Route 1 Multimodal Alternatives Analysis

Executive Steering Committee

March 13, 2014

Route 1 Multimodal Alternatives Analysis

DRPT Virginia Department of Rail and Public Transportation

Office of INTERMODAL Planning and Investment

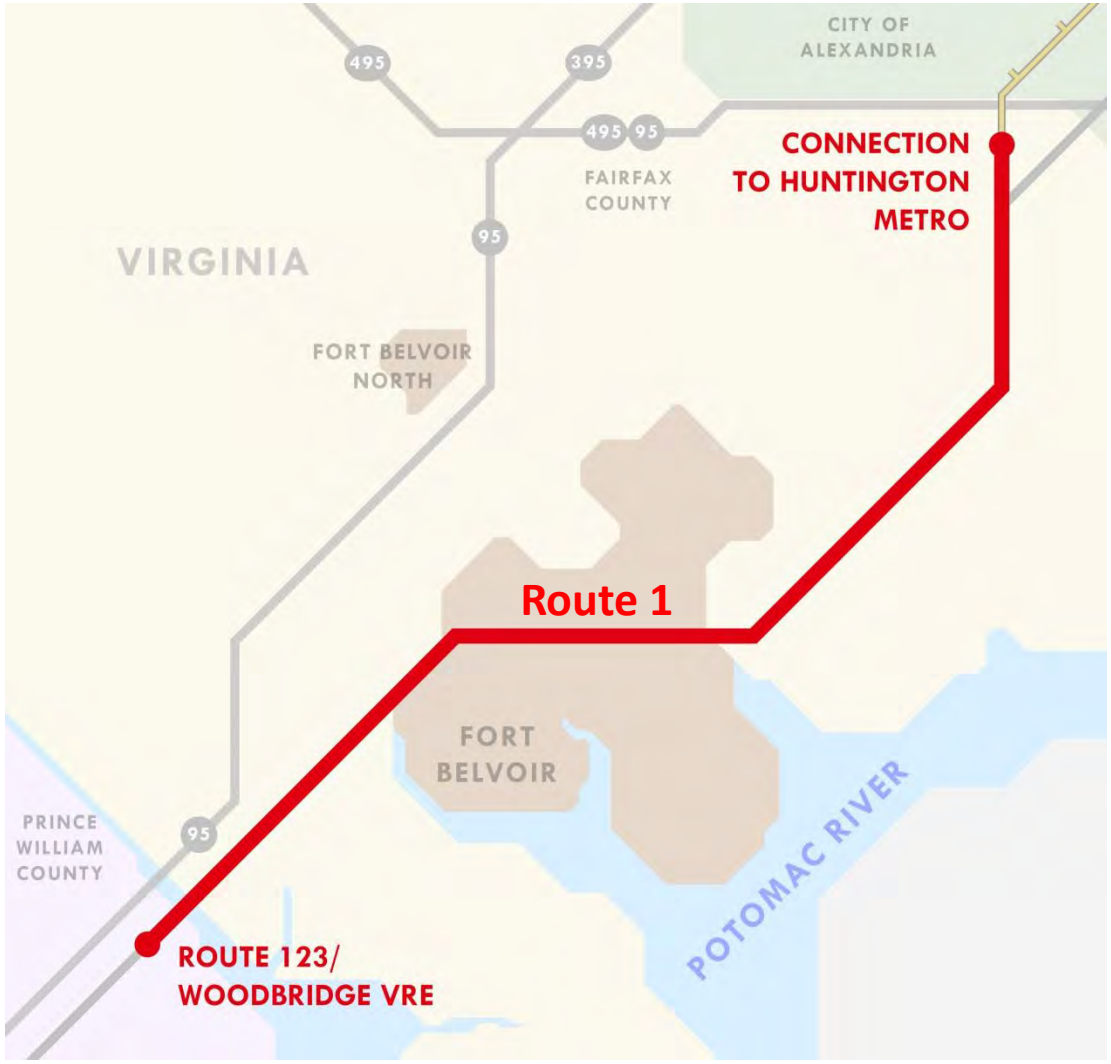
VDOT

Agenda

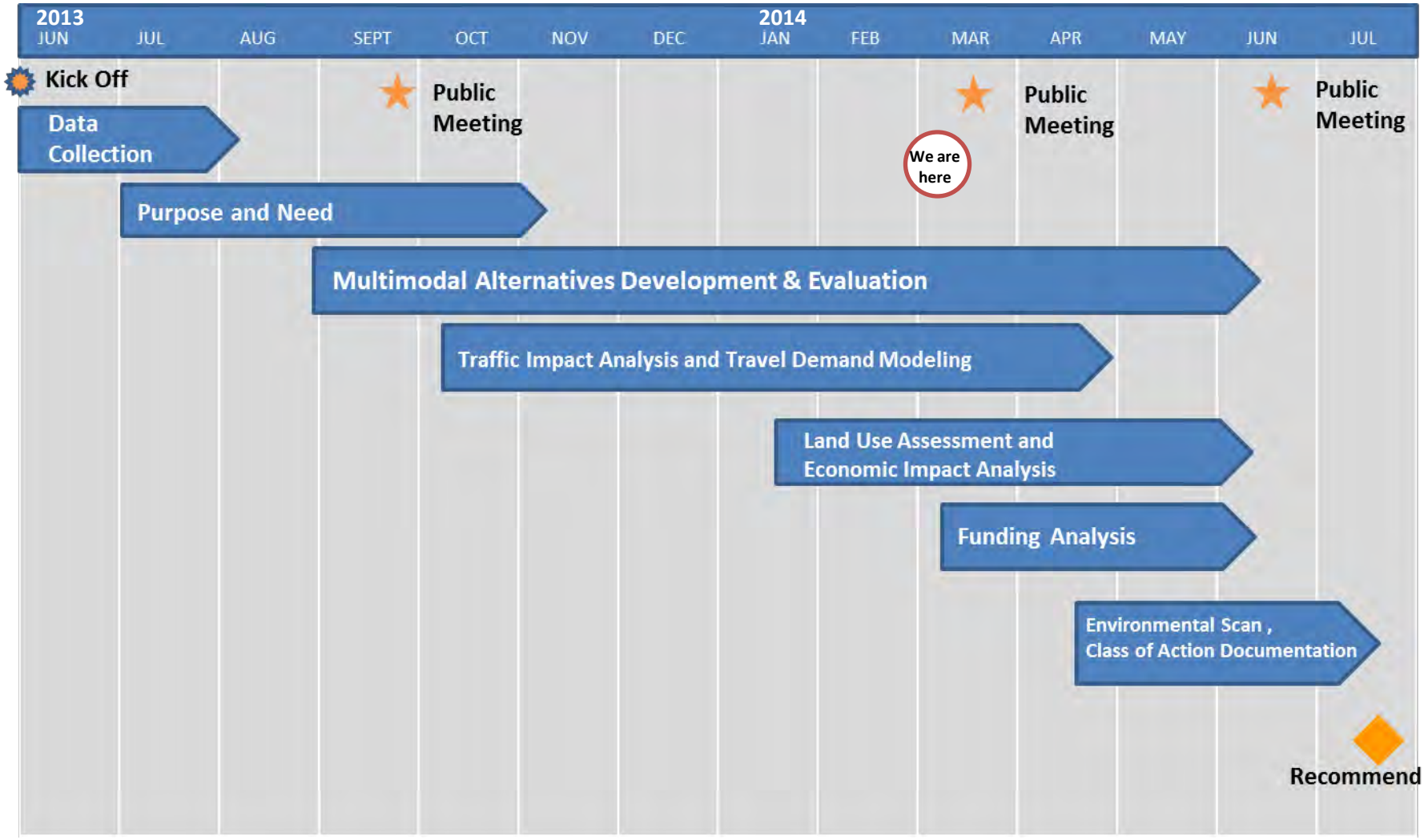
1. Introductions (3:30)
2. Background and Process (3:35)
3. Proposed Alternatives for Further Evaluation & Land Use Scenario Development (3:50)
4. Project Funding and Finance & Preliminary Economic Analysis (4:20)
5. Q&A, Discussion (4:40)
6. Upcoming Meetings and Next Steps (4:55)

1. Background and Process

Project Corridor

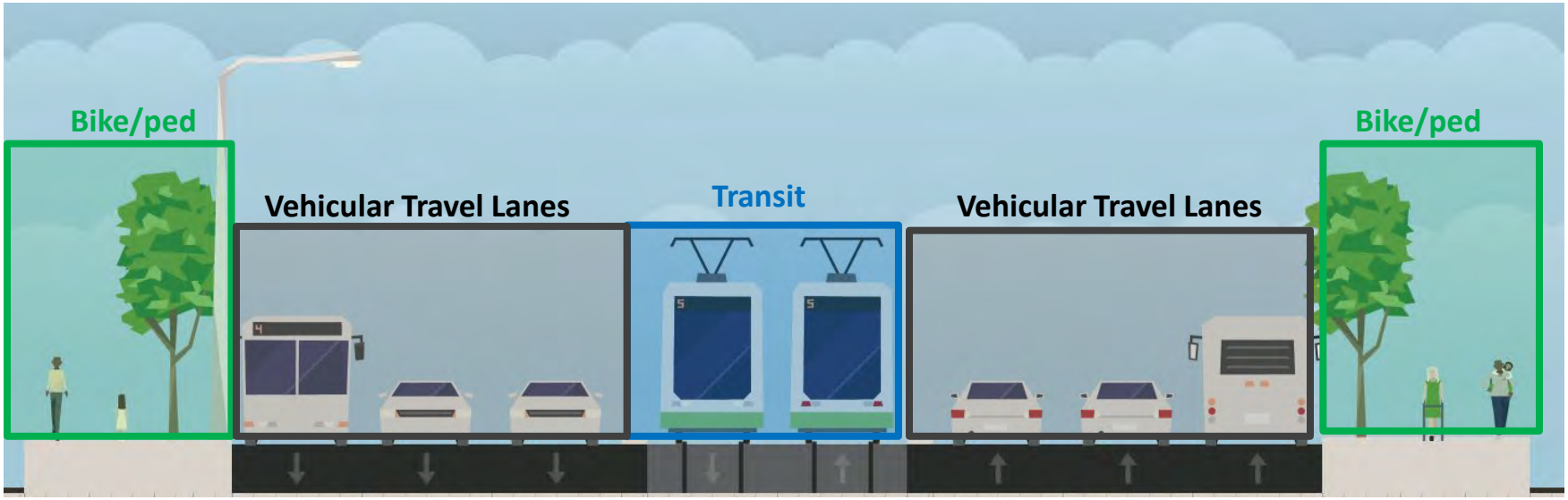


Project Schedule



Outcome of the Study

- A recommended multimodal alternative for implementation in the Route 1 corridor by the technical team
- The recommended alternative will have three elements:
  - **Transit**: Mode and alignment
  - **Vehicular**: Number of automobile travel lanes
  - **Bike/ Ped**: Facilities and location

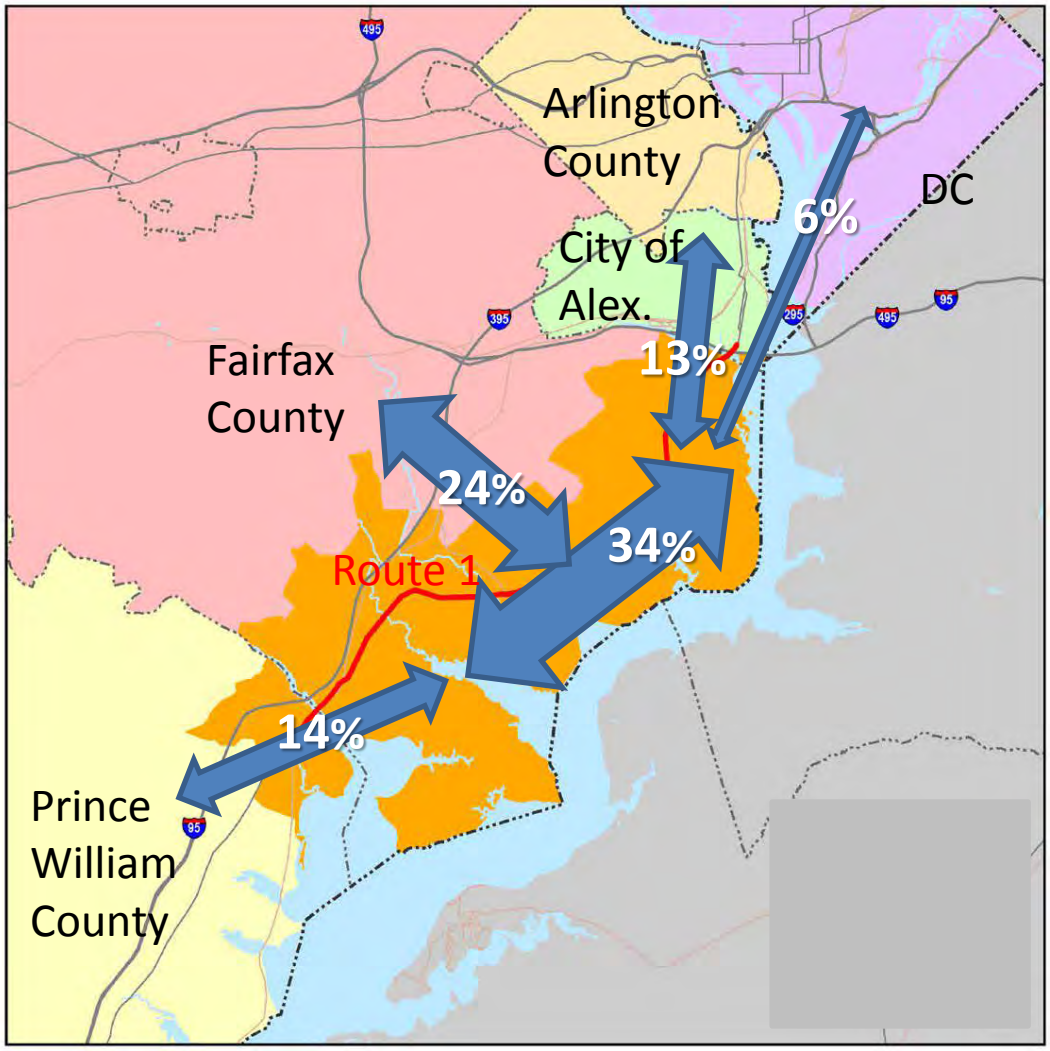


Purpose and Need

Purpose:
Provide improved performance for transit, bicycle and pedestrian, and vehicular conditions and facilities along the Route 1 corridor that support long-term growth and economic development.

Needs:
- Attractive and competitive transit service
- Safe and accessible pedestrian and bicycle access
- Appropriate level of vehicle accommodation
- Support and accommodate more robust land development

Existing Corridor Travel Patterns (Auto plus Transit)



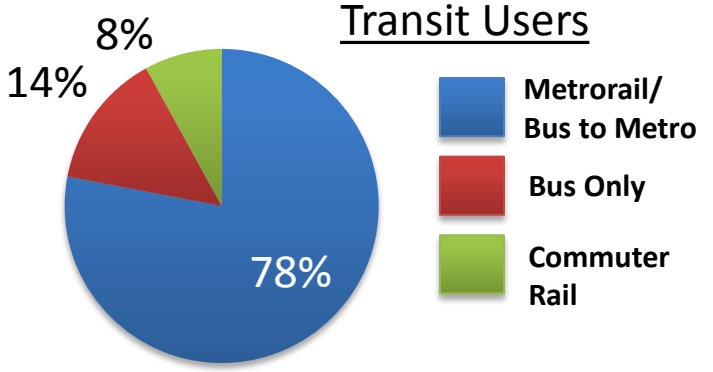
Daily trips (auto and transit) to, from, and within Route 1 corridor

Route 1 From/To	Total Trips		
	Total	% of Total	Transit Share
DC	52,000	6%	29%
Arl/Alex	116,000	13%	6%
Within Rt.1 Corridor	310,000	34%	1%
Fairfax Other	216,000	24%	0%
Prince William Other	124,000	14%	0%
Other Areas	95,000	10%	2%
Total	**913,000**	**100%**	**3%**

Transit Travel Markets

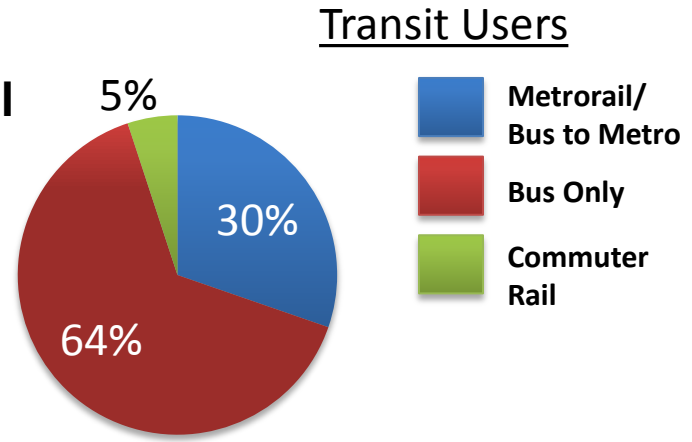
On an average week day, where do people who live in the corridor travel to?

- The majority of corridor transit users (52%) are commuting to Downtown, using Metrorail
- 86% of corridor transit users are traveling to Arlington or Downtown



On an average weekday, where do people who travel to the corridor come from?

- 64% of transit commuters to the corridor use the bus
- Most transit trips begin and end in the corridor



Reminder: Highlights of Last Meeting

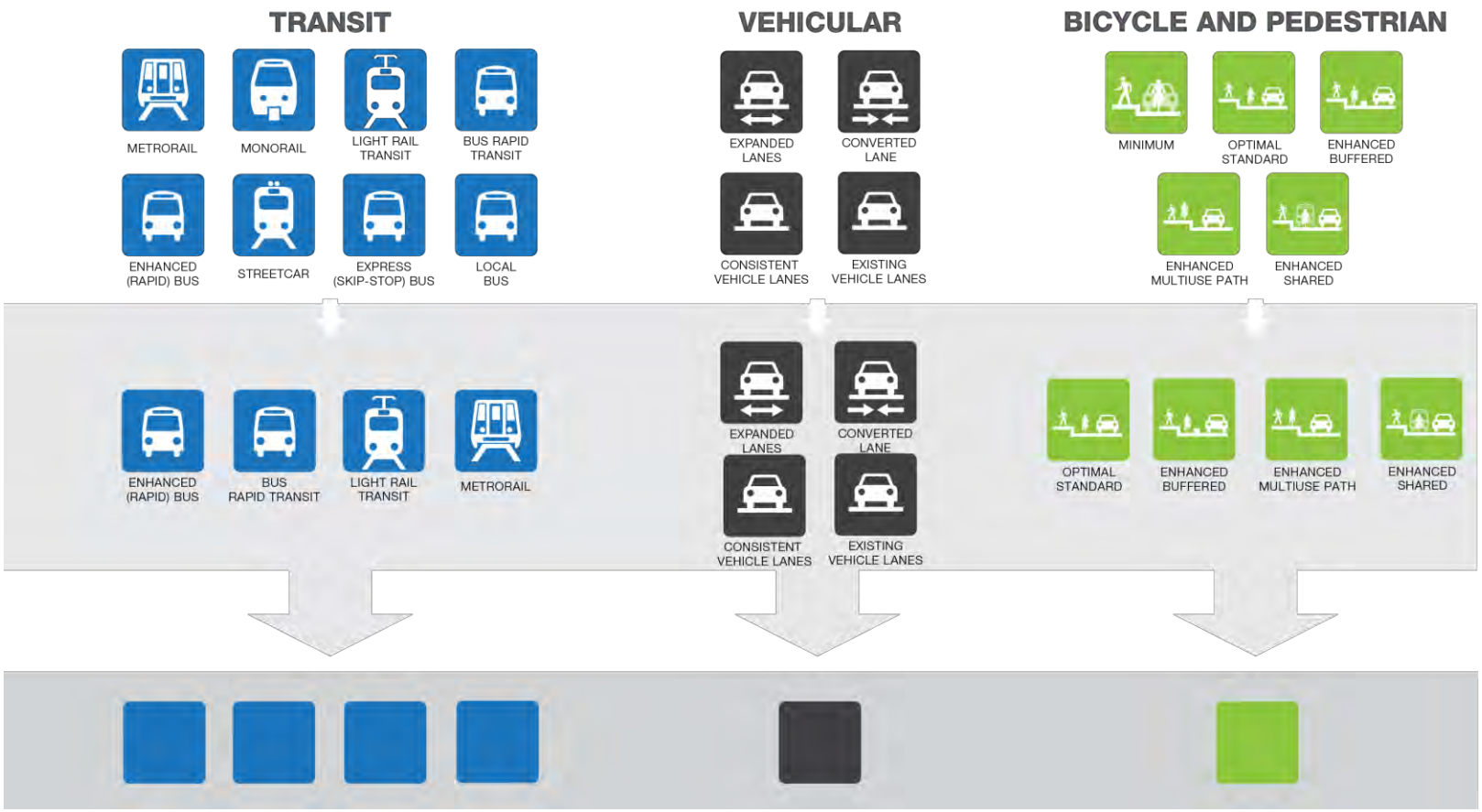
- Presented Purpose and Need
- Identified the transportation problems we want to solve
- Presented preliminary options for:
  - Transit modes
  - Vehicular Lanes
  - Bike/Ped facilities

Step 1: Identify the best transportation options

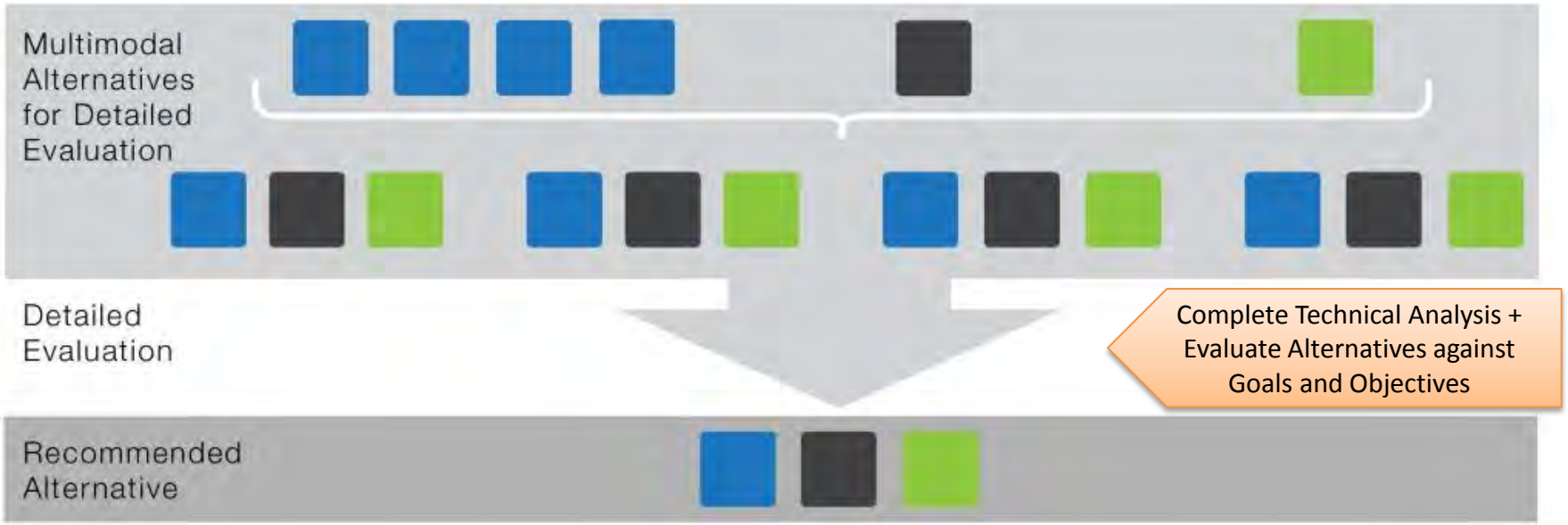
Range of Alternatives

Initial Alternatives

Refined Alternatives



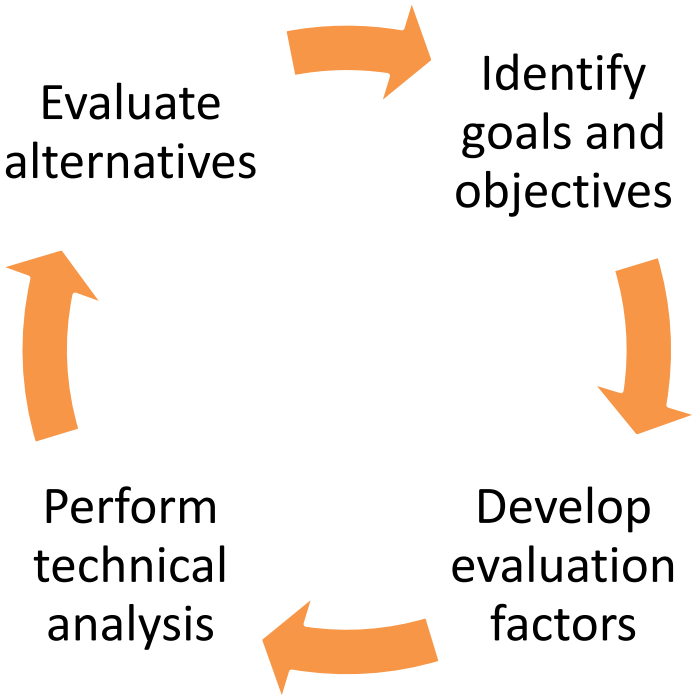
Step 2: Combine options into multimodal alternatives



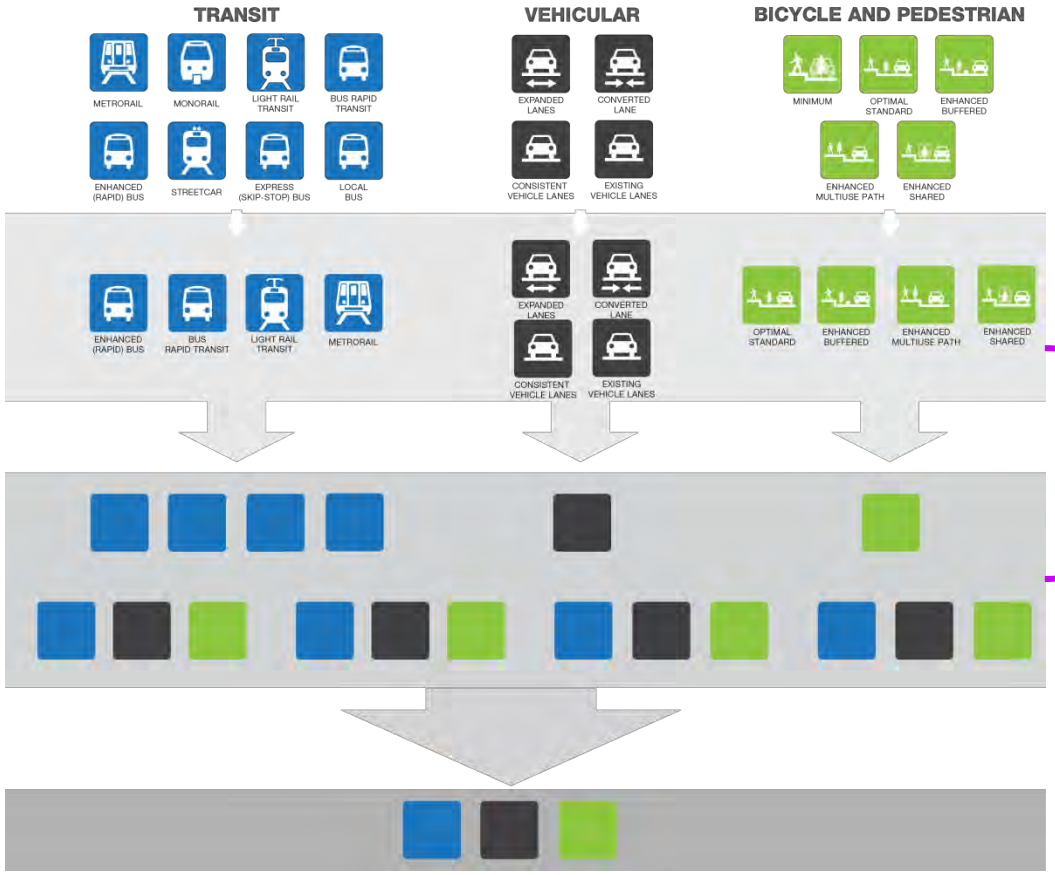
Arriving at Recommended Multimodal Alternative: How do we choose one?

Key Evaluation Factors:

- Transit system performance
- Bicycle and pedestrian network improvements
- Traffic operations
- Implementation/ ability to phase project
- Financial feasibility
- Capacity to meet current and future needs
- ROW and impacts on community resources



Multimodal Evaluation Process



Today's meeting answers

How do we get from Screen 1 to Screen 2?

Discuss the process for evaluating options under each category:

Transit, **Vehicular**, and **Bike/Ped**

At the end of the presentation, we will have confirmed:

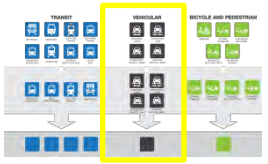
Which alternatives will be further evaluated?

(We'll have filled in the boxes!)

One of these options will ultimately be the recommended alternative.

3. Proposed Alternatives for Further Evaluation

Vehicular Travel Lanes Alternatives



Existing Lanes

Expanded Lanes:

Three or four lanes, depending on location along the corridor

Converted Lanes

Consistent Lanes

Key Evaluation factors:

- Level of Service (LOS)
- Volume-to-Capacity (V/C)
- ROW impacts

Other, qualitative factors:

- Maintaining existing speeds
- Minimizing lane transitions
- Reducing pedestrian crossing distance/time

Vehicular Lane Evaluation

Alternative		Intersection Performance	Right of Way Impacts
Expanded		No intersections with LOS E or worse	Significant ROW impacts
Consistent		3 intersections with LOS E or worse	Moderate ROW impacts
Converted		10 intersections with LOS E or worse	Few ROW impacts

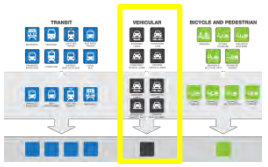
Compares less favorably

Compares more favorably

Other, qualitative factors:

- Desire to maintain existing speeds (45 mph)
- Minimize lane transition that contribute to travel delays
- Pedestrian crossing distance/time

Vehicular Lanes Evaluation: Overview



1. **Confirmed recommendation from prior studies and plans** (VDOT and Fairfax County Comprehensive Plan):

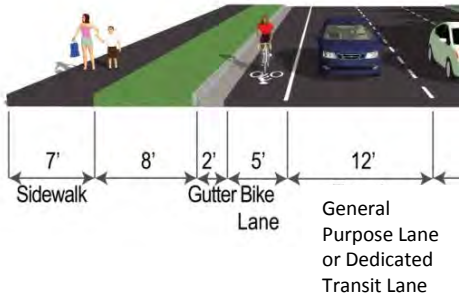
   Consistent, 6 vehicular lanes along the entire corridor

2. **Evaluated the Consistent 6-Lane Alternative to other options using quantitative and qualitative measures including**

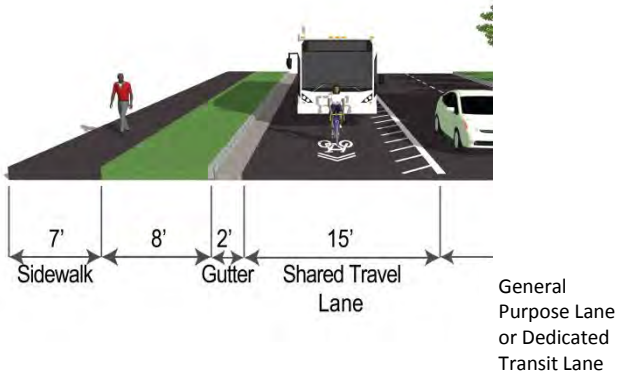
3. **Confirmed Findings with VDOT**

Bicycle and Pedestrian Alternatives

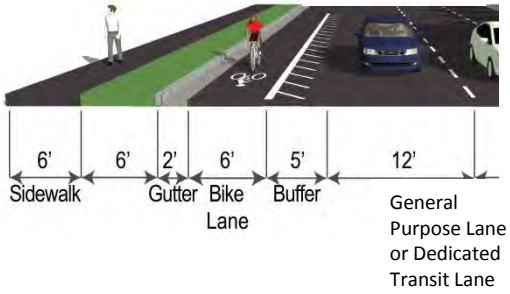
Sidewalk + bike lane



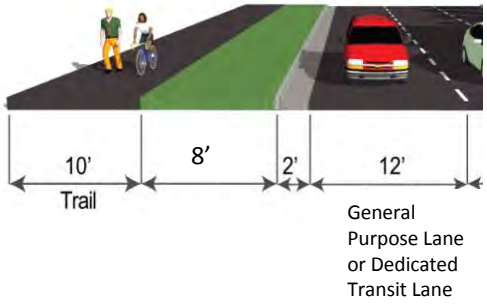
Sidewalk + bus/bike lane



Sidewalk + buffered bike lane



Multiuse path (bike and ped)



Key Evaluation factors:

- Safety and comfort for cyclists of all abilities
- ROW impacts

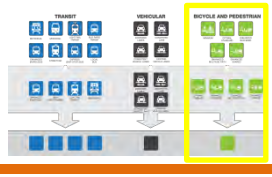
Measures and factors:

- Bicycle compatibility index and Bicycle Level of Service
- Possible to implement incrementally / flexible over time

Bicycle and Pedestrian Evaluation

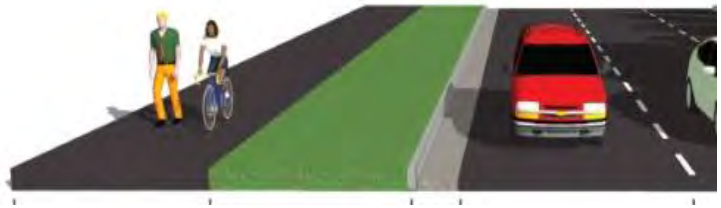
	In-street bike lane and sidewalk	Shared bus/bike lane and sidewalk	Buffered bike lane and sidewalk	Multiuse path
Legend for ratings: ↑ Compares more favorably ↓ Compares less favorably				
Provides access along full corridor	Improves walk & bike access to destinations ↑	Improves walk & bike access to destinations ↑	Improves walk & bike access to destinations ↑	Improves walk & bike access to destinations ↑
Provides safety and comfort given high auto speeds and volumes	In-street bike lane not recommended for 45 mph+ ↓	Shared bike/travel lane not recommended for 45 mph+ ↓	Bike lane buffered from 45 mph traffic ↑	Bike lane buffered from 45 mph traffic with curb and landscape strip ↑
Requires additional right-of-way	Requires some new ROW ↓	Requires little new ROW ↑	Requires significant new ROW ↓	Requires some new ROW ↓

Bicycle and Pedestrian Evaluation: Overview



Confirmed recommendation based on trade-offs among accessibility, safety, and required right-of-way

10-foot Multiuse Path



Note: implementation of recommended section varies along corridor

Transit Evaluation: Overview

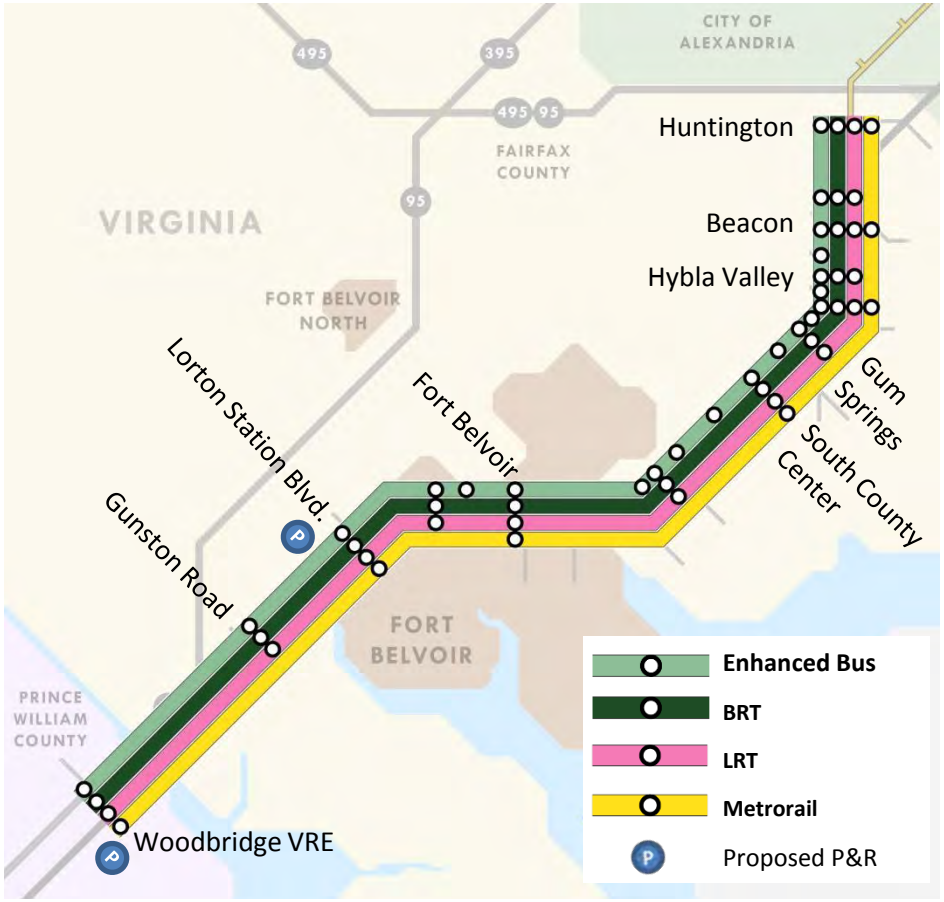
1. **Screened a wide range of transit alternatives** based on basic project requirements to arrive at four initial alternatives

2. Analyzed **four transit alternatives** to identify the most promising modes (e.g. rail, bus) and routes for further evaluation

Initial Alternatives

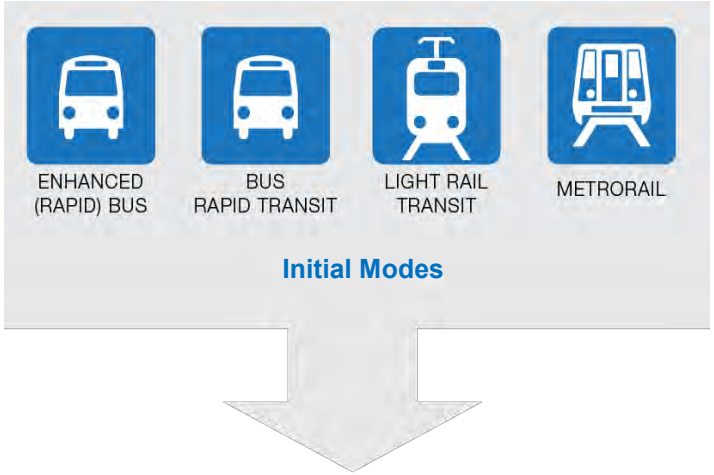
Four Initial Transit Alternatives:

- Enhanced Bus
- Bus Rapid Transit (BRT)
- Light Rail Transit (LRT)
- Metrorail

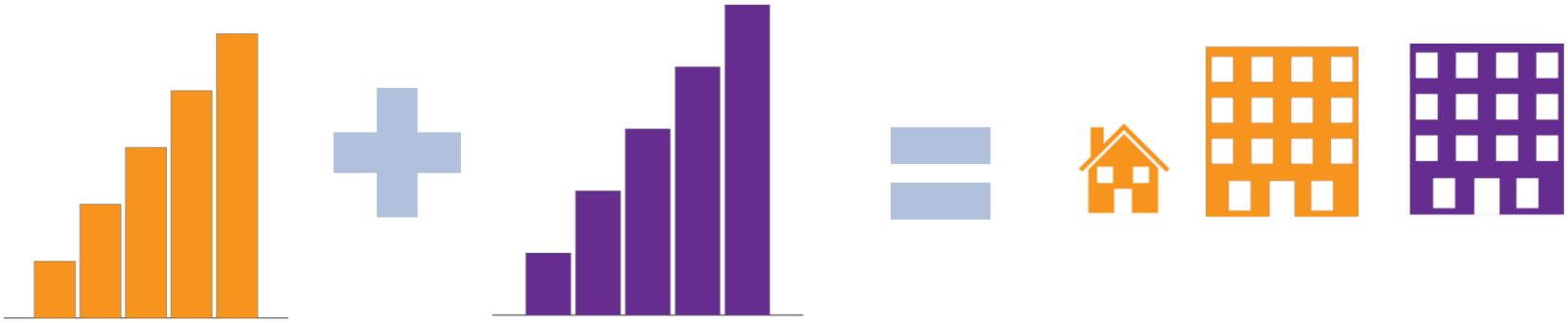


How do we refine the initial alternatives for further evaluation?

1. Quantitative Key Indicators:
   - Ridership
   - Estimated Capital Cost
   - Estimated O&M Cost
   - Cost per Rider
2. Preliminary Land Use Scenario and Economic Analysis



Transportation Investment helps to increase economic viability and vitality of the corridor



Population growth

Employment growth

Demand for new residential units and commercial space

Land use planning

Transportation investment

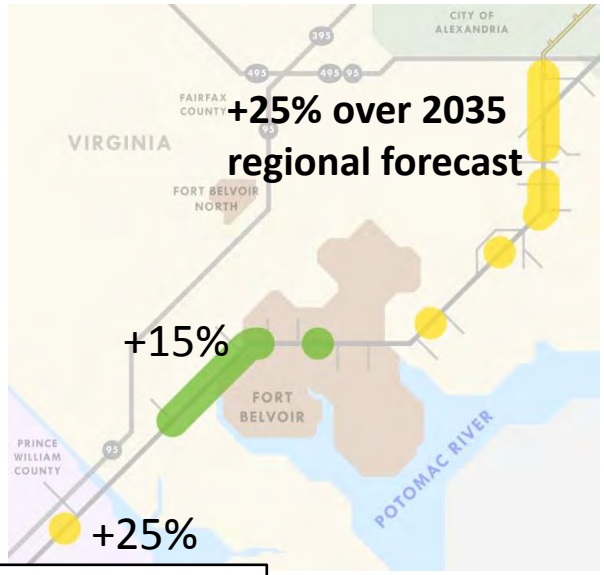
Support high quality community development

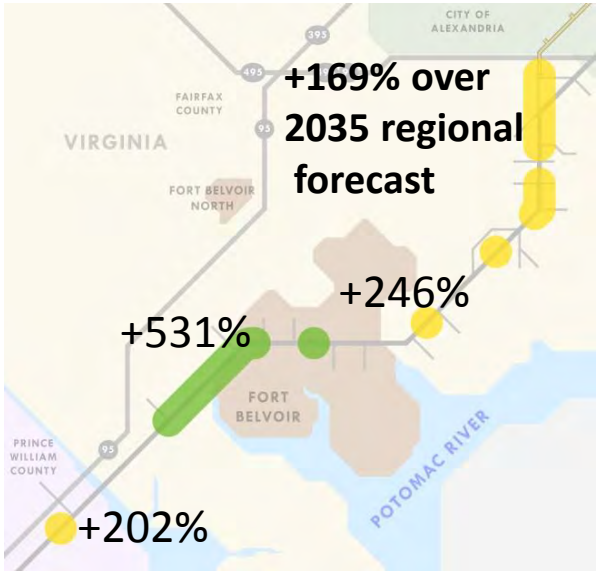
Land Use: Transit-Supportive Activity Densities

Scenario 1:
" Base Land Use Scenario" = 2035 MWCOG regional forecast

Scenario 2:
What is a reasonable growth expectation for a corridor that invests in high-quality transit (BRT or LRT)?

Scenario 3:
How much do population and employment need to increase to achieve density levels typically supportive of **Metrorail**?



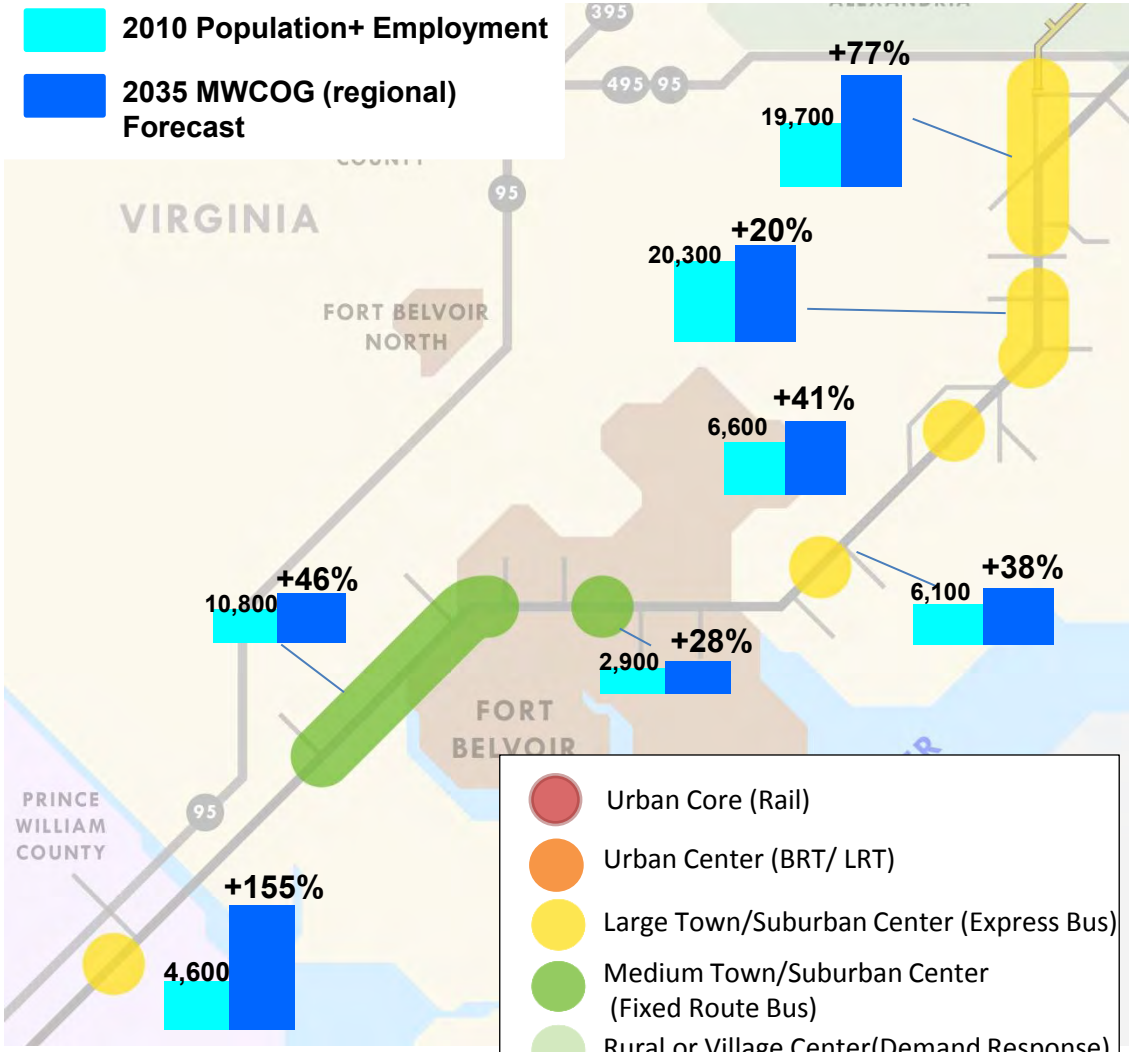


- Large Town/Suburban Center (Express Bus)
- Medium Town/Suburban Center (Fixed Route Bus)
- Rural or Village Center (Demand Response)

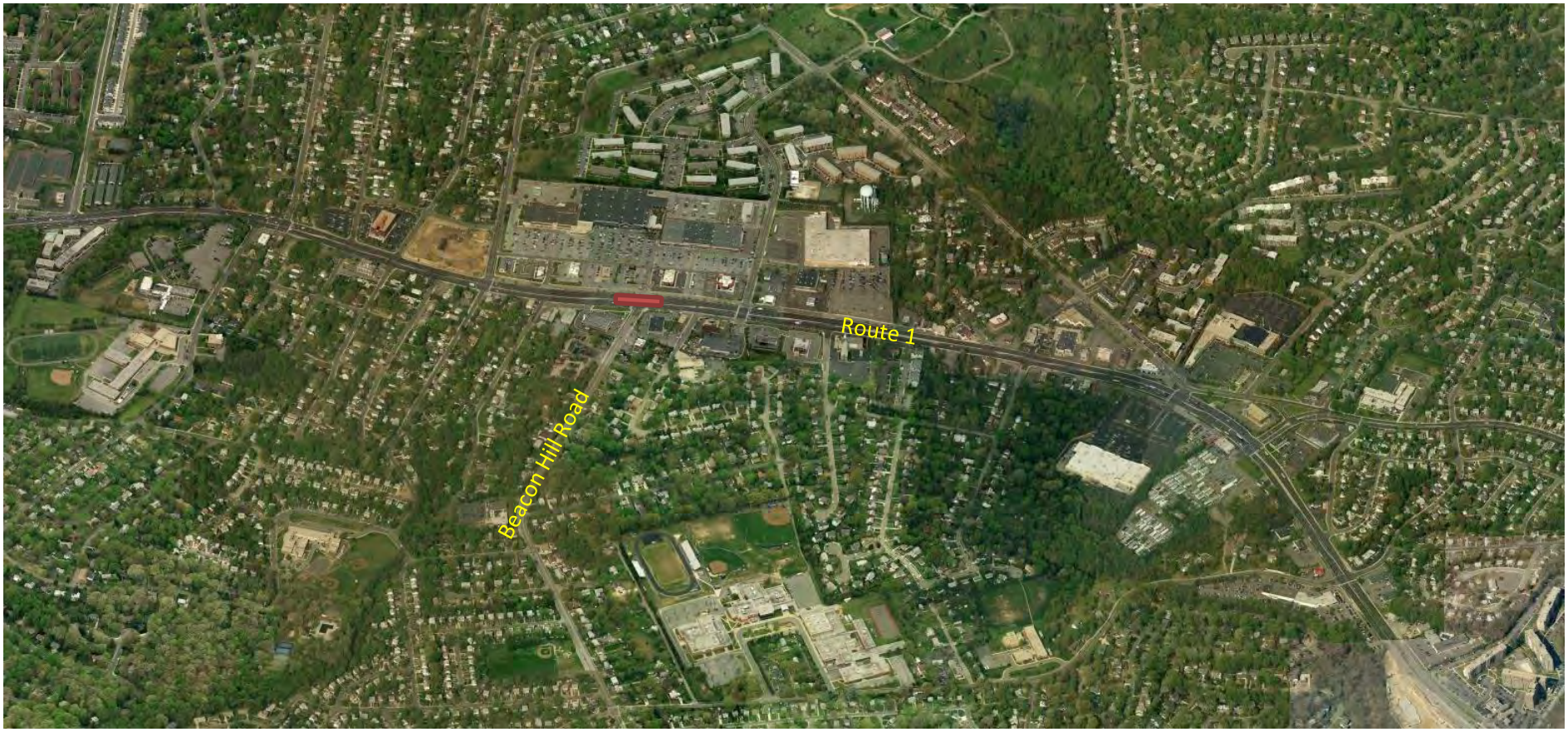
Source: DRPT Multimodal Design Guidelines (2013)

Scenario 1: 2035 MWCOG Population and Employment Forecast

- The 2035 regional forecast anticipates high growth that varies along the corridor
- Base scenario for potential FTA grant application
- Station areas (within ½-mile) in the north and at Woodbridge are supportive of express bus; areas near Fort Belvoir are less dense

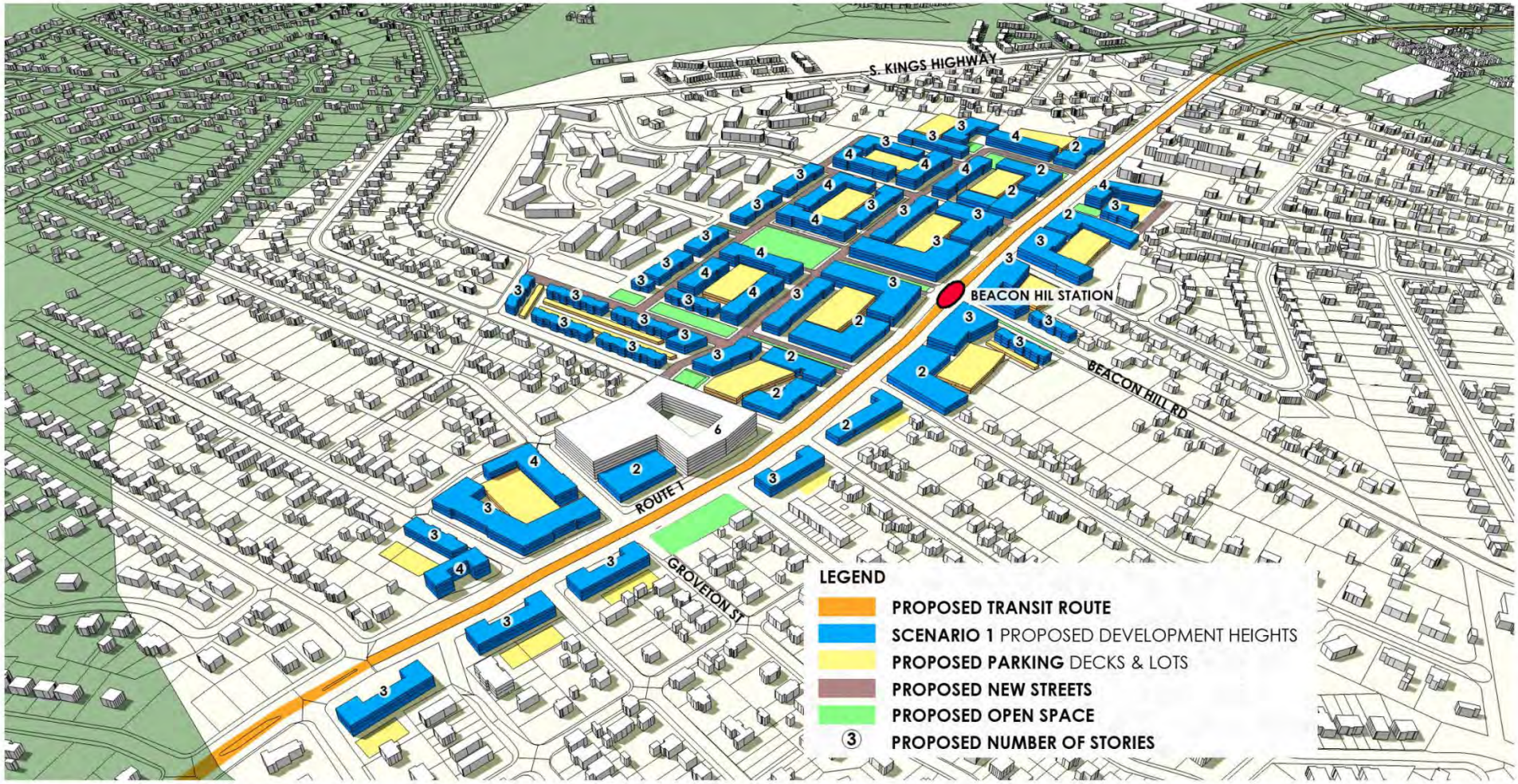


Beacon: Bird's Eye View Today



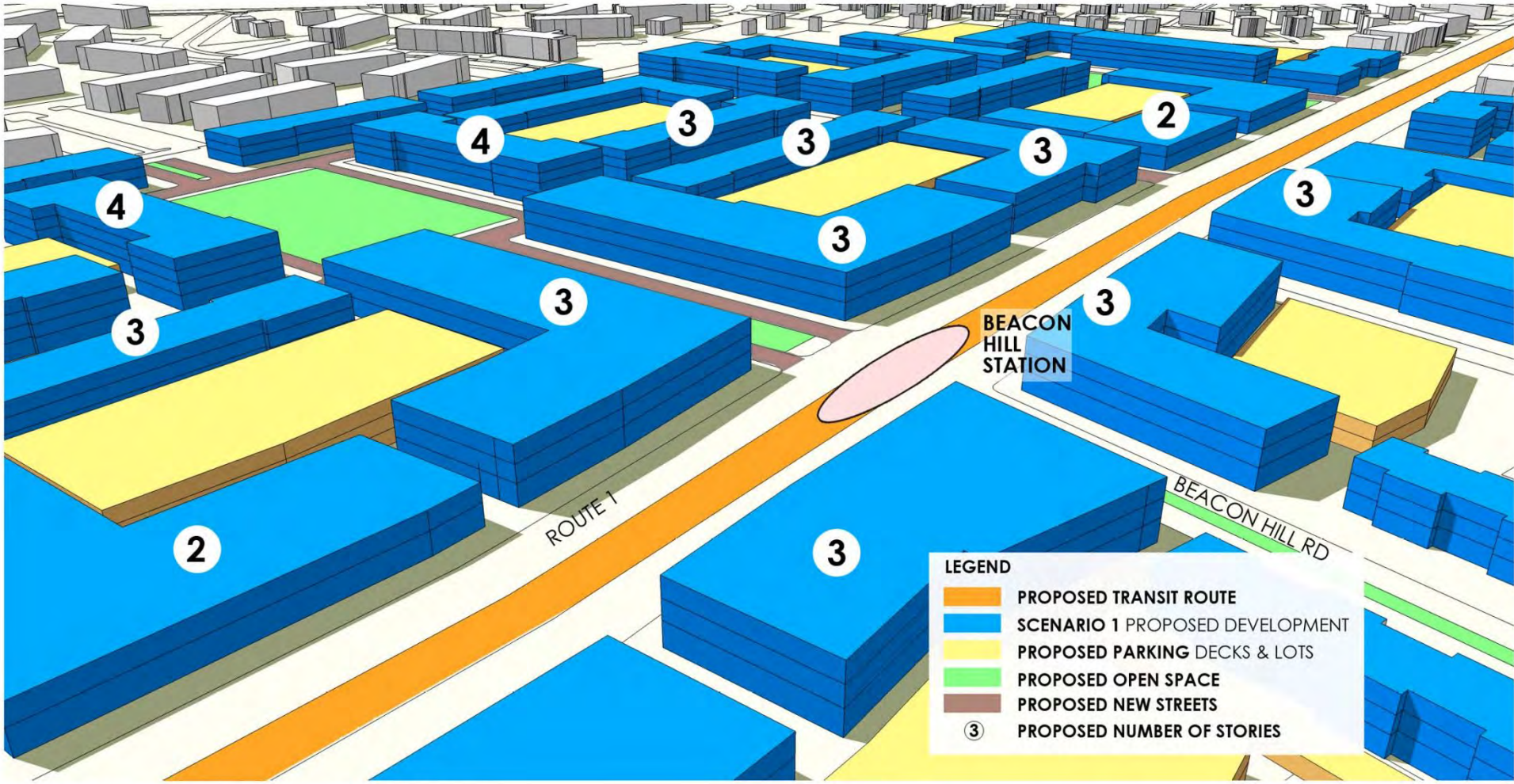
Source: Bing Maps

Beacon Hill: Land Use Scenario One (2035 COG Projection)



BEACON HILL STATION SCENARIO 1

Beacon Hill: Land Use Scenario One (2035 COG Projection)

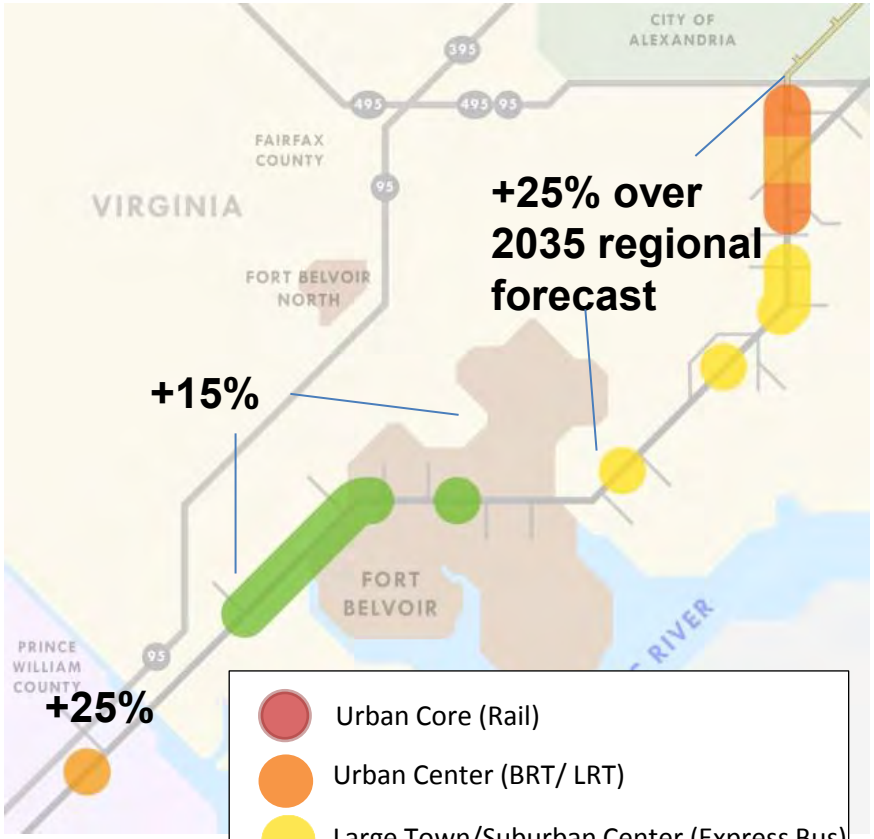


BEACON HILL STATION SCENARIO 1

Scenario 2: Reasonable Response to High-Quality Transit Investment

What is a reasonable growth expectation for a corridor that invests in high-quality transit (BRT or LRT)?

- Given national experience, assumed a **25%** increase in activity levels due to **premium transit investment,** coupled with strong land use **planning** and **development incentives**
- Coordinated assumptions with Fairfax County and Prince William County planners:
  - **25% increase** in activity level densities in the north portion and at Woodbridge
  - **15% increase** for stations near Lorton
- Enhanced land use (Scenario 2) would support a higher capacity transit mode (BRT or LRT) along the full corridor



Land Use Scenario 2

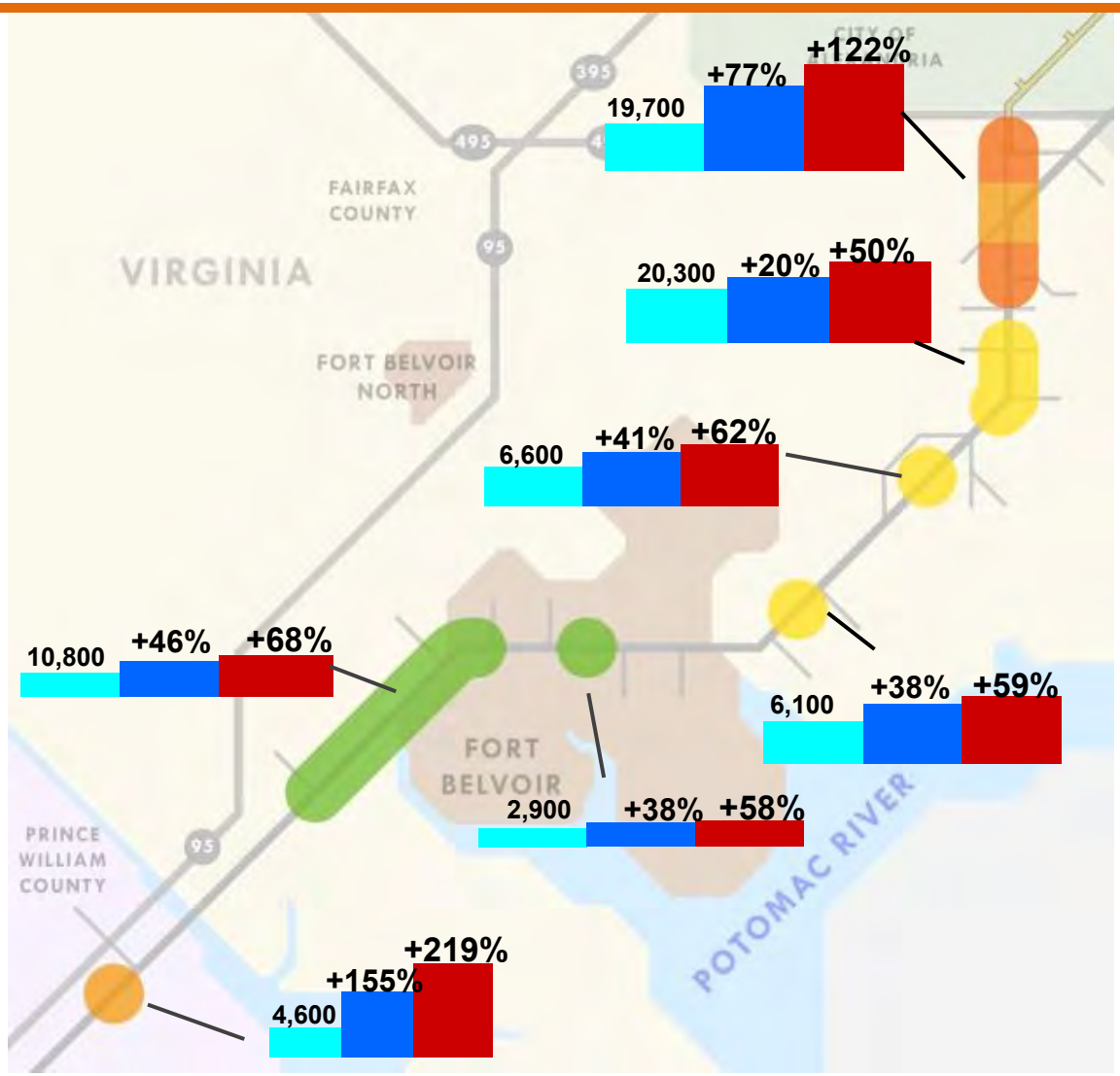
2035 MWCOG Population and Employment Forecast

- 2010 Population and Employment
- 2035 Population and Employment Forecast (MWCOG)
- Scenario 2: Proposed +25% Growth

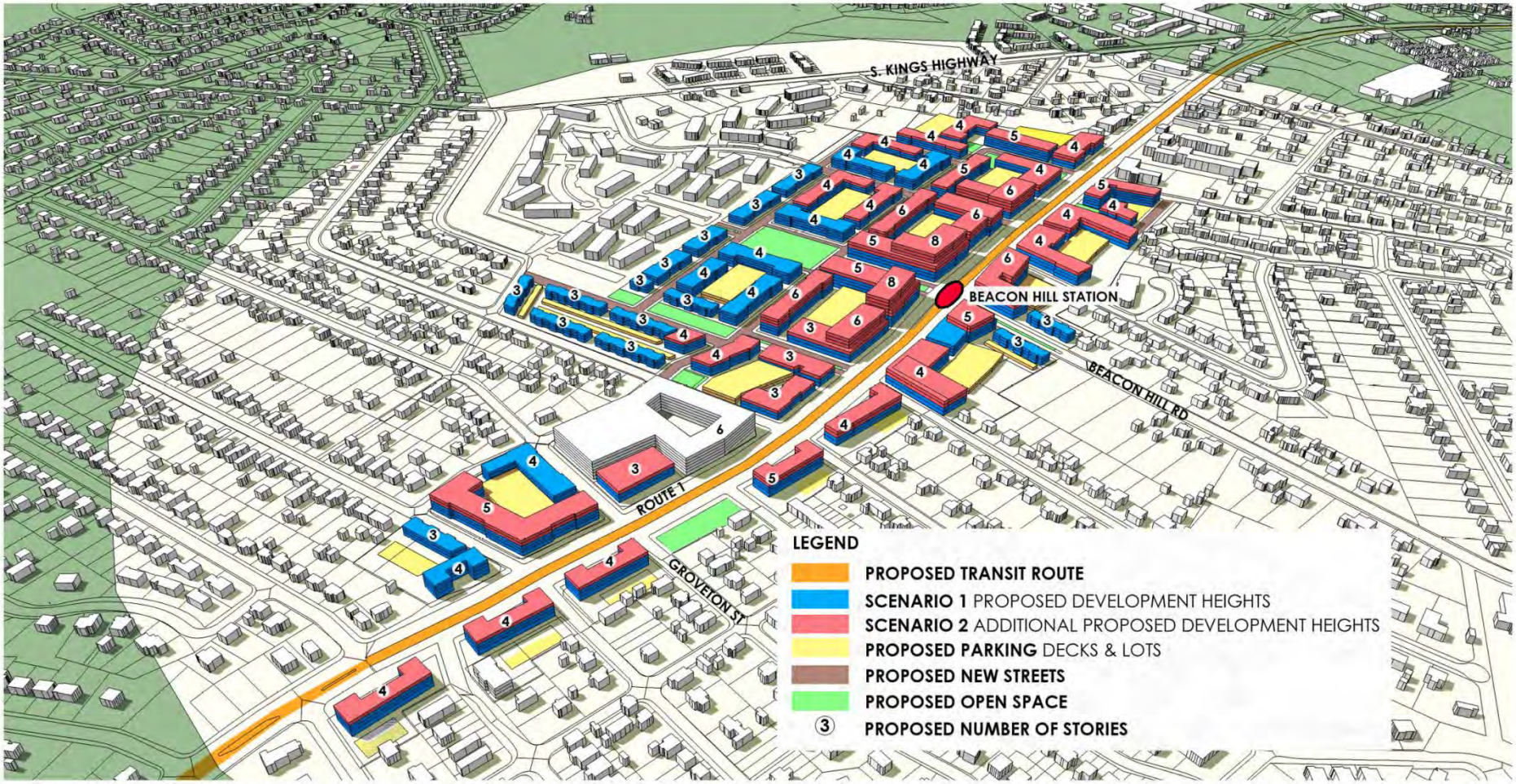
XX% = increase over 2010 Population and Employment Growth

- Urban Core (Rail)
- Urban Center (BRT/ LRT)
- Large Town/Suburban Center (Express Bus)
- Medium Town/Suburban Center (Fixed Route Bus)
- Rural or Village Center(Demand Response)

Source: DRPT Multimodal Design Guidelines (2013)

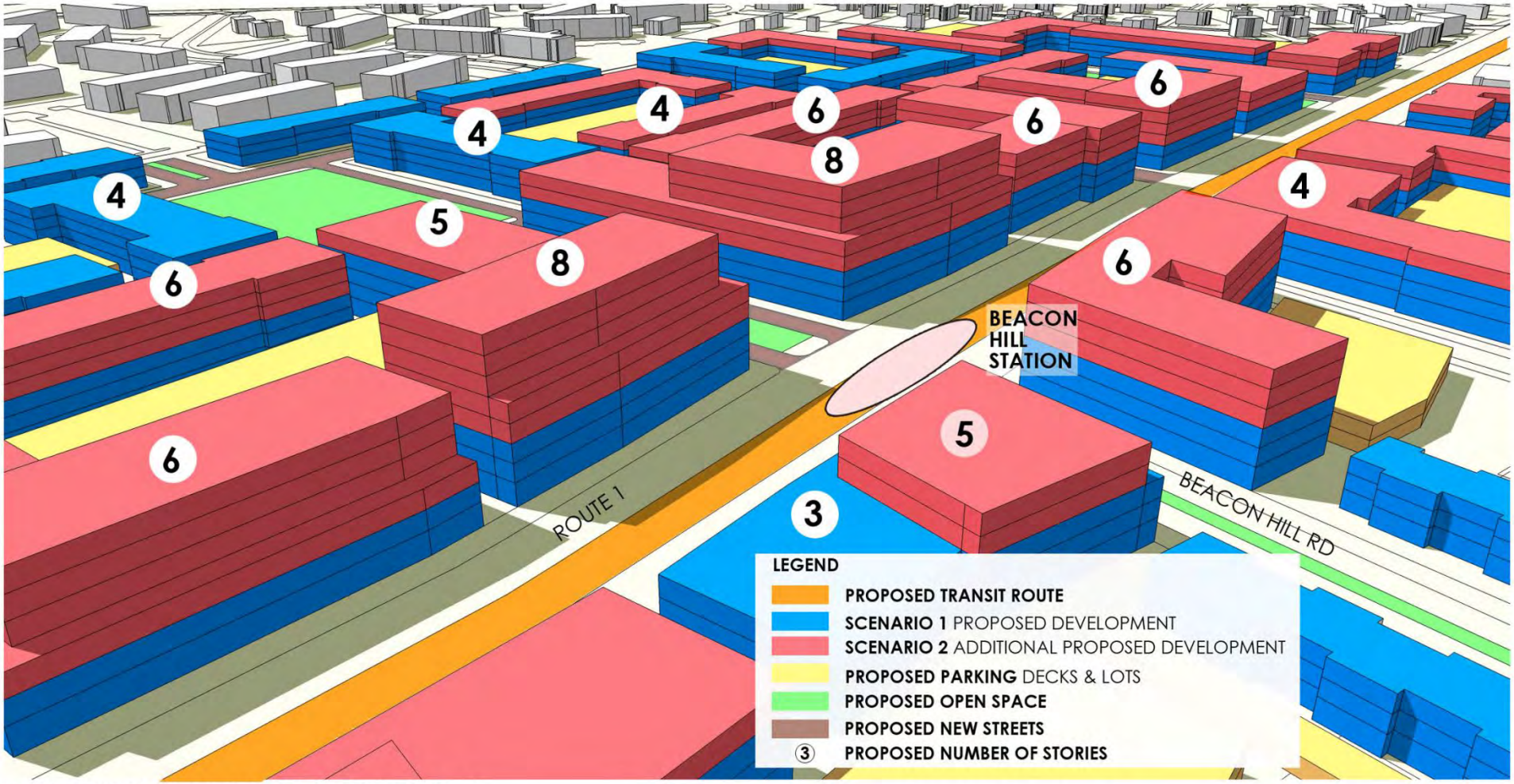


Beacon Hill: Land Use Scenario Two (additional growth increment)



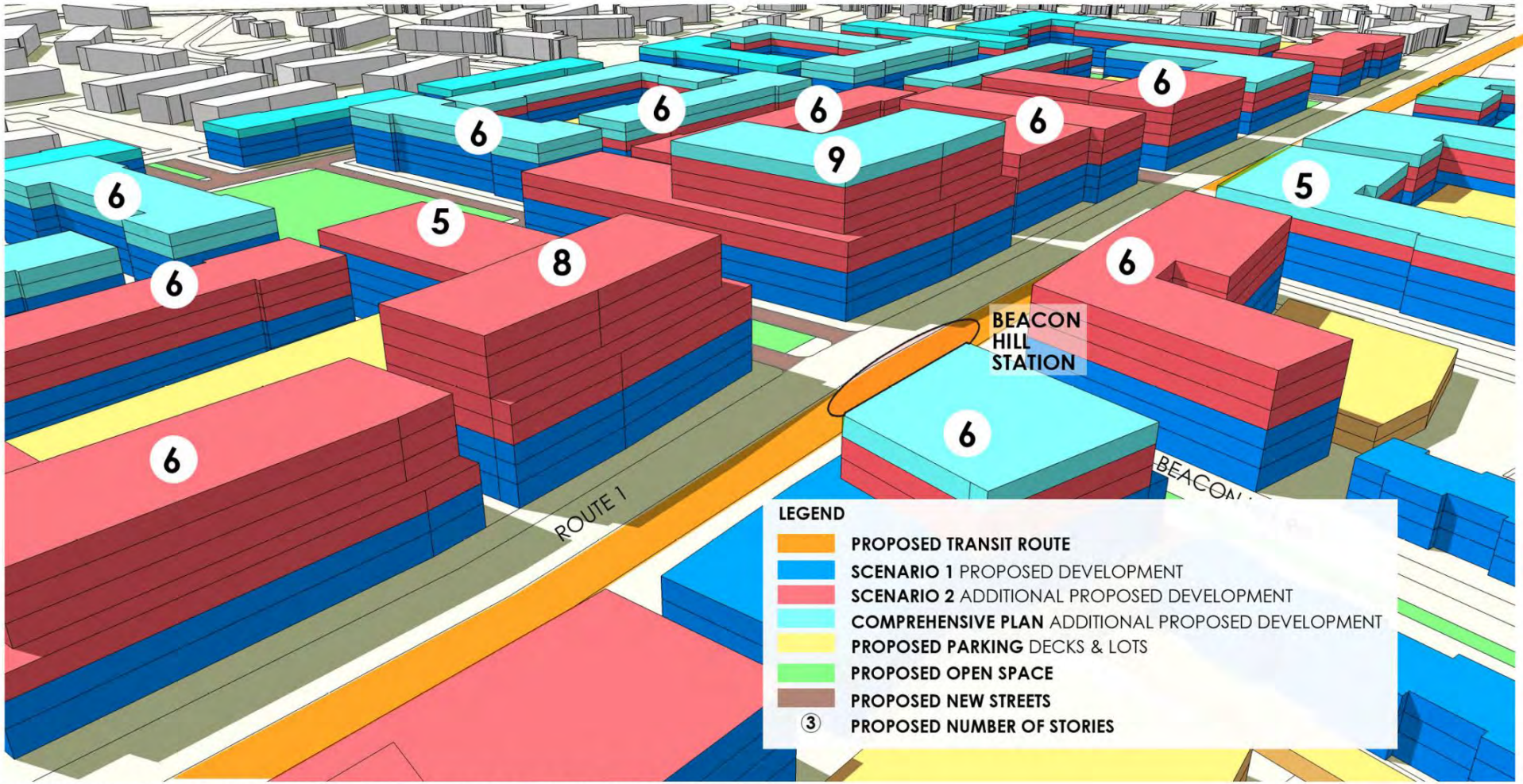
BEACON HILL STATION SCENARIO 2

Beacon Hill: Land Use Scenario Two



BEACON HILL STATION SCENARIO 2

Beacon Hill: County Comprehensive Plan



BEACON HILL STATION SCENARIO COMPREHENSIVE PLAN

Beacon Hill: Bird's Eye View Today

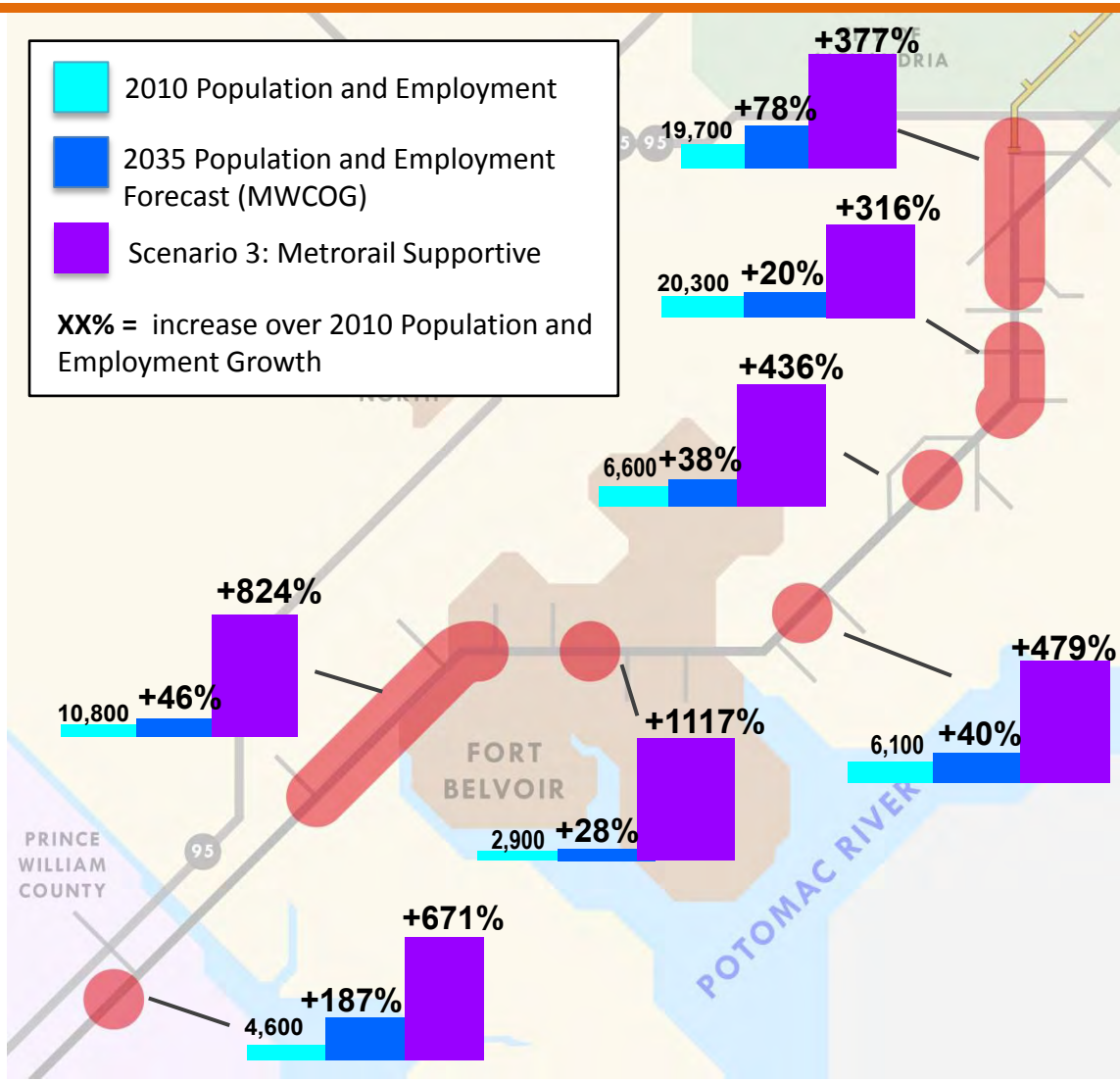
Beacon Hill: Scenario Two Bird's Eye View

Scenario 3: Land Use Supportive of Metrorail

Densities around stations would need to **increase dramatically** beyond the 2035 regional forecast to meet development levels typically associated with Metrorail as defined in the DRPT Multimodal Design Guidelines

- Urban Core (Rail)
- Urban Center (BRT/ LRT)
- Large Town/Suburban Center (Express Bus)
- Medium Town/Suburban Center (Fixed Route Bus)
- Rural or Village Center(Demand Response)

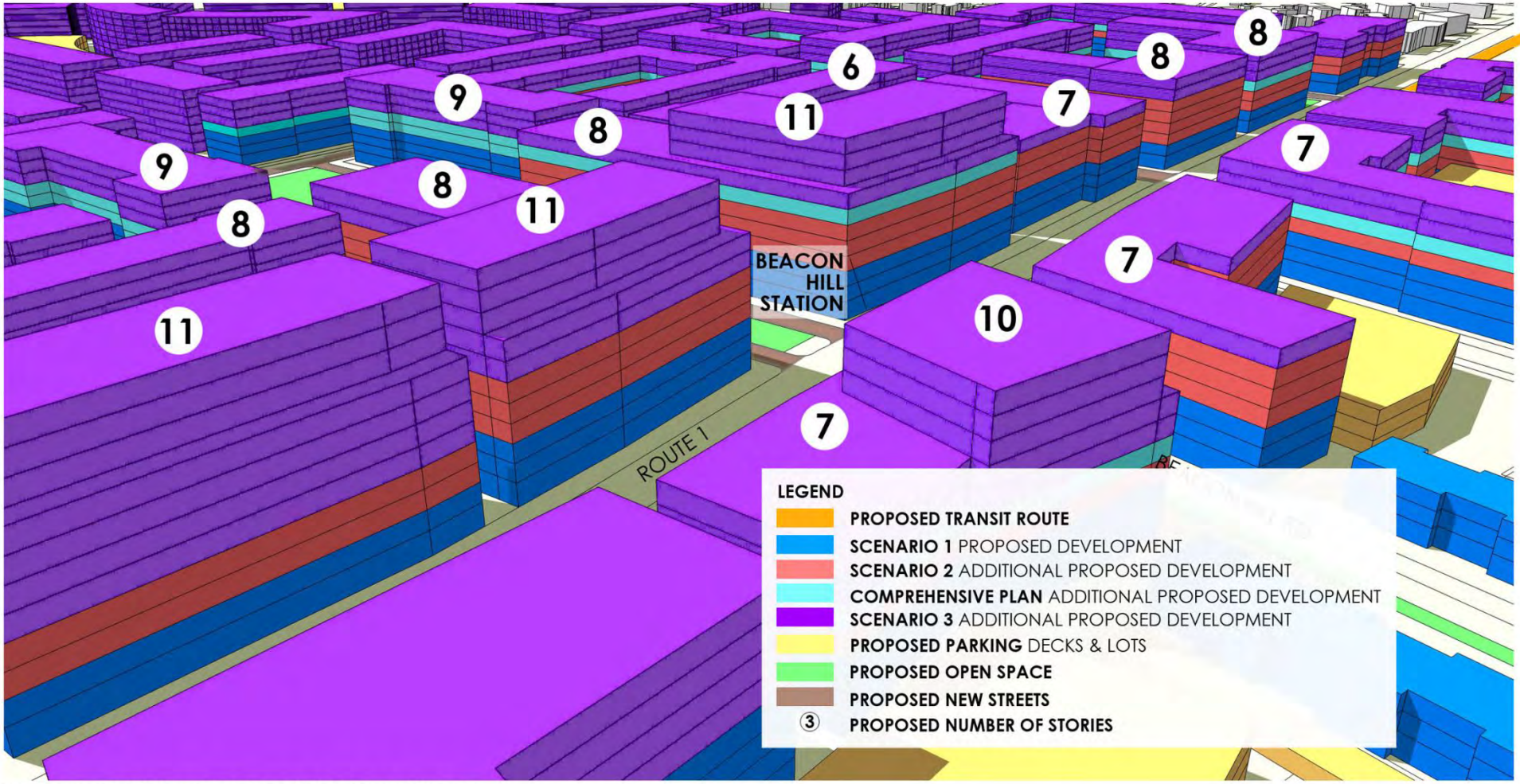
Source: DRPT Multimodal Design Guidelines (2013)



Beacon Hill Station: Scenario 3

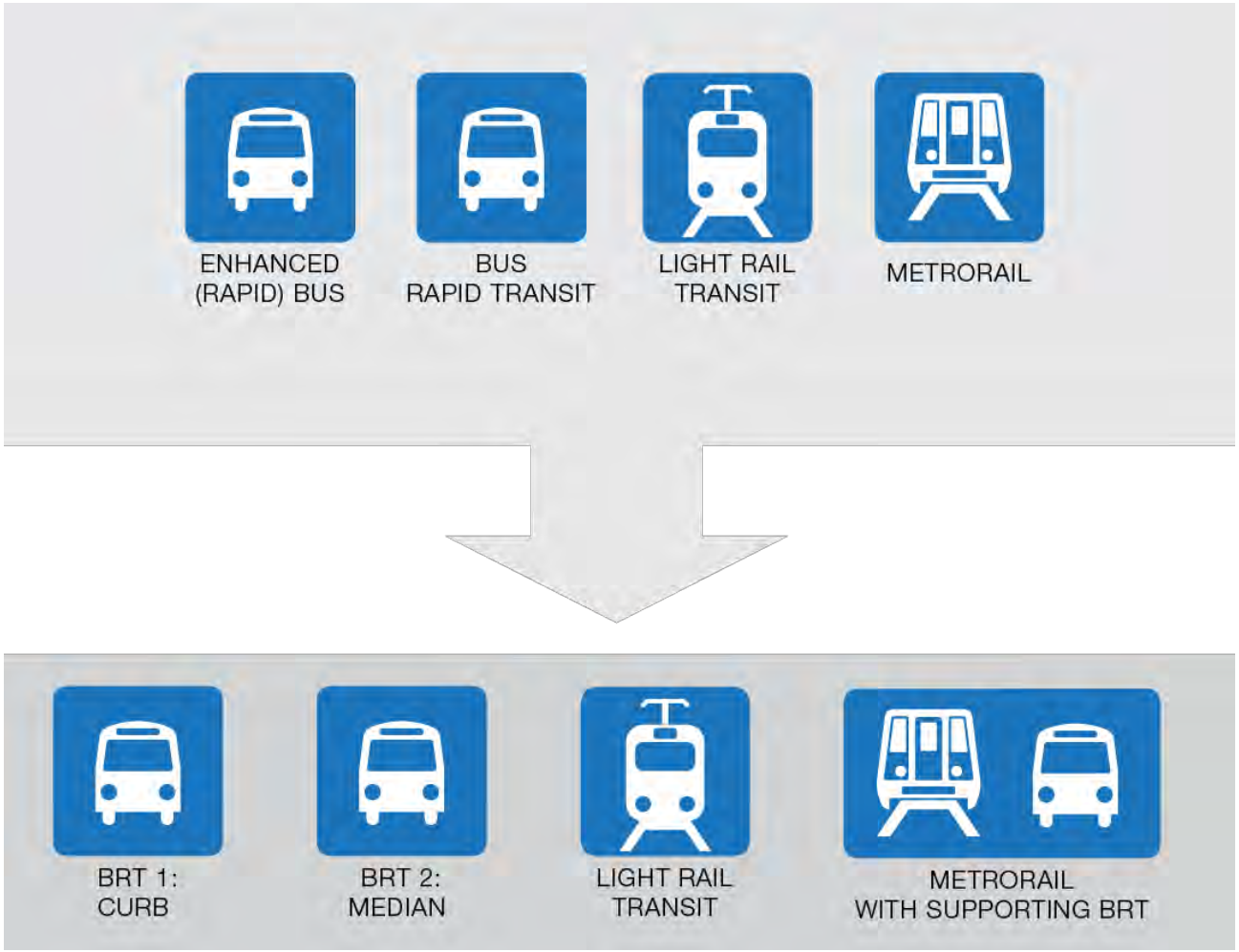
BEACON HILL STATION SCENARIO 3

Beacon Hill Station: Scenario 3



BEACON HILL STATION SCENARIO 3

Transit Alternatives Refinement



Summary of Initial Alternatives

	Enhanced Bus	Bus Rapid Transit	Light Rail Transit	Metrorail
Average Weekday Ridership (2035)	9,500	16,600	18,400	38,500
Conceptual Capital Cost	$180 M	$780 M	$1.20 B	$4.80 B
Annual O&M Cost	$14 M	$17 M	$24 M	$84 M
Cost Per Rider*	$10	$15	$21	$37

*Assumes Annualized Capital Cost + Operating Costs divided by total boardings (2035)
Note: FTA Cost Effectiveness measure averages current (2015) and horizon year (2035) costs and boardings

Four Refined Alternatives for Further Evaluation

Alternative 1: Bus Rapid Transit 1- Curb

- Bus operates in curb, dedicated transit lanes from Huntington to Fort Belvoir
- South of Fort Belvoir to Woodbridge, bus operates in mixed traffic

Alternative 2: Bus Rapid Transit 2- Median

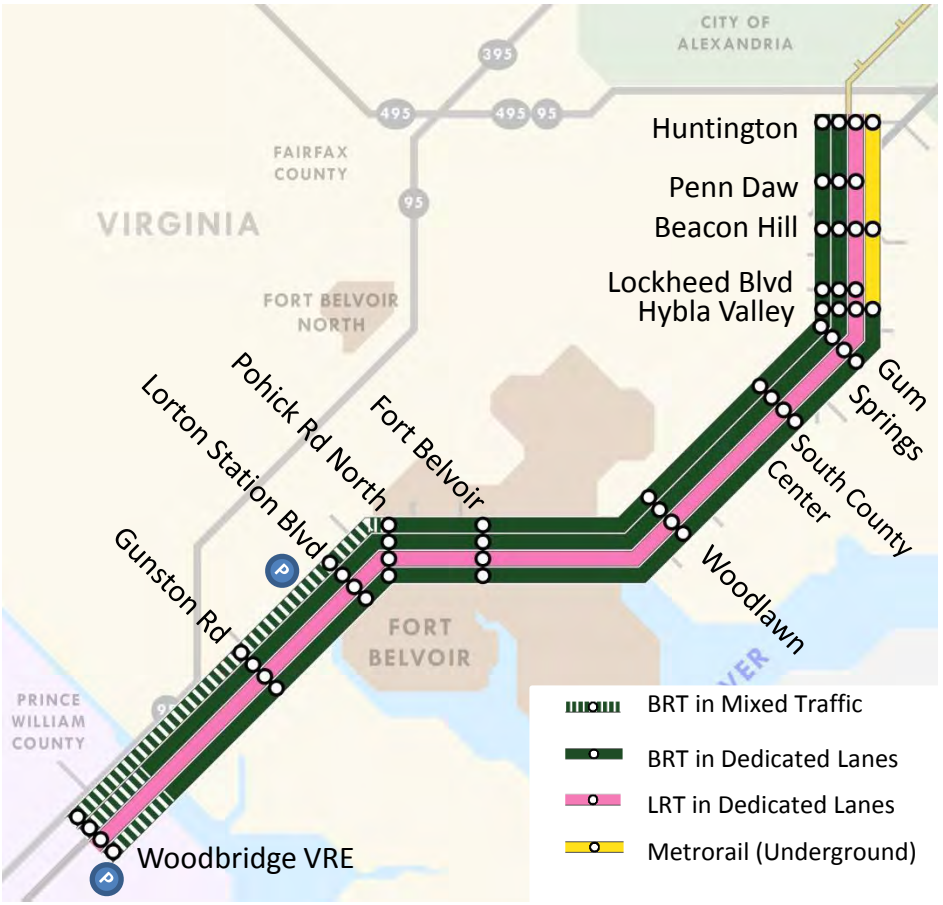
- Bus operates in the median in dedicated lanes for entire length of corridor and in mixed-traffic in Prince William County

Alternative 3: Light Rail Transit

- Light Rail vehicle operates in the median in dedicated lanes for entire length of corridor

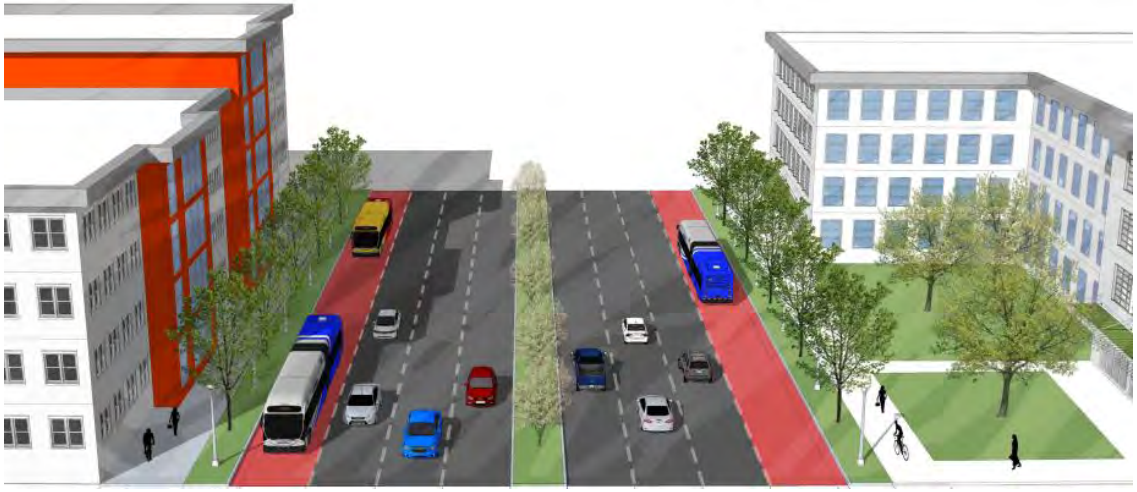
Alternative 4: Metrorail- BRT Hybrid

- Yellow line extension to Hybla Valley with connecting BRT service to Woodbridge

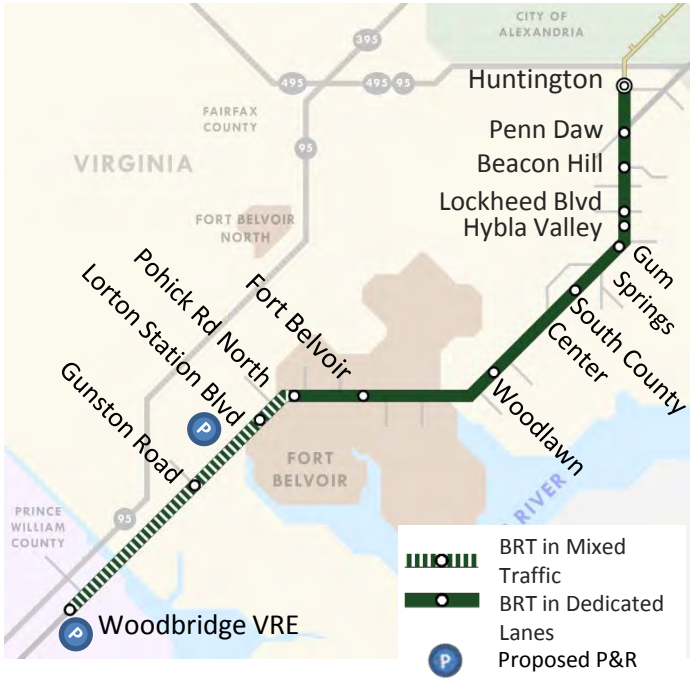


Alternative 1: Bus Rapid Transit 1 – Curb

BRT operates in dedicated curb lanes to Pohick Road North



BRT operates in mixed traffic from Pohick Road North to Woodbridge



Alternative 2:
Bus Rapid Transit 2 - Median

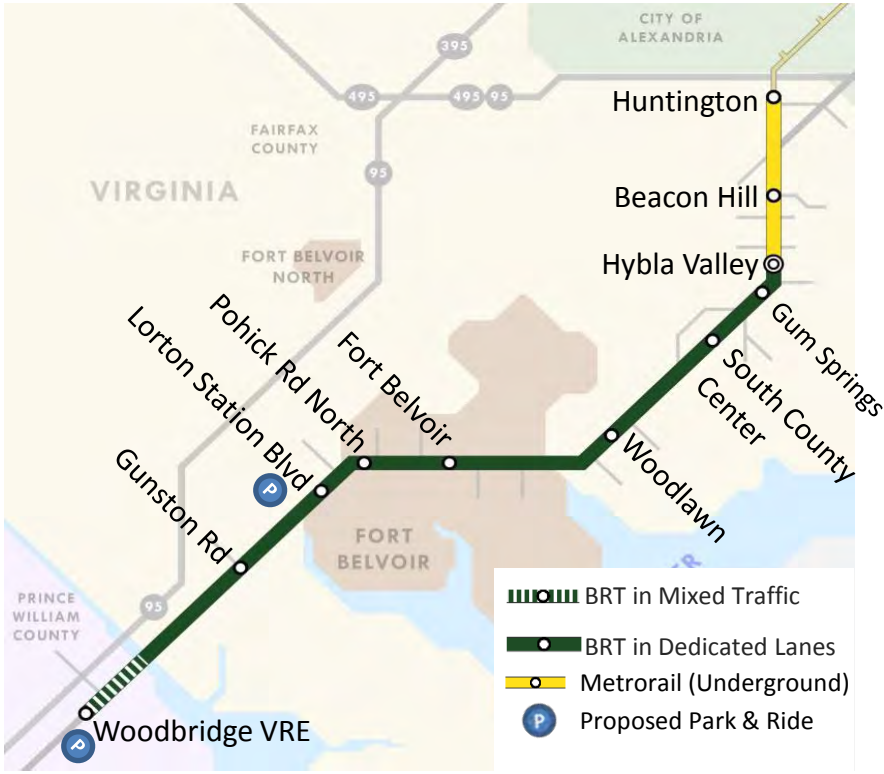
BRT operates in median in dedicated lanes in Fairfax County; transitions to mixed traffic through Prince William County

Alternative 3: Light Rail Transit (Median)

Light Rail operates in median in dedicated lanes for entire corridor

Alternative 4: Metrorail- BRT Hybrid

Metrorail underground to Hybla Valley;
Transfer to BRT service at Hybla Valley



BRT operates in dedicated lanes and transitions into mixed-traffic in Prince William County

Key Indicators: Refined Transit Alternatives

	Bus Rapid Transit 1 - Curb	Bus Rapid Transit 2- Median	Light Rail Transit-Median	Metrorail/BRT-Median Hybrid
Average Weekday Ridership (2035)	15,200	16,600	18,400	26,500* (BRT 10,600; Metro 22,900)
Conceptual Capital Cost	$500 M	$780 M	$1.20 B	$1.57 B
Annual O&M Cost	$18 M	$17 M	$24 M	$31 M
Cost Per Rider**	$12	$15	$21	$18

* Corridor ridership, excluding transfers between Metrorail and BRT portions

**Assumes Annualized Capital Cost + Operating Costs divided by total boardings (2035)
Note: FTA Cost Effectiveness measure averages current (2015) and horizon year (2035) costs and boardings

Summary: Refined Multimodal Alternatives

	BRT-Curb Running	BRT-Median Running	LRT	Metrorail-BRT (Hybrid)
Transit Elements	• Dedicated lanes north portion of corridor • Special treatments at key locations south portion of corridor	• Dedicated lanes for entire corridor • Median transitway • Mixed-traffic in Prince William County	• Dedicated lanes for entire corridor • Median transitway	• Metrorail extension for a short northern segment • BRT in dedicated lanes, mixed-traffic through Prince William County
Vehicular Lanes	• Consistent three lanes	• Consistent three lanes	• Consistent three lanes	• Consistent three lanes
Bike/Ped Elements	• Enhanced multi-use path	• Enhanced multi-use path	• Enhanced multi-use path	• Enhanced multi-use path

Evaluation of Alternatives

Evaluation Criteria: Project Goals and Objectives

Goals and Objectives	Multimodal Measures
GOAL 1: Expand attractive multimodal travel options to improve local and regional mobility	
Increase transit ridership	Transit ridership
Improve transit to reduce travel times	Transit travel time, Automobile travel time
Increase transportation system productivity	Total person throughput
Improve bicycle and pedestrian networks	Continuous sidewalk and bike pathway
Integrate with other transit service	Connections to existing and planned transit
GOAL 2: Improve safety; increase accessibility	
Provide accessible pathways	Continuous sidewalk and bike pathway
Reduce modal conflicts	Separate facilities for separate modes
Improve pedestrian crossings	Average pedestrian delay to cross, Adequate pedestrian refuges
Maintain traffic operations	Traffic LOS
GOAL 3: Increase economic viability and vitality of the corridor	
Support higher activity levels	Accommodate 2035 density (growth scenarios)
Investments are financially feasible to construct and operate	Project costs, cost effectiveness, Allows incremental implementation
High-capacity transit facilities at appropriate locations	Serves low-income residents, value added to adjacent properties
GOAL 4: Support community health and minimize impacts on community resources	
Minimize negative impacts to the natural environment	ROW impacts on environmental and historic resources
Contribute to improvements in regional air quality	Change in VMT
Increase opportunities for bicycling and walking	Continuous sidewalk and bike pathway

Evaluation Criteria: FTA New Starts/Small Starts

Project Justification Criteria
Economic Development: Transit supportive plans and policies; plans to preserve affordable housing
Mobility Improvements: Total project boardings; transit-dependent ridership is weighted 2x
Cost Effectiveness: Annualized cost per annual linked trip on the project
Land Use: Quantitative analysis of station area development, proportion of legally binding affordability
Environmental Benefits: Environmental benefits are monetized and compared to the annualized costs
Congestion Relief: Project sponsors will receive a medium rating until further guidance is released

Financial Commitment Criteria
Current Condition (capital and operating)
Commitment of Funds (capital and operating)
Reasonableness of Assumptions and Financial Capacity (capital and operating)

6. Project Funding and Finance & Preliminary Economic Analysis

Project Funding and Finance: Lessons Learned

- Project funding should be considered along with development and evaluation of alternatives
- Consider capital and long-term operating expenses
- Project will likely be implemented with a mix of several sources
- Federal Transit Administration grants are becoming more competitive; greater focus on local funding commitment

Project Funding: Overview of Potential Sources

Funding Source	Type	Notes
Federal	FTA New Starts/Small Starts	Limited funding for highly competitive nation-wide program
	FHWA Surface Transportation Program, CMAQ	Formula grants applied according to state and metropolitan priorities
Regional	NVTA funding	Dedicated funding for northern Virginia priorities
State	VDOT highway	Grants applied to statewide priorities
	DRPT Capital Assistance Program	Application for Major Capital Investments funded at Tier 2 level
Local	County managed funds	General fund, bond allocations, etc.
	Value capture (TIF or SAD)	Corridor-specific tools

Local Project Funding Sources

Funding Type	Description	Notes
County Managed Funds	• Sales Tax • Property Tax • Other revenues	Application of existing local revenue sources to cover costs of transportation infrastructure and services
Value Capture	• Tax Increment Financing (TIF) • Special Assessment Districts (SAD)	Capture increased property value that accrues over time resulting from public investment
	• Joint Development	Coordinated development of commercial and residential buildings with public transportation facilities

Economic & Financial Analysis: General Findings

Few options for corridor-specific funding:

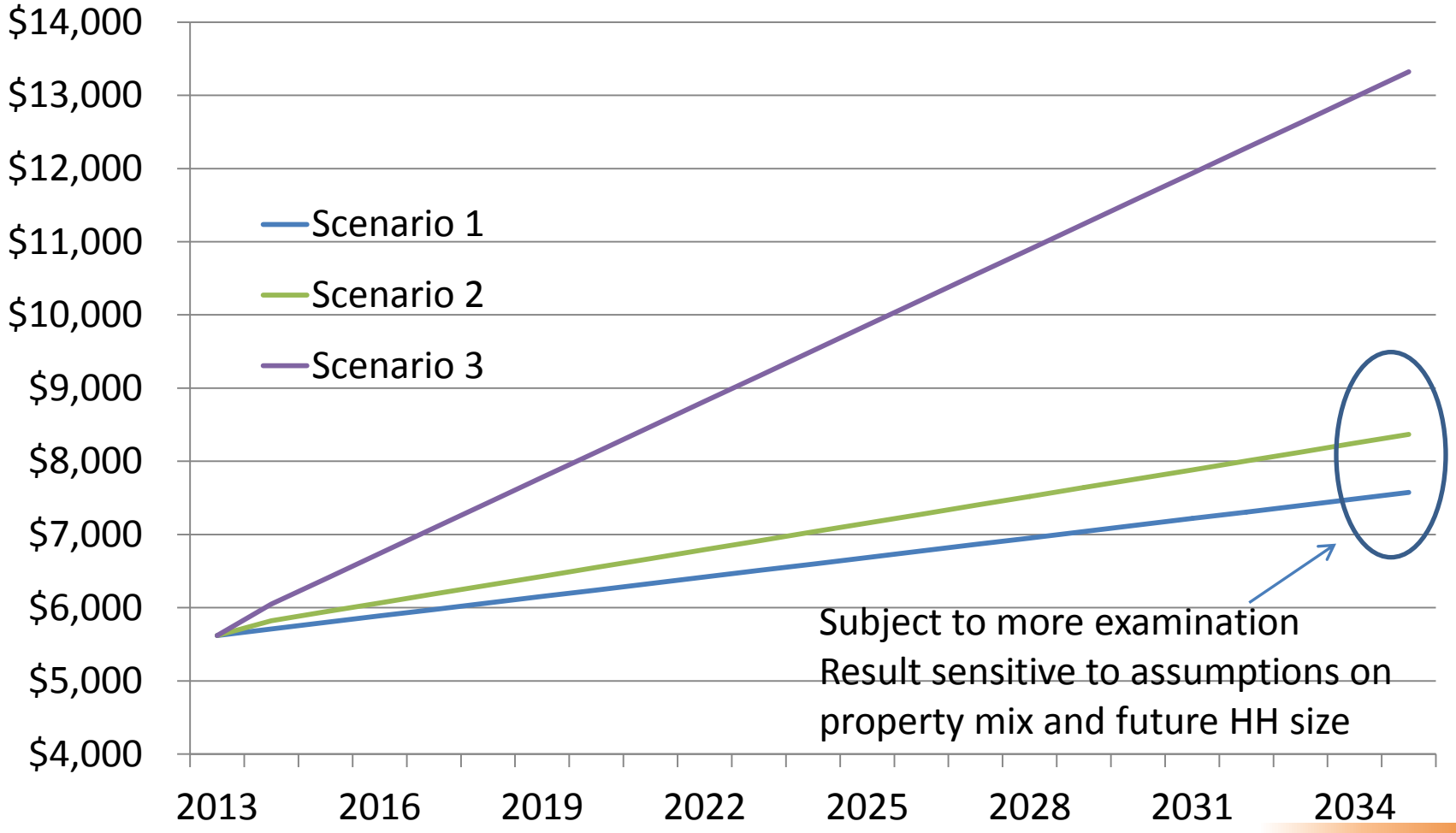
- Tax increment financing (TIF)
- Special assessment district (SAD)
- Joint development (JD)

Assess value projected for 3 Land Use Scenarios:

- Scenario 1: COG 8.2
- Scenario 2: 25% growth over COG 8.2 (based on input from Fairfax County and Prince William County)
- Scenario 3: Supportive of Metrorail (DRPT Guidelines—activity density of 70)

Economic Analysis: Preliminary General Findings

Assessed value of development within 1/2 mile of stations
Constant 2013 dollars, millions



Value Capture (VC) Analysis

- Estimated potential revenue streams from TIF and SAD to determine portion of the total capital costs that could be funded:

TIF (Tax Increment Financing)

- Applies current tax rate to development beyond current tax base
- Includes commercial, industrial, and residential property

SAD (Special Assessment District)

- Applies a new tax to commercial and industrial property only
- New tax contingent on approval by 51% of property owners

Note: the figures presented are very preliminary results. Analysis is to be further refined

Value Capture (VC) Analysis: Assumptions and Limitations

- " Back of the Envelope" estimates for the potential VC, need further refinement
- TIF has limited application in Fairfax County
  - Applied here for illustrative purposes
  - Best considered in context of paying for a portion of stations (TIF revenue starts from zero; revenue stream is relatively small)
- Project cost estimates are conceptual, subject to change
- VC analysis addressed construction costs only
  - 2018 is assumed to be 1st year of construction
  - TIF or SAD districts established in 2018 and dissolved in 25 years

Note: the figures presented are very preliminary results. Analysis is to be further refined.

Value Capture Analysis: Existing tax base

Land Use	2013 Assessed Value $Millions
Residential	$5,133
Office	$178
Retail	$209
Commercial, Hotel & Lodging	$100
Total	$5,620

VC Analysis: Tax Increment Financing (TIF)

Preliminary estimates of TIF revenue through 2035
(net present value @ 5%) if TIF Fund is established in 2018:

- **Scenario 1:** $160 million
- **Scenario 2:** $210 million
- **Scenario 3:** $640 million

TIF revenue (@ $1.085 per $100) as % of capital cost
(All incremental property tax assumed to accrue to TIF)

	Bus Rapid Transit 1 – Curb	Bus Rapid Transit 2- Median	Light Rail Transit- Median	Metrorail/ BRT- Median Hybrid	Metrorail (15-Miles)
Capital Cost	$500 M	$780 M	$1.20 B	$1.57 B	$4.80 B
Scenario 1	32%	21%	14%	N/A	N/A
Scenario 2	41%	27%	17%	13%	4%
Scenario 3	N/A	N/A	N/A	41%	13%

Note: the figures presented are very preliminary results. Analysis is to be further refined

VC Analysis: Special Assessment District (SAD)

Preliminary estimates of SAD Revenue through 2035 (net present value @ 5%) if SAD Fund is established in 2018:

- **Scenario 1:** $25 million
- **Scenario 2:** $30 million
- **Scenario 3:** $100 million

SAD revenue (@ $0.20 per $100) as % of construction cost:

	Bus Rapid Transit 1 – Curb	Bus Rapid Transit 2- Median	Light Rail Transit- Median	Metrorail/ BRT- Median Hybrid	Metrorail (15-Miles)
Capital Cost	$500 M	$780 M	$1.20 B	$1.57 B	$4.80 B
Scenario 1	5%	3%	2%	N/A	N/A
Scenario 2	7%	4%	3%	2%	1%
Scenario 3	N/A	N/A	N/A	7%	2%

Note: the figures presented are very preliminary results. Analysis is to be further refined

Project Funding: Next Steps

- **Economic analysis** to inform the degree to which transportation investments can be supported by value created with corridor growth and development
- **Viability of project funding** informs evaluation of alternatives
- **Funding strategy** developed for recommended alternative
- **Funding sequence** or cash flow projection developed for specific recommended alternative

7. Upcoming Meetings and Next Steps

Calendar of Meetings

Meeting	Date
Technical Advisory Committee	March 6, 10:00 - 11:30am South County Center
Executive Steering Committee	March 13, 3:30 - 5:00 pm Mount Vernon Government Center
Community Involvement Committee	March 18, 4:00 – 5:30 pm Mount Vernon Government Center
Public Meeting #2	March 26, 6:00 – 8:00 pm South County Center

Outreach for Public Meeting #2

- Regular Twitter and Facebook Postings
- Website Updates (interactive)
- Newspaper Ads (5 publications, English/Spanish)
- Press Release (38 media outlets, English/Spanish)
- Flyer and Fact Sheet
  - E-mails to 250 contacts
  - Hard Copies (English and Spanish)

Outreach for Public Meeting #2

- Mount Vernon Town Hall (February)
- School and PTA Outreach and Flyer Distribution
  (21 public schools near the corridor)
- Individual organization outreach:
  - VOICE
  - Progreso
  - Ventures in Community
  - Good Shepherd Church
  - Community Involvement

Multimodal Alternatives Analysis: Steps to Study Completion

1. Continue technical analysis of refined alternatives
2. Evaluate land use scenarios
3. Complete evaluation of multimodal alternatives
4. Conduct scan of potential project impacts
5. Develop project funding strategy
6. Recommend a multimodal alternative to be carried forward to next phase of implementation

General Project Implementation Schedule