

3.23 INDIRECT EFFECTS

3.23.1 What are indirect effects, and why do we study them?

In many cases, indirect effects would occur outside of the project right-of-way. As to the cause and effect relationship between the project and the indirect impact, CEQ states that indirect effects may include induced changes to land use resulting in resource impacts (40 CFR 1508.8). Other indirect effects include the potential alteration of or encroachment on the affected environment. Examples of this include fragmentation of a habitat or functional effects to water resources.

It is important to study the indirect effects of a proposed project because analyzing the direct effects alone does not tell the whole story of how a project would impact its study area. Considering the project on a larger scale in terms of both time and distance contributes to an understanding of how it influences, and is influenced by, the broader patterns of development in the area.

3.23.2 How did we evaluate indirect effects?

To determine the induced changes in land use resulting from the St. Johns River Crossing Project, the team conducted interviews with local land use planners from St. Johns and Clay Counties. Those planners are experienced and knowledgeable of their jurisdiction's growth patterns and plans. They were asked how development in their jurisdictions might occur if FDOT constructed either of two representative Build Scenarios compared to not constructing the project (No Build Scenario).

For this analysis, the Build Scenarios consisted of the North Florida Transportation Planning Organization (TPO) 2030 Long Range Transportation Plan (TPO, 2005), existing land use, and two representative Build Scenarios. The Northern Corridor Build Scenario follows the Purple Alternative and represents the Purple and Black Alternatives. The Southern Corridor Build Scenario follows the Pink 1 Alternative and represents the Brown 1 and 2, Orange 1 and 2, Green 1 and 2, and Pink 1 and 2 Alternatives. The No Build Scenario is the North Florida TPO 2030 Long Range Transportation Plan and existing land use without any of the Build Alternatives.

The team presented figures showing the two representative Build Scenarios and the No Build Scenario to local planners to ascertain forecasted development under these three scenarios (**Exhibit 3-66**). Other than the existence of

This section summarizes the analysis of indirect effects associated with the proposed project. For more detail, see the *Indirect and Cumulative Effects Discipline Report* on the enclosed CD.

Indirect Effects

The CEQ defines indirect effects as:

"...effects, which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems" (40 CFR 1508.8).

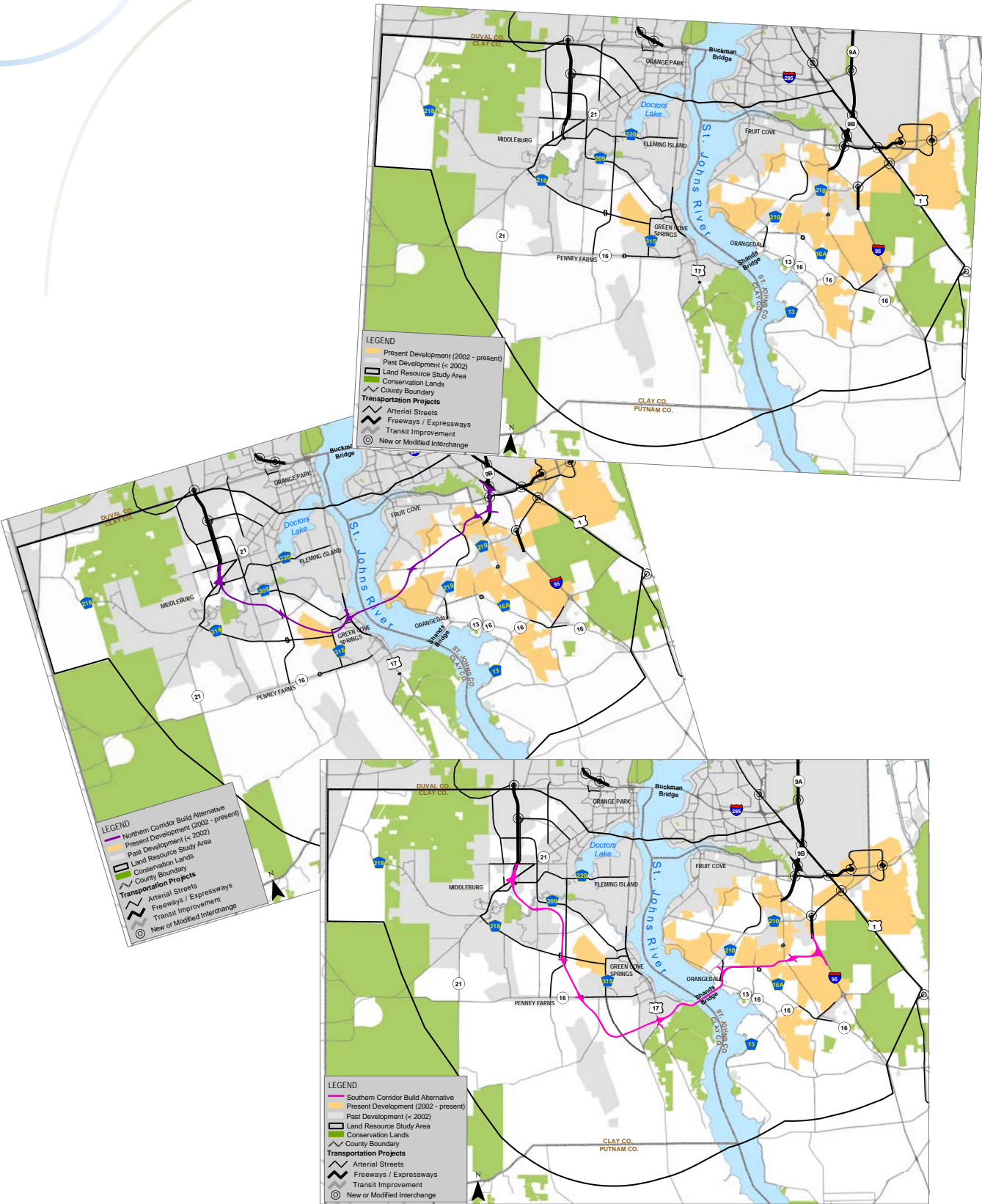


Exhibit 3-66: Build and No Build Scenarios

the Build Alternatives, the three scenarios shown to the local planners were identical. The team then conducted a series of interviews with the local planners to determine their estimate of where future development would be expected to occur within their jurisdictions under each of these three scenarios.

Where the local planners forecasted differences in development between the two representative Build Scenarios and No Build Scenario, the team overlaid the resulting “Indirect Effects Areas” on resource maps using GIS to estimate potential effects associated with each Build Scenario. The local planners indicated the forecasted development in these areas would be constricted by the lack of infrastructure and as a result, only discussed general areas anticipated to be developed rather than mapping specific locations where development would occur. The potential effects to resources associated with the Build and No Build Scenarios were evaluated to the extent practicable. However, it should be noted that the calculations provided here include the total amount of a resource mapped within the general areas anticipated to be developed, which is not equivalent to the total amount of those resources that would be impacted by future development.

This analysis also examined a second type of indirect effects: potential encroachment/alteration effects. Examples of these effects include habitat fragmentation and neighborhood cohesion. Where it was not possible to quantify indirect effects for a particular resource, indirect effects are described qualitatively.

Results of the analysis of potential indirect effects are summarized below. More detail is provided in the *Indirect and Cumulative Effects Discipline Report* on the enclosed CD.

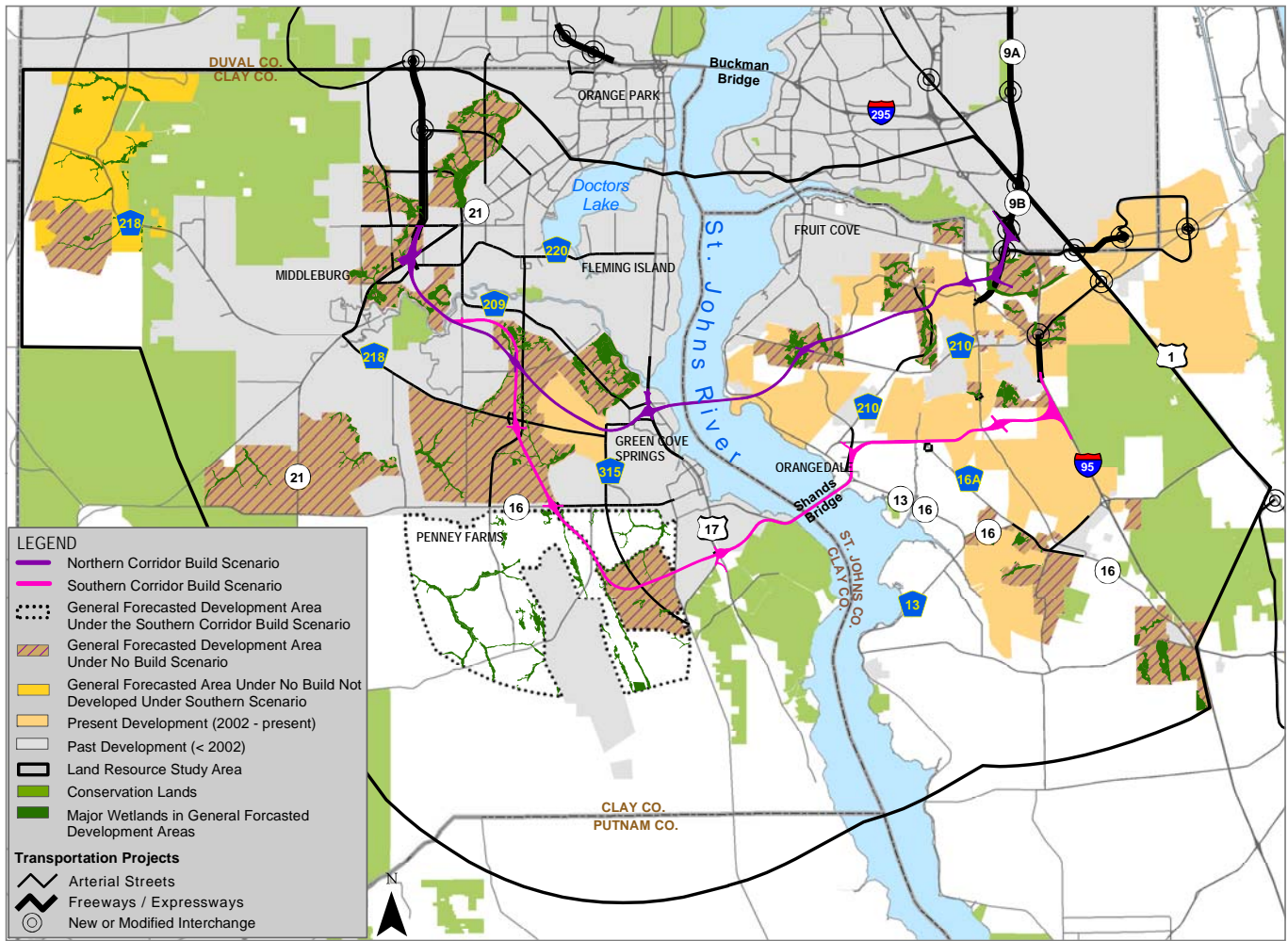
3.23.3 What are the project’s potential indirect effects?

Land Use and Induced Growth

Exhibit 3-67 depicts the Resource Study Area (RSA) for indirect effects, and shows the forecasted development in that area under each representative Build Scenario. Details on how the RSA was determined are provided in the *Indirect and Cumulative Effects Discipline Report*.

In St. Johns County, planners predicted that development under either of the representative Build Scenarios and under the No Build Scenario will be similar and will be governed by the county’s land use planning process.

Exhibit 3-67: Forecasted Development



In Clay County, the local planners predicted similar forecasted development between the No Build Scenario and the Northern Corridor Build Scenario. They predicted that development under either of these scenarios would occur largely in the northwest portion of Clay County, as shown on **Exhibit 3-67**. Under the Southern Corridor Build Scenario, they predicted that an area south of Penney Farms Road would develop, and said that this may represent a directional shift in development attributable to the Southern Corridor Build Scenario. The planners predicted that the Southern Corridor Build Scenario would make the area south of Penney Farms Road more desirable for development and, therefore, much of the forecasted development in the northwest would shift south of Penney Farms Road. (The area of development predicted to shift from the northwest is shown in gold on **Exhibit 3-67**).

Actual development in this area south of Penney Farms Road would be constricted by lack of infrastructure and the actual extent of future development is unknown as plans have not been developed for this area.

Based on these discussions with local planners, changes to land use within the Land RSA would occur under either of the two representative Build Scenarios or under the No Build Scenario through the year 2030. They forecasted a total of approximately 61,000 acres of development would occur under the No Build Scenario by 2030. Under the Northern Corridor Build Scenario, the planners predicted that approximately 61,000 acres of development also would occur; in other words, they predicted that no development would be induced beyond what was forecasted under the No Build Scenario by 2030.

Under the Southern Corridor Build Scenario, the local planners forecasted that by 2030, development within an area of approximately 21,600 acres could occur south of Penney Farms Road, which includes a shift of approximately 9,900 acres of development forecasted in the northwest portion of the RSA under the No Build Scenario. (In other words, 9,900 of the acres in the northwest that would develop under No Build would *not* develop under the Southern Corridor Build Scenario.) Therefore, the net additional development forecasted by 2030 under the Southern Corridor Build Scenario is anticipated to be approximately 11,700 acres. While this represents the area of potential induced development associated with the Southern Corridor Build Scenario, the exact nature and timing of development forecasted by the local planners are unknown. Therefore, the 11,700 acres is considered a maximum potential development area under the Southern Corridor Build Scenario. Federal, State and local regulations would further constrain development in this area. Resources are quantified based on this conservative (maximum) development area, and potential indirect effects are discussed in the appropriate resource sections.

Since the planners predicted no substantive difference in forecasted development under the No Build and the Northern Corridor Build Scenarios, there are no indirect effects from induced growth associated with the Northern Corridor Build Scenario. While no indirect effects from induced growth were forecasted for the Northern Corridor Build Scenario, encroachment/alteration effects may

occur and are discussed in the appropriate sections, arranged by resource. Effects from the forecasted development under the No Build Scenario are considered in the analysis of Cumulative Effects later in this chapter.

Communities, Neighborhoods and Economics

In the northern portions of Clay and St. John's Counties, where residential and commercial land uses are prevalent, it is unlikely that forecasted development under either of the two representative Build Scenarios will result in a reduction of community cohesion. The construction of the Southern Corridor Build Scenario will increase the rate of the development of the more rural southern portion of Clay County, which may alter the sense of rural community that currently exists. However, the local planners expect development to occur closer to the currently developed metropolitan Jacksonville area first. This expectation is partially based on the fact that most of the southern portion of the Land RSA would need upgraded infrastructure, such as water, wastewater, and adjoining transportation facilities, to support new development. Therefore, changes to the southern part of the RSA would occur over a period of years, and indirect effects to community cohesion are not expected to be substantial.

The forecasted development under the Southern Corridor Build Scenario could increase business opportunities. Clay County planners confirmed that there is currently a lack of employment centers in Clay County; more employment opportunities currently exist in St. Johns County.

As a result of the additional development from the representative Southern Corridor Build Scenario, Clay County will experience an increase in income, employment and earnings opportunities, and additional tax revenues. Because development associated with the Northern Build Scenario is anticipated to be similar to the No Build Scenario, an long-term increase over the No Build Scenario in income, employment and earning opportunities, and additional tax revenues is not anticipated. It is likely that construction of either of the representative Build Scenarios would increase short-term economic stimuli in both St. Johns and Clay Counties due to spending during the 4-year construction period.

Another beneficial indirect effect that could result from the Southern Corridor Build Scenario is the increased use and ease of use of the St. Johns River for navigation. The existing Shands Bridge restricts the size of the vessels and barges

that can be moved up and down the river between Lake George and the Atlantic Ocean, due to its vertical clearance of approximately 45 feet. A new bridge structure will have a vertical clearance of 65 feet. This could substantially improve commercial navigation in this area. Also, several large ship builders have stated that the low clearance of the existing bridge restricts the size of vessels they can build and move up the river. If FDOT removed this impediment to larger vessel traffic, these and other ship builders could construct larger vessels and expand their current operations. This could lead to the addition of new employees and create a positive economic stimulus to the regional economy.

Environmental Justice

Potential indirect impacts to minority and/or low-income populations could result from predicted development in the Land RSA. Area development under either of the representative Build Scenarios or the No Build Scenario could result in indirect impacts of increased property and rent values, causing further displacements for those not able to pay the increase. In addition, the St. Johns River Crossing Project could affect the historic cohesion achieved by generations of residents with an ethnic, cultural, or language-based identity because of an influx of immigrants, who are likely to be commuters, retirees, or others of diverse ethnic or racial backgrounds. This may be most evident in the future at the Pier Station community in southern Clay County. Pier Station has approximately 200 residents and is approximately 96 percent African American. The additional development estimated by the Clay County planners under the Southern Corridor Build Scenario would surround Pier Station. While this predicted, future development may change the character of this community over time, it would not represent a disproportionately high, adversely effect on minority or low-income populations.

Beneficial effects could also accrue to minority and low-income populations. For example, induced land use development could create additional job opportunities and increased access to job opportunities through enhanced transportation infrastructure.

Wetlands and Other Surface Waters

Potential effects to waters of the US, including wetlands, include placement of fill and degradation of function through encroachment and as a result of increased runoff. Within the forecasted development area under either the No Build or the Northern Corridor Build Scenario, there are approximately 13,100 acres of wetlands, and 101 miles of other surface waters.

In the area forecasted for induced development associated with the Southern Corridor Build Scenario, there are approximately 2,700 acres of wetlands and 37 miles of other surface waters (e.g., streams and backwater sloughs). The area anticipated to be developed under the No Build Scenario that would shift to south of Penney Farms Road includes approximately 1,300 acres of wetlands and 18 miles of other surface waters. Therefore, compared to the No Build, the Southern Corridor Build Scenario could affect up to an additional 1,400 acres of wetlands and 19 miles of other surface waters, which account for 3.5 and 0.9 percent of the wetlands and other surface waters within the Land RSA, respectively. (Local planners predicted that induced development under the Northern Corridor Build Scenario would be similar as that under the No Build Scenario; therefore there are no indirect effects from induced growth under the Northern Corridor Build Scenario).

The quantifications of these resources are likely an overstatement of the jurisdictional resources within the forecasted development area. The data source for quantifications included the National Wetland Inventory Maps by the US Fish and Wildlife Service (1992). This dataset may include features which may not be determined to be jurisdictional after field verification. For example, the other surface waters quantified may include water courses that are upstream of the jurisdictional limits of waters of the US.

In addition, it is unlikely that all waters of the US, including wetlands, within the forecasted development areas would be impacted. Most developments, including many in the Land RSA, typically leave open space areas and greenways where natural resources are left intact. Regardless of whether the forecasted development would be public or private, these developments would have to comply with Sections 404 and 401 of the Clean Water Act, which regulates the filling of and encroachment on these resources. The USACE administers Section 404 of the Clean Water Act and operates under a “no net loss” policy for wetlands, requiring avoidance and minimization of impacts, and compensatory mitigation for unavoidable impacts. Compensatory mitigation may include mitigation banking under specific criteria defined and approved by the Environmental Protection Agency (EPA) and the USACE.

Floodplains

Floodplains would pose a constraint to development under either of the two representative Build Scenarios or the No Build Scenario. This relates to the regulation of floodplains through both county and local ordinances. While these ordinances

do not prohibit development within the floodplain, they try to limit development in an effort to eliminate or reduce the potential damage from future floods.

There are approximately 12,400 acres of 100-year floodplain mapped within the forecasted development area for the No Build Scenario. Within the additional development area under the Southern Corridor Build Scenario, there are 3,400 acres of 100-year floodplain mapped; however, there are approximately 1,400 acres of 100-year floodplain in the area anticipated to be developed under the No Build Scenario that would shift to the area south of Penney Farms Road. Therefore, compared to the No Build Scenario, the Southern Corridor Build Scenario induced-development area includes an additional 2,000 acres of 100-year floodplain, which accounts for 1.4 percent of the 100-year floodplain areas in the Land RSA. (Local planners predicted that induced development under the Northern Corridor Build Scenario would be the same as that under the No Build Scenario; therefore there are no indirect effects from induced growth under the Northern Corridor Build Scenario).

Potential indirect effects to floodplains essentially relate to the natural values provided by floodplains, such as wildlife habitat, wetlands and water quality protection (described in other sections herein). Executive Order 11988 (1977), *Floodplain Management*, and county and local ordinances would minimize floodplain encroachment, to the extent allowable within the regulations, thereby preserving some of a floodplain's natural values.

The acres of floodplains noted above represent total acres of floodplains present, and not acres that are actually anticipated to be impacted. The stringent floodplain development regulations in place in this area are expected to prevent major impacts to floodplains from development.

Water Quality

Development under the two Build Scenarios and the No Build Scenario will result in some adverse effects to water resources through degradation of surface water quality. These effects are not expected to be substantially different under the Southern Corridor Build Scenario than those from the No Build Scenario. (Local planners predicted that induced development under the Northern Corridor Build Scenario would be the same as that under the No Build Scenario; therefore there are no indirect effects from induced growth under the Northern

Corridor Build Scenario). Development effects that result in water quality degradation include increased impermeable surface and increased non-point source pollution, such as pollution from fertilizers, pesticides, sediments, nutrients and vehicle residues. The indirect effects of development can include increased stormwater runoff velocities and pollutant loads leading to impacts to surface waters and, subsequently, groundwater. Future roadways and subdivision streets associated with forecasted development could contribute to these effects; however, the density and composition of future development within the area will determine the amount and type of the runoff.

Water quality protection is mandated by numerous federal, state and local ordinances within the Land RSA. Forecasted development within the Land RSA will be required to meet all water quality standards, some of the most stringent in the country. Because of the regulatory controls in place within the Land RSA, substantial impacts to water quality are not anticipated for either of the Build Scenarios or the No Build Scenario.

Vegetation and Wildlife Habitat

In addition to the wetland habitats described previously, four other types of habitat were evaluated: agricultural lands, barren lands, range lands and upland forests. While agricultural lands do not provide ideal habitat for wildlife, they are considered important for feeding and roosting. A majority of the upland forests within the Land RSA are comprised of commercial pine plantations. The upland forests in the area are less diverse and of lower value than natural woodlands; however, upland forests provide the important habitat component of cover for escape and concealment, particularly in areas subject to fragmentation due to development.

There are approximately 700 acres of agricultural land, 230 acres of barren land, 320 acres of range land and 14,700 acres of upland forest mapped within the Southern Corridor Build Scenario forecasted development area; however, there are approximately 800 acres of agricultural land, 180 acres of barren land, 600 acres of range land and 4,700 acres of upland forest in the area anticipated to be developed under the No Build Scenario that would shift to the area south of Penney Farms Road. Therefore, compared to the No Build Scenario, the Southern Corridor Build Scenario induced-development area includes ap-

proximately 100 fewer acres of agricultural land, an additional 60 acres of barren land, 280 fewer acres of range land and an additional 10,000 acres of upland forest. The additional upland forested areas that could be affected account for approximately 5.0 percent of the upland forest mapped within the Land RSA.

Exhibit 3-68 summarizes the vegetation and habitat acreages within the development area forecasted under the No Build Scenario and the net increase (over the No-Build) for the Southern Corridor Build Scenario. (Local planners predicted that induced development under the Northern Corridor Build Scenario would be the same as that under the No Build Scenario; therefore there are no indirect effects from induced growth under the Northern Corridor Build Scenario).

Exhibit 3-68: Vegetation and Habitat Types in the Area of Indirect Effects

Habitat / Vegetation Type	Acres in Development Area for No Build Scenario	Net Additional Acres in Development Area for Southern Corridor Build Scenario
Agricultural Land	6,100	-100
Barren Land	800	60
Range Land	2,000	-280
Upland Forest	33,000	10,000

¹ Local planners predicted that induced development under the Northern Corridor Build Scenario would be the same as that under the No Build Scenario. The No Build Scenario is shown here as a comparison with the Southern Corridor Build Scenario.

In addition to the potential loss of this habitat, future development could result in fragmentation of vegetation resources, and reduction of habitat connectivity in the larger area. Development plans that incorporate open spaces, trails, and greenbelts may reduce potential habitat fragmentation impacts, and could be used to maintain connectivity between larger habitat areas including nearby conservation lands where feasible.

Threatened and Endangered Species

There are 127 occurrences of 28 listed threatened, endangered and special-concern species recorded within the Land RSA (Florida Natural Areas Inventory Database, 2008). Of these, 26 species are state-listed as threatened, endangered or special status, and two are federally listed (American alligator and

West Indian manatee). All but two of the 127 occurrences involve state-listed species. (See the *Indirect and Cumulative Effects Discipline Report* for a map of known occurrence locations.) Approximately half of these (within the Land RSA have been recorded within the conservation lands in the western portions of the RSA. These conservation lands are protected in perpetuity by the SJRWMD and provide a haven for many of these species.

Within the area projected to develop under the No Build Scenario, there are 11 documented occurrences for 5 state-listed threatened and endangered species: Bartram's ixia (6), Florida mountainmint (1), gopher tortoise (2), pondspice (1), St. Johns black-eyed Susan (1).

Within the area forecasted to be developed under the Southern Corridor Build Scenario, there are three additional documented occurrences for two state-listed species: Bartram's ixia (2) and Florida black bear (1). There is no critical habitat for these species mapped in the forecasted development area associated with the Southern Corridor Build Scenario. Indirect effects to these additional protected species could result from the area of induced growth associated with the Southern Corridor Build Scenario. (Local planners predicted that induced development under the Northern Corridor Build Scenario would be similar to that under the No Build Scenario; therefore there are no indirect effects from induced growth under the Northern Corridor Build Scenario).

Federally listed species are protected under Section 7 of the Endangered Species Act (ESA). This section directs all Federal agencies to use their existing authorities to conserve threatened and endangered species, and in consultation with the USFWS, to ensure that their actions do not jeopardize the continued existence of listed species or significantly impact or adversely modify critical habitat. Section 10 of the ESA also provides protection to federally listed species from private development, and the State of Florida provides a system of protection to state-listed species. Therefore, all proposed development, public or private, will be subject to regulation under the ESA and state regulation.

Fish and Aquatic Resources

NMFS identified several categories of EFH as occurring within the St. Johns River in the project area. The tidally influenced portions of the St. Johns River

also serve as a nursery for commercially and recreationally important species. The forecasted development area south of Penney Farms Road for the Southern Corridor Build Scenario does not border the St. Johns River, so this development would not affect those resources. (Potential indirect effects to waters of the US, including wetlands, were discussed previously.)

Aquatic habitat encroachment/alteration effects may occur under the Southern Corridor Build Scenario. The existing Shands Bridge has a vertical height of approximately 45 feet which is an impediment to navigation on the St. Johns River by larger vessels. Under the Southern Corridor Build Scenario, the Shands Bridge would be demolished and replaced by a new bridge structure with 65 feet of vertical clearance, which would match the height clearances of the bridges north and south between the Atlantic Ocean and Lake George. This larger bridge structure would allow for larger vessels to navigate this stretch of the St. Johns River. Larger vessels utilizing this stretch of the St. Johns River could impact EFH and the commercially and recreationally important species. The waves associated with these larger vessels could disrupt spawning areas in the near-shore grass beds and wetlands and cause erosion along the banks of the St. Johns River.

As described previously, local planners predicted that induced development under the Northern Corridor Build Scenario would be similar to that under the No Build Scenario; therefore there are no indirect effects from induced growth under the Northern Corridor Build Scenario.

Cultural Resources

The effects to archaeological and historical resources from the forecasted development under either of the Build Scenarios or the No Build Scenario may be substantial if sites are eligible or potentially eligible for the NRHP. Depending on the type of development, these sites may not be subject to Federal or state protection.

Within the forecasted development area of the No Build Scenario, there are 70 recorded cultural resource sites, including 40 potentially eligible sites (recorded sites that have not yet been evaluated are considered potentially eligible for this assessment).

Within the Southern Corridor Build Scenario forecasted development area, 26 cultural resource sites have been recorded, including 2 potentially eligible sites. In the area anticipated to be developed under the No Build Scenario that would shift to the area south of Penney Farms Road, there are 13 recorded cultural resource sites, all of which are potentially eligible. Therefore, compared to the No Build Scenario, the Southern Corridor Build Scenario could affect up to an additional 13; however, it includes 11 fewer potentially eligible sites. (Local planners predicted that induced development under the Northern Corridor Build Scenario would be the same as that under the No Build Scenario; therefore there are no indirect effects from induced growth under the Northern Corridor Build Scenario).

Development forecasted under any of the scenarios could result in adverse effects to cultural resources. For archeological sites, it cannot be determined if the forecasted development will result in substantial effects because the quantity, location, and character of individual resources are unknown. In addition, the type of action (federal versus non-federal) would also dictate what level of protection, if any, is given to a particular cultural resource. For historic buildings, some of the development may fall under Federal or State regulatory resource protection review and, therefore, these historic properties may be protected or preserved. However, most of the development is residential and commercial development and would not fall under the Federal regulatory review process. Local permit application review processes vary by locality, and both St. Johns and Clay Counties have preservation ordinances that protect historic properties to varying degrees.

Section 4(f) Recreational and Conservation Resources

Based on the strong regulations protecting parkland and other recreational resources within the Land RSA, it is unlikely that forecasted development under either the No Build or the Southern Corridor Build Scenario would result in substantial adverse effects to recreation resources. Any potential impact to a recreational resource would be regulated and mitigated through the land development process. However, indirect encroachment/alteration effects could occur as a result of the Southern Corridor Build Scenario. This Scenario represents all the southern crossing alternatives; as described in the Section 4

(f) Resources discussion, the Brown 1, Pink 1, Orange 1 and Green 1 Build Alternatives would each require some acreage from the northern portion of the 10,320-acre Bayard Conservation Area. Because these alternatives would only take a small amount of the northern perimeter of the area (ranging from 23.6 acres to 34.5 acres), indirect encroachment/alteration effects would be considered minimal. SR 16 already borders the conservation area in the same location where additional right-of-way would be needed under this Build Scenario. (Local planners predicted that induced development under the Northern Corridor Build Scenario would be the same as that under the No Build Scenario; therefore there are no indirect effects from induced growth under the Northern Corridor Build Scenario).

Summary

The indirect effects to resources presented in this section have been quantified where possible, based on development forecasted through 2030 by local planners and an evaluation of the difference of this anticipated development between the two representative Build Scenarios and the No Build Scenario. **Exhibit 3-69** provides a summary of the potential indirect effects from forecasted development and encroachment/alteration effect from the No Build Scenarios and the Southern Corridor Build Scenario. As previously mentioned, in some cases, such as waters of the US and floodplains, the potential effects presented in this section may represent an overstatement of effects, as inclusion of resource features within a geographically defined development area does not imply that all such resources will be adversely affected. Actual impacts to some of these resources are likely to be reduced, as Federal and State regulations and local ordinances regulate development affecting these resources.

The induced growth forecasted under the Southern Corridor Build Scenario is approximately 11,700 acres more than that forecasted under the No Build and the Northern Corridor Build Scenarios, which represents an increase in growth of approximately 2.4 percent of the Land RSA. Therefore, the induced growth and its resulting indirect effects from the Southern Corridor Build Scenario are not considered to be substantial in comparison to the No Build and Northern Corridor Build Scenarios.

Exhibit 3-69: Summary of Potential Indirect Effects (Without Mitigation)

Resource or Effect Parameter		Potential Effects of the No Build Scenario ¹	Potential Additional Effects of the Southern Corridor Build Scenario
Land Use Conversion to Developed Uses		<ul style="list-style-type: none"> 61,000 acres could be converted to commercial & residential developed uses through 2030. 	<ul style="list-style-type: none"> An additional 11,700 acres could be converted to commercial & residential developed uses through 2030, for a total of about 72,700 acres.
Communities, Neighborhoods and Businesses		<ul style="list-style-type: none"> No substantial effects to community cohesion anticipated as the area develops over time. Forecasted development will have an increased beneficial effect on local and regional economies. 	<ul style="list-style-type: none"> No substantial effects to community cohesion anticipated as the area develops over time. Additional forecasted development will have an increased beneficial effect on local and regional economies.
Environmental Justice		<ul style="list-style-type: none"> Forecasted development has potential for increased property and rent values that could result in displacements for those not able to pay the increased amounts. EJ community cohesion could be affected. No disproportionately high adverse effects. 	<ul style="list-style-type: none"> Forecasted development has potential for increased property and rent values that could result in displacements for those not able to pay the increased amounts. EJ community cohesion could be affected; could be affected more in Pier Station than under the No Build due to development shifting to southern Clay County. No disproportionately high adverse effects.
Ecological Resources	100-Year Floodplains	<ul style="list-style-type: none"> 12,400 acres of 100-year floodplain are located within the forecasted development area. Stringent floodplain development regulations will prevent major indirect effects to floodplains. 	<ul style="list-style-type: none"> An additional 2,000 acres of 100-year floodplain are located within the additional forecasted development area, for a total of about 14,400 acres. Stringent floodplain development regulations will prevent major indirect effects to floodplains.
	Water Quality	<ul style="list-style-type: none"> Forecasted development and increases in impervious surface area could result in adverse effects to water resources through degradation of surface water quality. Because of the regulatory controls in place within the Land RSA, substantial impacts to water quality are not anticipated. 	<ul style="list-style-type: none"> Additional development induced by the Southern Corridor Build Scenario could result in some additional adverse effects to water resources through degradation of surface water quality; these potential effects are not expected to be substantially different than those under the No Build Scenario. Because of the regulatory controls in place within the Land RSA, substantial impacts to water quality are not anticipated.
	Vegetation and Wildlife Habitat Wetlands	<ul style="list-style-type: none"> 13,100 acres of wetlands are located within the forecasted development area. Existing Federal and State regulations are anticipated to minimize and mitigate impacts. 	<ul style="list-style-type: none"> An additional 1,400 acres of wetlands are located within the additional forecasted development area, for a total of 14,500 acres. Existing Federal and State Regulations are anticipated to minimize and mitigate impacts.
	Other Surface Waters	<ul style="list-style-type: none"> 101 miles of other surface waters are located within the forecasted development area. Existing Federal and State regulations are anticipated to minimize impacts. 	<ul style="list-style-type: none"> An additional 19 miles of other surface waters are located within the additional forecasted development area, for a total of about 120 miles. Existing Federal and State Regulations are anticipated to minimize impacts.

¹ Local planners predicted that induced development under the Northern Corridor Build Scenario would be the same as that under the No Build Scenario. The No Build Scenario is shown here as a comparison with the Southern Corridor Build Scenario.

Resource or Effect Parameter		Potential Effects of the No Build Scenario ¹	Potential Additional Effects of the Southern Corridor Build Scenario	
Ecological Resources	Vegetation and Wildlife Habitat	Agriculture	<ul style="list-style-type: none"> 6,100 acres of agricultural land could be converted to developed uses. 	<ul style="list-style-type: none"> Approximately 100 fewer acres of agricultural land could be converted to developed uses, for a total of about 6,000 acres.
		Barren Land	<ul style="list-style-type: none"> 800 acres of barren land could be converted to developed uses. 	<ul style="list-style-type: none"> Approximately 60 additional acres of barren land could be converted to developed uses, for a total of about 860 acres.
		Range land	<ul style="list-style-type: none"> 2,000 acres of range land could be converted to developed uses. 	<ul style="list-style-type: none"> Approximately 280 fewer acres of range land could be converted to developed uses, for a total of about 1,720 acres.
		Upland Forest	<ul style="list-style-type: none"> 33,000 acres of upland forest could be converted to developed uses. 	<ul style="list-style-type: none"> Approximately 10,000 acres of upland forest could be converted to developed uses, for a total of about 43,000 acres.
	Threatened and Endangered Species	<ul style="list-style-type: none"> Forecasted development could lead to indirect encroachment-alteration effects and loss of suitable habitat. State and Federal regulations provide strong regulatory protections for threatened and endangered species, indirect effects to threatened and endangered species are expected to be avoided or mitigated. 	<ul style="list-style-type: none"> Additional development induced by the Southern Corridor Build Scenario could result in additional indirect encroachment-alteration effects and loss of suitable habitat. State and Federal regulations provide strong regulatory protections for threatened and endangered species, additional indirect effects to threatened and endangered species from the Southern Corridor Build Scenario are expected to be avoided or mitigated. 	
Fish and Aquatic Resources	<ul style="list-style-type: none"> Forecasted development could lead to indirect encroachment-alteration effects, through loss of breeding habitat and reduction in water quality. Federal, State and local regulations would minimize development within essential fish habitat and require water quality standards to be met 	<ul style="list-style-type: none"> Forecasted development could lead to indirect encroachment-alteration effects, through loss of breeding habitat and reduction in water quality. Raising vertical clearance of Shands Bridge could result in larger vessels disturbing aquatic habitat. Federal, State and local regulations would minimize development within essential fish habitat and require water quality standards to be met 		
Recreational and Cultural Resources	Archeological and Historic Sites	<ul style="list-style-type: none"> Forecasted development area contains 70 recorded sites, including 40 eligible or potentially eligible sites. 	<ul style="list-style-type: none"> Additional forecasted development area contains 13 additional recorded sites, however 11 less potentially eligible sites, for a total of 83 recorded sites including 29 potentially eligible sites. 	
	Recreational Resources	<ul style="list-style-type: none"> Based on the strong regulations protecting parkland and other recreational resources within the Land RSA, it is unlikely that forecasted development would result in substantial adverse effects to recreation resources. Minor encroachment or alteration effects such as noise and visual impact could occur to protected lands bordering development. Any potential impact to a recreational resource would be regulated and mitigated through the land development process. 	<ul style="list-style-type: none"> Based on the strong regulations protecting parkland and other recreational resources within the Land RSA, it is unlikely that the additional forecasted development under the Southern Corridor Build Scenario would result in substantial adverse effects to recreation resources. Minor encroachment or alteration effects such as noise and visual impact could occur to protected lands bordering development. Any potential impact to a recreational resource would be regulated and mitigated through the land development process. 	

¹ Local planners predicted that induced development under the Northern Corridor Build Scenario would be the same as that under the No Build Scenario. The No Build Scenario is shown here as a comparison with the Southern Corridor Build Scenario.

This section summarizes the potential cumulative effects of the project in combination with other past, present, or future actions. See the *Indirect and Cumulative Effects Discipline Report* on the enclosed CD for more detail.

Cumulative Effects

The CEQ regulations for implementing the National Environmental Policy Act (NEPA) define Cumulative Effects as:

“the impact on the environment which results from the incremental impact of the action (project) when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.” (40 CFR 1508.7)

3.24 CUMULATIVE EFFECTS

3.24.1 What are cumulative effects and why do we study them?

Cumulative effects include a project’s direct and indirect effects, as well as other past, present and reasonably foreseeable actions that, while not caused by the project, will in combination with the project add to the overall effect, whether adverse or beneficial, on the environment.

Analyzing cumulative effects is important because what might appear to be minor impacts to resources, when combined with the impacts of numerous other past, present and reasonably foreseeable future projects, may add up to significant stress on a particular resource.

3.24.2 How do we evaluate cumulative effects?

FDOT identified and assessed potential cumulative impacts based on an approach developed by the Texas Department of Transportation (TxDOT, 2006). This approach involves the following eight steps:

- Identify the resources to consider in the analysis;
- Define the study area for each affected resource;
- Describe the current health and historical context for each resource;
- Identify direct and the indirect impacts that may contribute to a cumulative impact;
- Identify other reasonably foreseeable future actions that may affect resources;
- Assess potential cumulative impacts to each resource;
- Report the results; and
- Assess and discuss mitigation issues for all adverse impacts.

The cumulative effects analysis considered the magnitude of the cumulative effect on the health of each resource in the study area. Health refers to the general overall condition, stability, or vitality of that resource and the trend of that condition. Therefore, the resource health and trend are key components of the cumulative effects analysis. Laws, regulations, policies, or other factors

that may change or sustain these resource trends are considered as well, to determine whether more or less stress on the resource is likely in the foreseeable future.

To determine the trends and historical context of each analyzed resource, the team catalogued representative past, present and reasonably foreseeable future actions within the Resource Study Area (RSA). They identified the reasonably foreseeable future actions during the interviews with local planners and by reviewing planning documents, including comprehensive plans and transportation plans. As with the indirect effects evaluation, the cumulative impact analysis was performed using two representative Build Scenarios; the Northern Corridor and the Southern Corridor Build Scenarios.

For resources where the analysis predicted an adverse cumulative effect, the team considered potential mitigation measures that might reduce those effects. Mitigation measures are not intended to be measures that FDOT or the lead or cooperating agencies would, or even has the authority to implement; rather, they are intended as suggested steps that could be taken by local, state and federal agencies and organizations to minimize potential cumulative effects. This includes measures that could, if implemented, improve the overall health of the resource.

3.24.3 What resources were evaluated in this cumulative effects analysis?

FDOT completed the evaluation of cumulative effects for resources that were found to be adversely affected by the project, either directly or indirectly. They did not consider resources that were found to not be directly or indirectly affected by the project in a substantive way. Geology, soils and air quality were not addressed because the proposed project will not have any substantive effect on these resources. Contamination sites were not addressed because the proposed project would generally result in a benefit due to remediation of any sites found within the right-of-way. Section 4(f) lands were not included in the cumulative impact evaluation because the strict regulations regarding recreational and conservation lands will preclude substantive cumulative development impacts to these areas. Noise and visual effects were not evaluated separately but were included in the analysis of communities, neighborhoods and businesses.

The cumulative effects analysis considered the following resources:

- Land Use Conversion

- Communities, Neighborhoods and Businesses (including Environmental Justice)
- Water Resources (including wetlands, other surface waters, 100-year floodplains and water quality)
- Wildlife Habitat and Vegetation
- Threatened and Endangered Species
- Essential Fish Habitat
- Cultural Resources

3.24.4 What was the study area for the cumulative effects analysis?

The cumulative effects analysis considered both geographic and temporal study limits. For the geographic analysis, a RSA was defined for each resource; this area was shown previously under Indirect Effects and is the area that encompasses the forecasted development areas in the project vicinity.

The team considered the temporal limits by establishing a time frame as the period from a past environmental reference point, in this case the year 1980, to the planning year for the project, 2030. They chose the early date because the rapid urbanization of the Jacksonville metropolitan area did not begin until after 1980. This established a development or urbanization baseline for the cumulative effects analysis; however, specific historical information was often not available for each resource.

3.24.5 What other projects were included in the cumulative effects analysis?

The catalog of past, present and future actions developed for the St. Johns River Crossing Project helps to characterize the types of actions that are representative of past, present, and future development in the RSA. This context helps explain the way development projects may be related to the current health of the land and the trends the resources are experiencing. This catalog also provides insight as to the effect of development on future resource stress and future trends.

There was no practical way of determining all past, present, and reasonably foreseeable future actions in the RSA. As previously stated, 1980 was selected as the baseline year for the cumulative effects analysis. However, in many

cases, historic quantitative or geographically referenced information on the various resources (e.g., acres of a given resource, land use, or land cover type) for prior years was not available. In addition, a complete list of specific past actions is not available. CEQ guidance recognizes that this may not be practical and that the information may not be available, and so they do not require the compilation of this catalog (40 CFR 1500-1508). As a result, FDOT did not perform a quantification of individual past actions. However, they did consider past actions in describing the current health of each resource. The team considered past actions collectively as the development that had occurred as of 2002. They selected the year 2002 as the beginning year for present development because that was the date that FDOT conducted the Regional Transportation Planning Study that initiated the development of several conceptual alternatives for this project.

The following sections summarize the potential cumulative effects of the proposed project. The *Indirect and Cumulative Effects Discipline Report* located on the enclosed CD provides more detail on past, present and future actions considered, and the overall resource health and trends in the study area.

3.24.6 What are the project’s potential cumulative effects?

Land Use

The potential cumulative effects on land use were derived by adding the existing development in the RSA, the potential development under the No Build Scenario, and the direct and indirect land use conversions for the two representative Build Scenarios. Results are shown in **Exhibit 3-70**.

Exhibit 3-70: Potential Cumulative Land Use Effects of the Representative Build Scenarios

Representative Build Scenario	Land Use Conversion (acres)					Total Land within RSA
	Present Effects	Potential Effects under the No Build Scenario	Project		Potential Cumulative Effects	
			Direct Effects	Potential Indirect Effects		
Northern Corridor	30,000	61,000	1,301	--	92,301	473,000
Southern Corridor	30,000	61,000	1,661	11,700	104,361	473,000

All numbers are rounded

Under the Northern Corridor Build Scenario, the potential cumulative effect is 92,301 acres, approximately 19.5 percent of the RSA. However, given that no indirect effects related to development are associated with this Build Scenario, it would contribute less than one percent to the direct and indirect conversion of land within the RSA.

Under the Southern Corridor Build Scenario, the cumulative development area includes approximately 104,361 acres (22 percent) of the Land RSA. Based on the induced-development area, the Southern Corridor Build Scenario could contribute to a maximum of 13,361 acres of development, which accounts for approximately 2.8 percent of the Land RSA.

The predicted conversion of undeveloped land under either Build Scenario will not substantively affect the conversion trend within the Land RSA. Other resources, however, will be affected as described in the following sections.

Communities, Neighborhoods and Businesses

Anticipated private development and associated infrastructure will require right-of-way acquisition and land to be purchased that could involve relocation of residents and businesses. Under the Northern Corridor Build Scenario or the No Build Scenario, development in the RSA is expected to increase by an estimated 61,000 acres by the year 2030, mostly in northwestern Clay County. Under the Southern Corridor Build Scenario, development is expected to increase by an estimated 72,700 acres of development within the RSA, mostly within southern Clay County, by 2030. Approximately 11,700 acres of this increase will be attributable to the Southern Corridor Build Scenario.

Local and regional governments have also prepared for and encouraged growth in many jurisdictions. Right-of-way acquisition and relocations have resulted from many past and present transportation projects. Projects typically attempt to minimize the number of relocations, and moving assistance and mitigation is typically required. Land use planning is an important tool in preserving future corridors for transportation and utility uses and in minimizing relocations when funding for new facilities becomes available.

The cumulative effect of relocation and right-of-way acquisition is consistent with the general growth trend in the RSA. Required right-of-way acquisition and relocations due to forecasted future development with any of the alternatives is not expected to affect the overall quality of life in the northern part of the RSA. The quality of life could be affected to a greater extent as the forecasted development associated within the Southern Corridor Build Scenario would result in a transition from rural and undeveloped land uses to new residential and commercial land uses.

Other future development without the proposed project (the No Build Scenario) will result in increased population and employment opportunities in the RSA with corresponding increases in vehicular traffic, traffic noise, and visual intrusion. Depending on pre-existing conditions and proximity to new or augmented noise sources, these changes in ambient noise levels can affect the quality of life in existing communities, as can the added visual effects of residential and commercial development.

The traffic noise analysis for the two representative Build Scenarios determined where noise impacts will occur (direct impacts). Additional noise impacts and visual changes associated with induced development will most likely occur in the southern portion of the RSA, as a result of the Southern Corridor Build Scenario. This area has remained rural in nature and the predicted 11,700 acres of additional forecasted development, above that of the Northern Corridor Build Scenario and the No Build Scenario, would bring increases in noise levels, primarily associated with increased vehicular traffic on the expanded roadway system that would be required to accommodate the predicted growth in the area.

Future development associated with the No Build and the Northern Corridor Build Scenarios could also result in impacts to neighborhood and community resources in terms of increased noise levels and visual intrusion. These impacts would be more pronounced in the northwestern portion of the RSA. In addition to noise impacts to neighborhoods and residences in this portion of the RSA, there may also be noise impacts to the conservation lands in the area. Under the No Build and Northern Corridor Build Scenarios, local planners forecasted development surrounding the conservation lands in the northwest portion of the RSA. Noise impacts may be noticeable to users of the conservation lands, as well as the wildlife of the area. Visual changes associated with

surrounding development may also be noticeable to users.

Economic growth will continue whether the project is constructed or not, while additional economic development in the southern portion of the RSA is expected to occur under the Southern Corridor Build Scenario. Because of the land development policies in place in St. Johns and Clay Counties, this induced development in the south is consistent with local land development plans. Changes in the local economy of the southern portion of the RSA from agriculture to a regionally based economy may occur as a result of the Southern Corridor Build Scenario. The increases in economic output and employment associated with this development are considered beneficial cumulative effects.

Water Resources, Wetlands and Floodplains

As Florida's forests and grasslands have been developed over the years to create housing and transportation infrastructure, water quality has decreased due to the introduction of oil, fuel and other pollutants. The resulting roadway construction and number of cars on the roads has increased the amount of pollution carried by stormwater runoff into streams and waterways. Overall, streams in the RSA are in fairly stable condition, with localized areas of good resource condition as well as localized areas of degraded resource condition. Good conditions are generally found at streams or stream segments where native riparian vegetation is intact.

Prior to the onset of significant land development in the RSA, wetlands were a dominant landscape feature. The predevelopment extent of wetlands (based on the mapped distribution of hydric soils) is conservatively estimated to have been 83,320 acres (approximately 18 percent of the RSA) and may have covered as much as 118,443 acres (25 percent). Despite decades of development, overall loss of historical wetlands appears not to be substantial. Land use/land cover mapping by SJRWMD indicates the extent of wetlands in 2004 was comparable to the predevelopment estimate (110,315 acres, or approximately 23 percent of the RSA). However, the quality of these wetlands has very likely been diminished over time as a consequence of development, ditching, drainage, and groundwater withdrawal.

Historical trends in the RSA have resulted in the widespread use of floodplains for grazing and forage production. Developed land uses tend to be minimal within mapped floodplains due to the inherent unsuitability of floodplains as development sites. In some rural parts of the RSA, or in developed areas where floodplains are used as parklands, the retention of native riparian vegetation adds to the ecological and water resource protection functions of floodplains. The health of floodplains in the RSA is moderately healthy with a stable trend due to protection of the resource by Federal, State, and local regulations. Many acres of floodplains have been incorporated in parks and greenbelts and provide an important recreational and public use to residences within the RSA.

The potential cumulative effects of development to water resources from the Northern Corridor and Southern Corridor Build Scenarios are summarized in **Exhibit 3-71**.

Exhibit 3-71: Summary of Potential Cumulative Effects on Water Resources

Resource	Present Effects	Potential Effects under the No Build Scenario	Project		Potential Cumulative Effects	Total Water Resources Within RSA
			Direct Effects ¹	Potential Indirect Effects		
NORTHERN CORRIDOR BUILD SCENARIO						
Wetlands (acres)	10,900	13,100	1,163	--	25,163	147,800
Other Surface Waters (miles)	23	101	2	--	126	530
100-Year Floodplains (acres)	9,300	12,400	362	--	22,062	143,000
SOUTHERN CORRIDOR BUILD SCENARIO						
Wetlands (acres)	10,900	13,100	1,305	1,400	26,705	147,800
Other Surface Waters (miles)	23	101	2	19	145	530
100-Year Floodplains (acres)	9,300	12,400	339	2,000	24,039	143,000

¹ Direct effects include 85 acres of surface water for the Northern Corridor Build Scenario and 74 acres for the Southern Corridor Build Scenario. Conversion to miles of Other Surface Water impacts was determined using the typical right of way (324 feet) which converts to 2 miles (rounded) for each of these Build Scenarios.

Under the Northern Corridor Build Scenario, the cumulative development area includes 25,163 acres of wetlands, 126 miles of other surface waters and 22,062 acres of 100-year floodplains. This represents approximately 17 percent of the total amount of wetlands, 24 percent of the total amount of other surface waters and 15 percent of the total amount of 100-year floodplains within the RSA.

Under the South Corridor Build Scenario, the cumulative development area includes approximately 26,705 acres of wetlands, 145 miles of other surface waters, and 24,039 acres of 100-year floodplains. This represents approximately 18 percent of the total amount of wetlands, 27 percent of the total amount of other surface waters and 17 percent of the total amount of 100-year floodplains within the RSA.

The potential indirect and cumulative effects to streams, wetlands and 100-year floodplains are considered to be an overestimate, because the quantifications shown above are based on a total-take of the resources. Existing regulations govern effects to water resources, which would minimize potential effects. Some of these resources are experiencing a declining trend in the RSA, but Federal, State, and local protection should aid in minimizing the cumulative impacts beyond project boundaries. In addition, mitigation measures for impacts to these resources are typically required within the regulatory framework, which governs public and private development, and are intended to offset degradation of water resources. As a result, cumulative effects to water resources are not anticipated to be substantial.

Cumulative effects to water quality will occur from the continued land conversion in the RSA. Anticipated effects to water quality could include the increase in pollutant loading into existing surface waters associated with increased impervious cover. However, potential cumulative effects to water quality will be reduced by the regulatory controls administered by FDEP and SJRWMD.

[Habitat, Vegetation and Threatened and Endangered Species](#)

The RSA was historically dominated by pine flatwoods and longleaf pine-xeric oak forests. Linear hardwood swamps followed the courses of Black Creek, Yellow Water Creek, Peters Creek, Durbin Creek, Trout Creek, Sixmile Creek,

Turnbull Creek, and some of the lesser streams in the St. Johns River watershed. The inter-fluvial uplands were dotted with numerous swamps and freshwater marshes. These wetlands drained to the St. Johns River via a network of tributary streams, most notably Black Creek and its tributaries.

The pine flatwoods are primarily mesic habitats that support a wide array of wildlife. In predevelopment times, pine flatwoods once accounted for approximately 50 percent of the RSA; most of these open forests have been converted to silviculture which rose to prominence in the region in the 1930s. By 2004, silviculture accounted for almost 30 percent of the RSA. The forested wetlands are home to numerous species and provide foraging habitat for still more.

Federally threatened and endangered species associated with the wetlands in the region include the threatened American alligator and the endangered wood stork. Listed species associated with the mesic range land and mesic upland forest include the threatened eastern indigo snake, the endangered Chapman's rhododendron and, in the old growth pine area, the endangered red-cockaded woodpecker. Federally listed species associated with the xeric upland habitat types include the eastern indigo snake and red-cockaded woodpecker; species within the St. Johns River include the short-nosed sturgeon, West Indian manatee and the American alligator. (See the *Wildlife and Habitat Discipline Report* for more complete listings of species in the project area).

The direct and indirect project impacts, when added to the past, present, and reasonably foreseeable future actions, will result in the loss of vegetation cover types and wildlife habitat in the RSA. The primary impacts are from the conversion of wildlife habitat to residential, commercial, and public infrastructure development, and potential fragmentation of habitat. For the purposes of quantifying potential cumulative wildlife habitat and vegetation, four types of habitat were evaluated: agricultural lands, barren lands, range lands and upland forests. Impacts to wetlands and other surface waters, which are also an important wildlife habitat, are discussed in the previous section.

Potential cumulative impacts to vegetation and wildlife habitat of the Northern and Southern Corridor Build Scenarios are summarized in **Exhibit 3-72** and discussed in the following paragraphs.

Exhibit 3-72: **Potential Cumulative Effects to Vegetation and Wildlife Habitat**

Habitat Type ¹	Present Effects	Potential Effects under the No Build Scenario	Project		Potential Cumulative Effects	Total Habitat Within RSA
			Direct Effects	Potential Indirect Effects		
NORTHERN CORRIDOR BUILD SCENARIO						
Agriculture (Acres)	4,200	6,100	161	N/A	10,461	24,600
Barren Land (Acres)	220	800	9	N/A	1,029	4,100
Range Land (Acres)	650	2,000	151	N/A	2,801	12,700
Upland Forest (Acres)	13,700	33,000	705	N/A	47,405	201,000
Total	18,770	41,900	1,026	N/A	61,696	242,400
SOUTHERN CORRIDOR BUILD SCENARIO						
Agriculture (Acres)	4,200	6,100	152	-100	10,352	24,600
Barren Land (Acres)	220	800	24	60	1,104	4,100
Range Land (Acres)	650	2,000	81	-280	2,451	12,700
Upland Forest (Acres)	13,700	33,000	1,012	10,000	57,712	201,000
Total	18,770	41,900	1,269	9,860	71,619	242,400

¹ Wetlands and water habitats are quantified in the previous section, Water Resources, Wetlands and Floodplains.

Potential cumulative effects associated with the Northern Corridor Build Scenario include approximately 42 percent of the agricultural lands, 25 percent of the barren lands, 27 percent of the range land and 24 percent of the upland forest habitats being converted to developed uses through 2030. However, the project’s contribution to these cumulative effects under the No Build or Northern Corridor Build Scenarios would be approximately one percent or less each of the agricultural lands, barren lands, range lands and upland forest habitats being converted to developed uses.

Potential cumulative effects associated with the Southern Corridor Build Scenario include approximately 42 percent of the agricultural lands, 27 percent of the barren lands, 19 percent of the range land and 29 percent of the upland forest habitats being converted to development through 2030. However, the project’s contribution to these cumulative effects under the Southern Corridor

Build Scenario would include the conversion of a maximum of less than 1 percent of the agricultural lands, 2 percent of the barren lands, 0 percent of the range lands and 5 percent of the upland forest habitats being converted to developed uses.

Most of these potential cumulative effects would involve converting existing undeveloped land, resulting in a decline in existing habitat along with a corresponding increase in habitat fragmentation.

Wildlife populations rely on available habitat for their existence. The majority of habitat is unregulated or unprotected. Therefore, this conversion of vegetation and wildlife habitat would result in a corresponding effect to wildlife populations reliant on those habitats. In addition to the loss of habitat, indirect and cumulative effects will also result from habitat fragmentation, which reduces the quantity and quality of remaining habitat for wildlife. Habitat fragmentation generally has the effect of reducing the populations of those species that are sensitive to “edge” effects, such as increased predation, while benefiting those populations that prefer “edge” habitat. This will result in a continuance of the current trend in the RSA of a transition to wildlife species that are tolerant of or thrive in human-altered urban and suburban environments.

Additional transportation projects are included in the catalog of reasonably foreseeable future actions. As more roads and highways are built and development increases, there will be a corresponding increase in wildlife vehicle collisions, which could result in increased mortality to wildlife.

Along with general wildlife, there are numerous threatened, endangered and other protected species that depend on the habitats in the RSA. Within the project area (the area of direct effects), there are 21 Federally and state-listed endangered, threatened or protected species with moderate to high probability of occurring within the area of all Build Alternatives (refer to **Exhibit 3-54** in Section 3.16, Wildlife and Habitat).

Within the cumulative effects Land RSA, there are 127 documented occurrences of 28 protected species. Approximately half of these occurrences have been recorded within conservation lands. In the area forecasted to be developed under the No Build Scenario, there are 11 documented occurrences for five protected species: Bartram’s ixia (6), Florida mountain-mint (1), gopher tortoise (2), pondspice (1), and St. Johns black-eyed-susan (1).

In the area forecasted to be developed under the Southern Corridor Build Scenario, there are three additional documented occurrences for two protected species: Bartram's ixia (2) and Florida black bear (1). In addition to habitat loss, potential cumulative effects to these species include fragmentation of suitable habitat, and reduction of habitat connectivity in the larger areas.

No induced development is predicted under the Northern Corridor Build Scenario over that associated with the No Build. However, more of the development under the No Build and the Northern Corridor Build Scenarios would occur in the northwest part of Clay County than under the Southern Corridor Build Scenario. In the northwest area, local planners stated that the forecasted development is likely to surround the conservation lands in that part of the county. This could exacerbate habitat fragmentation and connectivity impacts because of the proximity of the development to the conservation lands.

Within the RSA, vegetation and wildlife habitat resources are reduced from historic levels, are stressed from the reduction in habitat acreage and fragmentation, and are experiencing a declining trend. Given this current trend and the estimated cumulative effects described here and for wetlands habitat in the previous section, there will be an adverse cumulative effect to wildlife habitat and vegetation in the RSA from either of the two representative Build Scenarios or from the No Build Scenario.

Protected species and their habitat are strictly regulated. There are approximately 70,000 acres of conservation lands, administered by SJRWMD within the RSA. A number of threatened and endangered species inhabit these conservation lands. Potential cumulative effects to protected species will be reduced due to the protection afforded by the Federal and state regulations and the amount of conservation land in the RSA.

Essential Fish Habitat

Potential direct and indirect impacts, when added to the past, present, and reasonably foreseeable future actions, will result in cumulative impacts to EFH. The major impact to fish and aquatic resources results from habitat alteration and fragmentation of wetlands and water quality degradation. The primary direct impact of either of the two representative Build Scenarios would be as-

sociated with the bridge structures over the St. Johns River. Both Build Scenarios would result in impacts within the ordinary high water mark of the river, and the bridge crossings will have some EFH involvement with submerged aquatic vegetation. No blasting will be used in the demolition of the existing Shands Bridge under the Southern Corridor Build Scenario.

Development along the St. Johns River could destroy or alter wetlands which provide EFH. Recreationally and commercially important species depend on EFH for their existence. Therefore, any degradation or alteration of that habitat will result in a corresponding effect to populations reliant on it. Induced development predicted under the Southern Corridor Build Scenario would occur south of Penney Farms Road and does not border the St. Johns River, so is not expected to affect EFH. Development predicted for the No Build and both Build Scenarios could fragment wetlands within the St. Johns watershed, thereby affecting EFH.

By increasing the vertical clearance of the existing Shands Bridge, the Southern Corridor Build Scenario would make it possible for larger vessels to utilize this portion of the St. Johns River. This could impact EFH through wave erosion of near-shore grassbeds and wetlands.

Regulatory controls, including the Clean Water Act and the Sustainable Fisheries Act, provide protection to EFH. Water quality in the RSA is regulated by SJRWMD and FDEP. Given current development trends and the estimated cumulative effects described here, there will be continued degradation to fish and aquatic resources and their habitat within the RSA through 2030. However, cumulative effects to fish and aquatic resources will be reduced by the regulatory controls administered by USACE, NMFS, FWC, FDEP and SJRWMD.

Cultural Resources

Previously recorded archeological sites and historic structures in the RSA were inventoried to estimate potential cumulative effects. It is expected that many more unknown sites exist within the area. **Exhibit 3-73** summarizes the potential cumulative effects to cultural resources in the RSA, based on known sites.

It is estimated that the Northern Corridor Build Scenario may result in cumulative effects to approximately 139 cultural resource sites, or 15 percent of the

Exhibit 3-73: Summary of Potential Cumulative Effects to Cultural Resources

Build Scenario	Present Effects	Potential Effects under the No Build Scenario	Project		Potential Cumulative Effects	Total Sites within RSA
			Direct Effects	Potential Indirect Effects		
CULTURAL RESOURCES (NUMBER OF KNOWN SITES)						
Northern Corridor	50	70	19	N/A	139	953
Southern Corridor	50	70	18	13	151	953

Note: This table includes all known cultural resource sites, regardless of eligibility status.

known cultural resource sites within the RSA. It is estimated that the Southern Corridor Build Scenario may result in cumulative effects to approximately 151 cultural resource sites or about 16 percent of the known cultural resource sites within the RSA.

It cannot be determined if forecasted development under the No Build or either Build Scenario will result in substantial effects to cultural resources because the quantity, location, and character of individual resources are unknown. In addition, the type of action (federal versus non-federal) would also dictate the level of protection given to a particular cultural resource. Cultural resource sites that are identified through the regulatory process would be protected or mitigated, thereby reducing the overall cumulative effect on the resource. Ultimately, site loss will continue to occur as development intensifies in the RSA.

Historic properties are most susceptible to projects and development that are not regulated by the Federal Section 106 process and that could cause the relocation, demolition, or physical alteration of the resource. These projects would primarily be residential, commercial, and industrial development within the RSA. However, Clay and St. Johns Counties include provisions that afford protection to cultural resources through their respective land development ordinances. Therefore, the potential cumulative impacts to cultural resources will be reduced through avoidance and mitigation strategies.

3.24.7 How can cumulative effects be minimized?

The analysis of cumulative impacts considered opportunities for the mitigation of adverse effects for each resource. Potential mitigation measures are described below, and are intended to disclose steps or actions that could be undertaken by local, state and federal agencies and organizations to minimize the potential cumulative effect on each resource health and trend.

Communities, Neighborhoods and Businesses

Many communities in the RSA have supported and planned for the proposed project as well as other future community improvements. Adopted land use plans and accompanying land use controls help to preserve future areas and prepare for orderly and controlled development. Land use planning, zoning, and local project review and approval also provide mechanisms to ensure that development and infrastructure projects avoid and minimize impacts to sensitive resources to the extent practicable. However, land use planning alone may not ensure complete avoidance and minimization of future development effects on communities, neighborhoods and businesses. Additionally, intergovernmental and public-private cooperative strategies and regional approaches could be employed. The relative success of small communities in retaining a measure of identity and cohesiveness in the face of spreading suburban growth depends on a number of factors, including the pace of new development and the commitment of residents to retain important elements, such as institutional practices, public facilities, cultural events, architectural styles, and economic patterns.

Water Resources

The USACE administers Section 404 of the Clean Water Act and operates under a “no net loss” policy for wetlands, requiring avoidance and minimization of impacts, and compensatory mitigation for unavoidable impacts. This may include mitigation banking under specific criteria defined and approved by USEPA and the USACE. The Federal regulatory framework will continue to positively affect the health of the resource. Impact awareness and public education seminars could be conducted to address the avoidance and minimization of permanent impacts to jurisdictional wetlands. This could also avoid the future degradation of wetland quality and functionality and help prevent alterations of stream sinuosity and water quality. In addition to public aware-

ness, land development policies administered by St. Johns and Clay Counties can incorporate methods to avoid or minimize impacts to these resources during the planning and design processes in order to preserve existing riparian vegetation, stream bank conditions, and other wetland features.

FEMA administers the National Flood Insurance Program and requires communities to adopt adequate land use planning and management measures to qualify for insurance in flood prone areas. In addition to these Federal requirements, local practices could include more stringent standards for developers in the RSA to incorporate flood control and storm water management into their projects to ensure that base flood elevations are not increased by alterations made to the landscape. Where locations in the RSA have experienced continued inundation or historical high water events, local entities or counties could purchase available lands adjacent to floodways and maintain the land as natural areas or parks where structural development or encroachment of the floodplain could be prevented. In addition, regulatory agencies could collaborate on approval of new development and limit the amount of impervious surfaces in a given area to reduce surface water run-off and the associated volume in drainage features.

Wildlife Habitat, Vegetation and Threatened and Endangered Species

SJRWMD owns and operates approximately 70,000 acres of conservation lands, which is about 15 percent of the total land within the RSA. These conservation lands not only help protect water resources, but they also provide habitat for wildlife, including many threatened and endangered species. The Florida Forever Act (FFA) provides for the issuance of up to \$3 billion in bonds over a 10-year period, for land acquisition, water resource development, stormwater management, water body restoration, recreational facility construction, public access improvements, invasive plant control, and related projects. From 2006 to 2007, SJRWMD completed 36 transactions totaling 21,478 acres of land, and it will continue to acquire land within the RSA through funding provided by the FFA.

The acquisition and protection of land will become even more important as the region continues to grow and available habitat becomes more scarce. Pres-

ervation of natural resources through expansion of public or private parks, wildlife management areas, and preserves or funding habitat improvement practices on these lands could help losses of natural resources within the same region. Clay and St. Johns Counties could develop ordinances that would encourage permanent preservation of open space, ranch and agricultural lands, woodlands and wildlife habitat, wetlands, and water bodies to promote interconnected green space and corridors. Landowners of tracts that exhibit specific environmental attributes could be eligible for financial or other incentives in return for voluntarily conserving sensitive portions of their property through a conservation easement. Design considerations for new development and infrastructure projects could maintain or enhance habitat linkages and wildlife movement between large tracts of public lands. Wildlife underpasses or culvert passageways could reduce habitat fragmentation and edge effects.

Timber lands within the RSA also provide important habitat for wildlife. The companies that operate these lands should be encouraged to manage them in ways that benefit wildlife, especially riparian and wetland areas that are not suitable for pine production. This could be accomplished by preserving portions of their land in a more natural state to encourage diversity.

There are land trust organizations that may be interested in preservation opportunities within the RSA. Such organizations involve a local, state, or regional nonprofit organization directly involved in protecting land for its natural, recreational, scenic, historical, or productive value. Private conservation groups are also interested in preservation efforts in this region. Such opportunities could involve land donations, fee acquisition, mitigation banks, land leases, or conservation easements.

Essential Fish Habitat

Efforts to reduce impacts to EFH could come from a variety of sources, including Federal, state and local government agencies and non-profit organizations. Efforts to protect EFH should focus on the preservation of riparian and aquatic habitats within the RSA and improvements to water quality. Organizations such as SJRWMD could make riparian areas within the RSA a priority for acquisition. Florida currently has one of the most stringent water quality standards in the U.S. Land development ordinances that encourage “setting-aside” riparian areas would help improve water quality by providing

vegetation filtration for run-off during storm events. Areas of substantial near-shore submerged aquatic vegetation within the St. Johns River could be protected by establishing “no anchoring or no wake” areas to protect the resource.

Cultural Resources

Future impacts to cultural resources could be mitigated through better awareness of the importance of these resources within the private sector. Loss of resources could be minimized to some extent through programs that would encourage voluntary preservation by developers. In addition, local archaeological societies or historic preservation societies are other organizations that could engage in public outreach and site salvage work. These groups could work with landowners toward site preservation, or if necessary, conduct salvage work at endangered sites. These groups could give public lectures and visit schools to promote cultural resource awareness. Increased funding of archaeological awareness programs could aid in future mitigation and protection for these resources through educational methods and increased public awareness.

Future impacts to historic properties could be mitigated through better awareness of the importance of historic properties and regulatory restrictions and review at the local level. Historic properties that may be impacted by private development, mainly residential and commercial developments, would not be subject to a regulatory review process and thus would have reduced protection. State and local programs for the identification of historic resources could help offset these impacts if properties have already been surveyed and evaluated.

3.24.8 Summary

The Land RSA and greater Jacksonville area are undergoing rapid population and employment growth with or without the proposed project. This growth is anticipated to continue under either of the two representative Build Scenarios or the No Build Scenario. Local and regional government agencies continue to plan for this growth and have adopted various land use and transportation plans for the area. The St. Johns River Crossing Project, combined with other

local and regional development efforts, would serve to accommodate present and planned growth and development. A number of regulatory mechanisms are in place to minimize potential adverse effects of social and economic growth.

The cumulative effects analysis attempted to determine the magnitude of the potential cumulative effects on the resources. Most cumulative effects assessed would not be substantial in the context of the RSA. However, vegetation and wildlife habitat would experience a substantial adverse cumulative effect from continued stress on the resource (loss of habitat and fragmentation) caused by development under any of the scenarios. It is unknown whether or not potential cumulative effects to archeological and historic resources would be substantial because sufficient information does not exist for the quality of the resource, the nature of the potential impact, or both. There would be beneficial cumulative effects to some socioeconomic and community issues, such as income and employment.

Mitigation measures required by regulation or that could be undertaken by local, state and Federal agencies and organizations will help to reduce potential cumulative effects in the RSA.

3.25 SUMMARY COMPARISON OF ALTERNATIVES

Exhibit 3-74 on the following pages provides a comparison of the alternatives evaluated in this Draft EIS. The exhibit summarizes the impacts and benefits of each alternative. Impacts shown do not take into account the application of mitigation measures described in this chapter.

Resource or Parameter	No Build	Black	Purple	Brown 1	Brown 2	Orange 1	Orange 2	Green 1	Green 2	Pink 1	Pink 2
ALTERNATIVES CHARACTERISTICS											
Length of Alternative (miles)	N/A	36	26	34	34	33	33	31	31	31	31
Number of Local Access Interchanges	N/A	8	6	9	9	9	9	7	7	7	7
Construction Cost (\$ billions)	N/A	\$1.67	\$1.29	\$1.46	\$1.45	\$1.55	\$1.56	\$1.36	\$1.36	\$1.26	\$1.28
Right-of-Way Cost (\$ millions)	N/A	\$337	\$269	\$284	\$359	\$286	\$314	\$239	\$265	\$236	\$313
Wetland Mitigation Costs (\$ millions)	N/A	\$85	\$54	\$57	\$55	\$54	\$54	\$57	\$56	\$59	\$57
Total Cost (\$ billions)	N/A	\$2.51	\$1.94	\$2.17	\$2.25	\$2.28	\$2.32	\$1.99	\$2.03	\$1.88	\$1.97
TRAFFIC AND TRANSPORTATION (Section 3.3)											
2030 Network Performance (volume/capacity)	0.897	0.836	0.843	0.835	0.835	0.827	0.827	0.833	0.833	0.842	0.842
2030 System Deficiency (% of roadway segments over capacity)	39%	32%	33%	32%	32%	32%	32%	33%	33%	34%	34%
2030 Network Travel Time Reduction (daily vehicle hours)	N/A	737,463	751,811	726,500	726,500	791,642	791,642	696,579	696,579	642,943	642,943
2030 Corridor Volume over St. Johns River (AADT)	N/A	78,900	74,600	74,600	74,600	74,100	74,100	74,000	74,000	74,700	74,700
2030 Annual Congestion Cost (\$ billions)	\$11.84	\$8.4	\$8.4	\$8.5	\$8.5	\$8.2	\$8.2	\$8.6	\$8.6	\$8.9	\$8.9
Emergency Evacuation Lane Miles West of River	96.0	124.12	124.59	146.57	146.57	144.05	144.05	144.05	144.05	146.57	146.57
Evacuation Effectiveness (vehicles in queue east of river, including the bridge)	61,723	54,297	54,298	48,373	48,373	49,038	49,038	49,038	49,038	48,373	48,373
NOISE (Section 3.5)											
Noise Impacts (number of sites)	N/A	35	35	28	27	28	28	35	34	35	33

Impacts shown do not take into account the application of mitigation measures. Mitigation measures remain under consideration by FDOT, and will be further evaluated for applicability, feasibility, and effectiveness, depending on which Build Alternative, if any, is selected as the Preferred Alternative.

Exhibit 3-74: Summary Comparison of Impact and Benefits of Project Alternatives

LAND USE (Section 3.6)											
Resource or Parameter	No Build	Black	Purple	Brown 1	Brown 2	Orange 1	Orange 2	Green 1	Green 2	Pink 1	Pink 2
Number of Residential Parcels Converted to Right-of-Way	N/A	59	57	42	57	43	58	39	54	38	53
Number of Office/Commercial Parcels Converted to Right-of-Way	N/A	9	9	3	3	6	6	6	6	3	3
Total Parcels Converted to Right-of-Way	N/A	273	219	206	221	227	245	183	201	162	177
Number of Residential Acres Converted to Right-of-Way	N/A	65	64	43	49	44	44	37	37	37	42
Number of Office/Commercial Acres Converted to Right-of-Way	N/A	17	17	5	5	5	5	5	5	5	5
Agricultural Acres Converted to Right-of-Way	NA	1,000	596	893	893	972	972	920	920	841	841
Total Acres Converted to Right-of-Way	N/A	1,907	1,301	1,724	1,710	1,654	1,639	1,590	1,576	1,661	1,647
SOCIOECONOMICS (Section 3.7)											
Residential Displacements	N/A	42	41	28	38	28	38	29	39	29	39
Business Displacements	N/A	14	14	2	3	13	14	15	16	4	5
Religious Facility Displacements	N/A	2	2	1	1	1	1	1	1	1	1
Total Displacements	N/A	58	57	31	42	42	53	45	56	34	45
Number of New Physical Barriers in Existing Community	N/A	1	1	0	0	0	0	0	0	0	0
Consistency with Local Plans	N/A	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Existing & Proposed Developments Served by Proposed Interchanges (number within 2 miles)	N/A	10	8	12	12	12	12	8	8	8	8
Annual Tax Revenue Lost from Right-of-Way Conversion (\$ thousands)	N/A	\$989	\$928	\$815	\$834	\$860	\$883	\$181	\$204	\$137	\$155

Impacts shown do not take into account the application of mitigation measures. Mitigation measures remain under consideration by FDOT, and will be further evaluated for applicability, feasibility, and effectiveness, depending on which Build Alternative, if any, is selected as the Preferred Alternative.

Resource or Parameter	No Build	Black	Purple	Brown 1	Brown 2	Orange 1	Orange 2	Green 1	Green 2	Pink 1	Pink 2
	ENVIRONMENTAL JUSTICE – MINORITY AND LOW-INCOME POPULATIONS (Section 3.8)										
Residential Displacements	N/A	1	0	5	15	6	16	3	13	2	12
Business Displacements	N/A	0	0	2	2	13	14	13	14	2	3
Potential Disproportionate Impacts from Displacements?	N/A	No	No	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
Potential Disproportionate Impacts from Tolling?	N/A	No	No	No	No	No	No	No	No	No	No
CULTURAL RESOURCES (Section 3.9)											
Known Resources Potentially Eligible for NRHP Listing	N/A	6	6	1	1	5	5	5	5	1	1
Moderate to High Potential for Archeological Sites (percent of corridor)	N/A	22%	27%	30%	30%	32%	32%	20%	20%	18%	18%
SECTION 4(f) RECREATIONAL RESOURCES – BAYARD CONSERVATION AREA IMPACTS (Section 3.10)											
Direct Impacts – Right-of-Way Take (acres)	N/A	N/A	N/A	34.5	0	23.6	0	23.6	0	34.5	0
Direct Impacts to Facilities	N/A	N/A	N/A	2 parking areas, caretaker residence, north end of 3 unpaved trails	No	1 parking area, caretaker residence, north end of 3 unpaved trails	No	1 parking area, caretaker residence, north end of 3 unpaved trails	No	2 parking areas, caretaker residence north end of 3 unpaved trails	No
Proximate Impacts: Visual	N/A	N/A	N/A	Yes	No	Yes	No	Yes	No	Yes	No
PUBLIC SERVICES AND UTILITIES (Section 3.11)											
Blacks Ford Swamp Effluent Disposal Site (acres)	N/A	3.5	3.5	9.3	9.3	9.3	9.3	0	0	0	0
No. of Service Towers and Power Line Crossings	N/A	6	6	7	7	7	7	7	7	7	7
Emergency Response Times	Increase	Decrease	Decrease	Decrease	Decrease	Decrease	Decrease	Decrease	Decrease	Decrease	Decrease

Impacts shown do not take into account the application of mitigation measures. Mitigation measures remain under consideration by FDOT, and will be further evaluated for applicability, feasibility, and effectiveness, depending on which Build Alternative, if any, is selected as the Preferred Alternative.

Exhibit 3-74: Summary Comparison of Impact and Benefits of Project Alternatives (cont)

VISUAL QUALITY (Section 3.12)											
Additive Visual Impact Rating (higher numbers indicate higher impacts)	NA	37.1	33.8	41.0	38.3	42.3	39.6	36.3	33.6	35.0	32.3
AIR QUALITY (Section 3.13)											
Carbon Monoxide	No exceedances of the 1-hour or 8-hour National Ambient Air Quality Standards										
WATER RESOURCES (Section 3.14)											
Stormwater Runoff Treatment Volume Required (millions of cubic feet)	N/A	4.9	3.7	4.8	4.8	4.7	4.7	4.4	4.4	4.4	4.4
Clean Water Act Section 303(d) Basins Affected	N/A	4	4	4	4	4	4	3	3	3	3
WETLANDS (Section 3.15)											
Direct, Dredge or Fill (acres)	N/A	748	477	502	487	484	476	501	493	518	504
Direct, No Dredge or Fill (acres)	N/A	976	601	666	653	642	629	687	674	713	702
Surface Water (acres)	N/A	88	85	72	70	67	65	69	67	74	72
Total Acres	N/A	1,812	1,163	1,240	1,210	1,194	1,170	1,257	1,234	1,305	1,278
UMAM Debit	N/A	643	408	430	417	413	406	435	427	450	438
WILDLIFE AND HABITAT (Section 3.16)											
Agriculture (acres)	N/A	173	161	158	160	137	137	149	130	152	154
Rangeland (acres)	N/A	160	151	173	178	178	178	87	87	81	82
Water (acres)	N/A	87	84	61	61	61	59	68	66	68	66
Wetlands (acres) (from habitat databases)	N/A	453	293	412	392	413	400	366	353	365	345
Upland Forest (acres)	N/A	1,171	706	1,036	1,033	962	957	939	935	1,013	1,010
Total Acres	N/A	2,044	1,395	1,840	1,817	1,751	1,731	1,609	1,571	1,679	1,657
Protected Species Potentially Present	N/A	26	26	26	26	26	26	26	26	26	26
FISH AND AQUATIC RESOURCES (Section 3.17)											
Submerged Aquatic Vegetation (acres)	N/A	4	4	3	2	3	2	3	2	3	2
Total Habitat (acres)	N/A	46	31	30	18	36	28	46	28	40	28

Impacts shown do not take into account the application of mitigation measures. Mitigation measures remain under consideration by FDOT, and will be further evaluated for applicability, feasibility, and effectiveness, depending on which Build Alternative, if any, is selected as the Preferred Alternative.

Resource or Parameter **No Build** **Black** **Purple** **Brown 1** **Brown 2** **Orange 1** **Orange 2** **Green 1** **Green 2** **Pink 1** **Pink 2**

GEOLOGY AND SOILS (Section 3.18)											
Aquifer Recharge	Minor impacts to recharge of the surficial aquifer; no impacts to the Floridan aquifer										
	ENERGY (Section 3.19)										
Energy Used for Construction (millions of BTUs)	N/A	14,664,277	11,369,046	12,850,146	12,949,822	13,668,194	13,734,505	11,945,563	12,011,874	11,127,515	11,227,191
Energy Consumption per year (gallons)	24,058,431	16,565,796	15,727,365	19,077,523		18,471,795		20,622,414		21,088,620	
Energy Savings per Year over No Build (gallons)	0	7,492,635	8,331,066	4,980,908		5,586,637		3,463,017		2,979,071	
Energy Payback (years)	N/A	15.1	10.5	19.8	20.0	18.8	18.9	26.7	26.9	28.8	29.1
CONTAMINATED PROPERTIES (Section 3.20)											
Low-Risk Sites	N/A	4	4	5	6	8	8	8	8	5	6
Medium-Risk Sites	N/A	2	2	1	1	3	4	3	4	1	1
High-Risk Sites	N/A	3	3	2	3	7	6	7	6	2	3
Total Sites	N/A	9	9	8	10	18	18	18	18	8	10
NAVIGABLE WATERWAYS (Section 3.21)											
Vertical Restriction - St. Johns River	45' at Shands Bridge	45' at Shands Bridge								65' (as elsewhere on river)	
Horizontal Restriction - St. Johns River	91' at Shands Bridge	91' at Shands Bridge								200' (USGS clearance guide)	
In Channel Development - St. Johns River	None	New bridge at Popo Point								None	
Black Creek	None									No new restrictions	
FLOODPLAINS (Section 3.22)											
Transverse Crossings of 100-Year Floodplain	N/A	13	6	17	17	15	15	14	14	16	16
Transverse Crossings of Regulatory Floodways	N/A	8	7	5	5	6	6	5	5	4	4
Longitudinal Crossings of 100-Year Floodplain	N/A	1	1	0	0	0	0	0	0	0	0

Impacts shown do not take into account the application of mitigation measures. Mitigation measures remain under consideration by FDOT, and will be further evaluated for applicability, feasibility, and effectiveness, depending on which Build Alternative, if any, is selected as the Preferred Alternative.

Exhibit 3-74: Summary Comparison of Impact and Benefits of Project Alternatives (cont)

