

28. Indirect Impacts and Cumulative Effects

Direct impacts are summarized in the conclusion to each of the preceding resource chapters. This chapter addresses the additive effect of the direct impacts, together with the impacts resulting from the development of other projects in the study area, unrelated to the Northern Branch. In order to determine the cumulative effects of the Build Alternatives combined with other past, present, and reasonably foreseeable major actions, it is necessary to take an overview approach to the projects implemented in the past, and planned for the future, in the project study area. The methodology used in this analysis has been developed according to the guidance presented in the 1997 Council on Environmental Quality (CEQ) publication, *Considering Cumulative Effects Under the National Environmental Policy Act*, and other professional guidance publications on the assessment of cumulative impacts.

For the purposes of this DEIS, cumulative effects are defined as the impact on the environment from the incremental impact of the Build Alternatives when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal; public or private) or person undertakes such actions (40 CFR-1508.7). Indirect impacts are environmental impacts caused by the Build Alternatives that occur later in time or are further removed in distance but still reasonably foreseeable (40 CFR-1508.8 (b)). Table 28-1 summarizes the indirect impacts and cumulative effects as a result of the No Build and Build Alternatives.

For this cumulative effects analysis, the No Build Alternative assumes existing conditions, plus any committed or proposed project as described in Chapter 4 (Land Use and Zoning) and Chapter 6 (Local Plans). Field investigations and a review of available information identified resources potentially affected by indirect impacts and cumulative effects. Table 28-1 below summarizes the indirect impacts and cumulative effects anticipated as a result of the implementation of each of the four Build Alternatives.

Table 28-1: Summary of Indirect Impacts and Cumulative Impacts

Past Action	Indirect Impacts	Cumulative Effects
Land Use, Zoning, and Economic Development		
Over time, zoning regulations have separated incompatible uses.	<p>No Build Alternative: The No Build Alternative would result in no indirect impacts. Development would continue to occur based on market factors along the corridor in accordance with local land use policy, guidelines and regulations.</p> <p>Build Alternatives: Alternatives resulting in indirect impacts: None</p> <p>As a result of existing development patterns and the minimal amount of vacant land along the rail corridor, a significant amount of project-induced development is not anticipated to occur in the vicinity of any of the proposed station sites, regardless of whether the Alternative terminates in Englewood (Light Rail to Englewood Route 4) or Tenafly (Light Rail to Tenafly (Preferred Alternative)). Development and redevelopment would continue to occur based on market factors along the corridor in accordance with local land use policy, guidelines and regulations.</p>	<p>No Build Alternative: Under the No Build Alternative, land use and zoning changes, as well as the development and redevelopment of properties throughout the project corridor may continue to occur regardless of planned transportation improvements in the region and local development policies. Planned residential and commercial redevelopment would also continue. Major improvements would likely have little influence the location and type of redevelopment that would occur along the project corridor. Commuter rail would not contribute to these land use changes, either beneficially or adversely, under the No Build Alternative.</p> <p>Build Alternatives: Alternatives contributing to cumulative effects: None</p> <p>For the Build Alternatives, major transportation improvements would have little influence on the location, density and type of development / redevelopment. The proposed project would not result in significant land use changes. Any development would be in accordance with local land use policy and regulations.</p>

Table 28-1: Summary of Indirect Impacts and Cumulative Impacts (continued)

Past Action	Indirect Impacts	Cumulative Effects
Community Facilities		
<p>Overall increase in demand for services results in an increase in their cost.</p>	<p>No Build Alternative: Under the No Build Alternative, there will be no increase in the response time of emergency services.</p> <p>Build Alternatives: Alternatives resulting in indirect impacts: None</p> <p>A minimal increase in the response times of emergency services due to the introduction of passenger rail service is anticipated. However, this would only occur when a train is passing through an active grade crossing. The short duration of time it would take for the Light Rail vehicle to pass through the grade crossing will minimize the likelihood of impacts. NJ TRANSIT and local municipalities would develop appropriate grade-crossing protection measures to ensure continued circulation for emergency service vehicles and safe access to and from all community facilities.</p>	<p>No Build Alternative: For the No Build Alternative, other major, regional transportation improvements could affect response times for emergency services if vehicles are impeded at grade crossings. Major development and/or redevelopment projects would likely lead to an increase in demand for community services and the provision of emergency services.</p> <p>Build Alternatives: Alternatives contributing to cumulative effects: None</p> <p>Combined with either of the Build Alternatives, major transportation improvements could influence the response times for emergency services. Similarly, major development and/or redevelopment projects would likely lead to an increase in demand for community services and the provision of emergency services. Coordination between the applicable public agencies, local government and emergency service providers would reduce the likelihood of adverse impacts.</p>
Land Acquisition and Displacement		
<p>Development / redevelopment activities have required the acquisition of property for infill development and transportation improvements, including road widening and the HBLR Tonnelle Avenue Station</p>	<p>No Build Alternative: The study area is nearly entirely built out; consequently, under the No Build Alternative, redevelopment activities will continue, requiring the acquisition of property.</p> <p>Build Alternatives: Alternatives resulting in indirect impacts: None</p> <p>Both Build Alternatives will require property acquisition to develop station sites and parking areas for riders; however, these acquisitions are discrete, one-time property impacts and will not result in the acquisition of additional property after completion of project construction.</p>	<p>No Build Alternative: For the No Build Alternative, other major transportation projects, including road widening efforts, may require the acquisition of properties for additional rights-of-way and related improvements. Redevelopment activities are also anticipated to continue, but these projects are not anticipated to require eminent domain takings.</p> <p>Build Alternatives: Alternatives contributing to cumulative effects: None</p> <p>Combined with other transit and transportation projects, the Build Alternatives would contribute to a stabilization of traffic demand on local roadways, reducing the likelihood of additional property acquisition for transportation improvements. Redevelopment activities are anticipated to continue.</p>
Parklands		
<p>Municipal, County, and State agencies have contributed funding and land to develop parks and open space areas for public use. Parks are continually undergoing upgrades and improvement.</p>	<p>No Build Alternative: Under the No Build Alternative, no indirect impacts to parklands are anticipated.</p> <p>Build Alternatives: Alternatives resulting in indirect impacts: None</p> <p>Neither of the Build Alternatives would take parkland or indirectly cause an impact to parkland. With the increase in access to parklands, especially Overpeck County Park, it is possible for the number of users to increase, however, this should not cause any indirect impacts.</p>	<p>No Build Alternative: Future development needs under the No Build Alternative may result in impacts to parkland and recreational resources in the study area.</p> <p>Build Alternatives: Alternatives contributing to cumulative effects: All</p> <p>Although it is not anticipated that adverse cumulative effects to parkland and recreational resources would result from the proposed project, other planned transportation and development/redevelopment projects could require the acquisition of parkland or affect access to or the functioning of parkland and other open space resources.</p>

Table 28-1: Summary of Indirect Impacts and Cumulative Impacts (continued)

Past Action	Indirect Impacts	Cumulative Effects
Traffic and Parking		
<p>Auto use increased as transit service diminished; parking demand increased in downtown business districts.</p>	<p>No Build Alternative: The No Build Alternative would result in no indirect impacts. Continued development activity within portions of the study area and the overall region is expected, resulting in an increase in background traffic growth and increase in parking demand.</p> <p>Build Alternatives: Alternatives resulting in indirect impacts: All</p> <p>Under either Build Alternative, traffic is expected to increase as a result of the addition of the station areas. On- and off-street parking spaces may be reduced as a result of mitigation measures for both alternatives. Mitigation measures, comprised of lane additions and additional signals and standard traffic engineering procedures, would minimize indirect impacts. Aside from the walk-up stations, the stations with parking areas would include adequately-sized parking lots to accommodate anticipated ridership. Frequent service and walkable stations in the town center areas of Englewood and Tenafly may reduce demand on parking in the business areas.</p>	<p>No Build Alternative: The No Build Alternative would result in cumulative effects to the transportation network, which serves the project corridor. Based on projected growth in the region, including the development / redevelopment projects in the study area, traffic is expected to increase. The proposed major transportation projects have been planned to reduce the cumulative effects of this growth on the transportation network.</p> <p>Build Alternatives: Alternatives contributing to cumulative effects: None</p> <p>Either Build Alternative could result in cumulative effects. The proposed project would cause localized increases in traffic; however, mitigation efforts would minimize these conditions. In addition, the proposed project would provide a new mode of regional transportation that would remove vehicles from the area's regional roadways, which would also reduce demand on parking in the downtown areas. The other planned transportation improvements would result in minimal transportation impacts beyond what is described in the No Build Alternative.</p>
Transit and Freight Rail		
<p>Rail service was discontinued and replaced by bus transit, oriented mainly to New York City. Freight service continued on existing rails.</p>	<p>No Build Alternative: The No Build Alternative would result in some indirect impacts. Without an alternative means of transit, additional bus service would likely be required to keep pace with commuter demand as the study area population grows. No indirect impacts to freight service are anticipated.</p> <p>Build Alternatives: Alternatives resulting in indirect impacts: All</p> <p>Both Build Alternatives provide an alternate means of transportation for study area commuters.</p> <p>Both Build Alternatives would also require an adjustment to freight operations to overnight service, which may have an impact on existing freight customers. However, freight access to existing customers will not be affected by the Build Alternatives.</p>	<p>No Build Alternative: Cumulative effects of the No Build Alternative are similar to those described in Indirect Impacts.</p> <p>Build Alternatives: Alternatives contributing to cumulative effects: All</p> <p>Combined with other planned transit improvements, the Build Alternatives would likely have a positive cumulative effect on transit service by providing additional options and capacity.</p> <p>No cumulative effects are anticipated for freight service as a combined result of the Build Alternative and other planned improvements.</p>

Table 28-1: Summary of Indirect Impacts and Cumulative Impacts (continued)

Past Action	Indirect Impacts	Cumulative Effects
Air Quality		
<p>Mobile source pollution increases with auto use and traffic congestion; some improvements from the Clean Air Act.</p>	<p>No Build Alternative: The No Build Alternative could result in minimal indirect effects as a result of increased traffic resulting from projected growth within close proximity of the project corridor.</p> <p>Build Alternatives: Alternatives resulting in indirect impacts: None</p> <p>Neither Build Alternative would cause any significant impacts to air quality. At the regional level, rail operations associated with this project would comply with any future State Implementation Plans or any attainment / maintenance plans which could be adopted in the future.</p>	<p>No Build Alternative: The No Build Alternative could result in cumulative air quality effects that would arise with continued growth in the region. The planned transportation projects would be subject to environmental review resulting in the consideration of mitigation efforts.</p> <p>Build Alternatives: Alternatives contributing to cumulative effects: None</p> <p>Although the Build Alternatives would not result in air quality impacts, the addition of other transportation improvements in the region and development / redevelopment projects in the study area could lead to cumulative air quality effects as discussed in the No Build Alternative. The other planned projects would not result in air quality impacts beyond what is described in the No Build Alternative.</p>
Noise and Vibration		
<p>Auto and rail traffic generates locally concentrated noise; standards established to abate noise.</p>	<p>No Build Alternative: The No Build Alternative could result in minimal indirect effects as a result of increased traffic resulting from projected growth within close proximity of the project corridor.</p> <p>Build Alternatives: Alternatives resulting in indirect impacts: All</p> <p>As a result of either Build Alternative, impacts as a result of wayside and whistle noise are expected. Quiet Zones are proposed in the vicinity of residential areas to minimize the number of residences impacted by the project.</p>	<p>No Build Alternative: The No Build Alternative could result in cumulative noise and vibration effects. The planned roadway projects would be subject to environmental review resulting in the consideration of mitigation efforts.</p> <p>Build Alternatives: Alternatives contributing to cumulative effects: All</p> <p>Either Build Alternative could result in cumulative effects. The proposed project would cause an increase in noise; however, Quiet Zones would minimize these conditions. In addition, short-term construction-related noise and vibration impacts could result. These temporary impacts would likely occur during rock splitting activities, pile driving, sheeting, excavation and compaction activities. These impacts would cease with the completion of construction and are considered minor due to the distance between construction activities and sensitive receptors for noise, as well as the use of best management practices to minimize potential vibration impacts. The other planned transportation improvements would not result in noise and vibration impacts beyond what is described in the No Build Alternative.</p>

Table 28-1: Summary of Indirect Impacts and Cumulative Impacts (continued)

Past Action	Indirect Impacts	Cumulative Effects
Water Quality		
<p>Severe reduction in surface and groundwater quality.</p>	<p>No Build Alternative: For the No Build Alternative, growth could continue to occur in some areas of the study area resulting in the creation of more impervious surfaces, causing increased stormwater runoff.</p> <p>Build Alternatives: Alternatives resulting in indirect impacts: None</p> <p>Either Build Alternative would result in a slight increase in impervious surfaces from new station structures and parking areas. Through strict adherence to regulations laid out by the NJDEP, as well as the utilization of BMPs, no adverse indirect impacts to water quality would occur as a result of the proposed project.</p>	<p>No Build Alternative: Other major transportation improvements in the region and development / redevelopment projects in the study area could affect surface water quality and cause an increase in stormwater runoff from impervious surfaces.</p> <p>Build Alternatives: Alternatives contributing to cumulative effects: All</p> <p>Construction of either Build Alternative, in addition to all other major actions, could result in minimal water quality effects beyond those described in the No Build Alternative. BMPs and specific design standards would be required for all major actions.</p>
Wetlands		
<p>Whole filling / reduction in acreage of wetlands.</p>	<p>No Build Alternative: The No Build Alternative could cause indirect impacts to wetlands due to growth occurring along the project corridor. Impacts could occur in areas most suitable to development and could include wetland loss and potential degradation of wetland quality and function. All growth activities would be pursuant to federal and state wetland regulations.</p> <p>Build Alternatives: Alternatives resulting in indirect impacts: None</p> <p>Less than five acres of wetlands would be disturbed as a result of either Build Alternative. Mitigation ratios for lost acreage would be at a 2:1 or a 4:1 depending on the wetlands resource value classification and amount of impacted acreage.</p>	<p>No Build Alternative: The No Build Alternative could result in cumulative effects to wetlands. Other major transportation improvements in the region and development / redevelopment projects in the study area could disturb wetlands. However, the replacement design for wetland functions and values is a standard component of any transportation project; therefore, there is an opportunity to expand the existing regional wetland base.</p> <p>Build Alternatives: Alternatives contributing to cumulative effects: All</p> <p>Either Build Alternative could cause cumulative effects to wetlands. The proposed project would disturb minimal acreage of wetlands and other major projects could also cause some degradation of wetland quality and function. All projects are subject to USEPA, USACOE and NJDEP regulations and the permitting process will stipulate measures to mitigate wetlands impacts.</p>
Floodplains		
<p>Development occurred in floodplain and flood fringe areas.</p>	<p>No Build Alternative: The No Build Alternative would have no indirect impact on floodplains.</p> <p>Build Alternatives: Alternatives resulting in indirect impacts: None</p> <p>The project corridor is adjacent to and in some locations located intermittently within the 100-year and the 500-year flood zones. Permits would be required by the NJDEP including a Flood Hazard Area permit. Mitigation measures would include using structures to cross floodplains instead of fill material, providing adequate flow circulation, reducing grading requirements and preserving natural drainage when possible. The development of a Floodplain Mitigation Plan prepared in conjunction with local and state agencies would minimize indirect impacts.</p>	<p>No Build Alternative: Other transportation improvements and development / redevelopment projects under the No Build Alternative could affect floodplains due to construction activities. All development would occur in accordance with NJDEP regulations.</p> <p>Build Alternatives: Alternatives contributing to cumulative effects: All</p> <p>Construction of either Build Alternative in addition to all other major actions could result in cumulative effects on floodplains. However, the NJDEP would regulate all actions and ensure measures are utilized to protect areas prone to flooding. As such, all projects are required to follow NJDEP regulations, including the replacement of currently inadequate flood prevention features.</p>

Table 28-1: Summary of Indirect Impacts and Cumulative Impacts (continued)

Past Action	Indirect Impacts	Cumulative Effects
Navigable Waterways		
<p>Use of navigable waterways for commerce and waste disposal resulted in water pollution and increased sediment.</p>	<p>No Build Alternative: The No Build Alternative would have no indirect impact on navigable waterways.</p> <p>Build Alternatives: Alternatives resulting in indirect impacts: None</p> <p>Neither Build Alternative will directly or indirectly affect the use of navigable waterways within the study area as means of transportation of goods and will not degrade navigable channels.</p>	<p>No Build Alternative: The No Build Alternative would have no cumulative impact on navigable waterways.</p> <p>Build Alternatives: Alternatives contributing to cumulative effects: None</p> <p>There are no planned transportation or development projects in the study area that would affect navigable waterways.</p>
Threatened and Endangered Species		
<p>Decrease in numbers and diversity of species from development.</p>	<p>No Build Alternative: The No Build Alternative could result in indirect impacts with regard to critical habitat. The potential indirect impacts of disturbance or habitat fragmentation from increased traffic and noise would not likely jeopardize the continued existence of any federal or state threatened or endangered species.</p> <p>Build Alternatives: Alternatives resulting in indirect impacts: None</p> <p>Neither Build Alternative is expected to affect federal and state threatened and endangered species.</p>	<p>No Build Alternative: The major transportation improvements and development / redevelopment projects in the study area could affect threatened and endangered species through the project corridor.</p> <p>Build Alternatives: Alternatives contributing to cumulative effects: None</p> <p>No direct impacts to threatened and endangered species are expected as a result of the proposed project.</p>
Hazardous Materials		
<p>Unregulated pollution and storage of hazardous materials.</p>	<p>No Build Alternative: The No Build Alternative would not result in the exposure of hazardous materials. Environmental regulations prohibit dumping and mandate clean up activity.</p> <p>Build Alternatives: Alternatives resulting in indirect impacts: None</p> <p>Under either Build Alternative, there is the potential of hazardous waste contamination of soil and groundwater at the proposed station sites. Further investigation would be conducted prior to construction to determine locations in order to avoid contact during excavation without proper remediation. If unanticipated hazardous materials are discovered during design or construction the appropriate remedial actions will be implemented.</p>	<p>No Build Alternative: For the No Build Alternative, cumulative effects from exposure to hazardous materials are not anticipated. Continued regulation, clean-up activity and incentives to redevelop brownfields will gradually slow pollution and provide for ongoing clean up of contaminated areas.</p> <p>Build Alternatives: Alternatives contributing to cumulative effects: None</p> <p>Construction of either Build Alternative in addition to all other major actions would possibly result in exposure to hazardous materials during construction. These areas would be remediated prior to or during construction. It is expected that these projects would not introduce new hazardous materials to areas of the region.</p>

Table 28-1: Summary of Indirect Impacts and Cumulative Impacts (continued)

Past Action	Indirect Impacts	Cumulative Effects
Energy		
<p>Inefficient consumption and increased demand of fossil fuels create shortages.</p>	<p>No Build Alternative: Under the No Build Alternative, growth would continue as projected, resulting in increases in energy expenditures.</p> <p>Build Alternatives: Alternatives resulting in indirect impacts: None</p> <p>The projected indirect and direct energy expenditures of either Build Alternative are marginal when compared to the overall statewide figures for New Jersey. Due to the small sizes of the projected increases in comparison with statewide figures, the projected increases are not considered significant and should be easily managed by existing New Jersey power resources.</p>	<p>No Build Alternative: Under the No Build Alternative, increased indirect energy expenditures are anticipated with the construction of the planned transportation improvements in the region and the development / redevelopment projects in the study area. It is expected that the consumption of energy resources becomes increasingly efficient, however direct energy expenditures may continue to increase as a result of growth.</p> <p>Build Alternatives: Alternatives contributing to cumulative effects: None</p> <p>Construction of either Build Alternative in addition to all other major actions planned for the project corridor would result in minimal impacts to direct and indirect energy expenditure. It is expected that the projected increases could be small in comparison with statewide figures; therefore, projected increases would not be considered significant. In addition, construction of several rail projects could reduce regional auto VMT and hence reduce energy consumption for automobiles.</p>
Electric and Magnetic Fields		
<p>Electric service distribution lines and substations have been constructed to provide electrical power to residences and business.</p>	<p>No Build Alternative: The study area is mostly built-out. Under the No Build Alternative, some additional electric service may be provided, but the overall impact on the study area will be negligible.</p> <p>Build Alternatives: Alternatives resulting in indirect impacts: None</p> <p>Although the overhead catenary and electrical substations required to power the light rail vehicles would produce electric and magnetic fields, the field strength is within the accepted safe levels, and drops further as distance increases from the right-of-way. Interaction with adjacent magnetic fields is unlikely to result in a magnetic field that exceeds safe limits.</p>	<p>No Build Alternative: Same as for Indirect Impacts.</p> <p>Build Alternatives: Alternatives contributing to cumulative effects: None</p> <p>It is unlikely that any planned transit improvement or development project will generate electric or magnetic fields within close enough proximity and of an intensity great enough to amplify the electric and magnetic fields generated by the light rail vehicle.</p>
Safety and Security		
<p>Grade crossings received minimum, and in some cases inadequate, protection.</p>	<p>No Build Alternative: Under the No Build Alternative, safety upgrades relative to freight service on the Northern Branch alignment will occur as-needed.</p> <p>Build Alternatives: Alternatives resulting in indirect impacts: None</p> <p>Safety measures, including upgraded grade crossing gates and pedestrian crossings will improve the safety for vehicles and pedestrians in the study area. No indirect impacts are anticipated.</p>	<p>No Build Alternative: No impact</p> <p>Build Alternatives: Alternatives contributing to cumulative effects: None</p> <p>Planned improvements will incorporate the most recent required safety measures. No adverse cumulative effects are anticipated.</p>

Table 28-1: Summary of Indirect Impacts and Cumulative Impacts (continued)

Past Action	Indirect Impacts	Cumulative Effects
Historic and Archeological Resources		
<p>Previously, there was a chronic disregard for historic / cultural resources. Awareness and advocacy resulted from the demolition of key landmarks.</p>	<p>No Build Alternative: The No Build Alternative could cause impacts to some historic sites / structures and archaeological resources from increased traffic and noise. Continued development / redevelopment in some areas could also cause alterations of some historic sites or structures.</p> <p>Build Alternatives: Alternatives resulting in indirect impacts: None</p> <p>No indirect impacts to historic sites and archaeological resources would likely result from the proposed project.</p>	<p>No Build Alternative: The No Build Alternative could cause cumulative effects to some historic and archaeological resources in the project corridor. Increased potential for cumulative effects could result from privately held historic buildings, which are subject to alteration depending upon the interests of the property owners.</p> <p>Build Alternatives: Alternatives contributing to cumulative effects: None</p> <p>Although it is not anticipated that adverse cumulative effects to historic and archaeological resources would result from the proposed project, other planned transportation and development / redevelopment projects could cause cumulative effects to some historic and archaeological resources in the corridor. All proposed Federal actions are subject to the requirements of Section 106 of the National Preservation Act and extensive coordination with the NJ SHPO. As a result of Section 106 requirements, as well as NJ SHPO coordination, any potential impacts would be mitigated.</p>
Environmental Justice		
<p>Unfair disturbance to minority and low-income neighborhoods.</p>	<p>No Build Alternative: The No Build Alternative would not result in indirect impacts on minority or low-income neighborhoods.</p> <p>Build Alternatives: Alternatives resulting in indirect impacts: None</p> <p>Modest concentrations of minority populations and of low-income populations live in close proximity to the rail right-of-way and a number of the proposed station areas. Both minority and low-income populations will share equally with the general population in any positive or negative indirect impacts that would be generated by the proposed project. Therefore, no environmental justice-related impacts will result from the proposed project.</p>	<p>No Build Alternative: Under the No Build Alternative, all planned transportation projects would have to comply with the regulations set forth in Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations", Title VI of the Civil Rights Act of 1964 and the ISTEA and its successor laws.</p> <p>Build Alternatives: Alternatives contributing to cumulative effects: None</p> <p>Under either Build Alternative, no adverse cumulative effects to minority and low-income populations are expected. All other planned transportation projects would adhere to the regulations set forth by the federal government. Both minority and low-income populations as well as the general population will benefit from the improvements in access and mobility.</p>

Source: Jacobs, 2009.