

Summary of Potential Engineering Impacts (1 of 2)

ENGINEERING

	Criterion	Measure	Alternative 1: No-Build	Alternative 3A	Alternative 3B	Alternative 3C
Operations	Travel Time Between Baltimore Penn Station and Gwynns Falls Bridge (southbound/northbound)	Minutes: Seconds	Amtrak Acela 5:43/6:10 Amtrak Regional 5:50/6:19 MARC 5:50/6:14	Amtrak Acela 3:59/4:02 Amtrak Regional 4:19/4:19 MARC 4:56/4:17	Amtrak Acela 3:24/3:25 Amtrak Regional 3:43/3:34 MARC 4:22/3:56	Amtrak Acela 3:27/3:27 Amtrak Regional 3:46/3:37 MARC 4:33/4:04
	Travel Time Savings over Alternative 1 (southbound/northbound)	Minutes: Seconds	Not Applicable	Amtrak Acela 1:56 Amtrak Regional 1:46 MARC 1:26	Amtrak Acela 2:32 Amtrak Regional 2:26 MARC 1:53	Amtrak Acela 2:30 Amtrak Regional 2:23 MARC 1:44
	Value of Time Savings for All Passengers	Dollars per year	Not Applicable	\$32.5 Million per Year	\$43.4 Million per Year	\$42.3 Million per Year
	Lowest Design Speed within the Alignment	MPH	30 mph	50 mph	50 mph	50 mph
	Maximum Design Speed along the Alignment	MPH	75 mph	100 mph	100 mph	100 mph
	Average Operating Speed (southbound/northbound)	MPH	Amtrak Acela 35/34 mph Amtrak Regional 34/34 mph MARC 34/34 mph	Amtrak Acela 54/56 mph Amtrak Regional 50/52 mph MARC 44/52 mph	Amtrak Acela 63/66 mph Amtrak Regional 57/63 mph MARC 49/57 mph	Amtrak Acela 65/68 mph Amtrak Regional 59/65 mph MARC 49/57 mph
	Operational Flexibility and Reliability	High Medium Low	Low – only two tracks in common bore	High – four tracks in individual bores and the ability to platform at West Baltimore from two different tunnel tracks	High – four tracks in individual bores and the ability to platform at West Baltimore from two different tunnel tracks	High – four tracks in individual bores and the ability to platform at West Baltimore from two different tunnel tracks
	Meets Projected Year 2040 Level of Service for Amtrak/ MARC/ Freight	Yes/No	No – two tracks does not accommodate projected level of service; does not accommodate double-stack freight	Yes	Yes	Yes
Engineering	Length of Alignment between Baltimore Penn Station and Gwynns Falls Bridge	Miles	3.5 Miles	3.66 Miles	3.66 Miles	3.83 Miles
	Length of Tunnel	Miles	1.42 Miles	1.91 Miles	2.03 Miles	2.23 Miles
	Steepest Vertical Grade	% Grade	1.3%	2.0%	2.0%	2.0%
	Ability to Meet Current Project Design Criteria: Passenger (P) and Freight (F)	High Medium Low	Low (P) Low (F) Two tracks in a single bore; does not accommodate double-stack freight	High (P) Medium (F) Four tracks in individual bores; accommodates double-stack freight, steep grades for freight	High (P) Medium (F) Four tracks in individual bores; accommodates double-stack freight, steep grades for freight	High (P) Medium (F) Four tracks in individual bores; accommodates double-stack freight, steep grades for freight
	Depth of Tunnel	Average Depth in Feet	15 foot average depth	130 foot average depth	130 foot average depth	140 foot average depth
	Extent of Major Utility Relocations	Minor Moderate Major Severe	None	Major – Relocations in the general vicinity of tunnel portals	Severe – Relocations extend significant distances outside of tunnel portal areas	Major - Relocations in the general vicinity of tunnel portals

Summary of Potential Engineering Impacts (2 of 2)

ENGINEERING

	Criterion	Measure	Alternative 1: No-Build	Alternative 3A	Alternative 3B	Alternative 3C
Transportation	Estimated Number of On-Street Parking Spaces Lost	# Spaces	0	0	150	40
	Requires Reconstruction of West Baltimore MARC Station	Yes/No	No	No	Yes	Yes
	West Baltimore MARC Station in proximity to Existing MARC Parking	Yes/No	Yes	Yes	Yes	Yes
	Allows for High-Level Platforms for West Baltimore MARC Station between Franklin and Mulberry Streets	Yes/No	No	No	Yes	Yes
Cost	Capital Cost Estimate	YOE \$	\$0	\$ 3.7 Billion	\$ 4.0 Billion	\$ 4.2 Billion
Construction	Impacts to Existing Amtrak Operations during Construction/ Rehabilitation	Minor Moderate Major Severe	Minor – Scheduled maintenance would continue during off-peak; emergency repairs could cause significant delays. Frequency and magnitude of repairs expected to increase with time.	Minor – Most work would be performed without affecting NEC operations; only final cutover would cause minor impacts.	Moderate – Most work would be performed without affecting NEC operations; numerous track shifts and temporary cutovers would cause moderate impacts.	Moderate – Most work would be performed without affecting NEC operations; numerous track shifts and temporary cutovers would cause moderate impacts.
	Impacts to Existing MARC Operations During Construction/ Rehabilitation	Minor Moderate Severe	Minor – Scheduled maintenance would continue during off-peak; emergency repairs could cause significant delays. Frequency and magnitude of repairs expected to increase with time.	Minor – Most work would be performed without affecting NEC operations; only final cutover would cause minor impacts.	Moderate – Most work would be performed without affecting NEC operations; numerous track shifts and temporary cutovers would cause moderate impacts.	Moderate – Most work would be performed without affecting NEC operations; numerous track shifts and temporary cutovers would cause moderate impacts.
	Impacts to Existing LRT Operations During Construction/ Rehabilitation	Minor Moderate Severe	None – Construction would be contained within existing tunnel.	Minor – Adequate ground cover between proposed tunnel and LRT track for minimally disruptive tunneling.	Minor – Adequate ground cover between proposed tunnel and LRT track for minimally disruptive tunneling.	Minor – Adequate ground cover between proposed tunnel and LRT track for minimally disruptive tunneling.
	Impacts to Existing NEC Freight Rail Operations During Construction/ Rehabilitation	Minor Moderate Severe	Minor – Scheduled maintenance would continue during off peak; emergency repairs could cause significant delays. Frequency and magnitude of repairs expected to increase with time.	Minor – Most work would be performed without affecting freight operations; only final cutover would cause minor impacts.	Minor – Most work would be performed without affecting freight operations; freight trains could be scheduled around the numerous track shifts and temporary cutovers.	Minor – Most work would be performed without affecting freight operations; freight trains could be scheduled around the numerous track shifts and temporary cutovers.
	Temporary Community Impacts During Construction	High Medium Low	None	Low – The portal construction area is mostly located in either existing Amtrak ROW or industrial property.	Medium – Portal construction would impact residential and industrial areas east of the existing NEC.	Medium – Portal construction would impact residential and industrial areas west of the existing NEC.

Summary of Potential Environmental Impacts (1 of 2)

ENVIRONMENTAL

	Criterion	Measure	Alternative 1: No-Build	Alternative 3A	Alternative 3B	Alternative 3C
Right-of-Way (ROW)	Surface Right-of-Way Acreage Required, by land use type	Acres	Residential: 0 Acres Commercial: 0 Acres Industrial: 0 Acres Other: 0 Acres Total: 0 Acres	Residential: 0 Acres Commercial: < 0.1 Acres Industrial: 2.5 Acres Other: 5.3 Acres Total: 7.8 Acres	Residential: 1.9 Acres Commercial: 3.1 Acres Industrial: 5.1 Acres Other: 7.0 Acres Total: 17.1 Acres	Residential: 0.9 Acres Commercial: 1.7 Acres Industrial: 6.2 Acres Other: 7.1 Acres Total: 15.9 Acres
	Surface Acreage of Roadway LOD	Acres	0 Acres	1.4 Acres	4.0 Acres	5.4 Acres
	Estimated Surface Parcels Impacted	# of Parcels	0	10	100	40
	Area of Excavation (including open cut)	Acres	0 Acres	10.2 Acres	14.9 Acres	17.1 Acres
	Area of Permanent Open Cut	Acres	0 Acres	5.6 Acres	12.5 Acres	12.9 Acres
Community Resources	Estimated Residential Building Displacements	# Displaced	0	0	48	24
	Estimated Business Displacements	# Displaced	0	2	9	10
	Estimated Community Facility Displacements	# Displaced	0	0	5	1
	Estimated Residential Properties Impacted, but Residence Not Displaced	# of Parcels	0	< 5	15	< 5
	Estimated Non-Residential Properties Impacted with No Displacement ³	# of Parcels	0	< 5	10	10
	Right-of-Way Impacts within Minority Population Areas	Acres	0 Acres	5.8 Acres	15.1 Acres	13.9 Acres
	Right-of-Way Impacts within Low Income Population Areas	Acres	0 Acres	0.9 Acres	2.4 Acres	5.0 Acres
	Impacts to Baltimore City's West Baltimore MARC Station Master Plan	Minor Moderate Severe	None – Compatible with West Baltimore MARC Station Master Plan	None – Compatible with West Baltimore MARC Station Master Plan	Moderate – Excavation would impact portions of industrial land proposed for redevelopment. MARC Station could remain between Franklin and Mulberry Streets.	Moderate – Excavation would impact portions of industrial land proposed for redevelopment. MARC Station could remain between Franklin and Mulberry Streets.
	Parks Potentially Impacted	# of Parks	0	0	1 – Lafayette and Payson Park	0
Estimated Area of Parkland Impacted	Acres	0 Acres	0 Acres	< 0.1 Acres	0 Acres	

¹ 2040 Projected ridership, 2015 dollars

² Does not include existing Amtrak ROW. Includes temporary and permanent

³ Includes schools, churches, community centers, libraries, hospitals, police and fire stations

⁴ Permanent or temporary impacts to property

Summary of Potential Environmental Impacts (2 of 2)

ENVIRONMENTAL

	Criterion	Measure	Alternative 1: No-Build	Alternative 3A	Alternative 3B	Alternative 3C
Cultural Resources	Adverse Effects for Historic Properties	Number of Properties (Number of Contributing Elements)	0	6 (6 contributing historic elements impacted)	8 (87 contributing historic elements impacted)	10 (132 contributing historic elements impacted)
	Area of Surface disturbance within Historic District	Acres	0 Acres	12.0 Acres – Monroe-Riggs, Baltimore & Potomac Railroad, and Midtown-Edmondson Historic Districts	25.3 Acres – Edmondson Avenue, Baltimore & Potomac Railroad, Greater Rosemont, Midtown-Edmondson, and Monroe-Riggs Historic District	20.3 Acres – Baltimore & Potomac Railroad, Edmondson Avenue, Greater Rosemont, Midtown-Edmondson, and Monroe-Riggs Historic Districts
	Known Archaeological Resource Sites Impacted	# of Sites	0	0	0	0
Natural Resources	Stream Impacts	Linear Feet	0 Feet	0 Feet	0 Feet	0 Feet
	Wetland Impacts	Acres	0 Acres	0 Acres	0 Acres	0 Acres
	Estimated Street Trees Impacted	# of Trees	0	0	2	1
	Forested Land Impacted	Acres	0 Acres	1.5 Acres	2.5 Acres	3.7 Acres
	100-Year Flood Plain Impact	Acres	0 Acres	3.5 Acres	3.5 Acres	3.5 Acres
Other Environmental	Use of Section 4(f) Properties	Number of Properties	0	5	11	10
	Hazardous Materials Sites Identified	# of Low, Medium, and High Priority Sites (and Total #)	N/A	57 Low, 29 Med, 6 High (92 Total)	71 Low, 37 Med, 6 High (114 Total)	92 Low, 52 Medium, 9 High (153 Total)
	Estimated Number of Buildings with Potential Noise Impacts	# of Buildings, Moderate or Severe	0 Severe 0 Moderate	0 Severe 254 Moderate	175 Severe 1,078 Moderate	111 Severe 979 Moderate
	Estimated Number of Sites with Potential Vibration Impacts	# of Sites	24	69	138	92
	Permanent Negative Visual Impacts	Low Medium High	None	Medium – would construct new south tunnel portal and portal ventilation plant in primarily industrial area and construct an intermediate ventilation plant in Reservoir Hill residential area	High – would construct new south tunnel portal, portal ventilation plant, and new tracks in residential area and construct a new intermediate ventilation plant in Reservoir Hill residential area	High – would construct new south tunnel portal, portal ventilation plant, and new tracks in residential area and construct a new intermediate ventilation plant in Reservoir Hill residential area

^[1] 2040 Projected ridership, 2015 dollars

^[2] Does not include existing Amtrak ROW. Includes temporary and permanent

^[3] Includes schools, churches, community centers, libraries, hospitals, police and fire stations

^[4] Permanent or temporary impacts to property