3.16 GROUNDWATER RESOURCES

3.16.1 What are the groundwater resources in the project study area?

The project study area is located above the Southeastern Coastal Plain Aquifer System, which is comprised of four regional aquifers, including the Surficial Aquifer, the Floridan Aquifer, Chattahoochee River Aquifer, and the Black Warrior River Aquifer. The regional aquifers in the project study area are the Surficial Aquifer, beneath that is the Chattahoochee River Aquifer, and farther beneath the surface, is the Black Warrior River Aquifer.[113] Five hydrogeologic units compose these three regional aquifers, which are from the surface down, the Surficial Aquifer, Pee Dee Aquifer, Black Creek Aquifer, Middendorf Aquifer, and Cape Fear Aquifer (refer to Figure 3-31). The Surficial Aquifer is an unconfined unit, while the rest are confined units, meaning they are separated by clay, silt, or rock. An aquifer is an underground layer of porous rock or gravel that holds water like a natural storage tank. Confining units are layers of impermeable rock, silt, or clay that separate aquifers, usually horizontally, and prevent mixing of water between aquifers.

Aquifer

An aquifer is an underground layer of porous rock or gravel that holds water, like a natural storage tank.

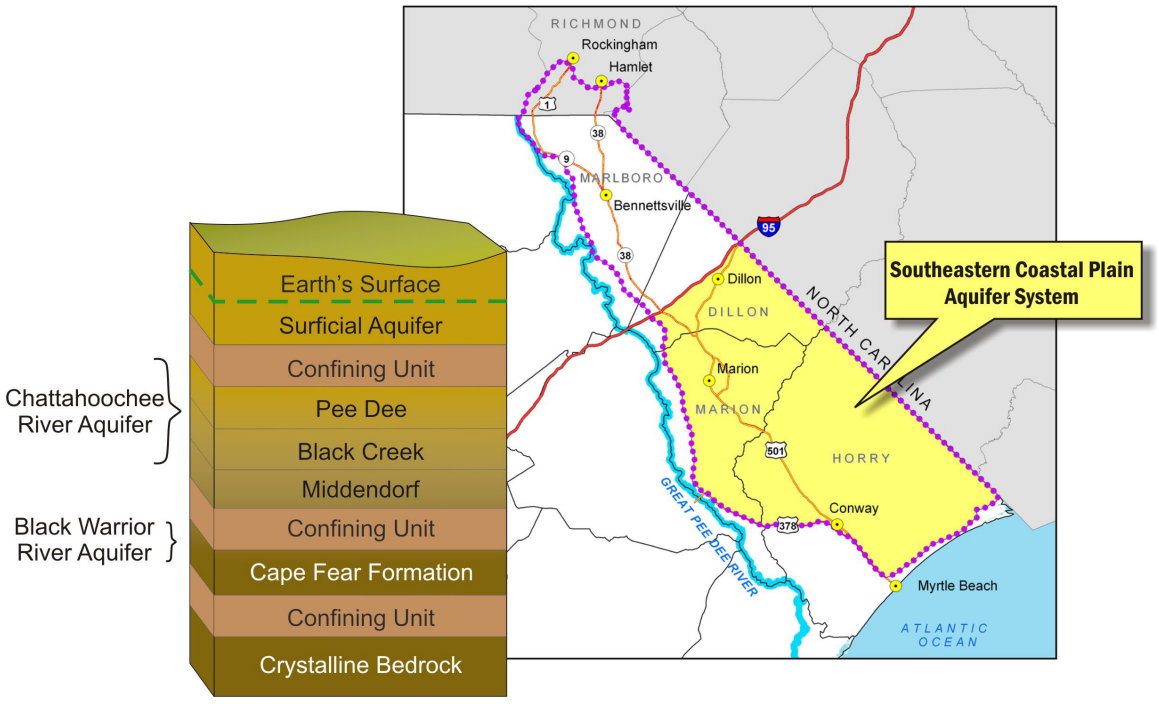

Figure 3-31: Groundwater Aquifers in Project Study Area

[113] United States Geological Survey, *Groundwater Atlas of the United States: Alabama, Florida, Georgia, South Carolina*. HA-730G, http://capp.water.usgs.gov/gwa/ch_g/G-text7.html (September 20, 2007).

The Surficial, Black Creek, and Middendorf Aquifers are the main groundwater sources in the South Carolina portion of the project study area.[114] The Surficial Aquifer is the saturated zone that underlies the surface of the land and is very shallow (usually 20 to 60 feet deep). It provides groundwater to individuals throughout the project study area who have private wells. The water quality of the Surficial Aquifer varies greatly, and due to this, detailed studies have not been done to determine its overall water quality. Instead, water quality is determined on a site-specific test for wells using this aquifer. The Surficial Aquifer has groundwater discharge/recharge areas throughout the project study area.

The Black Creek Aquifer overlies and covers the Middendorf Aquifer as they extend east toward the coast (refer to Figure 3-31, page 3-207). The Black Creek Aquifer is used as a groundwater source in a majority of the project study area since it is shallower than the Middendorf Aquifer, which makes it more economical to develop. The primary use of groundwater withdrawals from the Black Creek Aquifer is as a drinking water source. The Middendorf Aquifer provides groundwater supplies in the upper coastal plain near the Great Pee Dee River on the extreme northwestern portion of the project study area.

The Black Creek Aquifer generally has good to excellent water quality; however, the aquifer consistently has high levels of fluoride. This aquifer has high levels of chloride and sodium near the coast due to the mixing of saltwater with the water in the aquifer. Due to this, the hydrogen ion concentrations (pH) are usually higher throughout the aquifer, especially closer to the coastline. The discharge/recharge area of this aquifer is located between the Great Pee Dee and Little Pee Dee Rivers in South Carolina, a portion of which is located in the project study area.[115]

There is minimal ion concentration present in the upper coastal plain portion of the Middendorf Aquifer. This is due to the presence of clean quartz sands that have been thoroughly leached over time. Water found in the upper coastal portion is acidic, usually soft, and contains a low amount of dissolved solids. This has been correlated with the proximity of the water to the recharge area. Water in the lower coastal portion is usually highly mineralized, with higher levels of total dissolved solids and pH.[116] This is because the water in the lower coastal portion has been in the aquifer longer and has possibly mixed with more mineralized water from adjacent leaky aquifers. The Middendorf Aquifer has generally good water quality; however, the 2003 results showed high iron contents above USEPA standards in most of the wells sampled.[117] The discharge/recharge area for the Middendorf Aquifer is located between the fault line in Chesterfield County, South Carolina and the Great Pee Dee River, which is northwest of the project study area.[118]

3.16.2 How would groundwater resources be impacted by the Preferred Alternative?

It is not likely that the Preferred Alternative would impact groundwater. The Middendorf Aquifer and Black Creek Aquifer are confined units deep below the surface of the ground (depending on their distance

[114] SCDHEC, *South Carolina Ambient Groundwater Quality Monitoring Network 2003 Annual Report,* (October 2005).
[115] *Ibid.*
[116] *Ibid.*
[117] *Ibid.*
[118] *Ibid.*

away from the coast), and would not be impacted by construction or reached by pollutants filtering through sediment and rock. The Black Creek Aquifer does have recharge/discharge areas throughout the Little Pee Dee River and its associated swamp systems. However, except during long periods of drought conditions, wetlands mainly serve as groundwater discharge areas.[119] The Preferred Alternative would avoid and minimize any intrusion into wetlands if possible. For further information about wetlands, refer to Section 3.12, page 3-144.

Impacts could occur to the Surficial Aquifers due to its proximity to the surface, variability in depth, and that it contains unconfined units. During construction, the Surficial Aquifers could be exposed, leading to sediment entering the aquifers. Soluble materials such as petroleum products could be leaked or spilled during construction and enter these exposed areas and may cause contamination. However, BMPs would be in place, so if during construction, groundwater was encountered, a Spill, Prevention, Control, and Countermeasures Plan would be in place to manage spills and leaks of soluble materials.

While a majority of drinking water in the project study area is supplied through surface waters, Dillon, Horry, and Marion Counties use a substantial amount of groundwater for water supply, irrigation, and industrial uses.[120] Induced growth and development could increase the demand for groundwater needed in the project study area. Groundwater levels in aquifers are monitored by the United States Geological Survey and the SCDHEC. Dillon and Marion Counties are currently part of a six-county proposed capacity use area designated by SCDHEC to regulate the amount of groundwater being withdrawn and further protect the Middendorf and Black Creek Aquifers.[121] Horry County is within the Waccamaw Capacity Use Area, and regulations are already in place to regulate groundwater use. Any additional groundwater wells would require a permit prior to drilling, in accordance with state and local regulations.

3.17 SURFACE WATERS

3.17.1 What surface water resources are located within the project study area?

Eight drainage basins are found within South Carolina, and the Preferred Alternative is located in the Pee Dee River Basin. Four sub-basins make up the Pee Dee River Basin. Most of the project study area is located in the Pee Dee River Sub-basin, with a very small portion located in the Waccamaw/ Atlantic Intercoastal Waterway (AIWW) Sub-basin. The Pee Dee River Sub-basin consists of approximately 3,472 miles of streams, while the Waccamaw/ AIWW Sub-basin is composed of approximately 784 miles of streams (refer to Figure 3-32, page 3-211).[122]

[119] Ralph C. Heath, *Groundwater Recharge in North Carolina,* Prepared for the Groundwater Section of the Division of Environmental Management, North Carolina Department of Environment, Health and Natural Resources, (1994) http://h2o.enr.state.nc.us/aps/gpu/documents/Heath-gwrechargeinNC.pdf (September 20, 2007).
[120] SCDHEC, *South Carolina Water Use Report 2005 Annual Summary,* (January 30, 2007).
[121] SCDHEC, *Preliminary Assessment of the Groundwater Conditions in Part of the Pee Dee Region, South Carolina,* (2003) http://www.scdhec.net/environment/water/docs/pdrprt.pdf (September 11, 2007).
[122] South Carolina Department of Health and Environmental Control, Watershed Management Website, http://www.scdhec.net/environment/water/shed/pd_main.htm (September 20, 2007).

The Pee Dee River Sub-basin contains 27 watershed units, five of which are crossed by the Preferred Alternative (refer to Figure 3-32) while the Waccamaw/ AIWW Sub-basin contains 11 watershed units, one of which is crossed by the Preferred Alternative (refer to Figure 3-32). A list of the watershed units is located in Table 3.54 (refer to page 3-212).

Watershed Units

SCDHEC, in cooperation with the United States Geological Survey, have delineated watershed basins based on topographical maps into smaller units so that water resource planning and data collection can be performed in a more systematic and meaningful manner. Each number in a hydrologic unit code (HUC) has a specific meaning.

A watershed unit number can be read in the following manner:
11- digit HUC: 03040201-150

03 represents the region number
0304 is the sub-region
030402 is the accounting unit
03040201 is the cataloging unit
03040201-150 is the watershed unit

3.17.2 What are the designations of the surface waters?

The majority of the surface waters are designated by the SCDHEC as *freshwater*. Table 3.54 (refer to page 3-212), lists some major streams that are located within the project study area. *Freshwaters* are surface waters that are suitable for primary and secondary contact recreation and as a source for drinking water supply after conventional treatment in accordance with the requirements of SCDHEC. Systems designated as *freshwater* are also suitable for fishing and the survival and propagation of a balanced native aquatic community of fauna and flora, along with industrial and agricultural uses.[123] An asterisk by the word *freshwater* indicates that SCDHEC has set site specific standards for that waterbody. In this case, all of the *freshwater* marked with an asterisk in Table 3.54 (refer to page 3-212) refers to a set standard for pH (5.0 to 8.5) and dissolved oxygen (not less than 4.0 mg/l) in the stream.[124]

A few of the surface waters in the project study area are designated as *outstanding resource waters* by the SCDHEC (Table 3.54, refer to page 3-212). Waters are designated as outstanding resources because they are an outstanding ecological or recreational resource or because they are used as a drinking water source (with applicable treatment levels).[125]

3.17.3 What drinking water sources are in the project study area?

Drinking water sources in the project study area come from both groundwater and surface water sources. The USEPA, on its Safe Drinking Water Information System (SDWIS),[126] lists the main water systems in the project study area, along with the number of people served by the water system, and the source (refer to Table 3.55, page 3-213). The Black Creek and Middendorf Aquifers are used for supplying groundwater to users. There are no sole source aquifers located within the project study area.

[123] *Ibid.*
[124] *Ibid.*
[125] SCDHEC, *Water Classifications and Standards* (Regulations 61-68), *Classified Water* (Regulation 61-69), Columbia, SC, (June 26, 1998).
[126] USEPA. Safe Drinking water Information System, List of Water Systems in SDWIS, http://www.epa.gov/safewater/dwinfo/sc.htm#offices (September 20, 2007).

Dillon
Nichols
Mullins
Latta
Marion
Aynor
Little Pee Dee River (03040204-030)
Little Pee Dee River (03040204-060)
Buck Swamp (03040204-050)
Lake Swamp (03040204-080)
Kingston Lake (03040206-130)
Catfish Creek (03040201-150)
Great Pee Dee River (03040201-120)
Little Pee Dee River (03040204-070)
Brunson Swamp (03040204-090)
Little Pee Dee River (03040204-070)
LITTLE PEE DEE RIVER
BUCK SWAMP
REEDY CREEK
LITTLE REEDY CREEK
LAKE SWAMP
LOOSING SWAMP
JOINER SWAMP
SMITH SWAMP
CATFISH CANAL
DAWSEY SWAMP
CHINNERS SWAMP
BRUNSON SWAMP
SPRING SWAMP
BROWN SWAMP
95
9
41
57
76
917
701
410
38
501
301
319

Legend

- City

SCDHEC Water Quality Stations

- Impaired
- Not Impaired
- NPDES Permitted Site
- Interstate
- Highway
- County Boundary
- Watershed Units Not Directly Impacted

SCDHEC Water Quality Classifications

- Freshwater
- Freshwater - Specific Standard
- Outstanding Resource Waters
- Alternative Construction Limit
- Study Area Boundary

0 2.5 5 7.5 Miles

N E W S

FIGURE 3-32

POTENTIALLY IMPACTED WATERSHED UNITS

Table 3.54
Sub-basins, Watershed Units, and Majors Streams in Project Study Area
Interstate 73 FEIS: I-95 to the Myrtle Beach Region

Sub-basin	Watershed Unit (11-digit Hydrological Unit Code)	Major Stream Names	Water Classification
Pee Dee River Sub-basin	Catfish Creek (03040201-150)	Catfish Canal Tributary	FW
		Smith Swamp	FW*
		Smith Swamp Tributary	FW*
		Stackhouse Creek	FW
	Buck Swamp (03040204-050)	Little Reedy Creek Tributary	FW
		Mill Creek Tributary	FW
		Buck Swamp	FW*
		The Gulley	FW
		Maidendown Swamp	FW*
	Little Pee Dee River (03040204-070)	Back Swamp	ORW
		Little Pee Dee River	ORW
		Dawsey Swamp	ORW
		Tredwell Swamp	ORW
		Reedy Creek	ORW
		Brown Swamp	FW*
	Lake Swamp (03040204-080)	Lake Swamp	FW*
		Black Creek	ORW
		Joiner Swamp Tributary	FW
		Joiner Swamp	FW
		Loosing Swamp	FW
		Mill Branch	FW
	Brunson Swamp (03040204-090)	Chinners Swamp Mill Branch	FW*
		Chinners Swamp	FW*
		Chinners Swamp Tributary	FW*
		Spring Swamp	FW
		Savannah Creek	FW*
		Brunson Swamp	FW
		Palmetto Swamp	FW
Waccamaw/ AIWW Sub-basin	Kingston Lake (03040206-130)	Poplar Swamp Cross Branch	FW

FW—*Freshwater*s that are suitable for primary and secondary contact recreation and as a source for drinking water supply, after conventional treatment, in accordance with SCDHEC. These waters are suitable for fishing, and the survival and propagation of a balanced indigenous aquatic community of fauna and flora. This class is also suitable for industrial and agricultural uses.
FW*— *Freshwater*s that, in addition to the above definition, must have a pH between 5.0 and 8.5 and the dissolved oxygen level cannot be lower than 4.0 mg/l.
ORW—Outstanding resource waters are freshwaters or saltwaters which constitute an outstanding recreational or ecological resource, or those *Freshwater*s suitable as a source for drinking water supply purposed, with treatment levels specified by SCDHEC.[1]

Table 3.55
Water Service Providers in the Project Study Area
Interstate 73 FEIS: I-95 to the Myrtle Beach Region

Water Service Provider	Primary Water Source	Population (by number) Served	Principal County Served
City of Dillon	Groundwater	7,653	Dillon
Town of Lake View	Groundwater	789	Dillon
Town of Latta	Groundwater	2,046	Dillon
Trico Water Co	Groundwater	14,661	Dillon
Marco Rural Water Co	Groundwater	13,451	Marion
City of Marion	Groundwater	7,630	Marion
City of Mullins	Groundwater	5,826	Marion
Town of Nichols	Groundwater	408	Marion
Bucksport Water Co	Groundwater	10,324	Horry
City of Conway	Surface Water	18,716	Horry
Conway Rural	Surface Water	8,293	Horry
Grand Strand W&SA	Surface Water	85,960	Horry
Little River W&SA	Surface Water	15,284	Horry
City of Loris	Surface Water	3,024	Horry
City of Myrtle Beach	Surface Water	25,000	Horry
City of N. Myrtle Beach	Surface Water	25,558	Horry
Ocean Lakes Ltd	Surface Water	8,072	Horry
Thompkins MHP	Groundwater	45	Horry

3.17.4 How is surface water quality evaluated?

Under the *Clean Water Act*, states are required to record the condition of their surface waters with 305(b) and 303(d) documentation. The 305(b) documentation serves to evaluate the extent to which surface waters are supporting their designated uses for categories such as drinking water supply, aquatic life, recreational use, and fish consumption. SCDHEC produces Watershed Water Quality Assessments (WWQA) to meet the evaluation of their streams under 305(b). The 2000 WWQA describes the most currently known watershed conditions and trends that are developing based on data collected from various monitoring stations that are located along water bodies throughout the state.

The SCDHEC develops a priority list of water bodies pursuant to Section 303(d) of the *Clean Water Act*, 40 CFR §130.7, and in compliance with the requirements of the current regulation. These water bodies are targeted for water quality management action and are listed in the *State of South Carolina Section 303(d) List for 2006*.[127] Water quality monitoring stations that are on the 2006 303(d) List and within five miles of the Preferred Alternative are shown in Table 3.56. These sites are listed based on the water quality at the monitoring stations during the time samples were taken. Since the length of the impaired area around the water quality monitoring station is unidentified by SCDHEC, crossings within a five-mile distance from the station were considered impaired for purposes of this document.

[127] SCDHEC, *The State of South Carolina's 2006 Integrated Report, Part I: Listing of Impaired Waters,* (2006). http://www.scdhec.gov/environment/water/docs/06_303d.pdf (September 20, 2007).

Table 3.56
2006 303(d) List of Impaired Streams being crossed within five miles of the Preferred Alternative
Interstate 73 FEIS: I-95 to the Myrtle Beach Region

Stream	Monitoring Station Location	Impairment
Buck Swamp (blackwater system) Unit 03040204-050	PD-349: At State Route 42 Crossing, just North of Mullins before confluence with Little Pee Dee River	-Aquatic life use impairment due to low dissolved oxygen.
White Oak Creek (blackwater system, but has abnormally low DO levels) Unit 03040204-070	PD-037: At State Route 31 Crossing	-Aquatic life use impairment due to low dissolved oxygen; -Recreational use impairment due to high fecal coliform levels.

Watersheds within South Carolina were classified into one of the four following categories:

- Category I – Watersheds in Need of Restoration. These watersheds do not meet, or face imminent threat of not meeting, clean water and other natural resource goals;
- Category II – Watersheds Meeting Goals, Including Those Needing Action to Sustain Water Quality. These watersheds meet clean water and other natural resource goals and standards and support healthy aquatic systems;
- Category III – Watersheds with Pristine/Sensitive Aquatic Systems Conditions on Lands Administered by Federal, State, or Tribal governments; or
- Category IV – Watersheds with Insufficient Data to Make an Assessment.

The Pee Dee River Sub-basin was given a Category I rating (watershed in need of restoration) under the Unified Watershed Assessment since 31 percent of its assessed waters were impaired. The Waccamaw River/AIWW Sub-basin was also given a Category I rating (watershed in need of restoration) by the Unified Watershed Assessment because 87 percent of the assessed waters were impaired. Both sub-basins were designated as Priority One in the Watershed Restoration Priorities for fiscal year 1999-2000.

3.17.5 What is the surface water quality like in the Pee Dee River Sub-basin and Waccamaw/AIWW Sub-basin?

Water quality sampling results reported for watershed units in the Pee Dee River Sub-basin and the Waccamaw/AIWW Sub-basin were available, to varying extents, from 1998, 2000, 2002, and 2004. Sources for the information used included the SCDHEC WWQA for the Pee Dee Basin for 2000[128] as well as the State of South Carolina Section 303(d) Lists for 1998, 2000, 2002, 2004, and 2006. The watershed units in this area either drain to the Great Pee Dee, Little Pee Dee, or the Waccamaw Rivers,

[128] SCDHEC, *Watershed Water Quality Assessment: Pee Dee Basin,* (2000) http://www.scdhec.net/environment/water/shed/text/peedee2k1.pdf (September 20, 2007).

depending on topography and natural drainage systems in the area. Watershed units discussed below include only those being crossed by the Preferred Alternative. The remaining watershed units within the project study area are discussed in Appendix C of this document.

Eight of the ten stations chosen for analysis of current water conditions within the watershed units are closely associated with known NPDES discharge sites. Not surprisingly, these eight stations have been designated as having impaired waters through the 303(d) process. The one unimpaired station, located within the Lake Swamp watershed unit, is not associated with a NPDES discharge and is upstream from numerous ditch and tributary crossings. This station is not classified as impaired and for lack of a closer station to the project study area, project waters within a five-mile radius of this station were considered unimpaired.

NPDES

NPDES stands for the National Pollutant Discharge Elimination System. The program was set up by the USEPA by authority under the Clean Water Act to reduce pollution into streams. Any discharge into surface waters (except for personal residences) must have a permit in order to discharge effluent. States are authorized by the USEPA to regulate the NPDES program and permitting process.

3.17.5.1 Watershed units which drain into the Great Pee Dee River

Catfish Creek watershed unit 03040201-150

Catfish Creek watershed unit 03040201-150 (Figure 3-32, page 3-211) is located in portions of Marion and Dillon Counties. Major streams in this system are Catfish Canal, Smith Swamp, Stackhouse Creek, and Collins Creek. These streams are located south and southwest of the Town of Latta near I-95 and extend toward the City of Marion. Catfish Canal, which receives drainage from Stackhouse Creek, and Collins Creek which receives drainage from Smith Swamp, join to form the headwaters of Catfish Creek, which flows into the Great Pee Dee River. Smith Swamp and Catfish Creek are designated as *freshwater*s with specific pH and dissolved oxygen standards, while the rest of the streams in the watershed are classified as regular *freshwater*s.[129]

Smith Swamp has two monitoring stations located on it (PD-187 and PD-320), both of which are located close to the City of Marion. Smith Swamp is a blackwater system, which normally has low dissolved oxygen concentrations and pH levels due to the high amount of organic material being decomposed in the stream. The monitoring station located where U.S. Route 501 crosses this stream (PD-187) is non-supportive of aquatic life uses due to high concentrations of copper according to the 2000 WWQA. The monitoring station located where S.C. Route 19 crosses Smith Swamp (PD-320) was fully supportive of aquatic life uses in 2000. Both stations were partially supportive of recreational uses due to high fecal coliform bacteria levels at the sites. The 2004 303(d) List had both sites impaired for aquatic life uses due to low dissolved oxygen levels and impaired for recreational

[129] The specific pH (5.0 to 8.5) and dissolved oxygen (no less than 4.0 mg/L) levels set by SCDHEC for *freshwater* streams are the same throughout the watershed units in the project study area.

uses due to high levels of fecal coliform bacteria, while the 2006 List only has these stations impaired for aquatic life uses due to low dissolved oxygen levels, indicating some improvement at the stations.

Due to the close proximity of the City of Marion, sources of impairment for this watershed could be from nonpoint sources. These monitoring stations are also located in close proximity to a NPDES discharge site from the City of Marion, which discharges municipal effluent. Catfish Canal and Stackhouse Creek have no monitoring stations; therefore, the water quality of the streams is unknown at this time.

Two NPDES permitted discharges are located on Catfish Canal. Trico/Fred Hyatt Water Treatment Plant discharges municipal effluent, and Al Williams Enterprises discharges industrial effluent, both into Catfish Canal. Three mines are also in this watershed unit and are regulated by the Nonpoint Source Management Program. The mines are Marion County Bobby Mace Borrow Pit, City of Marion Coleman Mine, and the Bakers Brothers of Gresham, Inc., all of which extract sand and clay. Based on the water quality monitoring information, 2006 303(d) List, and the type of system, dissolved oxygen and pH levels are anticipated to be low throughout the watershed unit in the vicinity of the water quality monitoring stations. Due to the lack of water quality monitoring stations throughout the rest of the watershed unit, the water quality is unknown at this time.

3.17.5.2 Watershed units which drain into the Little Pee Dee River

Buck Swamp watershed unit 03040204-050

The Buck Swamp watershed unit 03040204-050 is located north and northeast of Latta, running in an easterly direction towards the City of Mullins in Dillon County and in Marion County (refer to Figure 3-32, page 3-211). Reedy Creek and its tributaries form the headwaters of Buck Swamp northwest of Latta. Buck Swamp flows northeast to east towards Mullins and receives drainage from Mill Creek, The Gully, and Maidendown Swamp before ultimately flowing into the Little Pee Dee River northeast of Mullins. All streams in the watershed are classified as *freshwater*s, with Buck Swamp and Maidendown Swamp having specific standards for dissolved oxygen and pH.

Buck Swamp is a blackwater system, and has two monitoring stations. One of the sites (PD-031) is located just east of Latta, and according to the 2000 WWQA, aquatic life and recreational uses were fully supported. However, it was listed on the 2006 303(d) List for impaired aquatic uses due to the low dissolved oxygen levels. The impairments could be due to NPDES permitted discharge of municipal effluent upstream of this station by the Town of Latta, along with nonpoint source pollution from the town. In addition, AVM Incorporated is an NPDES permitted discharger of industrial effluent into Maidendown Swamp. Sampling data collected from 1999-2004 at this station shows that, on average, dissolved oxygen levels were lower than the standard criteria.

The second monitoring station is located north of Mullins just before Buck Swamp's confluence with the Little Pee Dee River (PD-349). The site was fully supporting aquatic life and recreational uses based on the 2000 WWQA. However, the site was listed on the 2004 303(d) List for impaired aquatic life uses to due low dissolved oxygen levels and is listed for impaired aquatic life uses and impaired recreational uses on the 2006 List. Sampling data shows that the average levels over a five-year period between 1999 and 2004 were within the standard criteria. Based on the water quality monitoring information, 2006 303(d) List, and the characteristics of the blackwater system, dissolved oxygen and pH levels are anticipated to be low throughout the watershed unit in areas in close proximity to the monitoring stations.

Little Pee Dee River watershed unit 03040204-070

The Little Pee Dee River watershed unit 03040204-070 is located in Marion and Horry counties from Mullins south to Aynor (refer to Figure 3-32, page 3-211).

White Oak Creek is a tributary to Brown Swamp, which flows into the Little Pee Dee River southeast of Mullins. White Oak Creek and Brown Swamp are both blackwater systems and designated as *freshwater* streams with specific standards for dissolved oxygen and pH.

A monitoring station for White Oak Creek is located at its confluence with Brown Swamp (PD-037). Based on the WWQA, dissolved oxygen levels were abnormally low at this site and the 5-day biochemical oxygen demand was high. Phosphorus levels and turbidity were also high. Aquatic life support uses are only partially supported, and the site was on the 2006 303(d) List for low dissolved oxygen levels impairing aquatic life uses. Sampling data shows that the average levels over a five-year period between 1999 and 2004 were within the standard criteria. The Mullins wastewater treatment plant is located upstream of this monitoring station and could be a source of the impairments due to the NPDES discharges. The City of Mullins could also be contributing to the impairment sources through nonpoint source runoff pollution from the city. A Total Maximum Daily Load (TMDL) program is in place for White Oak Creek in the vicinity of Station PD-037.

TMDL

A Total Maximum Daily Load (TMDL) is the maximum amount of pollutant that can enter into a waterbody, allocated among the sources of the pollutant, and the waterbody still meet water quality standards.

The other streams in the watershed unit, Back Swamp, Dawsey Swamp, Tredwell Swamp, and Reedy Creek all accept drainage from smaller tributaries and flow into the Little Pee Dee River. There are no monitoring stations on any of these streams. All of the waters are classified as *outstanding resource waters* by the SCDHEC.

The Little Pee Dee River has a monitoring station in this watershed unit, near U.S. Route 501 at Galivants Ferry (PD-619). The site was designated as an *outstanding resource water* in the 2000 WWQA, however, it was non-supportive of aquatic life uses due to high concentrations of copper.

The monitoring station site was also listed on the 303(d) list for 2004 due to the high copper concentrations which prevented aquatic life support uses as well as being under a fish consumption advisory due to the high concentrations of mercury. The 2006 List has this site under a fish consumption advisory due to high levels of mercury. According to sampling data over the five-year period from 1999 to 2004, pH was slightly below and copper was in excess of the standard criteria.

NPDES dischargers in this watershed unit include the Locust Tree Development, APAC-Carolina, Incorporated, (Raines Plant), and B & M Aquaculture Farms, which discharge industrial effluent. The Marion County/Centenary Sewer System also discharges municipal effluent into this watershed. Seven mines exist in the watershed unit according to the WWQA, all of which are regulated under the Nonpoint Source Management Program. These mines include Baker Brothers of Gresham, Incorporated, APAC-Carolina, Incorporated, Carolina Sand, Incorporated, Weaver Company, Incorporated (Cannon Spring and Johnston Mines), G&C Incorporated, Cavu Incorporated, and Submit Incorporated. These mines extract sand, clay, and limestone. While most of the watershed unit contains outstanding resources, these waters are impaired for aquatic life and under a fish consumption advisory. Based on the information from the water quality monitoring sites, aquatic life impairments would be expected due to high copper levels and low dissolved levels in the watershed unit, especially in close proximity to the monitoring stations.

Lake Swamp watershed unit 03040204-080

The Lake Swamp watershed unit 03040204-080 is located east and northeast of Aynor in Horry County (refer to Figure 3-32, page 3-211). Black Creek flows into the Little Pee Dee River and is considered an *outstanding resource water*. Reedy Branch, Joiner Creek (or Swamp) and Loosing Swamp all drain into Lake Swamp and are classified as *freshwater*s in the 2000 WWQA. Lake Swamp, a blackwater system, is designated as *freshwater* with specific standards for dissolved oxygen and pH.

Lake Swamp has one monitoring station located downstream from its confluence with Loosing Swamp (PD-176) and aquatic life and recreational uses were fully supported at this site in 2000, according to the WWQA. No other monitoring sites occur on the other stream sites; however, the aforementioned station occurs downstream from the confluences of all the tributaries to Lake Swamp. According to sampling data from 1999 to 2004, on average, all sampling data were within the standard criteria.

The City of Loris wastewater treatment plant discharges municipal effluent under the NPDES system into a tributary of Lake Swamp. One sprayfield, owned by the Grand Strand Water and Sewer Authority, exists under the Nonpoint Source Management Program, at Green Sea Floyds High School. Black Creek Mine is also in this watershed and is regulated by the Nonpoint Source Management Program for sand mining. The water quality at the monitoring station was not impaired; however, this station is located in a relatively pristine area of the watershed unit. Due to the lack of other monitoring stations, it is unknown whether the rest of the watershed unit is unimpaired.

Brunson Swamp watershed unit 03040204-090

Brunson Swamp watershed unit 03040204-090 is located southeast of Aynor in Horry County (Figure 3-32, page 3-211). There are three tributaries to Brunson Swamp: Chinners Swamp (which includes Mill Branch and Savannah Creek), Spring Swamp, and Palmetto Swamp. Brunson Swamp then drains into the Little Pee Dee River. All the streams in the watershed are designated as *freshwater*s.

Chinners Swamp accepts drainage from Mill Branch and Savannah Creek before flowing into Brunson Swamp. Two monitoring stations are located along Chinners Swamp. One site is located just downstream of the confluence of Chinners Swamp and Mill Branch, near Aynor. Based on the 2000 WWQA, aquatic life and recreational uses are fully supported at this site. Downstream of this site prior to the confluence of Chinners and Brunson Swamps is where monitoring station PD-352 is located. According to sampling data from 1999 to 2004, on average, all sampling data were within the standard criteria except chromium. Aquatic life uses are fully supported at the site according to the 2000 WWQA, but recreational uses are only partially supported due to high fecal coliform bacteria levels in the stream. The site was also listed as impaired for the same reason on the 2004 303(d) List. However, the site is no longer listed for recreational use impairment on the 2006 List. A TMDL is in place for Chinners Swamp in the vicinity of station PD-352.

There are no monitoring stations for Spring Swamp, Palmetto Swamp, or Brunson Swamp. Therefore, the water quality of the streams is unknown.

NPDES discharges occur in this watershed unit, mainly around the Town of Aynor, which is west of Chinners Swamp. The Grand Strand Water and Sewer Authority/Aynor wastewater treatment plant discharges municipal effluent while the Corner Cupboard discharges industrial effluent. Nonpoint source pollution runoff also is possible from Aynor. Based on the information from the water quality monitoring information, some areas of the watershed unit are impaired for recreational uses due to high fecal coliform levels; other areas of the watershed unit may be impaired, due to the lack of information, it is unknown at this time.

3.17.5.3 Watershed units which drain into the Waccamaw River/AIWW

Kingston Lake watershed unit 03040206-130

Kingston Lake watershed unit 03040206-130 is located northwest of Conway in Horry County (refer to Figure 3-32, page 3-211). Maple Swamp receives drainage from Poplar Swamp and Horse Creek before flowing into the Kingston Lake watershed prior to draining into the Waccamaw River. Maple Swamp, Poplar Swamp, and Horse Creek are classified as *freshwater*s. The water quality of these streams is currently unknown because no monitoring stations exist on them; the nearest station is located at Kingston Lake. The Chiquolas Spinners/ Conway Plant discharges industrial effluent under the NPDES. Thompkins & Associates mines limestone under the Nonpoint Source Management Program.

3.17.6 How would water quality be impacted by the No-build and Preferred Alternatives?

For the water quality section, all streams and ditches designated as a blue or blue-dashed line on the United States Geological Service topographical maps were considered streams. Some of these streams are actually ditches, or may no longer exist. The Wetlands Section (refer to Section 3.12, page 3-144) counted only jurisdictional streams/ditches that were delineated during fieldwork, and did not include non-jurisdictional ditches. Water quality impacts could result from the potential pollutant buildup in the project study area from increased in traffic volumes. Inorganic materials, volatile compounds (from petroleum products), dust from vehicle brakes and exhaust, and heavy metals can build-up on roadways and runoff into streams and wetlands due to rain.

In addition, water quality impacts could occur from activities associated with normal operation and maintenance of the roadway from spraying of herbicides or use of paint and other materials. BMPs would be used for maintenance of the road and the use of herbicides in the right-of-way. The implementation of BMPs would minimize impacts from these maintenance activities would not have an impact to water quality in the project study area.

3.17.6.1 How much pollutant would runoff into streams in the project study area due to the No-build and Preferred Alternatives?

An analysis was done using the FHWA's "Constituents of Highway Runoff" to estimate the amount of pollutant that would enter streams after a twenty-day build-up period, assuming there were no structures such as retention basins or ditches to filter sediment.[130] The volume of traffic and the estimated length of the Preferred Alternative within each watershed unit was used to calculate the pollutant load for one point per watershed unit. Standard equations were used to calculate the constituents in the pollutant load, which were developed based on studies completed on a rural interstate highway in Pennsylvania. In general, the potential is higher for pollutants to drain into streams that are in urbanized areas when compared with those located in rural areas. This is due to the amount of vegetation along the sides of roadways that would filter pollutant prior to it draining into a stream. The results of this model and the constituent listing[131] are shown in Table 3.57 (refer to page 3-221).

The No-build Alternative would result in no additional pollutants entering streams at listed crossings of the Preferred Alternative. However, traffic volumes would be expected to increase on other roadways in the project study area over time, and pollutant loading would occur into different portions of the watershed units, depending on the locations of stream crossings. The pollutant runoff model was used to estimate the pollutant load that would enter stream/ditch crossings on U.S. Route 501 in 2030 without the Preferred Alternative (this is assuming that the pollutants are not being filtered through grass, sediment basins, or other stormwater treatment structures).

[130] FHWA, 1981. FHWA/RD-81/042: "Constituents of Highway Runoff". Washington, D.C., (1981).
[131] Using the model's equations, the sum of the constituents does not equal the amount of total solids.

Table 3.57
Pollutant Discharge by Pounds in Year 2030
Interstate 73 FEIS: I-95 to the Myrtle Beach Region

	No-build Alternative	Preferred Alternative
Total Solids	**3,047**	**3,231**
Suspended Solids	435	664
Total Organic Carbon	115	159
Chemical Oxygen Demand	277	289
Total Nitrogen	7	7
Total Kjeldahl Nitrogen	19	17
Total Phosphorus	3	4
Lead	1	1
Zinc	1	1
Iron	19	29
Chloride*	458	467
Other Heavy Metals†	-	-

†No detectable levels of Copper, Cadmium, Chromium, and Mercury were found to accumulate over a 20-day period based on the model.
* The equation is based on an interstate in a northern area where salts and deicers are used for roadways, unlike the proposed project which more than likely will never have any road salt or deicing materials spread on it. It is likely this number is greater than the actual amount of chloride due to the basis of the model.

Based on the calculated estimates from the model, the Preferred Alternative would generally have the same estimated amount of pollutant discharge as the No-build Alternative per storm event (refer to Table 3.57). In terms of constituents, no detectable levels of copper, cadmium, chromium, or mercury would be deposited into streams.

The watershed units in the project study area are natural blackwater systems, with low dissolved oxygen levels and pH, most of which have impaired water quality at monitoring stations, except the station located at the Lake Swamp watershed unit. These systems would continue to have low dissolved oxygen levels and pH due to their natural conditions, regardless of pollutant runoff into the streams.

3.17.6.2 How would the No-build Alternative impact water quality?

The No-build Alternative would result in additional stream impacts throughout the aforementioned watershed units except the Lake Swamp watershed unit (03040204-080). The No-build Alternative could also impact the watershed units listed below and summarized in Table 3.58. The stream impacts for the No-build Alternative were based on projected land use growth and the proposed 17,000 acres of new development in Marion County.

Table 3.58
Streams Impacted by Predicted Development in the Project Study Area
Interstate 73 FEIS: I-95 to the Myrtle Beach Region

		No-build Alternative	Preferred Alternative	Cumulative Development Impact
Great Pee Dee River 03040201	Pee Dee River (-120)	33FW	No Impact	33FW
	Catfish Creek (-150)	9FW	8FW	17FW
	Pee Dee River (-170)	2FW	No Impact	2FW
Little Pee Dee River 03040204	Little Pee Dee River (-030)	3FW	3FW	6FW
	Buck Swamp (-050)	1FW	5FW	6FW
	Little Pee Dee River (-070)	12FW 4FW* 1ORW	No Impact	12FW 4FW* 1ORW
	Lake Swamp (-080)	No Impact	No Impact	No Impact
	Brunson Swamp (-090)	6FW 12FW*	5FW*	6FW 17FW*
Waccamaw River/ AIWW 03040206	Waccamaw River (-120)	33FW	No Impact	33FW
	Kingston Lake (-130)	42FW	3FW	45FW
	Waccamaw River (-140)	2FW	No Impact	2FW

FW – *Freshwater*
FW*- *Freshwater* with specific standards set by SCDHEC
ORW- Outstanding Resource Waters

Pee Dee River Watershed Unit 03040201-120 – This watershed unit has four NPDES point and four nonpoint dischargers. A monitoring station (PD-337) is located in this watershed unit and is listed as impaired on the 2006 303(d) list for aquatic life support due to high nickel levels in the water. There is also a fish consumption advisory for this watershed unit due to high mercury levels. The No-build Alternative could have 33 *freshwater* stream impacts in this watershed unit, mainly due to the 17,000 acres of proposed development northwest of the City of Marion.

Catfish Creek Watershed Unit 03040201-150 – With the addition of growth projected in the No-build Alternative, nine *freshwater* streams could be impacted due to development.

Pee Dee River Watershed Unit 03040201-170 – Waccamaw National Wildlife Refuge is located in a portion of this watershed unit and would be federally protected from development. The No-build Alternative could result in additional development, which would impact two *freshwater* streams in this watershed unit.

Bull Creek is within this watershed and a major source of the drinking water provided by the Grand Strand Water and Sewer Authority. It is also used as drinking water for the City of Conway, the Town of Little River, and additional rural and contracted users.[132] As development increases throughout the eastern portion of the project study area, greater demand for water service could be anticipated.

Little Pee Dee River Watershed Unit 03040204-030 – Two water quality monitoring stations are located within this watershed unit, with Station PD-030 being impaired for aquatic life uses due to low dissolved oxygen levels and Station PD-030A being impaired for fish consumption due to high mercury levels. There are six NPDES point discharges, three NPDES nonpoint discharges, and two sand/clay mines in the watershed unit. TMDLs are in place for the streams containing station PD-030 and PD-030A. The No-build Alternative could impact three additional *freshwater* streams in the watershed unit.

Buck Swamp Watershed Unit 03040204-050 – The No-build Alternative could result in one stream crossing in the watershed unit, which is classified as a *freshwater* stream.

Little Pee Dee River Watershed Unit 03040204-070 – The No-build Alternative could result in additional impacts to 12 *freshwater* streams, four *freshwater* streams with specific standards, and one stream classified as an *outstanding resource water* in the watershed unit.

Brunson Swamp Watershed Unit 03040204-090 – The No-build Alternative could impact an additional six *freshwater* streams and 12 *freshwater* streams with specific standards.

Waccamaw River Watershed Unit 03040206-120 – Several water quality monitoring stations in this unit (CSTL-553, CSTL-554, and CSTL-555) are listed as impaired on the 2006 303(d) List due to a fish consumption advisory for high mercury levels. One NPDES permitted facility, one landfill, and four mines are located in this watershed. The No-build Alternative could be projected to impact 33 *freshwater* streams (or ditches).

Kingston Lake Watershed Unit 03040206-130 – The No-build Alternative is predicted to have an additional 42 *freshwater* streams potentially impacted by future growth and development.

Waccamaw River Watershed Unit 03040206-140 – There are six impaired monitoring stations that are listed on the 2006 303(d) list, five of which (Stations CSTL-556, CSTL-558, MD-136, MD-144, and MD-145) are listed due to high levels of mercury resulting in a fish consumption advisory. The other station (PD-638) is listed as impaired for aquatic life due to its macroinvertebrate community. TMDL programs are in place for the AIWW, and for the area around station MD-136 on the Waccamaw River. There are nine NPDES permitted facilities, two landfills, and eleven mines in this

[132] Grand Strand Water and Sewer Authority. Water Website, http://www.gswsa.com/ext/index.asp?main=water (September 20, 2007).

watershed unit. The Waccamaw National Wildlife Refuge is located in a portion of this watershed unit and would be federally protected from development. The No-build Alternative predicts that development could impact two *freshwater* streams.

3.17.6.3 How would the Preferred Alternative impact surface waters?

The Preferred Alternative would cross 71 streams/ditches in six different watershed units, including Catfish Creek (-150), Buck Swamp (-050), Little Pee Dee River (-070), Lake Swamp (-080), Brunson Swamp (-090), and Kingston Lake (-130). The most crossings would occur in the Buck Swamp watershed unit, while the second highest number of crossings would occur in the Lake Swamp (-080) watershed unit (refer to Table 3.59). A total of 62 *freshwaters*, six *freshwaters* with specific standards, and three *outstanding resource waters* would be crossed by the Preferred Alternative.

Table 3.59
Stream/Ditch Crossings by the Preferred Alternative
Interstate 73 FEIS: I-95 to the Myrtle Beach Region

			Preferred Alternative Stream/Ditch Crossings
Water Quality Classification	Freshwater		62
	Freshwater with Specific Standards		6
	Outstanding Resource Waters		3
Watershed Unit	Great Pee Dee River 03040201	Catfish Creek (-150)	13
	Little Pee Dee River 03040204	Buck Swamp (-050)	30
		Little Pee Dee River (-070)	4
		Lake Swamp (-080)	21
		Brunson Swamp (-090)	2
	Waccamaw River / AIWW 03040206	Kingston Lake (-130)	1
		Total Crossings	**71**

As previously mentioned, the Preferred Alternative would cross within a five-mile distance of two impaired sites (refer to Table 3.56, page 3-214). While Station PD-037 is impaired for both aquatic life and recreational uses, the station is upstream of the Preferred Alternative, and as such the Preferred Alternative would not be likely to further contribute to the impairment at the monitoring station. The Preferred Alternative would cross 4.6 miles upstream of Station PD-349, which is impaired for aquatic

life use due to low dissolved oxygen. Based on the pollutant runoff model, it is likely that nutrients could runoff into the stream, which may contribute to lower dissolved oxygen levels in the naturally blackwater stream.

3.17.6.4 What indirect impacts would occur from the No-build Alternative and Preferred Alternative?

The Preferred Alternative would indirectly impact streams in five different watershed units (refer to Table 3.58, refer to page 3-222). It is expected that five *freshwater*s with specific standards and 19 *freshwater*s could be impacted, in addition to the stream impacts from the No-build Alternative.

Stormwater runoff from impervious surfaces may also indirectly impact water quality in the project study area. Based on the land use model, the indirect and cumulative development in the project study area was analyzed by watershed unit. The amount of impervious surface in relation to a developed tract varies and is dependent on what the tract is being used for, i.e. residential, commercial, or industrial. Based on the NRCS's *Urban Hydrology for Small Watershed Basins: 1975,* the percentage of impervious surfaces would be 85 percent for commercial development, 72 percent for industrial development, 50 percent for public and institutional uses, and 25 percent for residential development.[133] Since the predicted development for the No-build Alternative and Preferred Alternative was distinguished by type (i.e. residential, commercial, etc.), the amount of development was multiplied by the corresponding percentage. The results are shown in Table 3.60, and separated by watershed unit (refer to Land Use, Section 3.1, page 3-1).

Impacts to watershed units begin to occur when 10 percent or more of the watershed unit is comprised of impervious surfaces.[134] The amount of impervious surfaces from future residential, commercial, and industrial uses are estimated to be approximately 10,947 acres (refer to Land Use, Section 3.1, page 3-1) from the No-build Alternative, and approximately 771 acres from the Preferred Alternative, cumulatively resulting in 11,718 acres of new impervious surfaces. When compared to the amount of total acres per watershed unit (refer to Table 3.60), and due to the rural nature of the project study area, no impacts are likely from the No-build or Preferred Alternatives as a result of the increase in impervious surfaces.

3.17.7 What are the cumulative impacts to water quality?

Numerous other roadway projects have been constructed, are currently being constructed, or are proposed within the Pee Dee River Sub-basin and Waccamaw/AIWW Sub-basin (refer to Figure 3-33), and have some effect on pollutant loading into streams in these sub-basins.

[133] USDA-NRCS Soil Conservation Service Engineering Division. *Urban Hydrology for Small Watershed Basins, Technical Release No. 55,* January 1, 1975.
[134] Schueler, T. The Center for Watershed Protection. "Watershed Protection Techniques." (Vol. 1, No. 3, Fall 1994).

Table 3.60
Anticipated Amount of New Impervious Surfaces by Induced Development in the Project Study Area (in acres)
Interstate 73 FEIS: I-95 to the Myrtle Beach Region

			Acres of Impervious Surface		Total acres per watershed unit	Percent Additional Impact
			No-Build Alternative	Preferred Alternative		
Watershed	Pee Dee River Sub-basin 03040201	03040201-120	5,190	0	62,577	8.29%
		03040201-150	2,815	175	111,365	2.68%
		03040201-170	10	0	12,232	0.08%
	Little Pee Dee River Sub-basin 03040204	03040204-030	13	24	107,952	0.03%
		03040204-050	38	100	97,538	0.14%
		03040204-070	727	126	178,640	0.48%
		03040204-080	5	0	144,086	0.003%
		03040204-090	567	41	53,102	1.14%
	Waccamaw River/ AIWW Sub-basin 03040206	03040206-120	66	0	56,419	0.12%
		03040206-130	1,487	293	83,408	2.13%
		03040206-140	28	0	79,592	0.04%
		Total	**10,946**	**759**	**986,911**	**1.19%**

In the Pee Dee Sub-basin, a seven-mile roadway widening project is currently being constructed in Dillon County along S.C. Route 38, extending from I-95 to Marion, South Carolina. I-73 North, a 36.8-mile new interstate, is proposed for construction between I-95 in Dillon County and I-73/74 in Richmond County, North Carolina, with new right-of-way varying from 300 to 400 feet. The Preferred Alternative for I-73 North would not cross any impaired streams or waters with special protections. Funding has not been secured for construction of I-73 North and it is uncertain when construction for the project will begin. A bridge replacement project on S.C. Route 917 at the Little Pee Dee River is also anticipated to occur. In addition, I-74 in North Carolina, which is partially in the Pee Dee Sub-basin, is proposed to be upgraded to interstate standards. It is uncertain at this time when the project would begin, or what additional effects it may have to the water quality in the sub-basin.

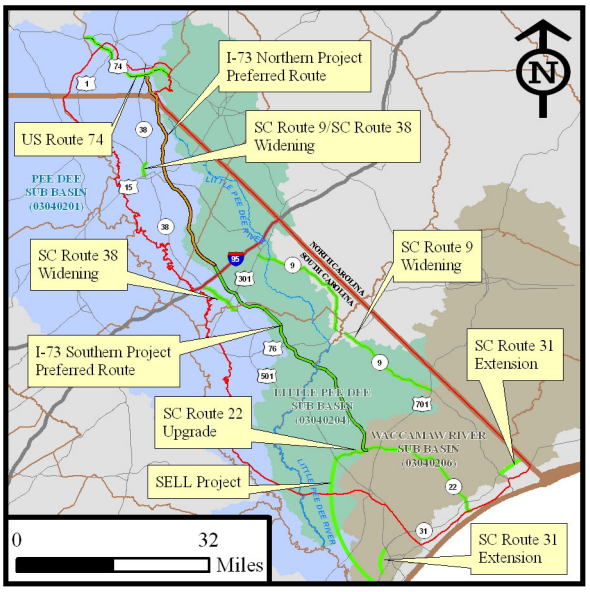

Figure 3-33: Other Projects occurring in the Pee Dee and Waccamaw Sub-basins

The construction of S.C. Route 22, which is a 28.5-mile stretch of roadway from S.C. Route 501 near Conway to North Myrtle Beach was within the Waccamaw/AIWW Sub-basin. S.C. Route 22 would be upgraded to interstate standards as part of I-73 South. Proposed for construction is the Southern Evacuation Lifeline, a new roadway extending from the Conway Bypass and terminating at either S.C. Route 544 or U.S. Route 17. A Preferred Alternative has not been selected for this project and it is uncertain when construction would begin. According to the *Statewide Transportation Improvement Program 2007 to 2012* (STIP), Carolina Bays Parkway (S.C. Route 31) is proposed to be extended south from S.C. Route 544 to S.C. Route 707 as well as north from S.C. Route 9 to the North Carolina State Line.[135] Encompassing both sub-basins, widening is also proposed in the STIP for S.C. Route 9 from I-95 in Dillon County to Road S-636 in Green Sea in Horry County. Although cumulative impacts to water quality could occur, the Section 401 water quality certification process would afford protection of the streams/ditches and watershed units identified within the project study area.

In addition to roadway projects, development of approximately 17,000 acres in Marion County, northwest of the City of Marion is proposed to occur, as well as the projected growth that is anticipated to occur throughout the entire project study area from the No-build Alternative. Prior to any construction, the proper permits for stormwater control and runoff would need to be obtained for these projects to be constructed. These projects would require that standards be met for run-off control and treatment. The requirements are designed to minimize potential impacts to water quality and volumes during construction and subsequent operation of these facilities.

3.17.8 What best management practices and measures to minimize the amount of runoff pollution into streams could be used?

The Preferred Alternative would be located in mainly rural areas, so the roadway design would include grassy swales and vegetated slopes on the sides of the pavement that would help filter pollutants from the runoff. The runoff would be routed through grassy ditches and as it moved through the ditches it would be filtered prior to entering streams. Retention ponds would be in place in some areas to allow pollutants to settle prior to entering streams. These design features, along with other BMPs found in the SCDOT and FHWA guidelines, would be used during construction to minimize the amount of runoff pollution entering streams.

Potential impacts to water quality from construction activities could be related to surface water runoff, accidental release of fuel or hydraulic fluids, sedimentation from soil erosion, and changes in stream channel grades. *The South Carolina Stormwater Management and Sediment Control Handbook for Land*

[135] SCDOT, *Statewide Transportation Improvement Program 2007 to 2012,* Revision 4, June 21, 2007, http://www.scdot.org/inside/pdfs/STIP.pdf (September 11, 2007).

Disturbance Activities,[136] provides information regarding stormwater management and sediment control during construction. Several BMPs may be used during construction include the following:

- land grading;
- construction of temporary diversions to dispose of runoff to control erosion and sedimentation;
- construction of diversion dikes to prevent sediment-laden runoff from exiting the construction site;
- construction of temporary sediment traps that would detain sediment-laden runoff and trap the sediment to prevent impacts to surrounding water bodies;
- construction of sediment basins;
- straw bale dikes; and,
- rock dams to retain sediment on the construction site and prevent sedimentation of off-site water bodies.

The contractor would be required to comply with Section 107.26, SCDHEC's *Environmental Protection and Water Pollution Control* from the *South Carolina Highway Department Standard Specifications for Highway Construction*.[137] In addition, the contractor would be required to comply with current federal and state laws, as well as regulations regarding water quality and stormwater management.

[136] SCDHEC-OCRM, *A Guide to Site Development and Best Management Practices for Stormwater Management and Sediment Control.*

[137] SCDHEC-OCRM, *South Carolina Stormwater Management and Sediment Control Handbook for Land Disturbance Activities* (2003), Appendix E.

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