang for the buck" with its investments.

A basic question is "How can the region make informed decisions about the future, especially when there are a lot of uncertainties about the future?"

The typical approach to making decisions about future transportation systems involves:

- Developing population and employment forecasts for the region and its jurisdictions
- Applying these forecasts to the regional travel demand model to predict where and how people will travel, given proposed changes to the existing network of roads and transit lines.

Forecasts and models are essential to the transportation planning work the region conducts. Their basic approach is to predict and react. However, much about the future is unpredictable. As a result, forecasts and models may not provide all of the information the region needs to make the most informed decisions about the future.

Scenario thinking is a way to supplement forecasts and models. Scenarios can help a region prepare and adapt, as opposed to predict and react. The region can use a scenario approach to examine uncertain forces that could dramatically affect how we will live and travel over the next 25 years. The goals of scenario thinking are to:

- Prepare the region to be resilient: better able to adapt to a variety of potentially significant future changes.
- Identify investment strategies, policies, and projects that can be effective under a variety of possible future conditions.

GATHERING PUBLIC INPUT

To begin the scenario thinking process, the BRTB surveyed the public and stakeholder groups in June and July 2014. The survey asked people to choose which external forces might have the greatest effects on transportation, the environment, and growth in the Baltimore region between now and 2040. To help keep things organized, the survey divided forces into five basic types, according to a model sometimes referred to by the acronym "STEEP": (1) Social-Demographic, (2) Technological, (3) Economic, (4) Environmental, (5) Political.

The survey generated 209 total responses. According to these responses, the most critical forces facing a future Baltimore region are:

Social-Demographic Forces

- Older and more diverse population
- Changes in work and lifestyle patterns, such as increases in teleworking or delayed retirement
- Changes in transportation preferences, such as the recent decline in per capita vehicle miles traveled

Technological Forces

- Innovations in interconnected systems (vehicle-to-vehicle and vehicle-to-network)
- Innovations in personal transportation, such as driverless vehicles and/or shared vehicles

Economic Forces

- Long-term systemic unemployment

Environmental Forces

- Climate change
- Threats to water resources

Political Forces

- Political will to tap new sources of transportation funding, whether federal, state, local or private

REFINING PUBLIC INPUT THROUGH A FOCUS GROUP

In July 2014, the BRTB convened a focus group to look at the survey responses and try to determine the forces that will be most critical for the Baltimore region. This group consisted of representatives from various agencies and organizations: the City of Baltimore, the Regional Transit Agency, the Mid-Atlantic Regional Air Management Association, the University of Maryland Center for Advanced Transportation Technology, and the Maryland Department of Transportation.

The focus group concluded that two of the forces indicated in the survey responses (the top vote getters in the survey) are certain or nearly certain to happen in the future:

- The region's population is getting older and more diverse
- There will never be enough funding to meet all transportation needs and aspirations.

Since the group saw these two forces as certain or nearly certain, its members believed that the scenario thinking effort should focus more on uncertain forces, all the while recognizing the importance of the two more certain forces. The group recommended developing scenarios around these uncertain forces:

- Changes in patterns and preferences with respect to work, lifestyle, and travel
- The degree to which climate change might affect regional transportation systems (and low-lying communities)
- Innovations in interconnected systems, vehicles, and devices

In addition, the focus group wanted the scenario initiative to consider the degree to which quality of life in the region might improve or decline over the next 25 years. How might these changes affect the region's economic competitiveness relative to other regions? Another concern was the extent to which air pollutants such as ozone, diesel emissions, and fine particulate matter might affect public health in the future.

DEVELOPING AND APPLYING SCENARIOS TO SUPPORT *MAXIMIZE2040*

Based on public and focus group input, staff members developed three scenarios to examine critical forces facing the region. These scenarios presented possible events and conditions in three very different futures. Although the scenarios assumed some best and worst case future conditions, these are all challenges the region faces today:

- "Wash Overflow," in which population growth and job growth have spilled over from the Washington, DC region into the Baltimore region
- "Simmered Up," in which climate change effects have led to rising sea level and more extreme weather events throughout the U.S., and particularly in the Baltimore region
- "Zuber Connected," in which significant advances in vehicle-to-vehicle and vehicle-to-network communication systems and sensors have occurred

Scenario Exercises: Workshops to Engage Regional Stakeholders

Groups of regional stakeholders gathered on two days (September 23, 2014 and December 11, 2014) to work through these scenarios. Participants included:

- professors and instructors from local universities and colleges
- staff members from the Maryland Department of Transportation, Maryland State Highway Administration, Maryland Transit Administration, and Maryland Port Administration
- staff members from local jurisdictions specializing in emergency response and resiliency planning
- staff members from groups dealing with environmental issues and public health
- representatives from private transportation providers, including ZipCar
- organizations focused on workforce development and health/disability issues
- staff members from Ft. Meade, the Chesapeake Science and Security Corridor, the BWI Partnership, the Central Maryland Transportation Alliance, and the Greater Baltimore Committee
- Public Advisory Committee members
- representatives of consulting firms

At the September workshop, participants were assigned to be in one of three groups (one for each of the scenarios). The December group was smaller, so that group broke into two subgroups: one focused on the Wash Overflow scenario and the other discussing the Simmered Up scenario.

Participants were asked to assume the events and conditions in their scenario actually had happened in the years between 2014 and 2039, 25 years in the future. This led to participant discussions on the likely effects of these events and conditions on key regional socioeconomic and travel trends and goal-focused performance measures. The groups also considered which investment approaches might enable the region to address future challenges most effectively.

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The graphic at left illustrates the approach: (1) discuss external forces that likely will be critical to the region, (2) analyze the effects of these forces on key regional socioeconomic trends, travel trends, and performance measures, and (3) determine which types of actions the BRTB can take, and which investments the region can make, to best prepare for these effects.

Scenario Findings: Trends and Measures

September Workshop

The chart below shows the probable future effects of each scenario on key trends and performance measures, as determined by each of the three groups at the September workshop.

Much less/worse	Less/worse	Same	More/better	Much more/better

	Wash Overflow	Simmered	Connected
Socioeconomic Indicators			
• Gross domestic product			
• Jobs			
• Population			
• Average Age			
Regional Travel Trends			
• Distance to work			
• Distance to shop			
• Personal auto use			
• Transit use			
• Freight deliveries			
• Total miles traveled			
Performance Measures			
• Traveler safety (injuries/fatalities)			
• Traffic flow (individual)			
• Traffic flow (freight)			
• Road/bridge conditions			
• Transit infrastructure conditions			
• Air quality			

Technology: “Savior” or Catalyst for Increased Driving?

All three groups agreed that technology will play a large role no matter how the socioeconomic trends or the environmental forces play out. The groups discussed whether or not technological advances will be a “savior” with respect to safety and congestion in the region. That is, technological advances in vehicle-to-vehicle and vehicle-to-network systems and sensors could help to improve safety and ease congestion significantly in the future. On the other hand, the improvements resulting from technological advances could act as a catalyst for increased driving and increased “sprawl.” Opinions were divided on this topic.

Increase in Freight Deliveries

The groups also thought that freight and commercial trips are likely to increase in the future. Again, the role of technology was seen as central to this topic.

Deteriorating Infrastructure Conditions

All three groups concluded that infrastructure conditions (roadway, bridge, and transit) are likely to deteriorate in the future. Again, technology could help in this area by facilitating asset management and through the development of new, more durable and heat-tolerant materials (pavement, bridge, rail).

December Workshop

The chart below shows the probable future effects of each scenario on key trends and performance measures, as determined by each of the two groups at the December workshop.

Much less/worse	Less/worse	Same	More/better	Much more/better

	Wash Overflow	Simmered
Socioeconomic Indicators		
• Gross domestic product	Much more/better	Much less/worse
• Jobs	Much more/better	Much less/worse
• Population	Much more/better	Much less/worse
• Average Age	Much less/worse	More/better
Regional Travel Trends		
• Distance to work	Much more/better	Same
• Distance to shop	Much less/worse	Much less/worse
• Personal auto use	More/better	Much less/worse
• Transit use	Much more/better	More/better
• Freight deliveries	More/better	More/better
• Total miles traveled	More/better	Much less/worse
Performance Measures		
• Traveler safety	Same	Same
• Traffic flow (individual)	Much less/worse	More/better
• Traffic flow (freight)	Same	More/better
• Road/bridge conditions	Much less/worse	Much less/worse (darkest)
• Transit infrastructure conditions	More/better	Much less/worse
• Air quality	Much more/better	Much less/worse

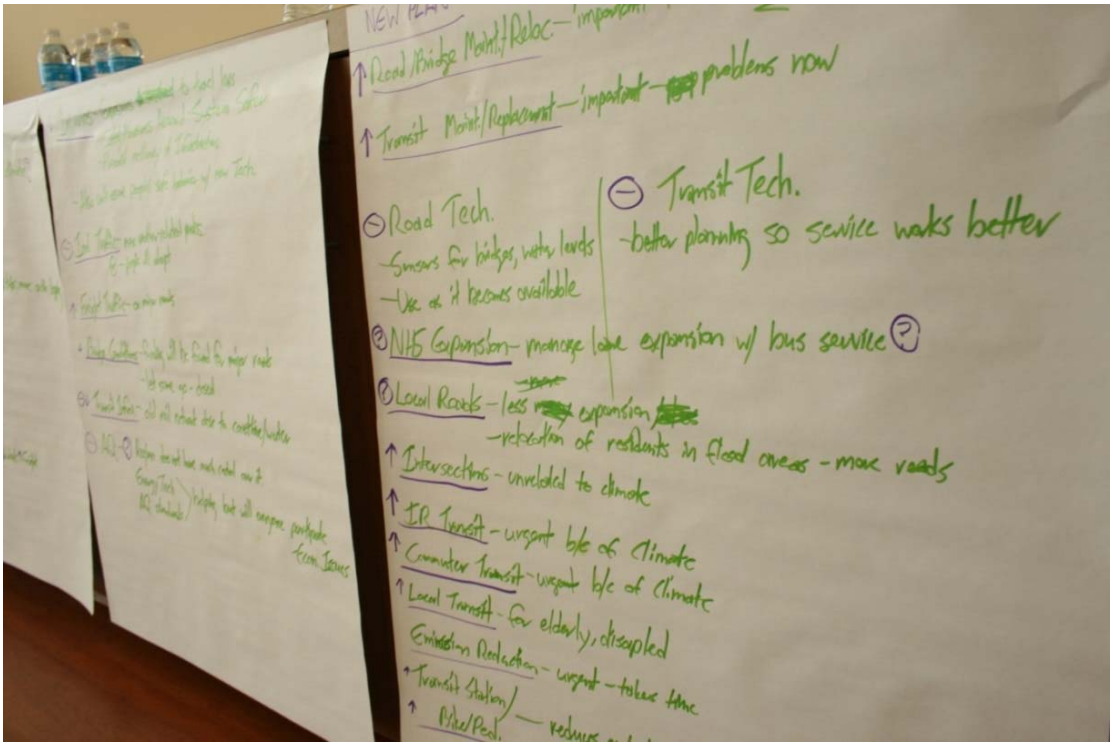
Additional Comments and Concerns

The conclusions of the December Wash Overflow and Simmered Up groups were similar to those of the September groups, with a few notable exceptions:

- In the area of travel trends, the December Wash Overflow group generally was more pessimistic than the September group. The December group, for example, believed that distance to work and personal auto use would increase because of the conditions noted in the scenario. That is, these conditions could contribute to additional “sprawl.”

- For both the Wash Overflow and Simmered Up scenarios, the December group was less certain than the September group that advances in vehicle and infrastructure technologies would lead to safer conditions.
- In the area of performance measures, the December Wash Overflow group generally was more optimistic than the September group. The December group, for example, believed that transit infrastructure conditions (i.e., the condition of transit vehicles, rails, etc.) would improve.
- This group also was more optimistic than its September counterpart with respect to air quality, believing that air quality would improve because of continued stringent statutory and regulatory requirements as well as advances in vehicle technologies.
- On the other hand, the December Simmered Up group was less optimistic than its September counterpart with respect to air quality. This group believed that air quality would be worse under its scenario conditions.

Both December groups held out hope that technological advances in vehicle and infrastructure technology would improve conditions with respect to traveler safety and traffic congestion. But there also was a lot of uncertainty about this. There also was some concern about growing inequality—that is, the future might see disparity between those who can afford new technologies and those who can't afford them, potentially setting up a "haves" vs. "have nots" situation. There also were concerns about privacy in an era where vehicle and infrastructure technologies will enable everyone's positions and movements to be tracked to an even greater extent than they are today.



Scenario Findings: Investment Strategies

All of the scenarios examined in the breakout sessions at each workshop assumed some best and worst case future conditions. However, these conditions are all challenges we face to some degree today.

At each workshop, following the discussions and exercises in the breakout sessions, the group at large reconvened to review the findings of each breakout group. Each breakout group summarized (1) the effects its scenario will have on key socioeconomic and travel trends and on key performance areas and (2) what kinds of policy choices and investments in transportation network operations and capital projects might help the Baltimore region to prepare for these effects. The larger group also looked at some of the areas in which all three groups had some agreement.

September Workshop

The chart below summarizes the conclusions of the September group.

Important and Urgent	Important, but action can wait	Not as important or urgent

	Wash Overflow	Simmered	Connected
Investment Strategies			
• Road/bridge maint./relocation			
• Transit vehicle maint./replacement			
• Road technologies			
• Transit technologies			
• NHS road expansion			
• Non-NHS road expansion			
• Intersection/interch. improvements			
• Inter-regional transit expansion			
• Commuter transit expansion			
• Local transit expansion			
• Transit station improvements			
• Bike/walk access improvements			
• Emissions reduction			

All three of the September groups found these investment areas to be both important and urgent:

- Road and bridge maintenance (or relocation as necessary)
- Expansion of commuter transit services
- Emission reduction measures

All three groups determined that these investment areas are at least important but not urgent (investment is important, but it could be delayed to allow the region to address more urgent issues first):

- Transit facility maintenance / transit vehicle replacement
- Transit technologies (vehicle-to-vehicle and vehicle-to-network communications systems)
- Transit station improvements
- Improvements to pedestrian and bicycle facilities / improvements to pedestrian and bicycle access to other types of transportation

Other types of investments were not determined to be important in all three scenarios, although some scenarios may have found them to be critical for their particular set of events and conditions.

December Workshop

The chart below summarizes the conclusions of the December group.

Important and Urgent	Important, but action can wait	Not as important or urgent

	Wash Overflow	Simmered
Investment Strategies		
• Road/bridge maint./relocation		
• Transit vehicle maint./replacement		
• Road technologies		
• Transit technologies		
• NHS road expansion		
• Non-NHS road expansion		
• Intersection/interch. improvements		
• Inter-regional transit expansion		
• Commuter transit expansion		
• Local transit expansion		
• Transit station improvements		
• Bike/walk access improvements		
• Emissions reduction		

Both of the December groups found these two investment areas to be both important and urgent:

- Road and bridge maintenance (or relocation as necessary)
- Expansion of local transit services

Here are investment areas both December groups determined were at least important but not urgent:

- Transit facility maintenance / transit vehicle replacement
- Transit technologies (vehicle-to-vehicle and vehicle-to-network communications systems)
- Commuter transit expansion
- Transit station improvements
- Improvements to pedestrian and bicycle facilities / improvements to pedestrian and bicycle access to other types of transportation
- Emission reduction measures

SCENARIO THINKING: WHERE DO WE GO FROM HERE?

Staff has briefed the BRTB members on the findings of the scenario exercises. The local jurisdictions and state agencies can use these findings to inform their decision making as they deliberate on which projects the region should plan for and implement over the next 25 years, given the financial resources expected to be available.

In addition, periodically staff will update the BRTB members on developments and trends relative to the topics discussed in the scenarios. These include population and employment projections, potential climate change effects, and developments in technology as well as other national or regional forces or trends that could affect the region's ways of living and traveling in the future.