

SYSTEM PLAN 2050 DRAFT PLAN REVIEW

March 15, 2024





AGENDA

1. Recap of Vision, Goals, Market Assessment
2. The 2030 Service Alternative
3. The 2050 Service Vision
4. Ridership Forecasts
5. Phasing Plan
6. Financial Analysis
7. Service Vision Benefits

System Plan 2050 Update

Phase I

June – December 2022

- Coordination with peer agencies and stakeholders
- Vision and Goals development
- Ridership trend and potential new market analysis

Phase 2

January – October 2023

- Develop and screen future service scenarios
- Public surveys, stakeholder outreach, data collection
- Focus on 2030 near-term service planning and implementation

Phase 3

November – April 2024

- Long-term 2050 service scenario refinement and screening
- Determine costs and funding needs for future operations and infrastructure
- ID of infrastructure constraints and new capital projects



VISION, GOALS, AND PLAN OUTREACH

Planning Context: Building on Past Themes to Inform the Future

VRE 2040 System Plan

Improve and Expand Service

Address Emerging Markets

VRE as Part of a Larger System

Partnerships to Add Capacity

VRE 2022 Organizational Goals

Commitment to VRE Mission

Service enhancements, ridership,
& revenue growth

Enhance Sustainability

Prioritize diversity, equity &
inclusion



System Plan 2050 Vision

VRE will grow to serve the region as the transportation service of choice, creating meaningful connections and economic opportunities in a safe, sustainable, and equitable manner.

2050 System Plan Goals



1. Safety and Reliability



2. Market Growth and Financial Stability



3. Regional System Integration and Equitable Service



4. Sustainability and Resiliency

General Population Survey: What did we hear?



- **Travel time and reliability** are the two most important deciding factors for the public when making transportation choices
- **Telework rates** in the area continue to be higher than pre-Pandemic averages: 2.9 days per week for current VRE riders and 3.3 days per week for former riders
- **The perception and/or reality that it's faster to drive** than take transit is a real barrier to use
- **Attrition from employment** has had a significant impact on VRE ridership
- **Most regional travelers do not use VRE**



Summary of Community Pop-ups

5

Pop-ups conducted

5

Additional Pop-ups scheduled

100

Residents engaged

150

Flyers distributed with Plan QR code



What we heard from the Pop-Ups

Current and past riders shared general satisfaction with VRE service



Desires and unmet needs:

- More flexibility
 - Higher frequency
 - Reverse-peak direction service
 - Later evening service
- More catering to non-commuters
 - Sports
 - Performances
 - Airport
 - Weekend travel
- Better connections to VRE stations via transit for areas between both lines

"Where would you like to take the train to?"
(regardless of current possibility)



- **Washington, D.C.**
- **Richmond**
- **Fredericksburg**





TRAVEL MARKET ANALYSIS

Driving Forces for VRE Ridership

What we can control

- Levels of service
- Quality of transit service*
- Fares
- Integrated services (partnerships with other transit operators)

What we react to

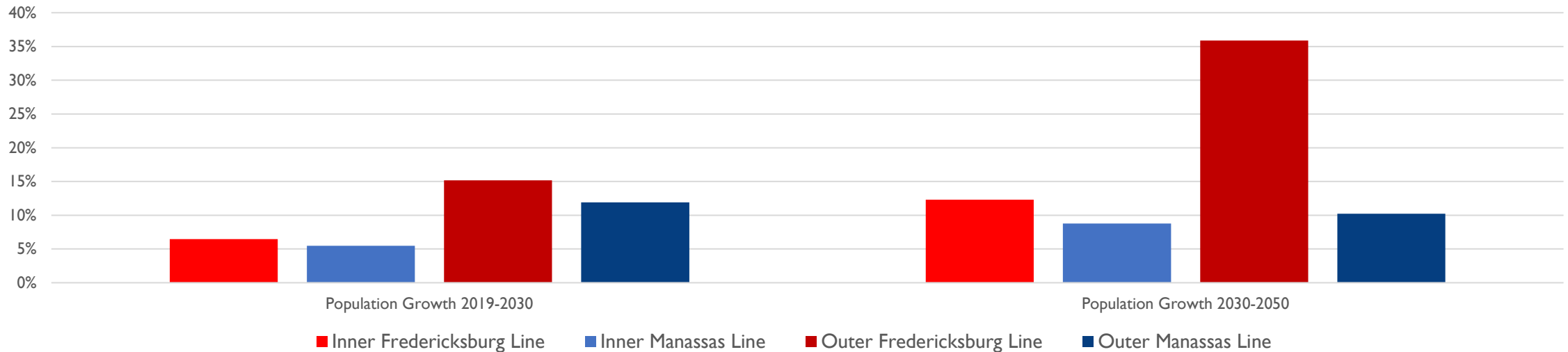
- Competitive modes (auto operating cost, parking, congestion)
- Highway congestion mitigation projects (toll lanes, widenings, etc.)
- Land use/urban form/zoning
- Socioeconomic characteristics
- Telework—Federal workforce decisions
- Pandemic and broad economic shifts

*Limited ability to control delays caused by host railroads and their tenants until passenger/freight separation is achieved



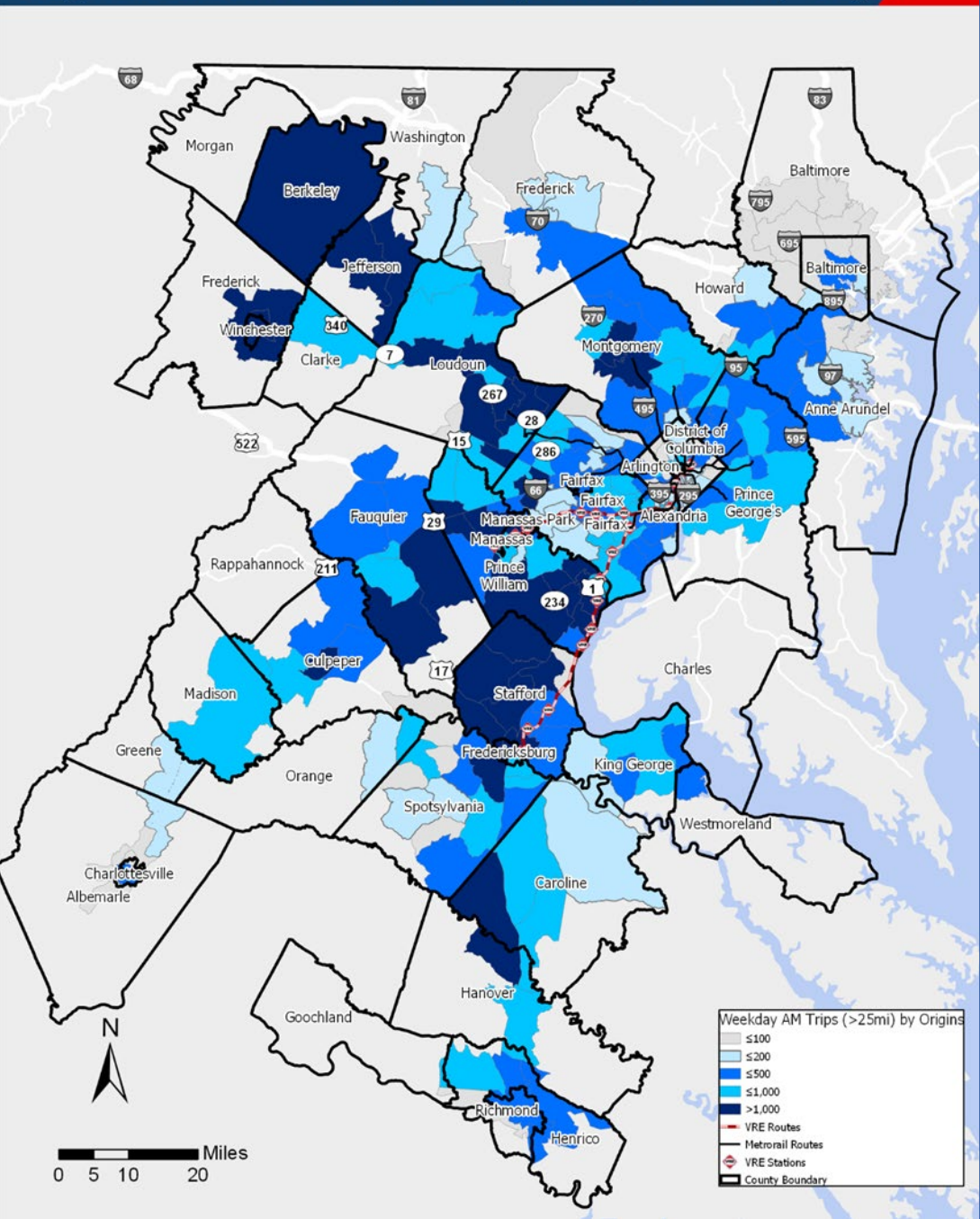
Travel Market Assessment

Population and Employment Growth

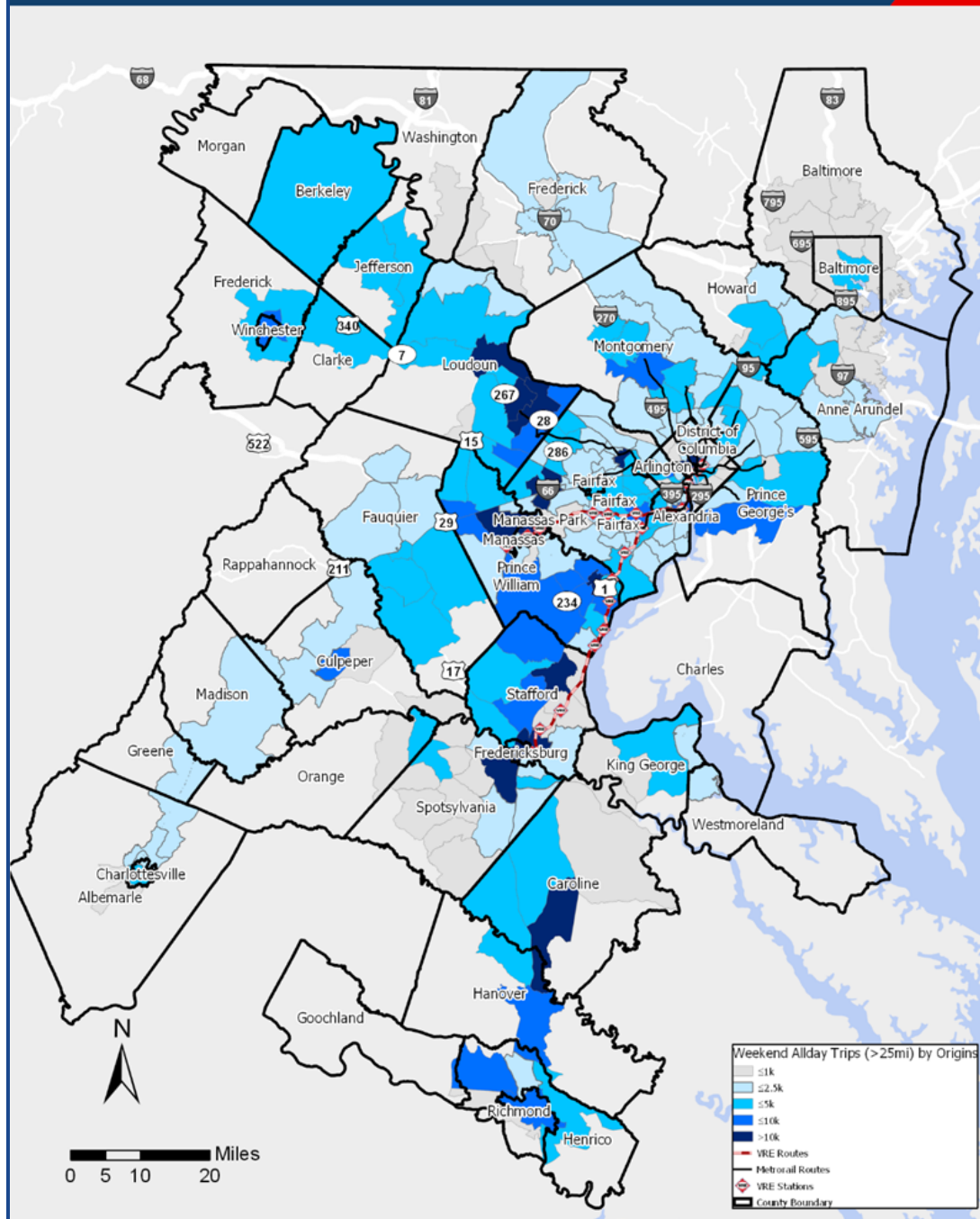


- Highest rates of population growth to 2030 and 2050 will be around VRE outer stations' service areas¹
- Employment densities in 2030 and 2050 will increase primarily along high frequency transit corridors
- Highest areas of projected employment growth served by VRE:
 - Crystal City
 - D.C. Core
 - Fairfax County - Springfield/Belvoir North area

Long-Distance Weekday AM Trips from/to VA by Origins



Long-Distance Weekend Daily Trips from/to VA by Origins



These trips are:

- 1. 25+ miles
- 2. Start or end in VA
- 3. Shown by origin

Reverse Flow Markets Impact on Ridership

Reverse flow services could generate:

~10% of total 2030 ridership

~8% of total 2050 ridership

Origin Zone Name	Destination Zone Name	# All Daily Trips
MCBQ West of I-95	Central Fredericksburg-South Stafford	459
DC Core	Rippon	435
Potomac Mills	Central Fredericksburg-South Stafford	402
North Springfield	Central Manassas	374
DC Core	Central Manassas	359
North Stafford	Central Manassas	311
SE Dale City	Central Fredericksburg-South Stafford	276
DC Core	Woodbridge	260
Cherry Hill-Potomac Shores	Central Fredericksburg-South Stafford	242
Rippon	Central Fredericksburg-South Stafford	235

These trips are:

1. +25-mile trips
2. One End in current VRE service area



Daily Demand from VA to MD

Top Ten Origin/Destination Pairs from Virginia to the MARC Service Area Greater than 25 miles

Origin Zone Name	Origin County/State	Destination Zone Name	Destination County/State	Average Daily Trips
Sterling	Loudoun, VA	Rockville	Montgomery, MD	316
Leesburg	Loudoun, VA	West Frederick	Frederick, MD	253
Tysons	Fairfax, VA	Germantown	Montgomery, MD	246
Centreville	Fairfax, VA	Bethesda	Montgomery, MD	224
Sterling	Loudoun, VA	Gaithersburg	Montgomery, MD	218
Sterling	Loudoun, VA	Potomac MD	Montgomery, MD	217
Crystal City - Pentagon City	Arlington, VA	Rockville	Montgomery, MD	211
Dulles Airport	Loudoun, VA	Rockville	Montgomery, MD	210
Crystal City - Pentagon City	Arlington, VA	Gaithersburg	Montgomery, MD	203
Sterling	Loudoun, VA	Bethesda	Montgomery, MD	199

- Union Station infrastructure improvements should allow for timed transfers to all MARC lines before 2050
- System Plan 2050 does not preclude Maryland to VA run-through service in future service planning, however, travel volumes from VA to Maryland are very low compared to other VRE travel markets identified



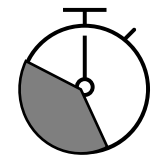
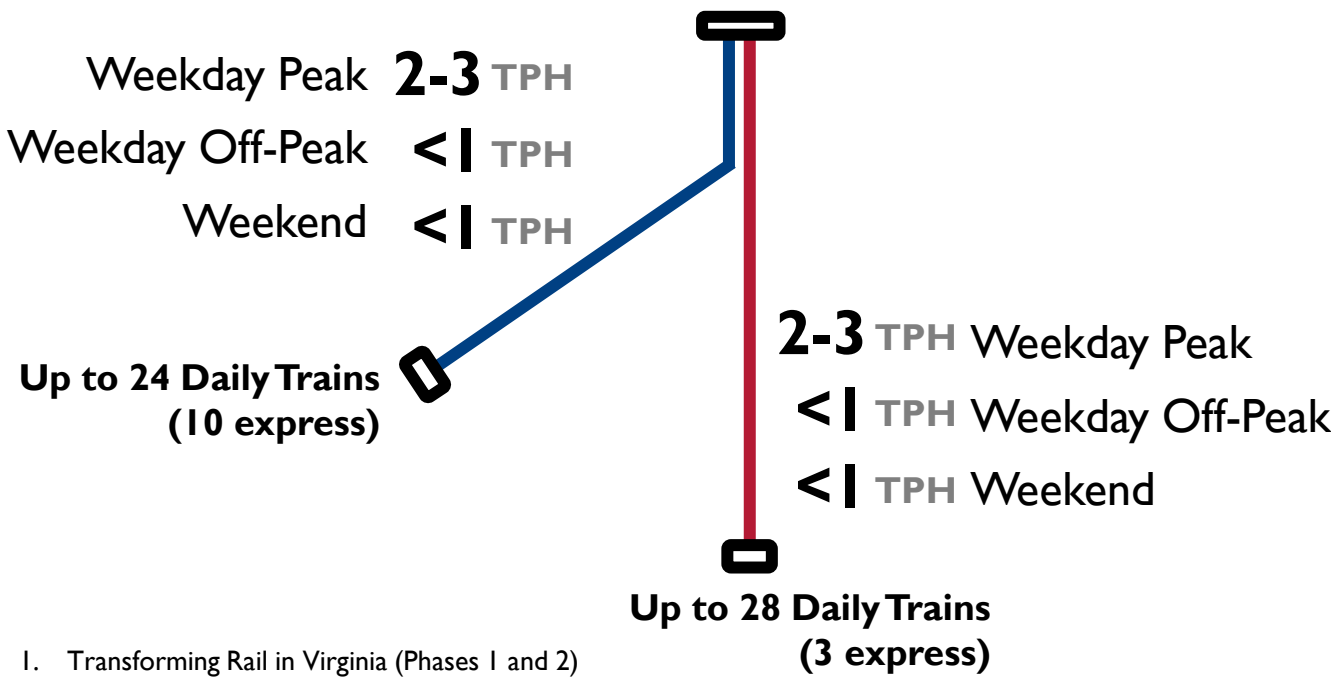
2030 SERVICE ALTERNATIVE



2030 Board-Recommended Service

Alternative A-C – TRV¹ Baseline Enhanced

Align operations to constrained midday storage capacity of 13 consists



20-30 Headways in Peak Periods/Peak Directions (AM & PM)²

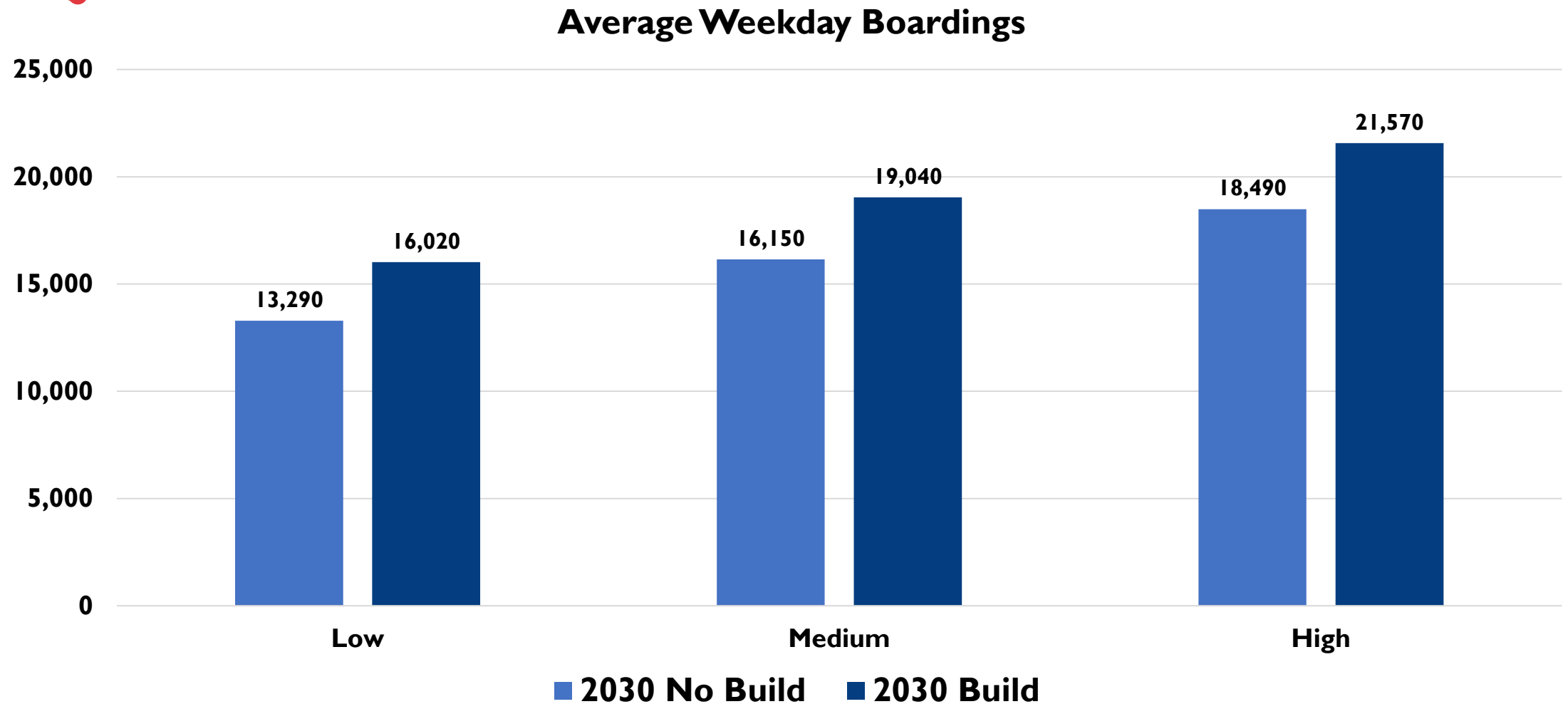
Average Headways	Manassas	Fredericksburg
AM Peak/Direction ²	21-22 minutes	21-22 minutes
PM Peak/Direction ²	28 minutes	19 minutes
AM Reverse Peak	55 minutes (2 trains)	30 minutes (3 trains)
PM Reverse Peak	120 minutes (3 trains)	44 minutes (2 trains)
Mid-Day	2 trains SB/ 0 trains NB	2 trains SB / 0 trains NB
Late Night	2 trains SB / 0 trains NB	2 trains SB / 1 train NB

Weekend Freqs. ³	Manassas	Fredericksburg
NB Direction	6 trains	7 trains
SB Direction	6 trains	7 trains

1. Transforming Rail in Virginia (Phases 1 and 2)
2. When Amtrak Svc. Included
3. Weekend Svc. subject to adtl. agreements

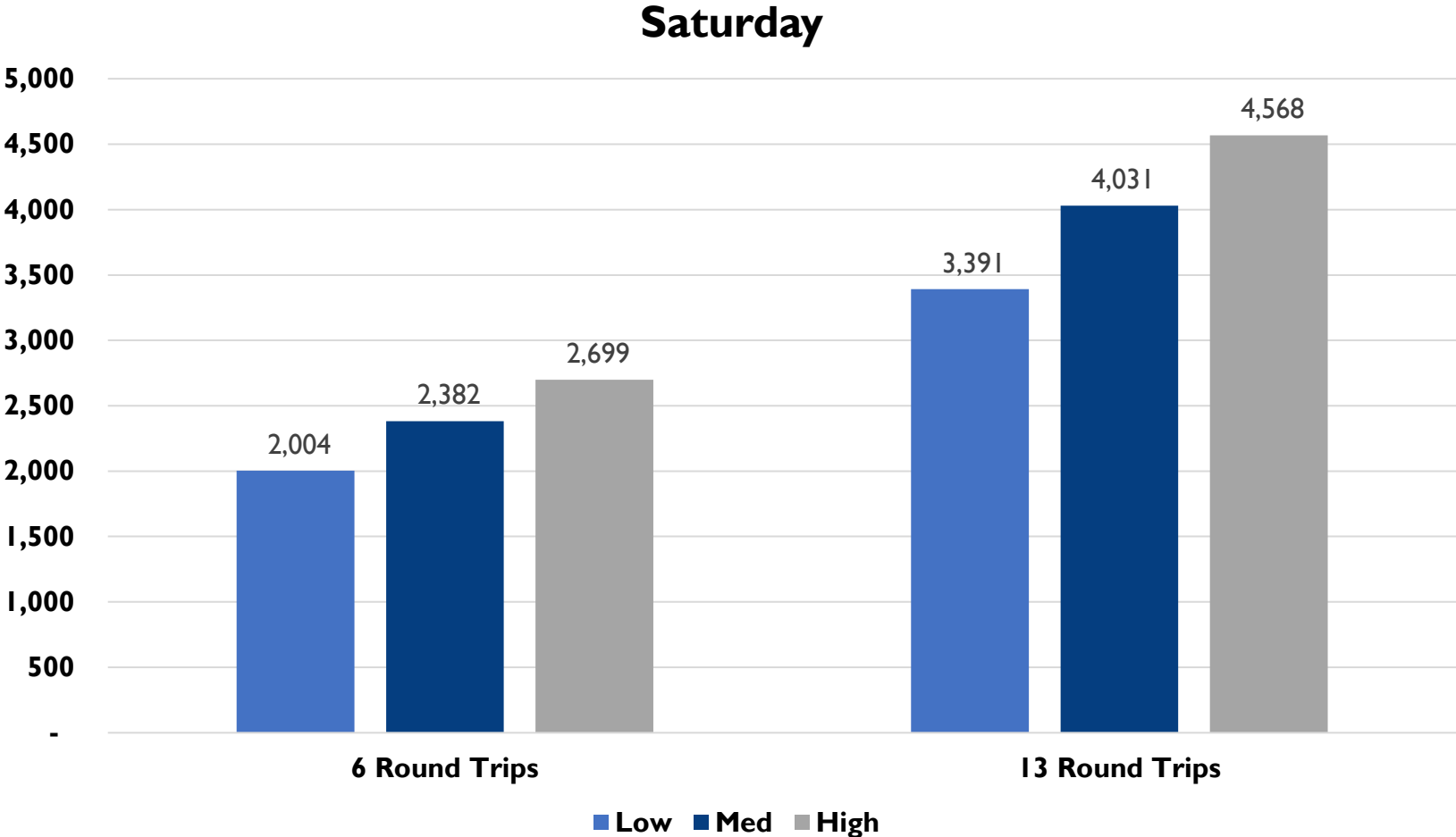


2030 Weekday Ridership Forecasts: Build vs No Build



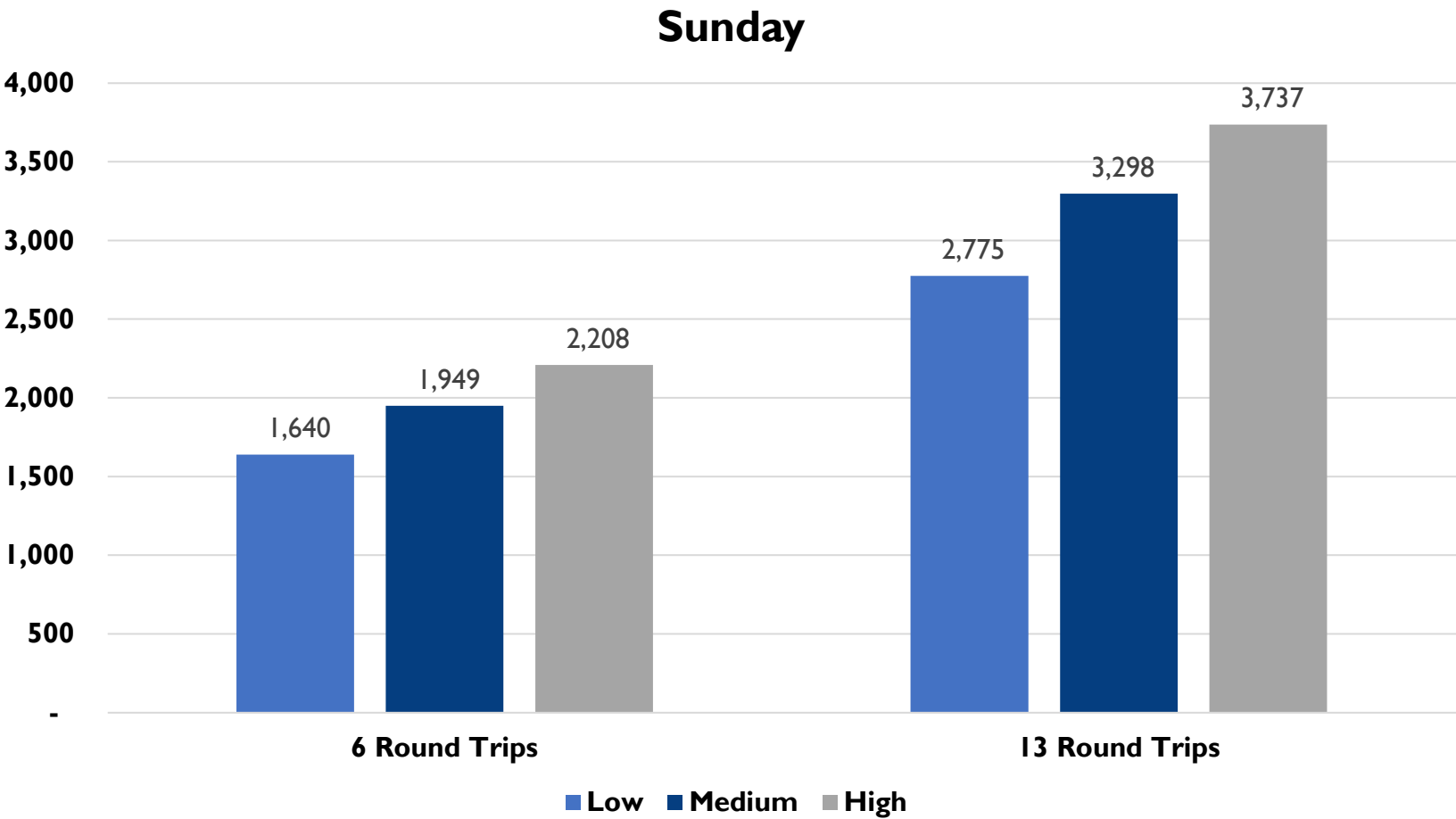
2030 Saturday Ridership Forecasts

Average
Saturday
Boardings



2030 Sunday Ridership Forecasts

Average
Sunday
Boardings



2050 SCENARIO SCREENING



2050 Draft Service Scenarios

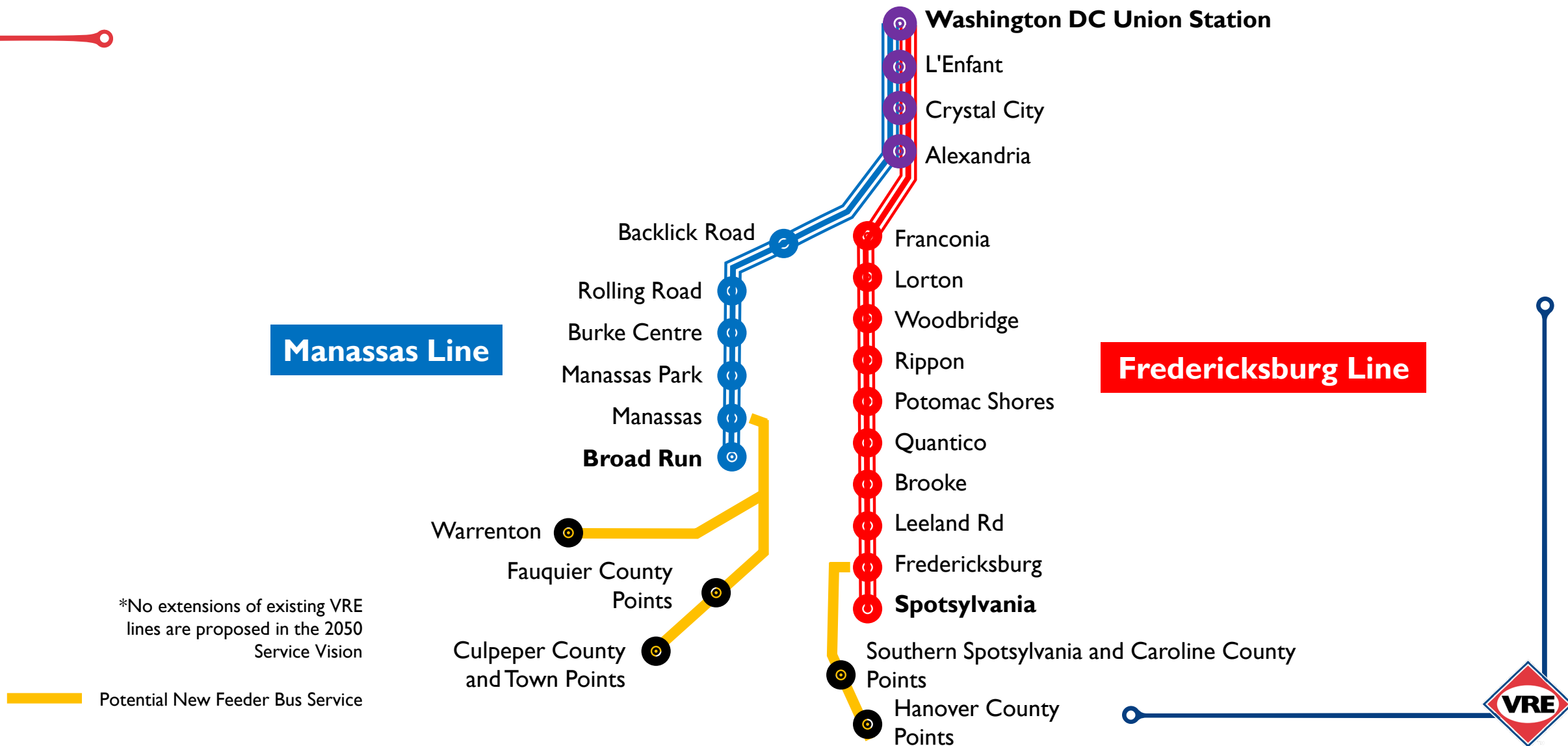
Name	Description	"Public Facing" Name	Weekday Trains Per Day	Weekday Express Trains	Saturday Trains Per Day	Sunday Trains Per Day
Scenario A	TRV v6.1 Service Plan with Enhancements	Transforming Rail in Virginia (TRV) Enhanced	52	12	26	26
Scenario A1	20 Minute Peak + Uniform (not less than hourly) Off-Peak	Enhanced Market Scenario	92	21	64	56
Scenario A2	Clockface Headways + Physical Service Expansion	Clockface Service with Geographic Expansion (Clockface 1)	92	21	152	128
Scenario A3	Inner Zone Rapid-Rail Peak Frequencies / Off-Peak 30-Minute Clockface Headways	Clockface Service with High Inner Frequencies and No Expansion (Clockface 2)	296 (96 short trips)	46	160	128



THE 2050 SERVICE VISION



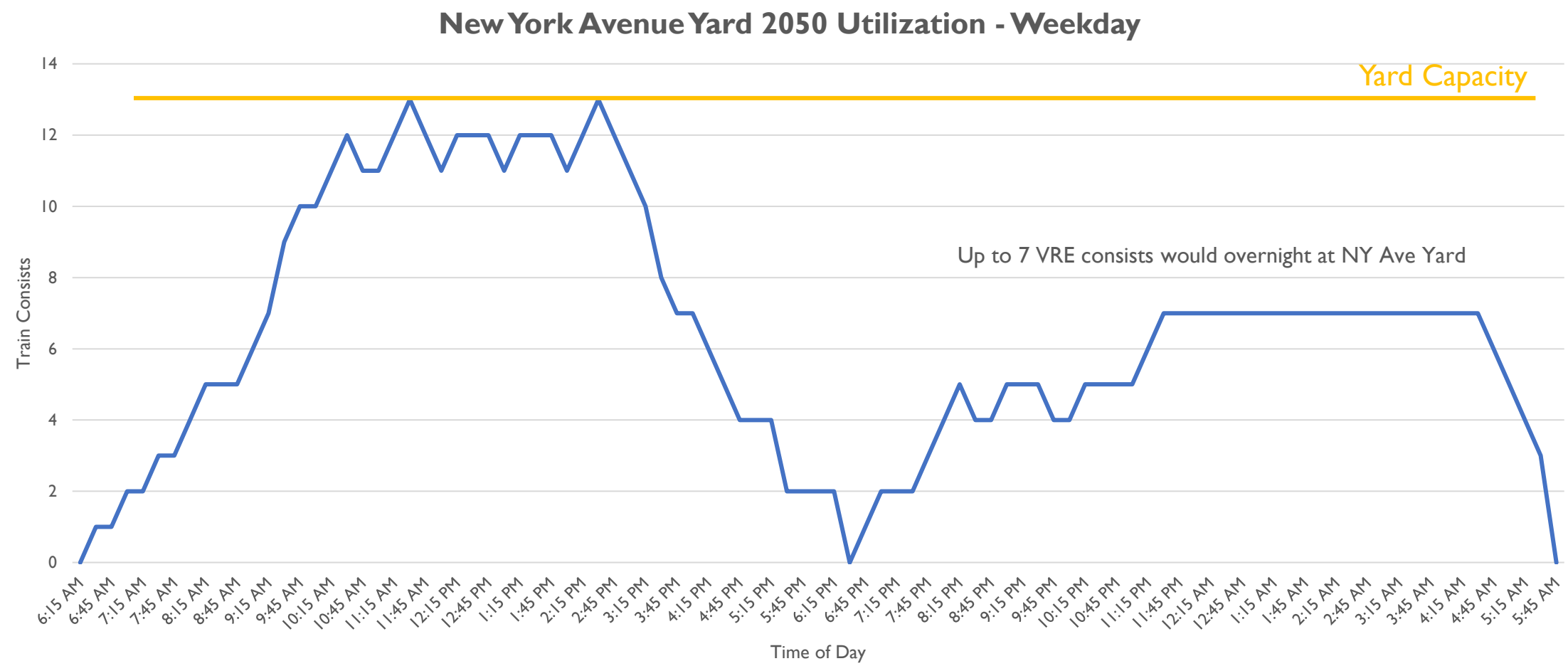
Recommended 2050 Service Scenario



2050 Recommended Service Scenario

Name	Description	"Public Facing" Name	Weekday Trains Per Day	Weekday Express Trains	Saturday Trains Per Day	Sunday Trains Per Day
Current Service	VRE's Current Service Plan	Current VRE Service	32	1	0	0
Scenario A (by 2030)	TRV v6.1 Service Plan with Enhancements	Transforming Rail in Virginia (TRV) Enhanced	52	12	26	26
Scenario A1 (by 2050)	20 Minute Peak + 30 Minute Reverse Peak + Uniform (not less than hourly) Off-Peak on each line	Enhanced Market Scenario	116	24	68	60

Mid-Day Storage Considerations Driving Proposed Service Levels



Assessment of Infill & Relocated Stations

	Criteria	Population & Employment	Economic Growth Potential	Transit in Underserved Areas	Foster Multimodal Connectivity	Site Parameters	Weighted Total Score
	Weight	20%	20%	15%	15%	30%	
Ivy City (NY Avenue)		23	50	50	40	10	31
Van Dorn (Fredericksburg Line)		64	60	30	90	70	64
Van Dorn (Manassas Line)		100	70	30	60	80	72
Newington/Ft. Belvoir		14	80	40	10	70	47
Brooke Station relocate to Courthouse Road (VA-630)		12	10	20	10	70	30
Rolling Road relocated to north of Forrester Blvd.		11	15	30	10	70	32

- VRE included both Van Dorn and Ivy City locations in 2050 ridership, cost, and benefits analysis
- No specific location feasibility or site selection studies were performed (to be conducted in future studies)
- Ivy City included because it was a high-scoring location in the 2017 D.C. Statewide Rail Plan infill station analysis



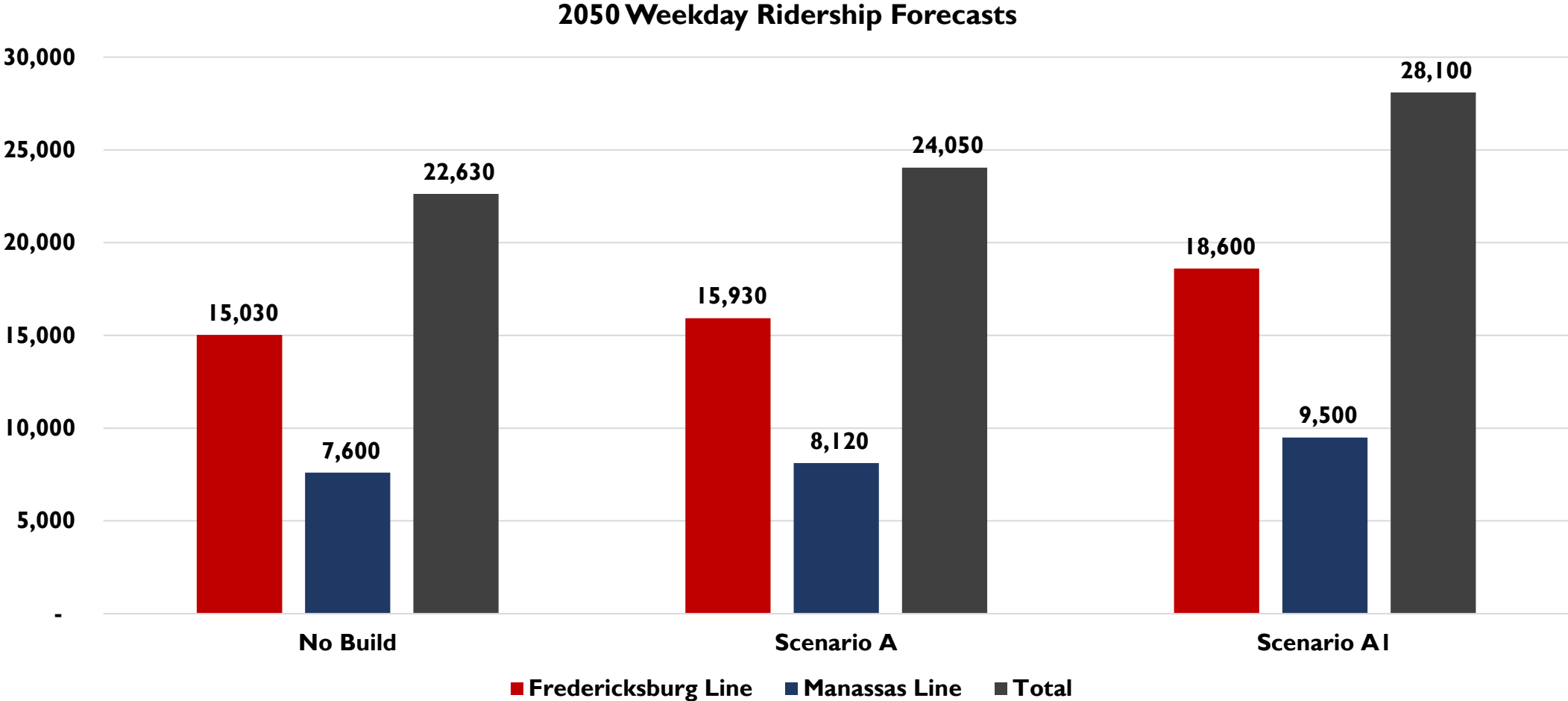
Assessment of Infill & Relocated Stations



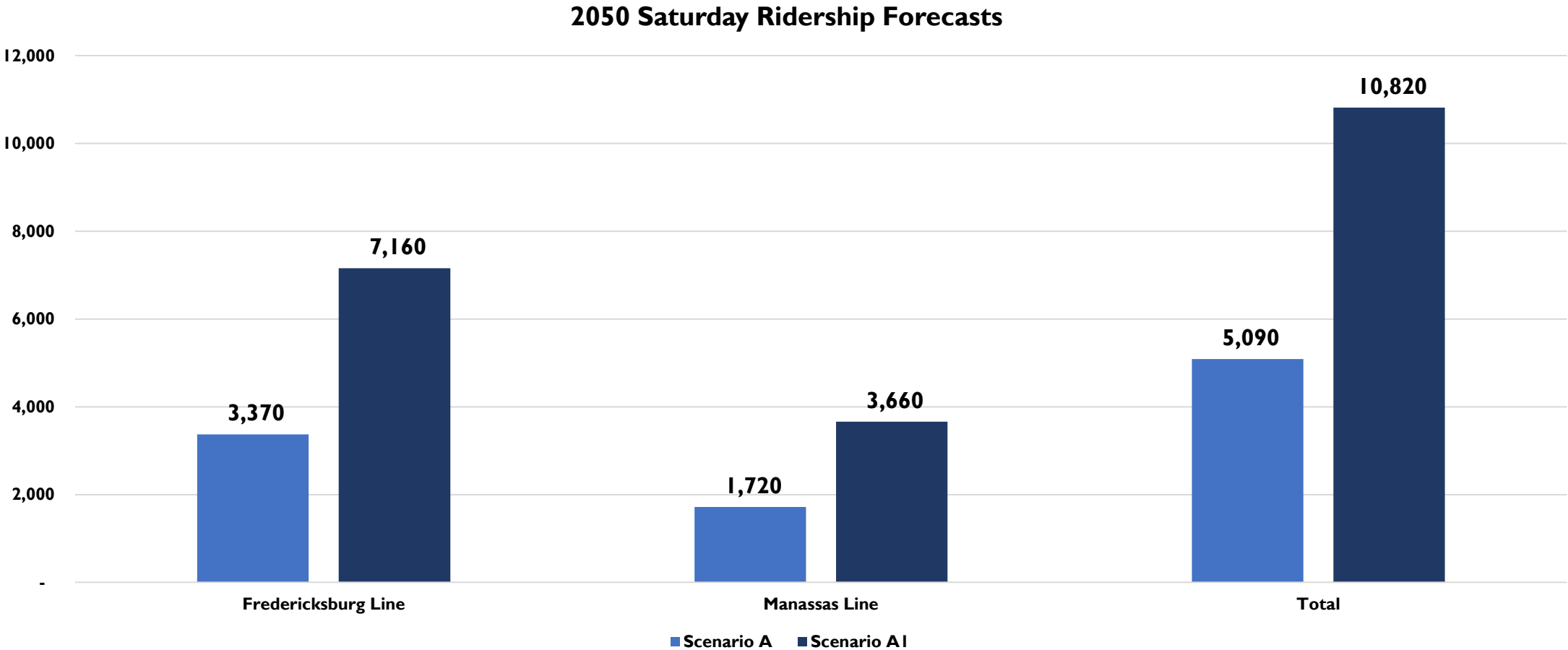
2050 RIDERSHIP FORECASTS



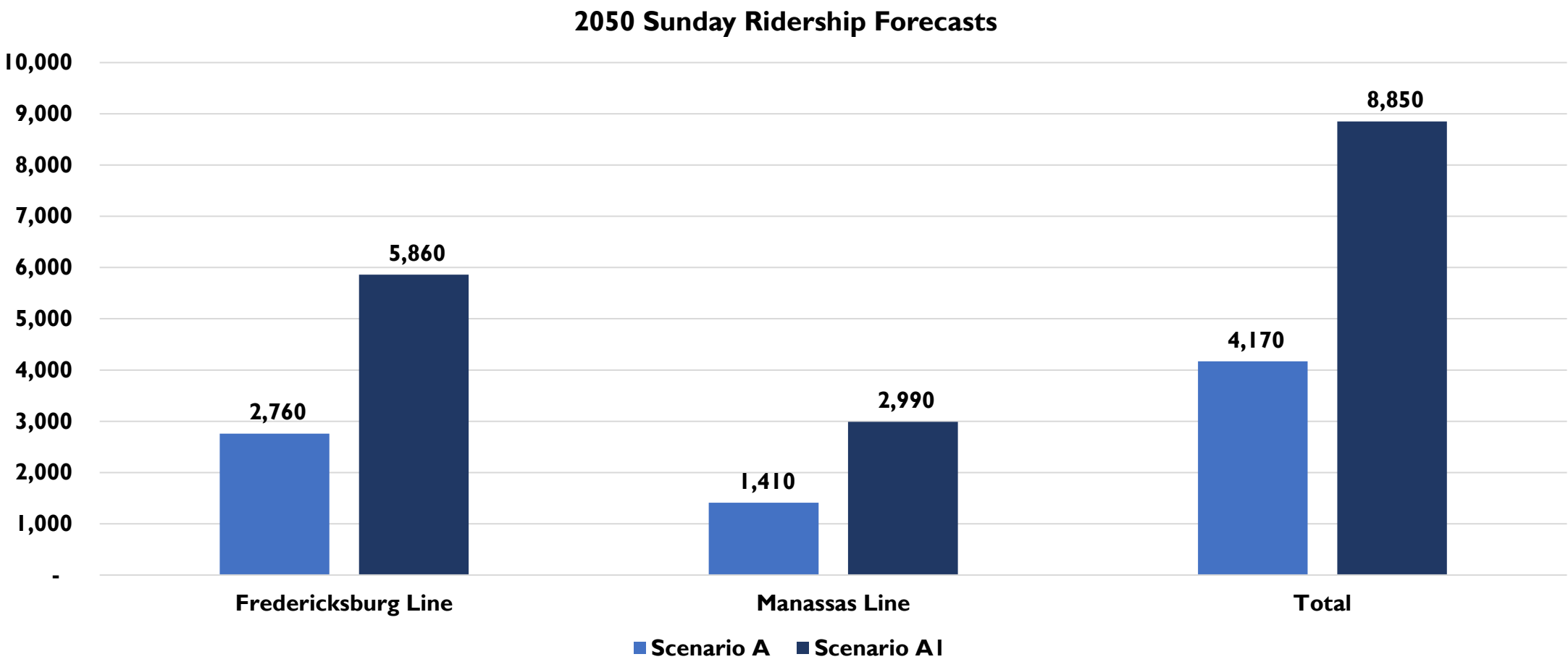
2050 Ridership Forecasts



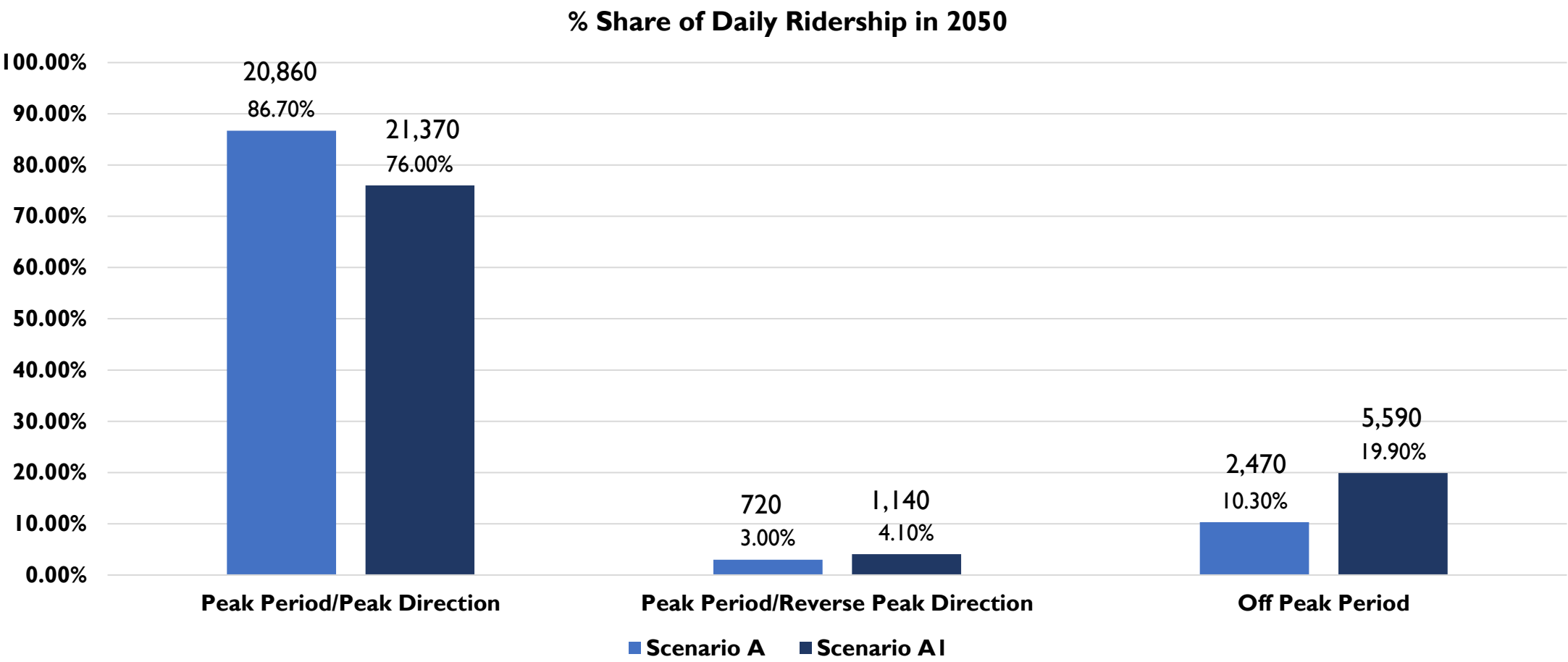
2050 Ridership Forecasts



2050 Ridership Forecasts



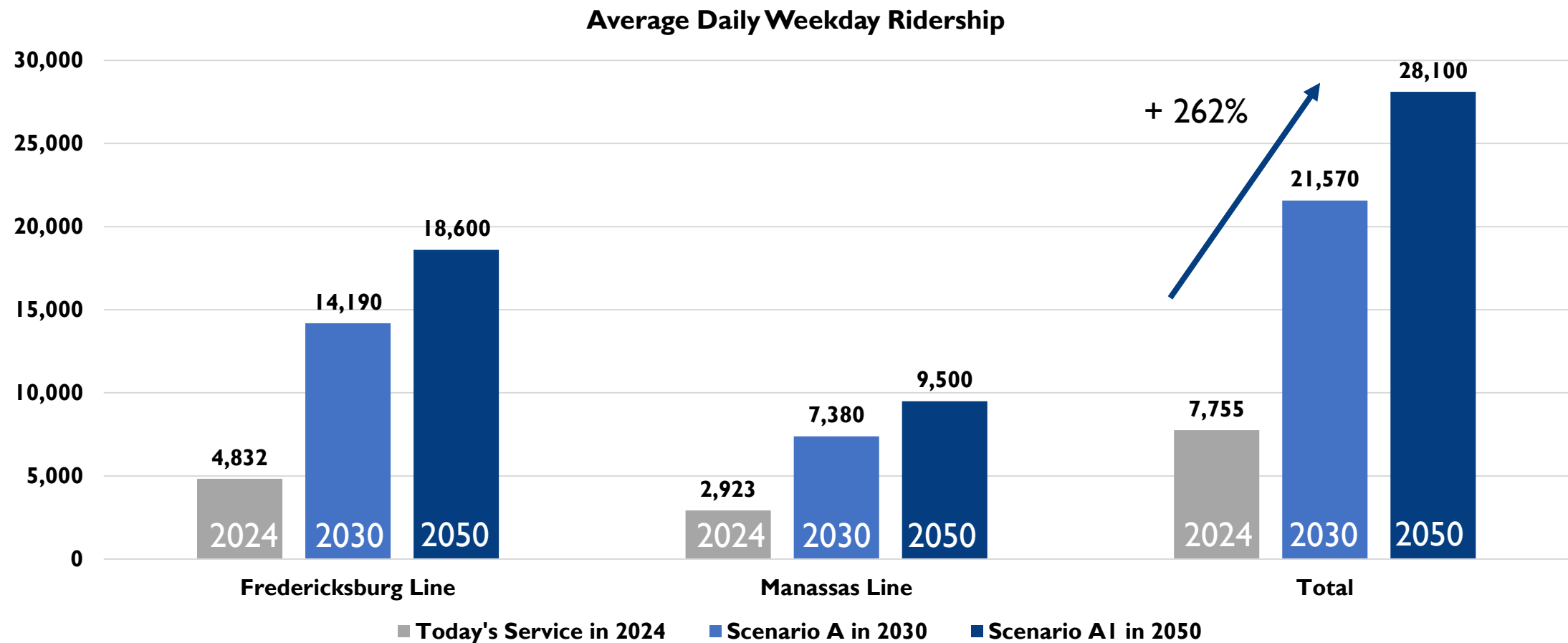
2050 Ridership Forecasts



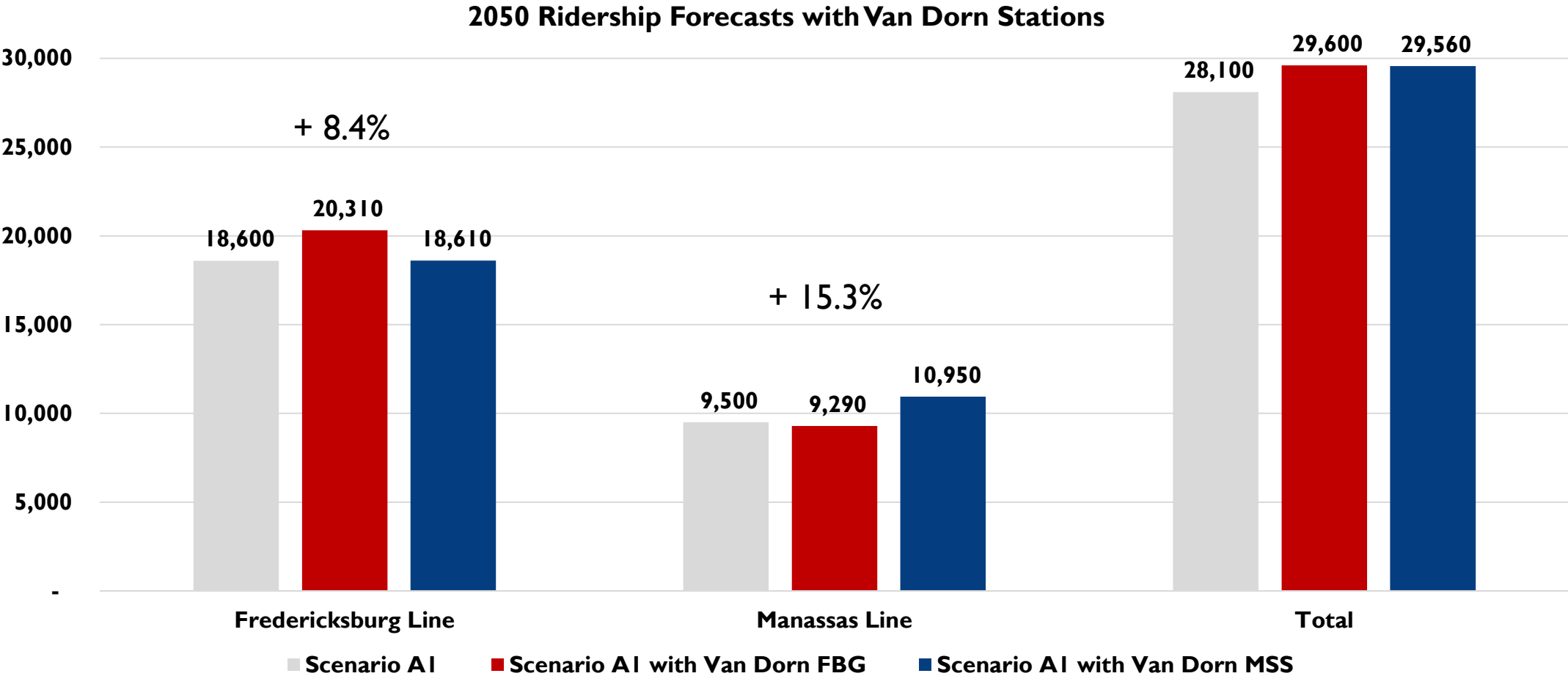
*Off-Peak: Midday and evening periods combined



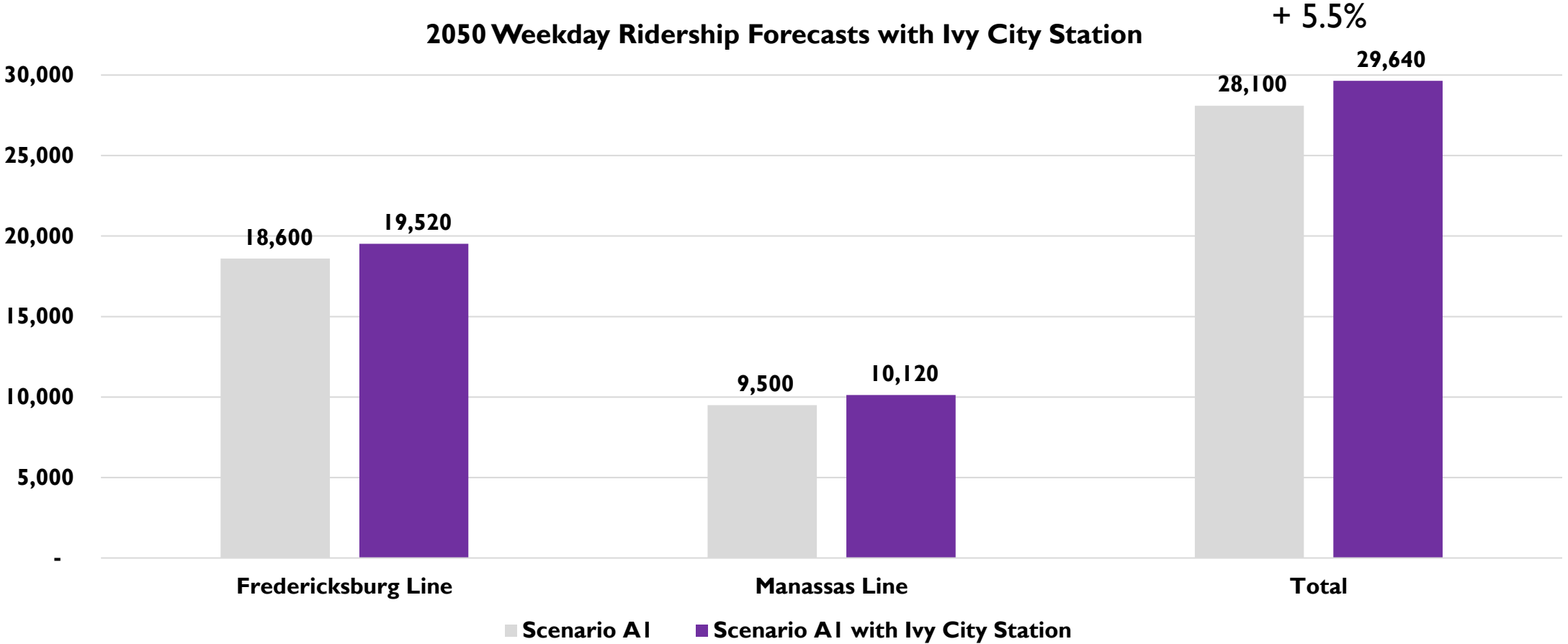
Average Daily Ridership By Year



2050 Weekday Ridership with Van Dorn



2050 Weekday Ridership with Ivy City



Comparison to Existing Stations

2050 Ivy City Station Weekday Boardings: 770

Station	Weekday Boardings 2050
Fredericksburg Line	
L'Enfant Plaza (Fredericksburg Line Trains)	4,590
Union Station (Fredericksburg Line Trains)	1,920
Crystal City (Fredericksburg Line Trains)	1,760
Fredericksburg	1,440
Brooke	1,370
Leeland Road	1,350
Rippon	1,330
Spotsylvania	1,260
Woodbridge	1,000
Van Dorn (Fredericksburg Line Location)	860
Lorton	770
Alexandria (Fredericksburg Line Trains)	690
Quantico	580
Franconia-Springfield	390
Potomac Shores	120

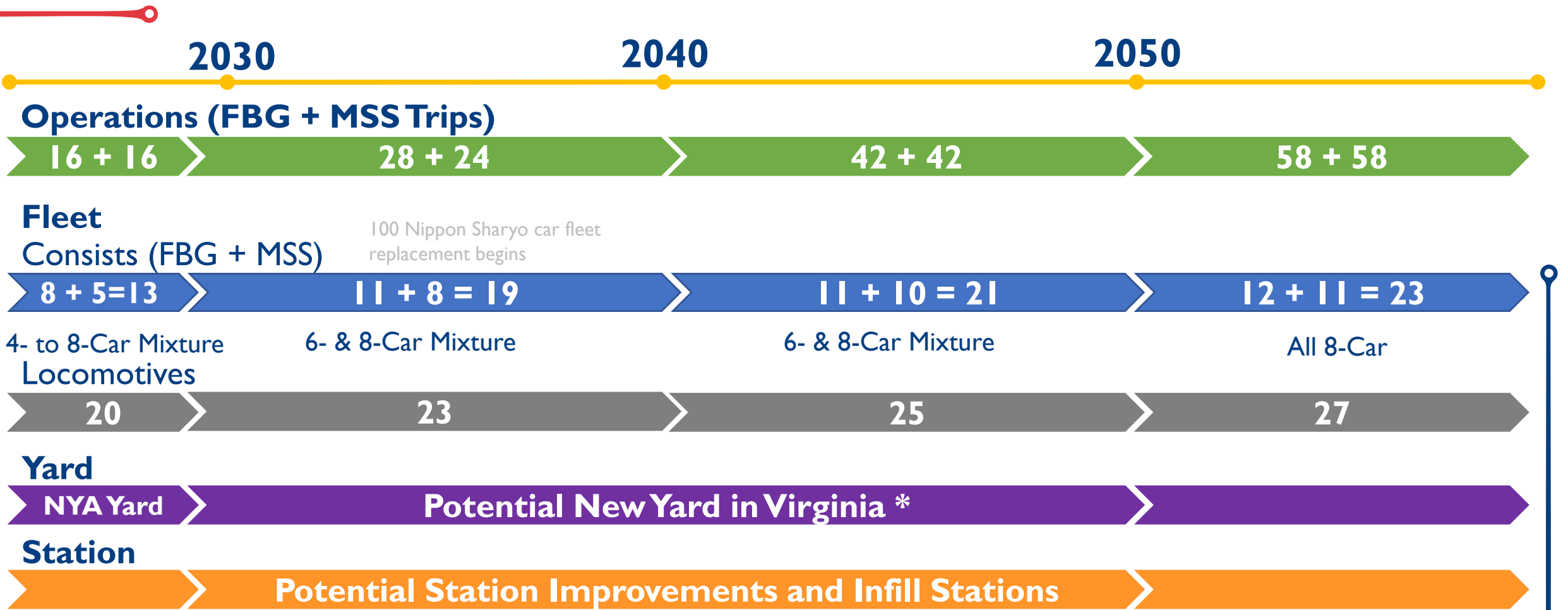
Station	Weekday Boardings 2050
Manassas Line	
L'Enfant Plaza (Manassas Line Trains)	2,360
Union Station (Manassas Line Trains)	1,290
Broad Run/Airport	1,110
Manassas City	1,050
Manassas Park	920
Crystal City (Manassas Line Trains)	800
Van Dorn (Manassas Line Location)	730
Burke Centre	650
Backlick Road	520
Alexandria (Manassas Line Trains)	470
Rolling Road	340



INFRASTRUCTURE AND SERVICE PHASING PLAN



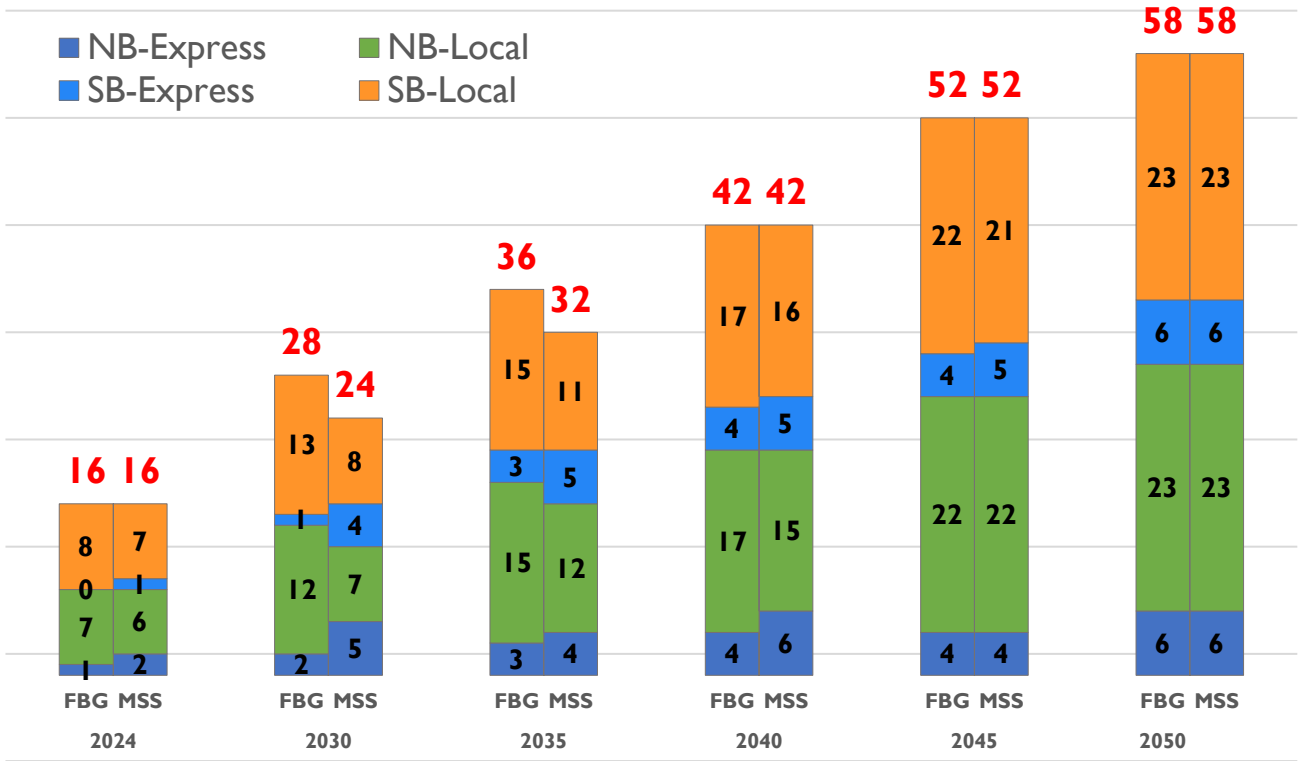
Infrastructure and Service Phasing Plan



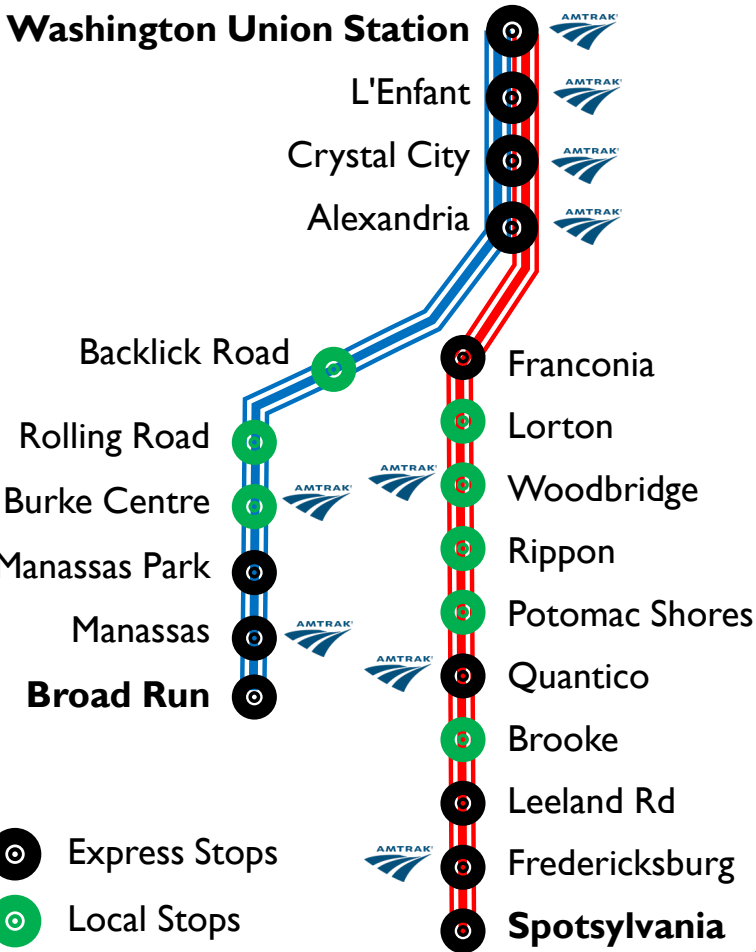
* Only needed if overnight storage at NYA Yard is not available past 2030



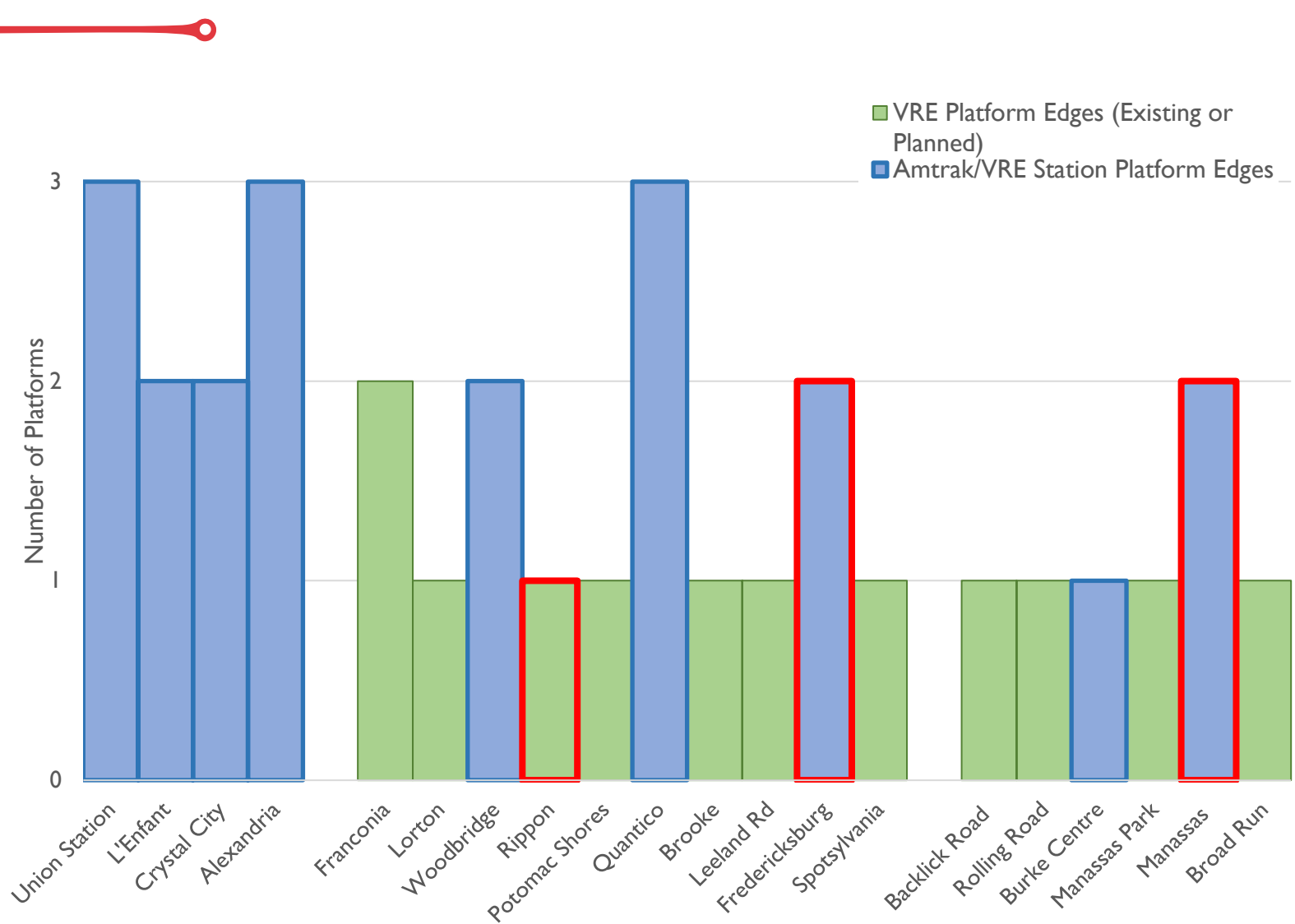
Service Phasing Plan



- Growth Pattern: Linear increase in service to meet rising demand
- By 2040, lines regain equal service levels
- Shifting from an initial focus on peak service to balanced service with bi-directional peak and off-peak trips



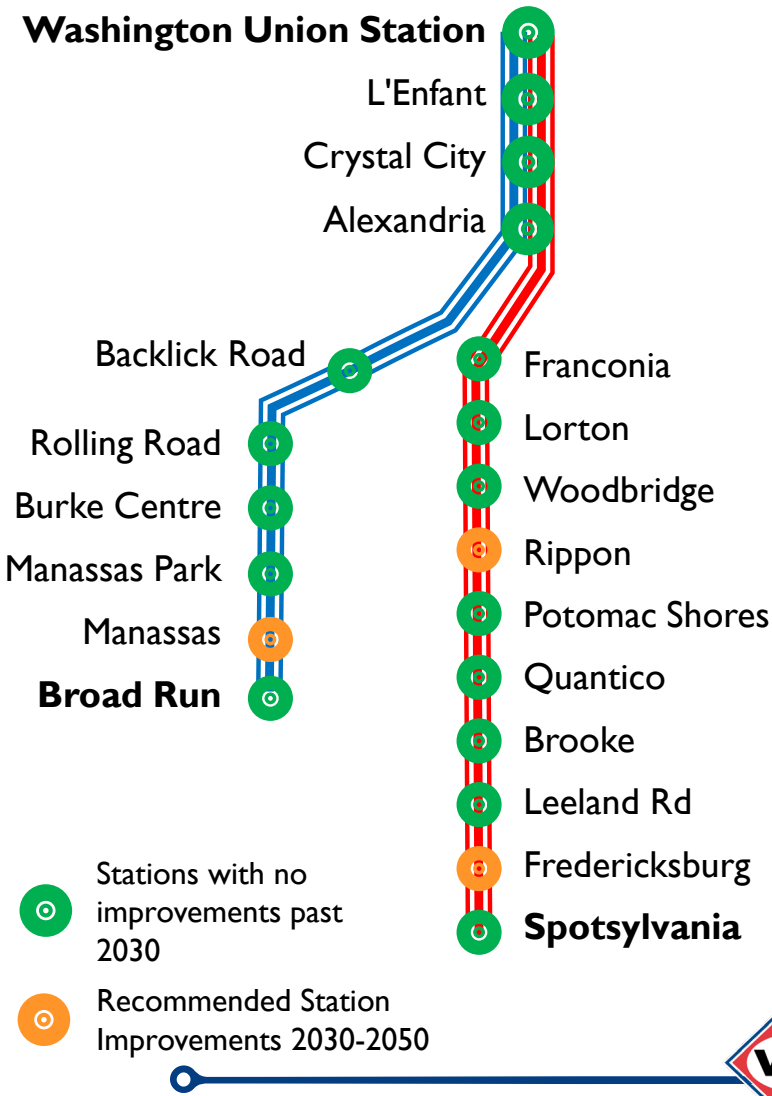
Minimum Infrastructure Requirements 2050



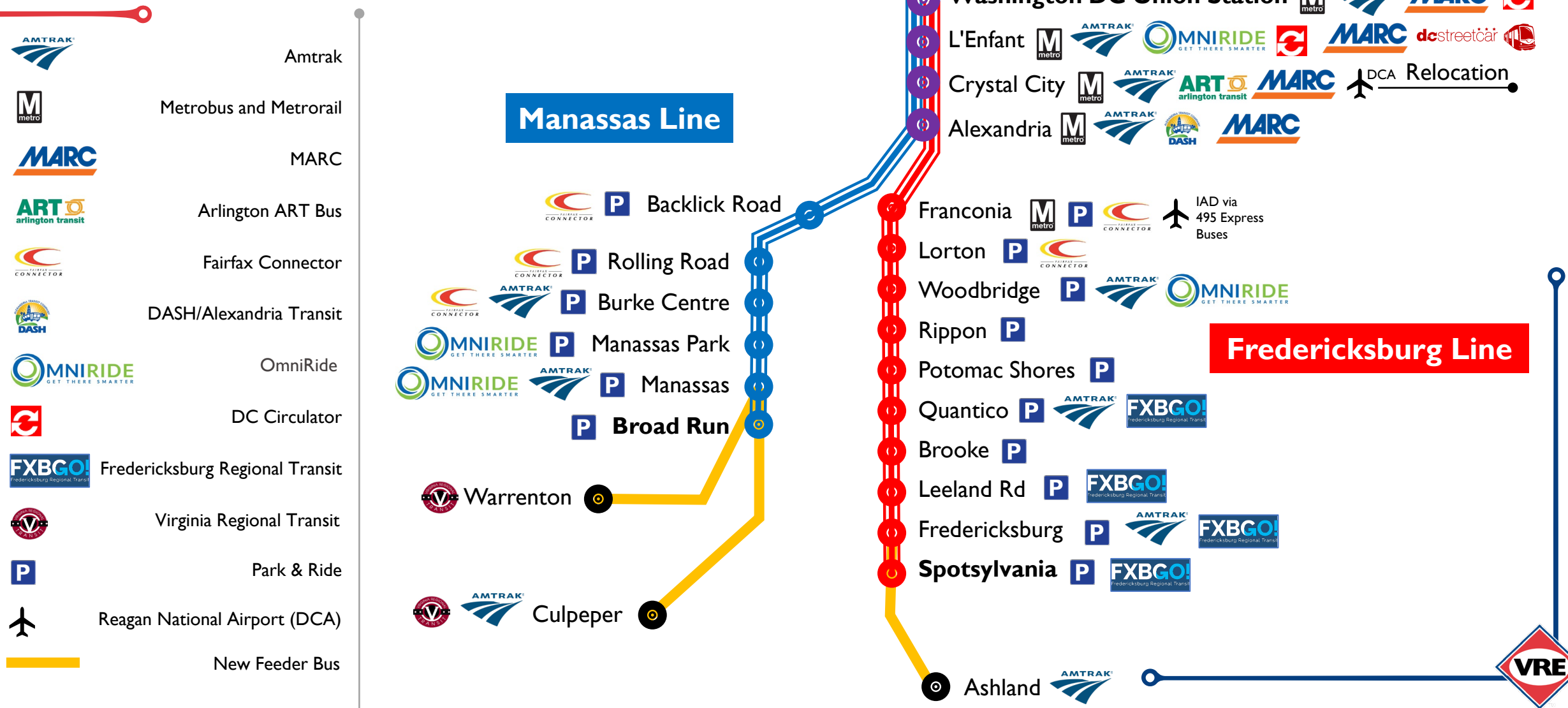
Minimum Infrastructure Requirements 2050

	Fredericksburg Line	Manassas Line
Platform	Fredericksburg Station Both Platform Extensions to 8-car Length	Manassas Station New East Platform
	Rippon Station Platform Extension to 8-car Length	
Parking	Woodbridge 189 Spaces	Backlick Road 214 Spaces
	Rippon 616 Spaces	Manassas 262 Spaces
	Brooke 643 Spaces	Broad Run 35 Spaces
	Leeland Rd 112 Spaces	
	Fredericksburg 650 Spaces	
Track	10 Crossovers*	8 Crossovers*
	16,000 ft Track Construction	12,800 ft Track Construction
		Broad Run Third Track

*Does not include signal/access improvements in conjunction with crossover installation



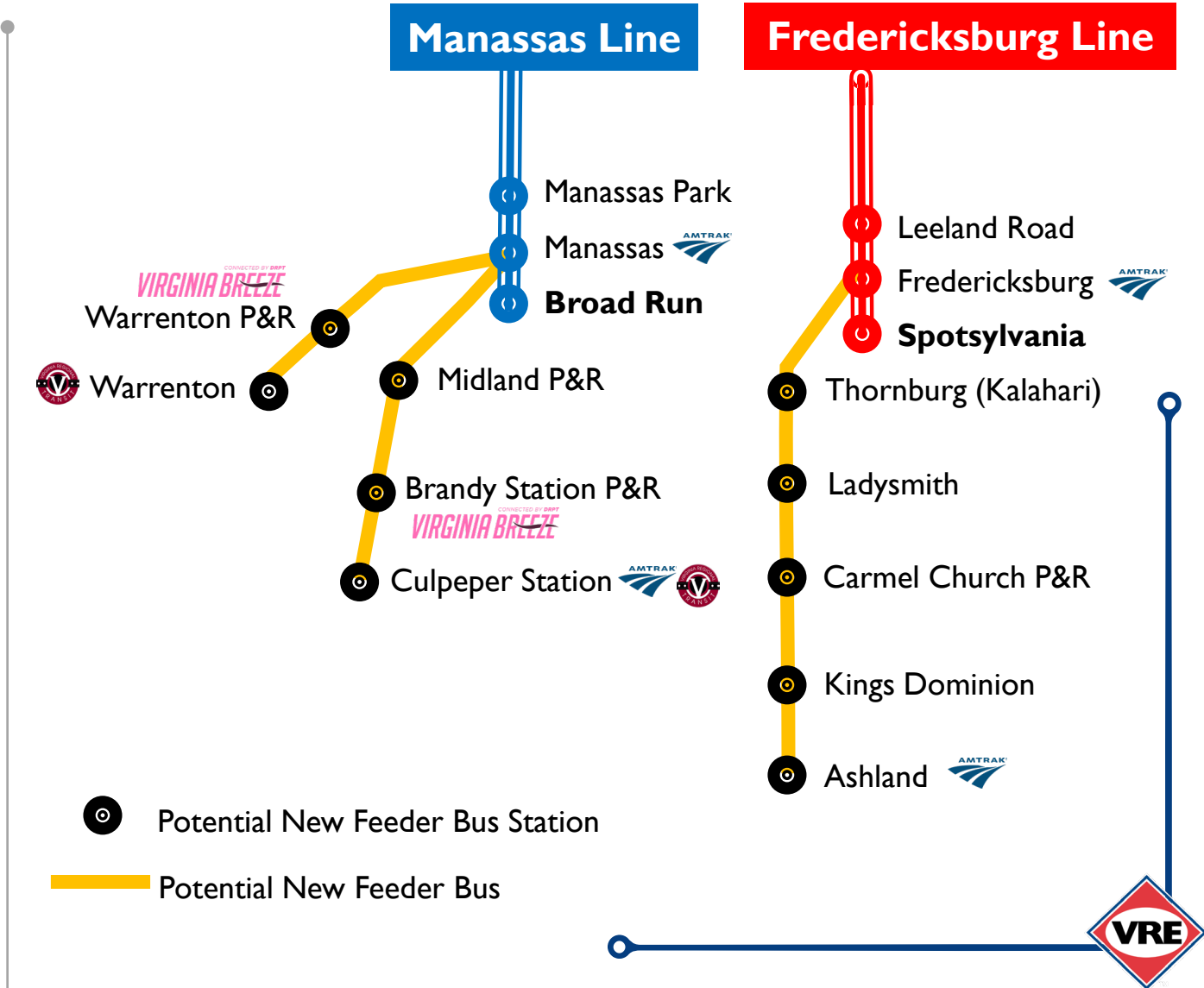
Connecting and Complementary Transit Services in 2050



Proposed Feeder Bus Routes

- Serving identified markets with the potential for future VRE expansion
- Connected to joint-use stations at Fredericksburg and Manassas
- Scheduled to allow transfer to and from both VRE Express and Amtrak trains
- May be operated by other regional transit operators

Route	Ashland	Culpeper	Warrenton
Trips per Day	35	19	19
Vehicles	9	6	6
Length (Mile)	46	36	20
Run Time	1:10	0:50	0:37



2050 FINANCIAL FORECASTS



Financial Forecasts

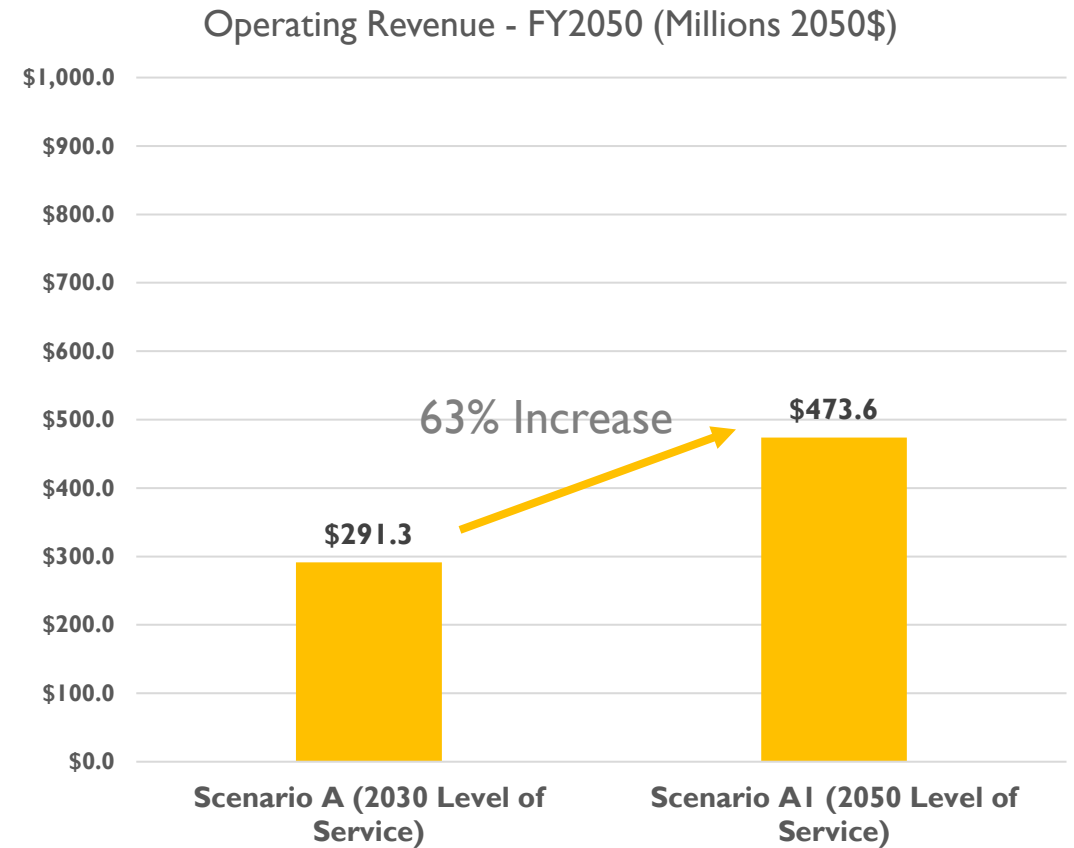
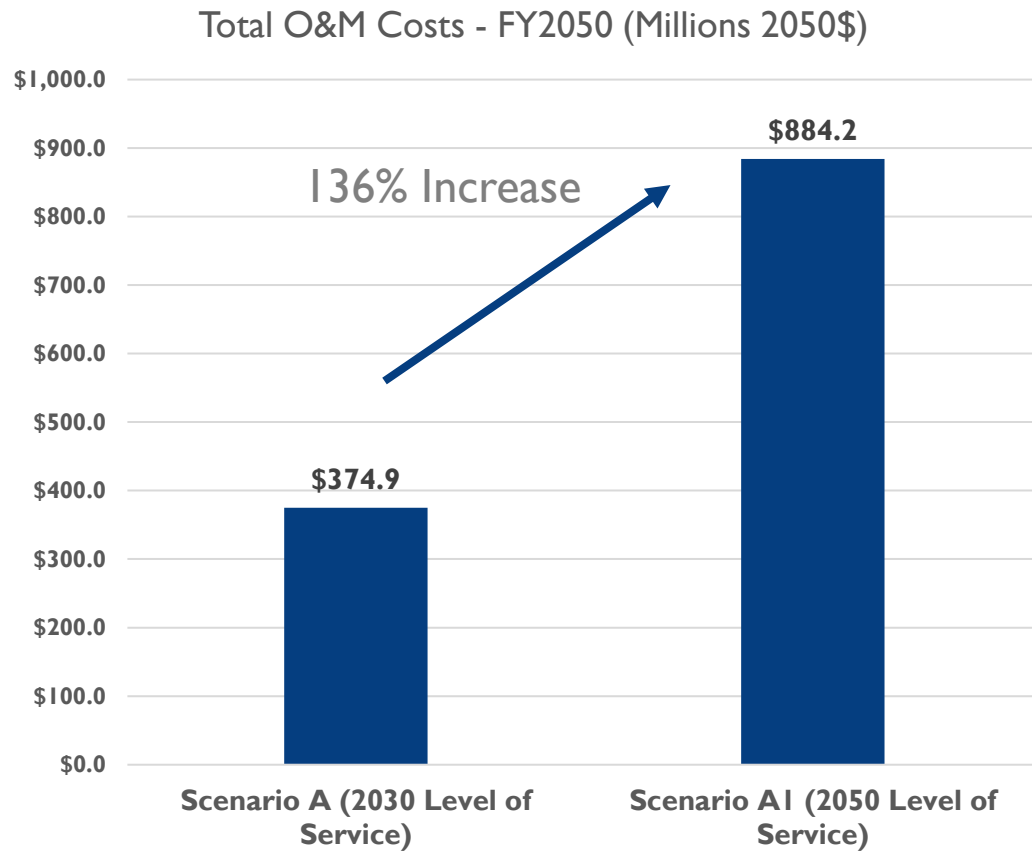
Operating

- Projections of operating expenses in 2050
 - Operations and maintenance costs
 - Track access fees
- Projections of operating revenues in 2050
 - State (MTF) + Jurisdictional Contribution
 - Fare revenue
 - VPRA track access fee reimbursement (84%)
 - CROC
- Financial assessment to project the FBR% in FY50 for Scenarios A and AI

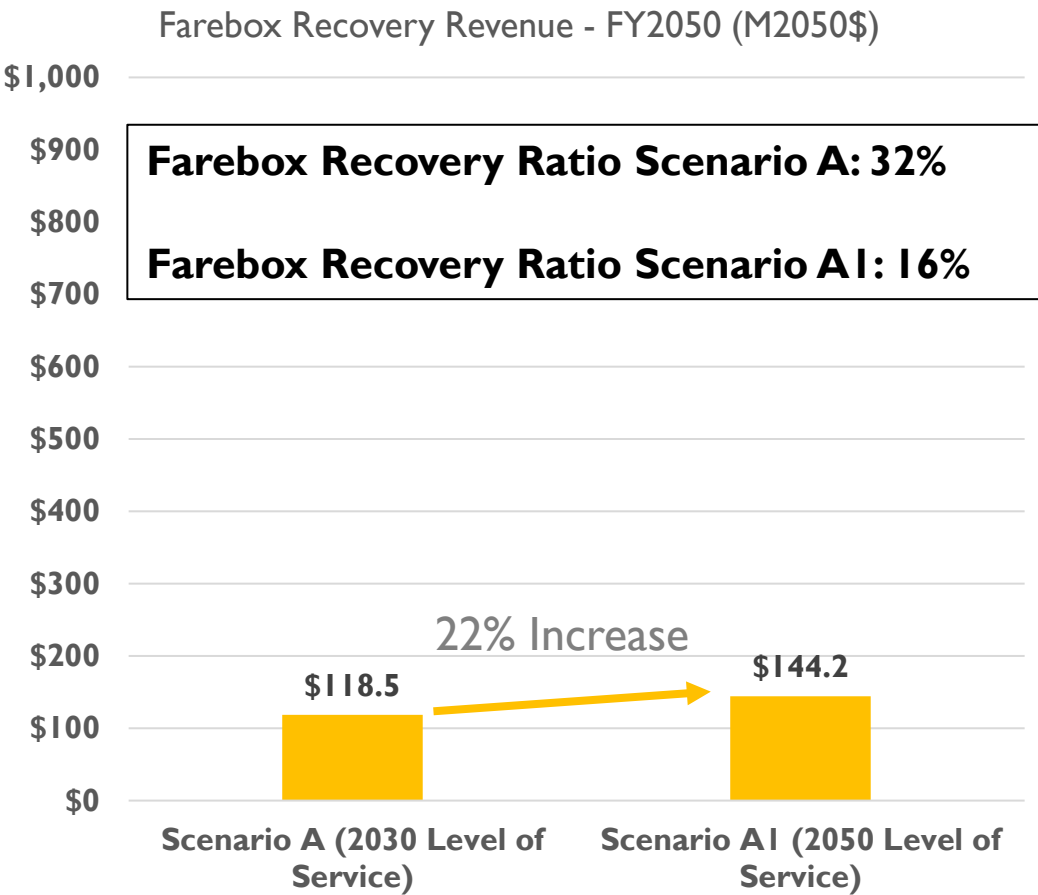
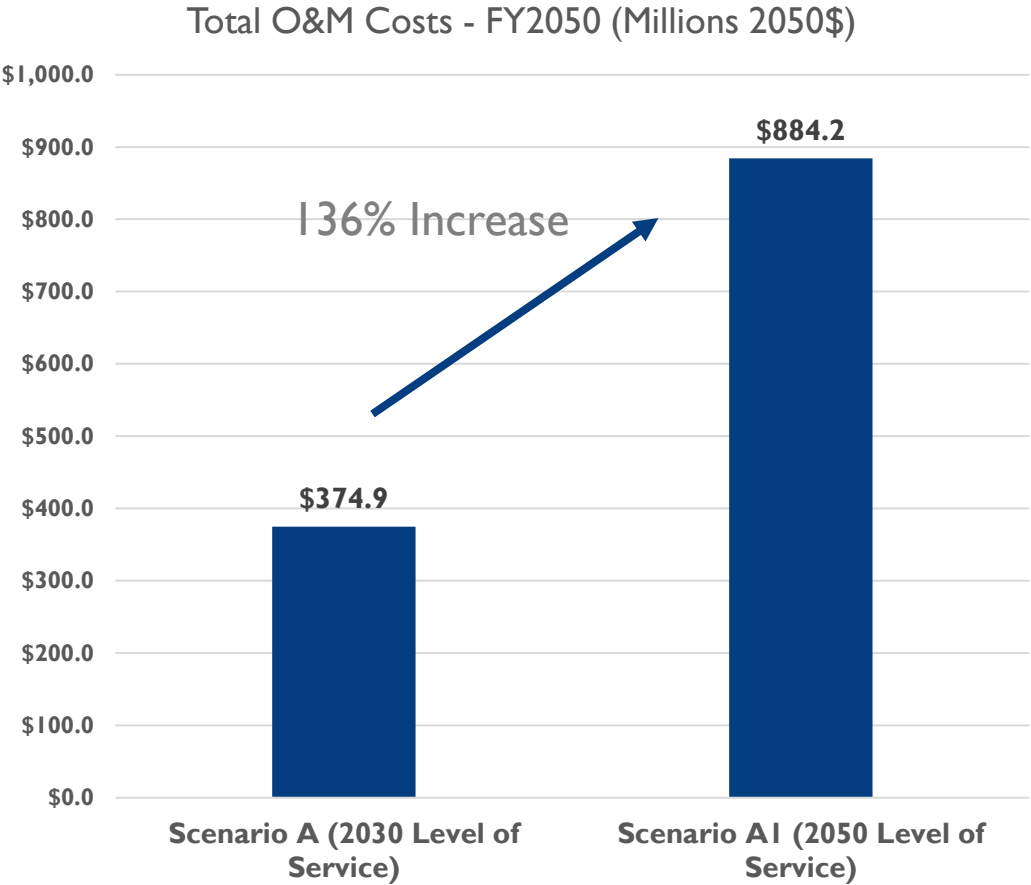
Capital

- Projections Capital Revenue: FTA formula funding (5337 and 5307)
- Infrastructure: station and track improvements necessitated by new service
- Rolling stock SOGR replacement
- Rolling stock expansion

2050 Financial Forecasts: Operating



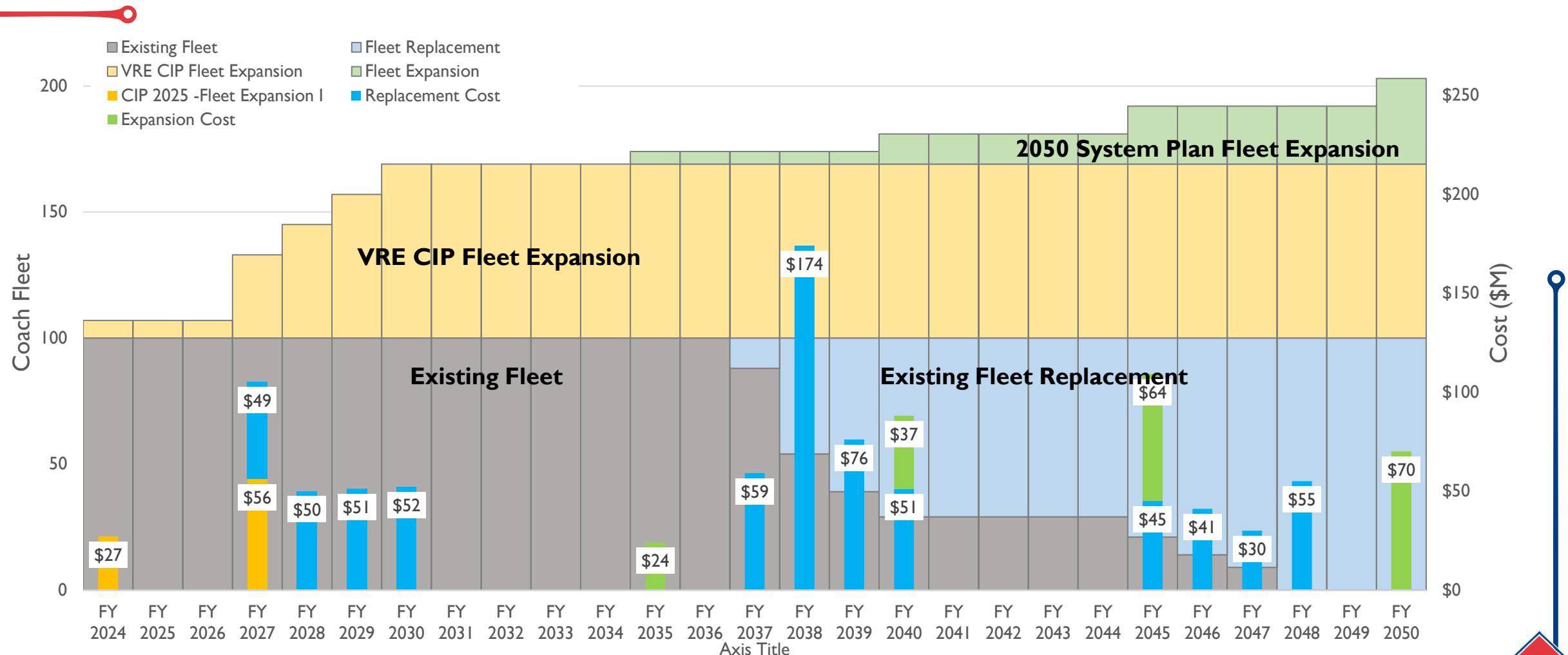
2050 Financial Forecasts: Farebox Recovery



- VRE Farebox Recovery, 2022: 13%
- Peer System Farebox Recovery, 2022: 5.2%
- VRE Farebox Recovery, March 2024: 16%



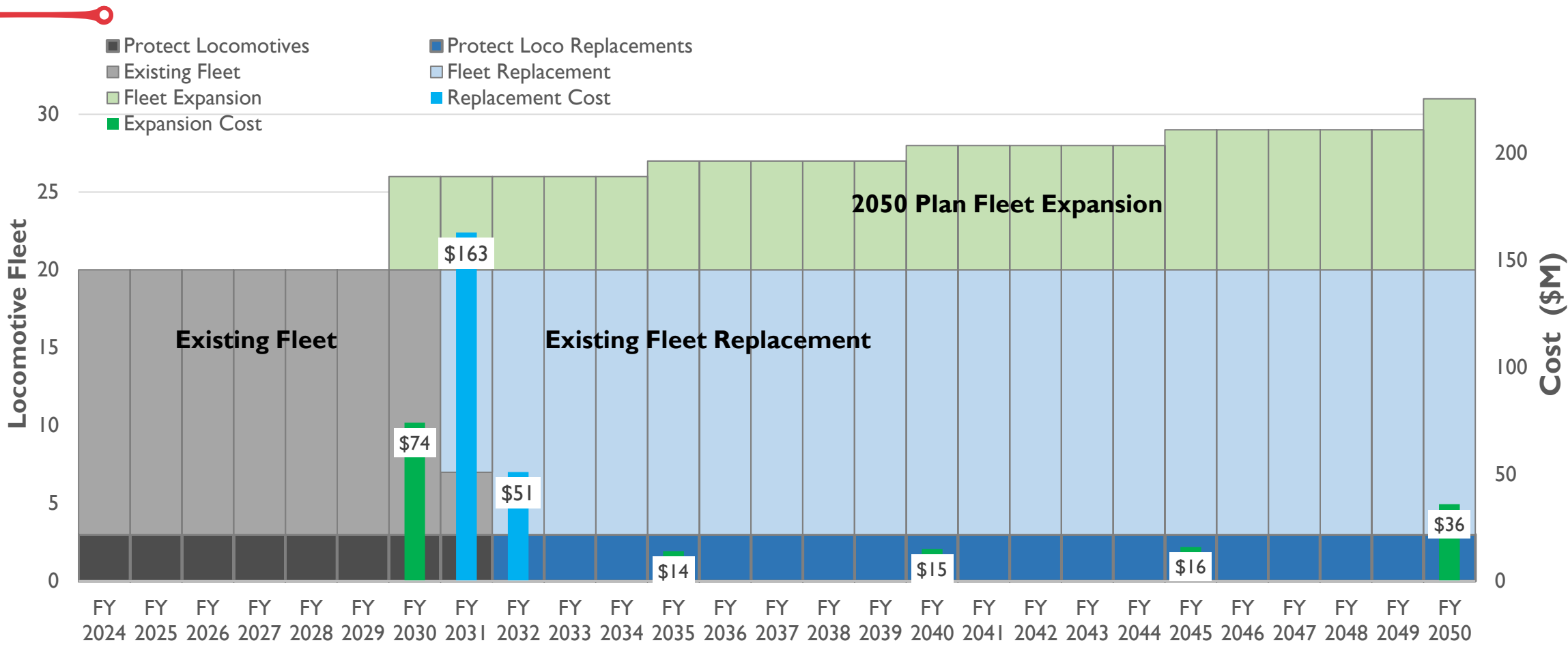
Capital Costs – Coach Fleet



* Including 10% of spares in the coach fleet. All cost estimates are in the year of expenditure dollars.



Capital Costs – Locomotive Fleet



* Including 20% of spares in the locomotive fleet. Replacement costs include the cost of three (3) “protect” locomotive replacements. All cost estimates are in the year of expenditure dollars.



Capital Costs - Infrastructure

Improvements	Fredericksburg Line	Manassas Line	2024 Cost
Platform	Fredericksburg Station Two Platform Extensions	Manassas Station New East Platform	\$38,200,000
	Rippon Station Platform Extension		
Parking	Woodbridge 189 Spaces	Backlick Road 214 Spaces	\$157,800,000
	Rippon 616 Spaces	Manassas 262 Spaces	
	Brooke 643 Spaces	Broad Run 35 Spaces	
	Leeland Rd 112 Spaces		
	Fredericksburg 650 Spaces		
Track	10 Crossovers near Springfield, Lorton, Rippon, Potomac Shore, Brooke, and Leeland Road stations	8 Crossovers near Backlick Road, Rolling Road, Burke Centre, Manassas Park, and Manassas stations	\$123,600,000
		12,800 ft Track Construction	
	16,000 ft Track Construction	Broad Run Third Track	
Total			\$319,600,000

- Platform: based on the proposed 2050 operating scenario and TRV Phase IV build conditions
- Parking: based on the 2050 ridership forecasts at the station level and the existing and planned parking spaces
- Track: based on the need for bi-directional operations in the TRV Phase IV build conditions
- All cost estimates are in 2024 dollars

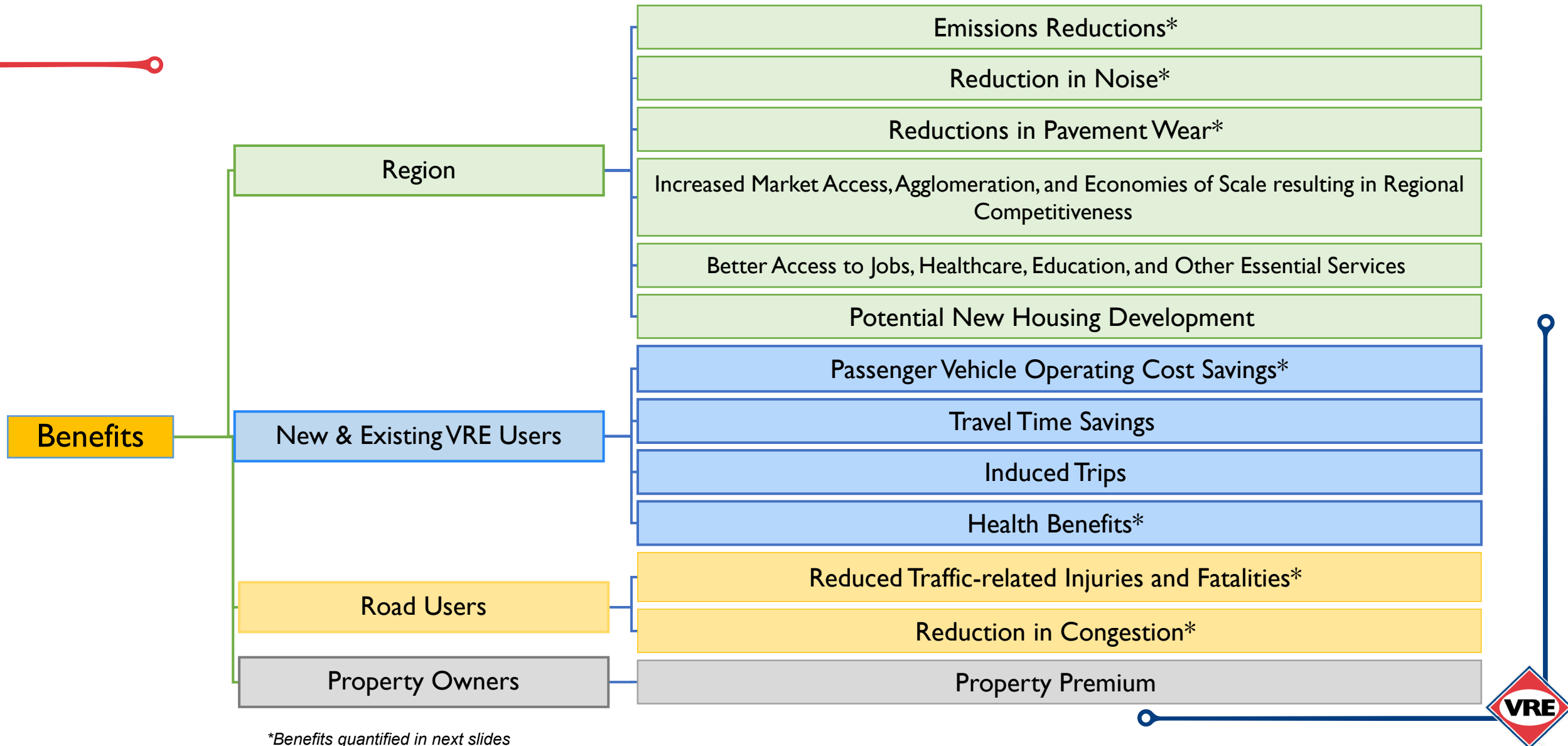


SYSTEM PLAN BENEFITS

Benefits to new and existing riders



Benefits of 2050 Scenario



Benefits Quantified



Emissions: Reduction in air pollution and other pollutant exposures associated with auto congestion



Reduction in Noise: Reduction in low-level persistent noise created from vehicular traffic



Reduction in Pavement Wear: Lower cost of highway maintenance from vehicle wear and tear on the roadways



Passenger vehicle operating costs avoided: Reduction of VMT (Vehicle Miles Traveled) will reduce the burden associated with operating and maintaining personal vehicles



Health: Transit users are more likely to use active transportation (e.g., walking) for first mile and last mile options and are less likely to be exposed to bodily stresses caused by frequent driving







Safety: Benefits associated with reductions in vehicular fatalities and injuries



Congestion Mitigation: Reduction in VMT growth rates by shifting some users to transit enables efficient and reliable trips during peak hours in congested corridors/at bottlenecks



VMT and Ridership Related Benefits

All values are in 2050		Induced trips (new to VRE)		All Trips	
		Alt A	Alt AI	Alt A	Alt AI
Annual VMT Reduction		5,446,000	19,469,000	18,283,000	51,188,000
Annual Vehicle Operating Cost Savings		\$891,000	\$3,184,000	\$5,981,000	\$16,744,000
Increase in Passengers from No Build (2050)		178,900	634,800	2,431,800	5,391,100
Annual CO2 Avoided (metric tons)		440	1,560	1,460	4,100

THANKYOU

