Table 3.57, continued
State Listed Rare, Threatened, and Endangered Species
Known to Occur in Dillon County and Marlboro County, South Carolina, and Richmond County and Scotland County, North Carolina

Scientific Name	Common Name	Status	Habitat	Counties	Suitable Habitat Present?
ANIMALS					
Lampsilis cariosa	Yellow lamp mussel	S1	In gravel bars, margins of the flowing portions of water bodies and cracks in bedrock in both large rivers and small streams. Found in the Pee Dee River.	Richmond	No
Ligumia nasuta	Eastern pond mussel	S1	In lakes, ponds, streams and rivers of variable depths with muddy, sandy or gravelly substrates. Often found in very shallow water near the banks of rivers. Found in the Pee Dee River.	Richmond	Yes
Micrurus fulvius	Eastern coral snake	S1	In the Coastal Plain in sandy flatwoods, maritime forests, and sandhills with pines, scrub oaks, and wiregrass.	Scotland	Yes
Moxostoma robustum	Robust redhorse	S1	In mainstream rivers in riffles, runs and pools. Adults are usually found in association with tree snags, often in deep water near shore. Found in the Pee Dee River.	Richmond	No
Rana capito	Carolina gopher frog	S2	Dry, turkey oak-pine associations and other sandy areas in pine savannahs. Highly terrestrial, enter the water only to breed. When not active on the surface, they occupy burrows. Breeds in pine savanna ponds and Carolina bays.	Scotland	No
Semotilus lumbee	Sandhills chub	S2	In small headwater creeks, where it is often the only fish present, as well as in larger portions of creeks downstream, usually over gravel and /or sand.	Marlboro	Yes
Strophitus undulatus	Creeper	S2	In high quality rivers and streams, including the Pee Dee.	Richmond	No
Villosa vaughaniana	Carolina creek shell	S2	Endemic to the Carolinas in the Cape Fear, Catawba, Pee Dee and Santee-Cooper River basins. Burrows in mud or sand near banks or occasionally in gravelly sand in the main channel.	Richmond	No

Notes:
S1 = Critically imperiled statewide because of extreme rarity or because of some factor(s) making it especially vulnerable to extirpation.
S2 = Imperiled statewide because of rarity or factor(s) making it vulnerable.

Section 3.16 Groundwater Resources

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

The project study area in South Carolina is located above the Southeastern Coastal Plain Aquifer System, which is comprised of four regional aquifers, including the Surficial Aquifer, Chattahoochee River Aquifer, and the Black Warrior River Aquifer. The regional aquifers in the South Carolina portion of 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.[192] 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 3-33). 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.

The Surficial, Black Creek, and Middendorf Aquifers are the main groundwater sources in the South Carolina portion of the project study area.[193] 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 3-33). The Black Creek Aquifer is used as a groundwater source in the portion of the project study area in southern Marlboro and northern Dillon Counties 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 throughout most of Marlboro County.

[1192] USGS, *Groundwater Atlas of the United States: Alabama, Florida, Georgia, South Carol*ina, HA-730G, http://capp.water.usgs.gov/gwa/ch_g/G-text7.html (May 26, 2008).
[193] SCDHEC, *South Carolina Ambient Groundwater Quality Monitoring Network 2003 Annual Report*, (October 2005), http://www.scdhec.net/environment/water/docs/amb2003.pdf (May 26, 2008).

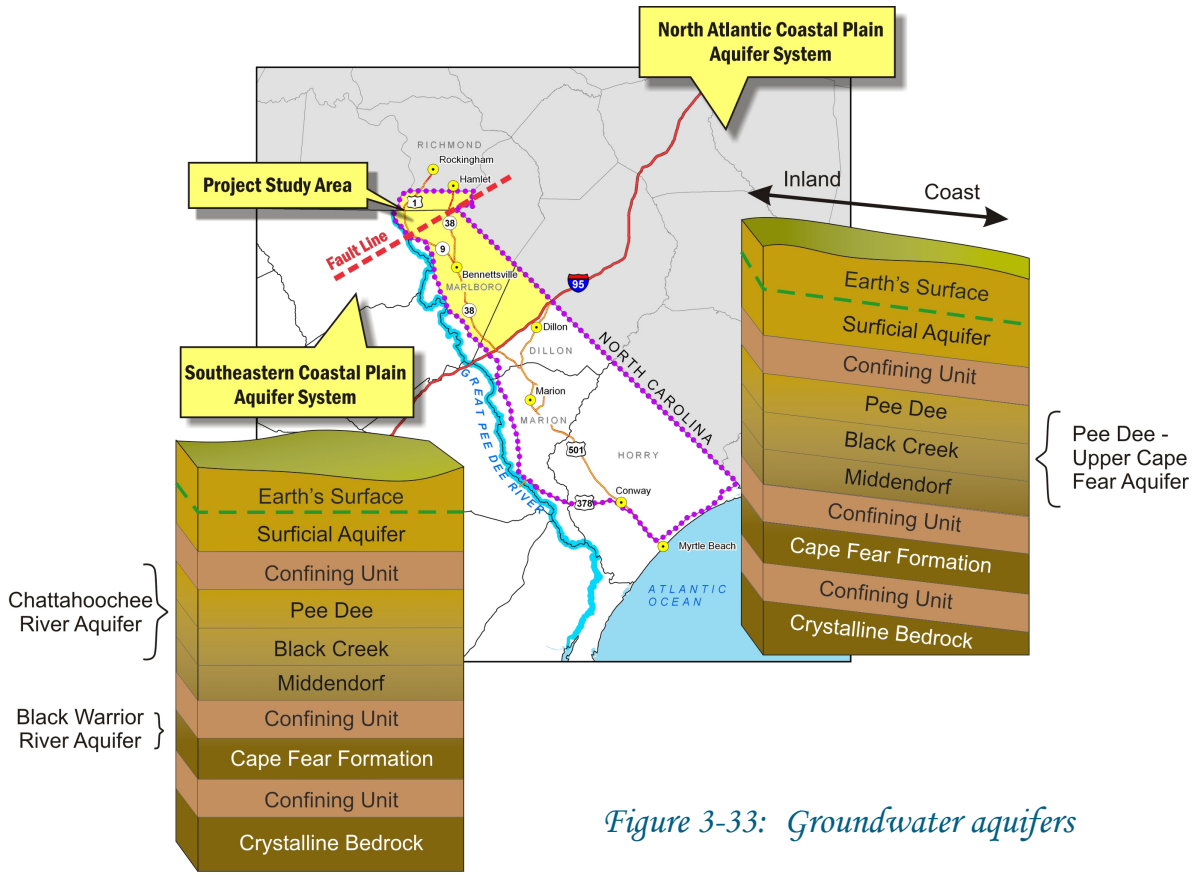

Figure 3-33: Groundwater aquifers

Source: USGS, Groundwater Atlas of the United States: Alabama, Florida, Georgia, South Carolina.

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.[194]

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

[194] *Ibid.*

solids and pH.[195] 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 United States Environmental Protection Agency (USEPA) standards in most of the wells sampled.[196] 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 in the northern portion of the project study area.[197]

The portion of the project study area in North Carolina is mostly located within the North Atlantic Coastal Plain Aquifer System. The Southeastern Coastal Plain Aquifer System slopes laterally into the North Atlantic Coastal Plain Aquifer System near the North Carolina and South Carolina state line in Scotland County then east towards the coastline (refer to Figure 3-33, page 3-239).[198] While there may be some geographic overlap, the aquifer systems are separated by thick confining units, which were believed to prevent intermixing of water between the two systems. According to the United States Geological Survey (USGS), a study is currently underway re-examining whether intermixing occurs between the two aquifer systems. Several regional aquifers within the two aquifer systems possess the same name (i.e., the Pee Dee Aquifers and the Black Creek Aquifers). These aquifers are in similar geographical positions within the Southeastern Coastal Plain and the North Atlantic Coastal Plain, and correlate to each other. However, the fact that two similarly named aquifers correlate does not necessarily mean that intermixing occurs or that they are the same aquifer.[199] The relationship between correlating aquifers is one facet of the USGS study.

The North Atlantic Coastal Plain Aquifer System is comprised of six regional aquifers, two of which are located in the project study area, the Surficial Aquifer and the Pee Dee – Upper Cape Fear Aquifer. The Surficial Aquifer in the North Atlantic Coastal Plain Aquifer System is similar to the one found in the Southeastern Coastal Plain Aquifer System, and consists of unconsolidated sand and gravel of marine and nonmarine origin. The Surficial Aquifer is recognized as a principal aquifer, even though it has a low potential to yield large volumes of water. In North Carolina, withdrawals from this aquifer are mainly for domestic and agricultural supplies. Water quality within the Surficial Aquifer is highly variable, dependent on the chemistry of precipitation and the underlying sediments. In general, precipitation contributions are dependent on proximity to coastal waters. Closer towards the coastline, precipitation contributes more dissolved sodium and chloride concentrations and less dissolved sulfate concentrations to the aquifer. Due to the short residence time, the dissolutions of minerals from within this aquifer to the aquifers below are restricted.[200]

[195] *Ibid.*
[196] *Ibid.*
[197] *Ibid.*
[198] USGS, *Ground Water Atlas of the United States: Delaware, Maryland, New Jersey, North Carolina, Pennsylvania, Virginia, West Virginia, HA 730-L*, http://capp.water.usgs.gov/gwa/ch_l/L-text3.html (May 26, 2008).
[199] *Ibid.*
[200] USGS, Ground Water Atlas of the United States: Delaware, Maryland, New Jersey, North Carolina, Pennsylvania, Virginia, West Virginia, HA 730-L, http://capp.water.usgs.gov/gwa/ch_l/L-text3.html (May 26, 2008).

The Pee Dee – Upper Cape Fear Aquifer is composed of three hydrogeologic units separated by clay and silt confining units: the local Pee Dee Aquifer, the Black Creek Aquifer, and the Upper Cape Fear Aquifer (refer to Figure 3-33, page 3-239). Of the three aquifers, groundwater from the Black Creek Aquifer is most commonly used for public, agricultural, mining, and industrial uses. Water quality within the Pee Dee – Upper Cape Fear Aquifer is highly variable, especially in regards to dissolved solids and sodium chloride. In general, dissolved solids concentration increase towards the coast, with significant saline concentrations being found along the coastline. Dissolved solids found in groundwater withdrawals near the coastline are composed primarily of shell materials, bicarbonate matrixes, and sodium chloride.[201] Specific data on the water quality for each hydrogeologic unit of the Pee Dee – Upper Cape Fear Aquifer is not available at this time.

3.16.2 How would groundwater resources be impacted by the proposed project?

It is not likely that this project would impact groundwater. The Middendorf Aquifer, Black Creek Aquifer, and Pee Dee – Upper Cape Fear Aquifer are confined units deep below the surface of the ground (depending on their distance 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.[202] This project would avoid and minimize any intrusion into wetlands wherever possible. For further information about wetlands, refer to Section 3.12, page 3-160.

Impacts could occur to the Surficial Aquifer due to its proximity to the surface, variability in depth, and that it contains unconfined units. During construction, the Surficial Aquifer 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, best management practices would be in place, such as a spill prevention control and countermeasures plan, to manage spills and leaks of soluble materials if a spill occurred during construction.

While the majority of drinking water in the project study area is supplied through surface waters, Dillon, Marlboro, Richmond, and Scotland Counties use a substantial amount of groundwater for water supply, irrigation, and industrial uses.[203] 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 NCDENR or SCDHEC in their respective

[201] *Ibid.*

[202] 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 (May 26, 2008).

[203] SCDHEC, *South Carolina Water Use Report 2005 Annual Summary*, (April, 2006) http://www.scdhec.gov/environment/water/docs/wtruse2005.pdf (May 26, 2008).

states. Dillon and Marlboro 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.[204] Any additional groundwater wells would need to be permitted prior to drilling, in accordance with state and local regulations.

3.17 Surface Water Resources

3.17.1 What drainage basin is the proposed project located within?

The proposed project is located within the Pee Dee River Basin, one of the eight drainage basins in South Carolina, and the Yadkin-Pee Dee Basin, one of North Carolina's seventeen drainage basins. The Pee Dee River Basin is composed of four sub-basins, while the Yadkin-Pee Dee River Basin is made up of 17 sub-basins. The project study area is located in the Pee Dee River Sub-basin in South Carolina and the Yadkin-Pee Dee River Sub-basin 03-07-16 in North Carolina. The Pee Dee River Sub-basin consists of approximately 3,472 miles of streams and 27 watershed units, eight of which occur within the project study area.[205] Sub-basin 03-07-16 has approximately 5,862 miles of streams and seventeen watershed units, three of which include the project study area.[206] Watershed units and major streams located in the project study area is shown on Figure 3-34. A list of the watershed units crossed by the Preferred Alternative is found in Table 3.58 (refer to page 3-244), along with a list of major streams found in each watershed unit.

3.17.2 What surface waters are located in the project study area?

All of the surface waters located in the South Carolina portion of the project study area are classified by SCDHEC as *freshwaters*. *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 *freshwaters* 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.[207]

In the North Carolina portion of the project study area, all of the surface waters are designated as Class C, Fishable and Swimmable Waters. Class C waters are protected for secondary recreation, fishing, wildlife, fish and aquatic life propagation and survival, agriculture, and other uses.

[204] SCDHEC, *Preliminary Assessment of the Groundwater Conditions in Part of the Pee Dee Region, South Carolina*, (2003) http://www.scdhec.gov/environment/water/docs/pdrprt.pdf (May 26, 2008).
[205] SCDHEC, Watershed and Planning: Pee Dee River Basin, http://www.scdhec.net/environment/water/shed/peedee.htm (May 26, 2008).
[206] NCDENR, Division of Water Quality, Yadkin-Pee Dee River Basin Executive Summary, http://h2o.enr.state.nc.us/basinwide/yadkin/Yadkin%20final%202003%20BP/Yad%20ExecSum.pdf (May 26, 2008).
[207] *Ibid.*

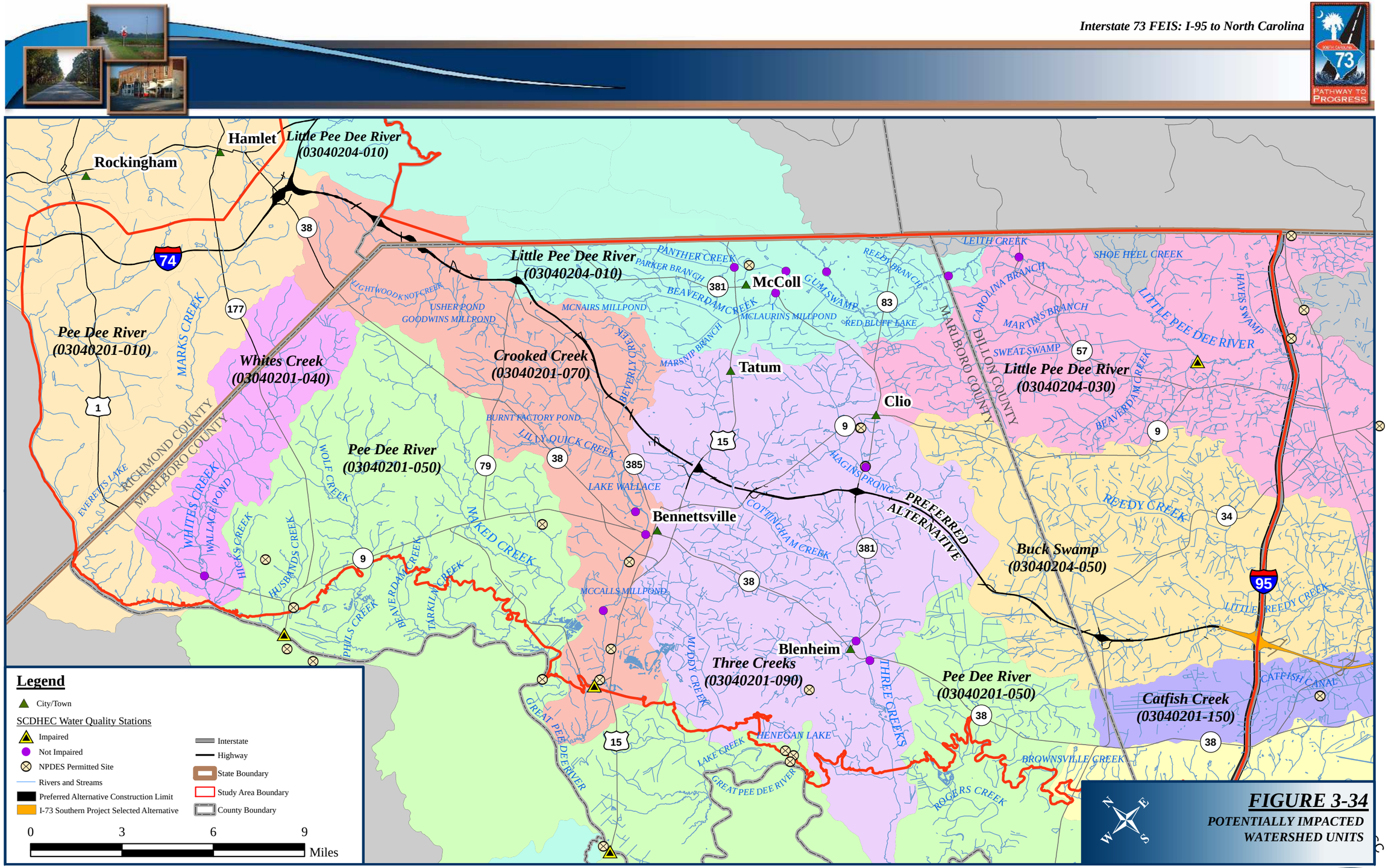

FIGURE 3-34
POTENTIALLY IMPACTED WATERSHED UNITS

Table 3.58
Sub-basins and Watershed Units Crossed by Preferred Alternative

Sub-basin	Watershed Unit (11-digit Hydrological Unit Code)	Major Streams within Watershed Unit	
Pee Dee River (SC) and Yadkin-Pee Dee River 03-07-16 (NC) Sub-basins	Pee Dee River (03040201-010)	Great Pee Dee River Marks Creek	
	Crooked Creek (03040201-070)	Crooked Creek Usher Pond Beverly Creek Lilly Quick Creek Lake Wallace	Goodwin's Millpond Burnt Factory Pond McCalls Millpond Lightwood Knot Creek
	Three Creeks (03040201-090)	Three Creeks Cottingham Creek Hagins Prong	Muddy Creek Great Pee Dee River
	Little Pee Dee River (03040204-010)	Gum Swamp Beaverdam Creek McNairs Millpond Parker Branch Marsnip Branch Leith Creek	Panther Creek Red Bluff Lake Reedy Branch McLaurins Millpond Little Pee Dee River
	Buck Swamp (03040204-050)	Reedy Creek Little Reedy Creek	

Source: SCDHEC and NCDENR Websites.

"Secondary recreation includes wading, boating, and other uses involving human body contact with water where such activities take place in an infrequent, unorganized, or incidental manner."[208]

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,[209] 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 3.59, page 3-245). 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.

[208] NCDENR, Water Classification Standards Website, http://h2o.enr.state.nc.us/csu/swc.html (May 26, 2008).
[209] USEPA, Safe Drinking Water Information System, List of Water Systems in SDWIS Webpage, http://www.epa.gov/safewater/dwinfo/sc.htm#offices (May 26, 2008).

Table 3.59
Water Service Providers in the Project Study Area

Water Service Provider	Primary Water Source	Population (by number) Served	Principal County Served	State
City of Dillon	Groundwater	7,612	Dillon	SC
Town of Lake View	Groundwater	789	Dillon	SC
Town of Latta	Groundwater	2,249	Dillon	SC
Trico Water Co	Groundwater	14,433	Dillon	SC
Marlboro Co Water Authority	Surface water	8,500	Marlboro	SC
Marlboro CPW	Surface water	2,038	Marlboro	SC
Town of Ellerbe	Surface water	1,497	Richmond	NC
Hamlet Water System	Surface water	11,027	Richmond	NC
Richmond County Water System	Surface water	18,275	Richmond	NC
City of Rockingham	Surface water	10,627	Richmond	NC

Source: USEPA Drinking Water Website, 2008.

3.17.4 How is surface water quality evaluated?

Under the CWA, 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 descriptions of these categories are provided in Table 3.60, while NCDENR descriptions can be found in Table 3.61 (refer to page 3-247). SCDHEC Bureau of Water produces Watershed Water Quality Assessments (WWQA) to evaluate its streams under 305(b). The SCDHEC 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 of South Carolina. NCDENR's Division of Water Quality produced the *2003 Yadkin-Pee Dee River Basinwide Water Quality Plan* to conform to 305(b) requirements. The 2003 report 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 of North Carolina.

The 303(d) documentation is a comprehensive list of impaired water bodies that each state must develop under the CWA to identify water bodies that do not support their designated use classifications. The SCDHEC and NCDENR develop a priority list of water bodies pursuant to Section 303(d) of the CWA, 40 CFR §130.7, and in compliance with the requirements of the current

Table 3.60
SCDHEC's Use Support Determination System

Type of Use Support	Description	Evaluation Criteria	Support Ranking System
Aquatic Life Use Support	Evaluation of a water body's ability to provide an environment in which native plant and animal communities can survive and reproduce.	Based on percentage of samples for levels of dissolved oxygen, pH, and toxic substances in the water body. The Standard is at least 4-5mg/l for dissolved oxygen. The pH level ranges from 5 to 8.5. Acute aquatic life standard is used for toxic substances.	10% or less of samples are not within desired levels- Aquatic life uses fully supported. 11-25% of samples are not within desired levels- Aquatic life uses partially supported. More than 25% of samples are not within desired levels- Aquatic life uses not supported. (Individual toxic substances are evaluated separately on the same scale with respect to attainment of the acute aquatic life standard.)
Recreational Use Support	Evaluation of a water body's suitability for whole body contact recreational activities such as swimming.	Based on the percentage of fecal coliform bacteria excursions, defined as greater than 400/100ml for all surface water classes, found in water body.	Less than 10%- recreational uses fully supported. 11-25%- recreational uses partially supported. Greater than 25%- recreational uses not supported.
Drinking Water Use Support	Used to determine the suitability of the water body to be used as a drinking water source.	Criteria developed by SCDHEC under the Safe Drinking Water Act (as amended).	
Fish Consumption Use Support	Evaluation of digestible fish in the water body to determine if safe fish consumption by humans is possible.	Tests done for mercury concentration in fish, evaluated with the average exposure dose to determine the consumption rate that would not be likely to pose a health threat to adult males and non-pregnant females.	No Fish Advisory or Ban- full fish consumption use support in water body. Fish Advisory- fish consumption partially supported; certain limits and restrictions on consumption are advised. Fish Ban- fish consumption is not supported in the water body.

Source: SCDHEC (2000), *Watershed Water Quality Assessment: Pee Dee Basin*

Table 3.61
NCDENR's Use Support Determination System for Class C Waters

Type of Use Support	Description	Evaluation Criteria	Support Ranking System
Aquatic Life and Secondary Recreation Use Support	Benthic Bioclassifications	Ephemeroptera, Plecoptera, and Trichoptera (EPT) Biotic Index	Excellent, Good, and Good to Fair Rankings are Supporting Fair to Poor Rankings are Impaired
	Fish Community Biodassifications	North Carolina Index of Biotic Integrity	Excellent, Good, and Good to Fair Rankings are Supporting Fair to Poor Rankings are Impaired
	Ambient Monitoring Data	Based on a five-year monitoring window that ends on August 31 of the year sampling. Selected parameters are measured against standards for a minimum of ten samples.	Criterion exceeded ≤ 10% - Supporting Criterion exceeded 11-25% - Impaired
Fish Consumption Use Support	Assesses whether humans can safely consume fish from a waterbody	Issuance of Fish Consumption Advisories by the NC Department of Health and Human Services.	No Issuance of Fish Consumption Advisory – Supporting Issuance of Fish Consumption Advisory – Impaired
Primary Recreation Use Support	Evaluates waterbodies for the support of primary recreation activities such as swimming, water-skiing, skin diving, and similar uses usually involving human body contact with water where such activities take place in an organized manner or on a frequent basis	Based on a five year monitoring window for fecal coliform bacteria that ends on August 31 of the year sampling.	For Class C waters: Supporting: standard not exceeded within five-year window Impaired: standard exceeded within five-year window (200 colonies per 100ml geometric mean as calculated for a minimum of five samples collected within 30 days, or greater than 20 percent of these samples exceeded 400 colonies per 100 ml over the five year data window).
Water Supply Use Support	Assesses whether a water can be used for water supply purposes	Has not been developed.	Has not been developed.

Source: NCDENR, *2003 Yadkin-Pee Dee River Basinwide Water Quality Plan.*

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[210] and State of North Carolina 303(d) List for 2006.[211] These lists identify water bodies that do not meet state water quality standards after the application of required controls for point and nonpoint source pollutants, as well as priority water bodies to which the agencies can direct their attention when developing required controls. Water quality monitoring stations that are on the list and within the project study area are included in Table 3.62). These sites are listed based on the water quality at the monitoring stations during the time samples were taken. The stream distance of an impaired area around water quality monitoring stations in South Carolina is not identified by SCDHEC. Since the affected areas are not known, crossings within a five-mile distance from an impaired station were considered impaired for purposes of this document. The 2008 North Carolina and South Carolina 303(d) Draft Lists have been released but not finalized yet. Both draft lists have the same impaired waterbodies listed for 2008 as shown in Table 3.62.[212,213]

Table 3.62
303(d) List of Impaired Streams within Project Study Area*

Stream	State	Monitoring Station Location	Impairment
Buck Swamp (blackwater system) Unit 03040204-050	South Carolina	PD-031: At State Route 33 Crossing, just east of Latta.	-Aquatic life use impairment due to low dissolved oxygen.
Pee Dee River Unit 03040201-090	South Carolina	PD-242: Great Pee Dee River at Blue's Landing	-Fishing Advisory due to high mercury levels.
Everetts Lake – Marks Creek Unit 03040201-010	North Carolina	Q994000: Marks Creek at NC State Road 1812 near Hamlet	- Impaired biological integrity due to agricultural inputs

* Based on 2006 South Carolina 303(d) List and 2006 North Carolina 303(d) List.

[210] SCDHEC, *The State of South Carolina's Section 303(d) List for 2006*, (October 2006), http://www.scdhec.net/environment/water/docs/06_303d.pdf (May 26, 2008).
[211] NCDENR, *The State of North Carolina 303(d) List for 2006*, (May 2007), http://h2o.enr.state.nc.us/tmdl/General_303d.htm#Downloads (May 26, 2008).
[212] SCDHEC, *The State of South Carolina's Section 303(d) Draft List for 2008*, http://www.scdhec.net/environment/water/docs/08_303draft.pdf (May 26, 2008).
[213] NCDENR, *The State of North Carolina 303(d) Draft List for 2008*, (January 2008), http://h2o.enr.state.nc.us/tmdl/documents/B.Draft2008303dList.pdf (May 26, 2008).

The USEPA, USDA, and other federal agencies released the Clean Water Action Plan in February 1998. This plan calls on states to evaluate the eight-digit watersheds within the state boundaries and determine if they "(1) meet clean water and other natural resource goals and support healthy aquatic systems or (2) are in need of restoration because the waters within them do not meet, or face imminent threat of not meeting, clean water and other natural resource goals." The watershed assessment process, called Unified Watershed Assessment, had states select Watershed Restoration Priorities for the fiscal years 1999 and 2000. SCDHEC and NRCS were the lead agencies in the assessment process for South Carolina and compiled the *South Carolina Unified Watershed Assessment and FY 1999-2000 Watershed Restoration Priorities*, in September 1998. NCDENR's Division of Water Quality and the NRCS were the lead agencies for North Carolina and developed the *North Carolina Unified Watershed Assessment Detailed Report* in 1998. Watersheds in South Carolina were assessed based on water quality and macroinvertebrate community sampling data from 1,000 monitoring stations statewide, as well as input from 18 other federal and state agencies, and from private groups. Watersheds in North Carolina were assessed based on the following factors: percentage of monitored waters rated as impaired (305(b) type assessments), 303(d) priority ratings, local interest, geographic distribution, and potential for combining existing or ongoing efforts.

SCDHEC, NCDENR Division of Water Quality, and NRCS established criteria, based on guidance from the USEPA, for classifying watersheds. Eight-digit watersheds within South Carolina and North 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 Watershed in South Carolina (03040201) was given a Category I rating under the Unified Watershed Assessment due to 31 percent of its assessed waters being impaired.[214] In addition, this watershed was designated as Priority One in the Watershed Restoration Priorities for fiscal year 1999-2000. The Lower Pee Dee River Watershed (03040201) in North Carolina was given a Category II rating by NCDENR and USDA.[215]

[214] SCDHEC and USDA-NRCS, *South Carolina Unified Watershed Assessment and FY 1999-2000 Watershed Priorities*, (1998) http://www.scdhec.gov/environment/water/docs/uwafull.pdf (May 26, 2008).
[215] NCDENR and USDA-NRCS, North Carolina's Unified Watershed Assessment Website. http://h2o.enr.state.nc.us/nps/uwa.htm (May 26, 2008).

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.

Watersheds that do not meet their designated uses are required to develop total maximum daily loads (TMDLs) under the section 303 of the CWA and 40 CFR Part 30. A TMDL is a calculation of the total amount of a pollutant that a water body can accept from point and nonpoint sources and still meet water quality standards.[216] Existing and future projects or facilities discharging into a watershed that has a TMDL in place must coordinate with state water quality agencies to ensure compliance with the TMDL. Based on information from NCDENR and SCDHEC, no TMDLs have been developed for impaired waters within the project study area.

3.17.5 What are the surface water quality conditions in the watershed units crossed by the Preferred Alternative?

Water quality sampling results reported for the watershed units crossed by the Preferred Alternative were available, to varying extents, from 1998 through 2006. In South Carolina, sources for the information used included the *SCDHEC WWQA for the Pee Dee Basin for 2000* as well as the South Carolina Section 303(d) lists from 1998 to the 2008 draft list. In North Carolina, sources for the information used included NCDENR's *2003 Yadkin-Pee Dee River Basinwide Water Quality Plan,*[210] as well as the North Carolina Section 303(d) lists from 1998 to 2008 (draft). The watershed units in both sub-basins drain to either the Great Pee Dee or Little Pee Dee Rivers, depending on topography and natural drainage systems in the area.

The SCDHEC and the NCDENR submit water quality data to the USEPA Storage and Retrieval (STORET) system on a regular basis. Readily available information was downloaded from the USEPA STORET for the water quality monitoring stations in the project study area and station averages were calculated for each parameter using only those values that were above the corresponding method detection limit. A summary of the information available within the USEPA STORET database from 1999 to 2006 is provided throughout the discussion of the watershed units, with the number of violations being stated for those parameters with set criteria, and sampled averages for those which have no set standard criteria. Detailed information for each water quality monitoring station is found in the *Natural Resources Technical Memorandum*.

[216] USEPA, Introduction to TMDLs Webpage, http://www.epa.gov/owow/tmdl/intro.html (May 26, 2008).

3.17.5.1 Watershed units which drain into the Great Pee Dee River

Pee Dee River Watershed Unit 03040201-010

Pee Dee River watershed unit 03040201-010 is located in Marlboro and Chesterfield Counties, South Carolina and Richmond County, North Carolina. Streams in this watershed unit that are also within the project study area include Marks Creek in North Carolina and the Great Pee Dee River and associated tributaries from the state line south to Whites Creek in South Carolina, (refer to Figure 3-34, page 3-243). Station Q9940000, which is monitored by the NCDENR, is located on Marks Creek at N.C. State Road 1812 near the City of Hamlet. Marks Creek from N.C. Route 177 to the North Carolina/South Carolina state line was placed on the North Carolina 303(d) list from 1998 to present due to impaired biological integrity caused by agricultural inputs. This station is approximately one mile upstream of the Hamlet Wastewater Treatment Plant, a NPDES discharge, which was noted to be in significant noncompliance in 2003.[217] Monitoring data averages from this station show that water samples were in excess of the standards set by NCDENR for dissolved oxygen, pH, iron, and fecal coliforms. Samples taken at the station for other parameters met the standard criteria or were not sampled. A fish consumption advisory was also issued by the both SCDHEC and NCDENR due to high mercury levels within this watershed unit.

Crooked Creek Watershed Unit 03040201-070

Crooked Creek watershed unit 03040201-070 is located in Marlboro County, South Carolina and in Richmond and Scotland Counties, North Carolina. While both watershed units comprise a single hydrologically connected watershed unit, it has been administratively separated at the North Carolina/South Carolina state line. This watershed unit is comprised of Crooked Creek and its tributaries, including Lightwood Knot Creek, Usher Pond, Goodwins Millpond, Burnt Factory Pond, Beverly Creek, Lilly Quick Creek, Lake Paul Wallace, and McCalls Millpond, all of which drain into the Great Pee Dee River (refer to Figure 3-34, page 3-243).

Watershed Units

SCDHEC and NCDENR, 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

[217] *Ibid.*

There are three stations monitored by the SCDHEC that are located within five miles of the Preferred Alternative, all are downstream of the alignment. Station CL-086 is located at the Lake Wallace Dam Recreation Pond while Station RL-02324 is also located on Lake Wallace 0.8 mile south of Beauty Spot Road (Road S-35-47). Station PD-107 is located on Crooked Creek at S.C. Route 9 in Bennettsville. Based on sampling data from 1999 to 2006, Stations CL-086 and PD-107 were in violation of the pH data between 42 percent (CL-086) and 65 percent (PD-107) of the sampling events. Additionally, PD-107 and RL-02324 were in excess of the fecal coliform standard between 10 percent (RL-02324) and 24 percent (PD-107) during sampling events. Station PD-107 was in excess of the standard criteria for zinc 25 percent of the sampled events. The other aforementioned stations were either within standard criteria for other parameters or those parameters were not sampled. Station PD-107 was listed on the 2002 303(d) list due to excess fecal coliform levels, but was not listed on the 2004, 2006, or draft 2008 lists. The remaining stations were not included on the 303(d) lists, meaning they are supporting their intended uses.

Three Creeks Watershed Unit 03040201-090

Three Creeks watershed unit 03040201-090 is located in Marlboro County, South Carolina and consists of Three Creeks and its tributaries, including Cottingham Creek, Hagins Prong, Muddy Creek, and a portion of the Great Pee Dee River (refer to Figure 3-34, page 3-243).

SCDHEC Monitoring Station PD-336 is located along Hagins Prong at S.C. Route 381, approximately 2.5 miles upstream of the Preferred Alternative. No other water quality monitoring stations are within five miles of the Preferred Alternative. Sampling data for this station from 1999 to 2006 indicates that samples were in violation below the pH standards set forth in the SCDHEC Standard Criteria 60 percent of the time. Station PD-336 was not included on the 303(d) lists from 1998 to 2008, which indicates that the stream at is supporting its intended uses.

3.17.5.2 Watershed units which drain into the Little Pee Dee River

Little Pee Dee River Watershed Unit 03040204-010

Little Pee Dee River watershed unit 03040204-010 is located in Marlboro, Dillon, and Marion Counties, South Carolina. This reach of the Little Pee Dee River extends from its headwaters to Leith Creek and includes tributaries from Beaverdam Creek, McNairs Millpond, Parker Branch, Marsnip Branch, McLaurins Millpond, Panther Creek, Gum Swamp, Red Bluff Lake, and Reedy Branch (refer to Figure 3-34, page 3-243).

The Preferred Alternative crosses approximately 1.9 miles of this watershed unit at the S.C. Route 79 interchange. As such, no water quality monitoring stations are located within five miles of the Preferred Alternative within this watershed unit and the water quality in this specific area is unknown at this time.

Buck Swamp Watershed Unit 03040204-050

Buck Swamp watershed unit 03040204-050 is located in Dillon, Marlboro, and Marion Counties, South Carolina and drains into the Little Pee Dee River. The portion of the watershed unit in the project study area is comprised primarily of the headwaters to Buck Swamp, including Reedy Creek and Little Reedy Creek and their tributaries (refer to Figure 3-34, page 3-243). No water quality monitoring stations exist in the portion of the watershed unit that is in the project study area; therefore, the water quality of the streams crossed by the Preferred Alternative is unknown at this time.

3.17.6 What are the potential impacts to water quality?

For purposes of water quality, all streams and ditches that were designated as a blue or blue-dashed line on the United States Geographical Service topographical maps were considered streams and evaluated for purposes of impacts. Some of these streams are actually ditches, or may no longer exist. The Wetlands Section (refer to Section 3.12, page 3-160), counted only USACE jurisdictional streams and ditches that were delineated during fieldwork, and did not include non-jurisdictional ditches.

As previously mentioned, all waters in the project study area are classified as *freshwater* or type C (refer to Section 3.17.2, page 3-242). No *outstanding resource waters*, protected waters, *freshwaters* with specific standards, or 303(d) impaired streams would be impacted by the Preferred Alternative.

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

Water quality impacts could result due to pollutant buildup in new areas of the project study area from the increase 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 during normal operation and maintenance of the roadway from spraying of herbicides or use of paint and other materials. Best management practices (BMPs) would be used for maintenance of the road and the use of herbicides in the

right-of-way. The implementation of BMPs would ensure that these maintenance activities would not have an impact to water quality in the project study area.

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 buildup period, assuming there were no structures such as retention basins or ditches to filter sediment.[218] The volume of traffic and the estimated length for the Preferred Alternative within a watershed unit was used to calculate the pollutant load for one point per watershed unit. FHWA's 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, more pollutant would drain into streams that are in urbanized areas than those located in rural areas. This is due to the greater amount of vegetation along the sides of rural roadways that would filter pollutants prior to draining into streams. The results of this model and the constituent listing[219] are shown in Table 3.63 (refer to page 3-255). This is a general model for constituent loading into streams, and it does not factor in filtering or retention structures that would be installed in specific areas as part of the Preferred Alternative. The No-build Alternative was analyzed using the two main travel routes from future I-74 to I-95, which are S.C. Route 38 and U.S. Route 1/S.C. Route 9. While this captures a large amount of the traffic in the 2030 No-build Alternative, it does not account for the total amount of traffic which may use other routes throughout the project study area. Therefore, the amounts of pollutants listed in Table 3.63 (refer to page 3-255) will underestimate the true amount of pollutants entering into streams as a result of the No-build Alternative.

3.17.6.2 How would the No-build Alternative impact water quality in the project study area?

Traffic would be expected to use other roadways in the project study area and pollutant loading would occur in different portions of the watershed units, depending on the locations of the stream/ditch crossings by existing routes. Over time, the increased traffic volumes on the existing routes would result in a larger addition of pollutants at these existing crossings.

Not previously described, the Little Pee Dee River watershed unit (03040204-030) is located in Marlboro and Dillon Counties, South Carolina and includes the Town of McColl. This reach of the Little Pee Dee River extends from Leith Creek to Buck Swamp (refer to Figure 3-34, page 3-243). For further information about this watershed unit, please refer to the *Natural Resources*

[218] FHWA, 1981. FHWA/RD-81/042: "Constituents of Highway Runoff". Washington, D.C., 1981.
[219] Using the model's equations, the sum of the constituents does not equal the amount of total solids for each Build Alternative.

Table 3.63
Pollutant Discharge, in Pounds per Twenty-day Buildup Period

	No-build Alternative Scenarios		Preferred Alternative
	U.S. 1/ S.C. 9	S.C. 38	
Total Solids	**915**	**384**	**3,091**
Suspended Solids	212.48	70.08	911.04
Total Organic Carbon	53.57	17.47	203.45
Chemical Oxygen Demand	124.51	67.75	302.31
Total Nitrogen	3.06	1.83	6.60
Total Kjeldahl Nitrogen	10.23	7.68	13.93
Total Phosphorus	1.44	0.47	6.13
Lead	0.35	0.12	1.26
Zinc	0.28	0.10	0.86
Iron	9.30	3.07	39.86
Copper	0.20	0.14	0.31
Cadmium	0.13	0.10	0.18
Chromium	0.15	0.05	0.65
Mercury	0.16	0.16	0.07

Technical Memorandum. Due to limited development likely to occur in the project study area by 2030, regardless of the proposed project, predicted land use modeling anticipates only one stream/ditch impact with the No-build Alternative in the Little Pee Dee River watershed unit (03040204-030) (refer to Table 3.64).

3.17.6.3 How would the Preferred Alternative impact water quality in the project study area?

Going from I-74 south to I-95, approximately 1.5 miles of the Preferred Alternative would be located in the Pee Dee River watershed unit (03040201-010). It would cross two intermittent streams/ditches that are tributaries to Mark's Creek (refer to Figure 3-34 page 3-243). The Preferred Alternative would then traverse the Crooked Creek watershed unit (03040201-070) for approximately 6.5 miles and cross 13 intermittent streams/ditches and two perennial streams. The alignment passes through the Little Pee Dee River watershed unit (03040204-010) for 1.9 miles, and crosses three intermittent streams/ditches that are tributaries to Beaverdam Creek, a

Table 3.64
Streams/Ditches Impacted by Predicted Development in the Project Study Area

			Number of Stream/Ditch Crossings	
			No-Build Alternative	Preferred Alternative
Watershed	Pee Dee River Sub-basin 03040201	Pee Dee River 03040201-010	0	0
		Pee Dee River 03040201-050	0	2
		Crooked Creek 03040201-070	0	6
		Three Creeks 03040201-090	0	13
	Little Pee Dee River Sub-basin 03040204	Little Pee Dee River 03040204-030	1	1
		Buck Swamp 03040204-050	0	1
		Total	**1**	**23**

perennial stream. The Preferred Alternative then would pass back into the Crooked Creek watershed unit (03040201-070) for approximately 5.2 miles, and cross through five intermittent streams/ditches that are tributaries to Beverly Creek. It would cross Beverly Creek, a perennial stream, just south of the community of Lester. The Preferred Alternative would traverse the Three Creeks watershed unit (03040201-090) and cross 11 intermittent streams/ditches and one perennial stream that all drain into Cottingham Creek. The Preferred Alternative would cross Cottingham Creek, a perennial stream, north of the S.C. Route 9 overpass, west of Covington Millpond. As the Preferred Alternative goes farther south, it would cross through five intermittent streams/ditches that are tributaries to Hagins Prong, a perennial stream. It would cross through Hagins Prong just north of the community of Dunbar. The Preferred Alternative would then pass into the Buck Swamp watershed unit (03040204-050) and traverse approximately 8.8 miles before connecting to I-73 South. The alignment would intersect 23 intermittent streams/ditches and one perennial stream that flow into Little Reedy Creek. It would cross Little Reedy Creek, a perennial stream, just south of the community of Bingham.

Overall, the Preferred Alternative would cross 70 streams/ditches in five different watershed units, including Pee Dee River (03040201-010), Crooked Creek (03040201-070), Little Pee Dee River (03040204-010), Three Creeks (03040201-090), and Buck Swamp (03040204-050). The Buck Swamp watershed unit would have the most crossings at 25 (refer to Table 3.65).

Table 3.65
Stream/Ditch Crossings by Preferred Alternative

Watershed	Watershed Unit	Intermittent Streams	Perennial Streams	Total
Pee Dee River Sub-basin 03040201	Pee Dee River 03040201-010	2	0	**2**
	Crooked Creek 03040201-070	18	3	**21**
	Three Creeks 03040201-090	16	3	**19**
Little Pee Dee River Sub-basin 03040204	Little Pee Dee River 03040204-010	3	0	**3**
	Buck Swamp 03040204-050	23	2	**25**
	Total	**62**	**8**	**70**

Not previously described, the Pee Dee River watershed unit 03040201-050 is located in Marlboro, Chesterfield, Darlington, and Florence Counties, South Carolina. The stream reach of this watershed unit extends from Whites Creek to Black Creek (refer to Figure 3-34, page 3-243). For further information about this watershed unit, please refer to the *Natural Resources Technical Memorandum.* The Preferred Alternative would have indirect impacts to 23 streams/ditches within five watershed units due to projected induced development based on land use modeling by 2030 (refer to Table 3.65). Two stream impacts would occur within the Pee Dee River (03040201-050), six within Crooked Creek (03040201-070), and 13 within Three Creeks (03040201-090), and one each in the Little Pee Dee River (03040204-030) and Buck Swamp (03040204-050) for a total of 23 *freshwater* indirect stream impacts.

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, 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.[220] Since the predicted development for the 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 3.66 and separated by watershed unit. The greatest amount of development would be added to the Three Creeks watershed unit 03040201-090 by the Preferred Alternative with over 139 acres, and then to the Crooked Creek watershed unit 03040201-070 with 127 acres of new impervious surfaces.

Impervious surfaces would not only be added to the previously described watershed units, but are also predicted to be added in the following watershed units described below.

Table 3.66
Anticipated Amount of New Impervious Surfaces by Induced Development in the Project Study Area (in acres)

			Acres of Impervious Surface		Total acres per watershed unit
			No-Build Alternative	Preferred Alternative	
Watershed	Pee Dee River Sub-basin 03040201	03040201-010	25.72	68.82	117,993
		03040201-040	0	0.67	19,834
		03040201-050	0	22.90	225,816
		03040201-070	0	127.09	49,569
		03040201-090	0	139.53	79,667
		03040201-120	2.94	8.31	84,380
		03040201-150	1.03	2.06	111,416
	Little Pee Dee River Sub-basin 03040204	03040204-010	5.76	49.27	83,775
		03040204-030	13.68	41.31	107,985
		03040204-040	0.73	1.46	81,863
		03040204-050	0.36	23.21	97,567
		Total	**50.22**	**484.63**	

* Indicates watershed units that are administratively separated at the North Carolina/South Carolina state border.

[220] USDA-NRCS Soil Conservation Service Engineering Division. *Urban Hydrology for Small Watershed Basins, Technical Release no. 55*. January 1, 1975.

Whites Creek watershed unit 03040201-040 is located in Marlboro County, South Carolina and watershed unit 03040201-0502 is located in Richmond County, North Carolina (refer to Figure 3-34, page 3-243). These watershed units comprise a single hydrologically connected watershed unit that has been separated at the North Carolina/South Carolina state line. The stream consists of Whites Creek and its tributaries including Wallace Pond and Everetts Lake, which eventually drains into the Great Pee Dee River near the North Carolina/South Carolina state line. Based on the 2000 WWQA, Whites Creek is considered a blackwater system, which is naturally low in pH, but it is fully supporting SCDHEC designated uses.

Pee Dee River watershed unit 03040201-120 is located in Dillon, Marion, and Florence Counties. Portions of Brownsville Creek are located in the project study area, and eventually drain into the Great Pee Dee River (refer to Figure 3-34, page 3-243). The water quality of the portion of the watershed unit in the project study area is unknown at this time due to the lack of water quality monitoring stations within the portion of the watershed unit located within the project study area.

Catfish Creek watershed unit 03040201-150 is located in Marion and Dillon Counties and includes Catfish Creek and its tributaries, which eventually flow into the Great Pee Dee River (refer to Figure 3-34, page 3-243). A portion of the watershed unit is located within the project study area, consisting of the headwaters to Catfish Canal. No water quality monitoring stations exist in the portion of the watershed unit in the project study area; therefore, the water quality of the stream is unknown at this time.

Shoe Heel Creek watershed unit 03040204-040 is located in Dillon County on the border of the North Carolina state line and accepts drainage from Shoe Heel Creek and its tributaries, which eventually flow into the Little Pee Dee River. No water quality monitoring stations exist at this time in the watershed unit; therefore, the water quality of this stream is unknown at this time.

Impacts to watershed units begins to occur when ten percent or more of the watershed unit is comprised of impervious surfaces.[221] The amount of impervious surfaces from current residential, commercial, and industrial uses are estimated to be approximately 5,000 acres (refer to Land Use, Section 3.1, page 3-1). Due to the rural nature of the project area and the total acres per each watershed unit, no impacts are likely from the No-build or Build Alternatives as a result of the increase in impervious surfaces.

[221] Schueler, T. The Center for Watershed Protection. “Watershed Protection Techniques.” (Vol. 1, No. 3, Fall 1994).

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

This proposed project would be located in mainly rural areas, so the roadway design would consist of grassy swales and vegetated slopes on the sides of the pavement which 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, NCDOT, and FHWA guidelines, would be used during construction to minimize the amount of runoff pollution entering streams.

3.17.8 How would water quality impacts be minimized during construction?

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 Disturbance Activities,*[222] provides information regarding stormwater management and sediment control during construction. Several Best Management Practices (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 which 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*.[223] 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 and a Spill, Prevention, Control and Countermeasure plan would be in place.

[222] SCDHEC-OCRM, A Guide to Site Development and Best Management Practices for Stormwater Management and Sediment Control.
[223] SCDHEC-OCRM, *South Carolina Stormwater Management and Sediment Control Handbook for Land Disturbance Activities* (2003), Appendix E.

3.17.9 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 Sub-basin (03040201) (refer to Figure 3-35). These projects have had an effect on pollutant loading into the Pee Dee Sub-basin. Previous projects include work associated with I-74, accounting for 14 miles of roadwork completed in Richmond County, North Carolina in 2000. A seven-mile roadway widening project is currently being conducted in Dillon County along S.C. Route 38, extending from I-95 to Marion, South Carolina.

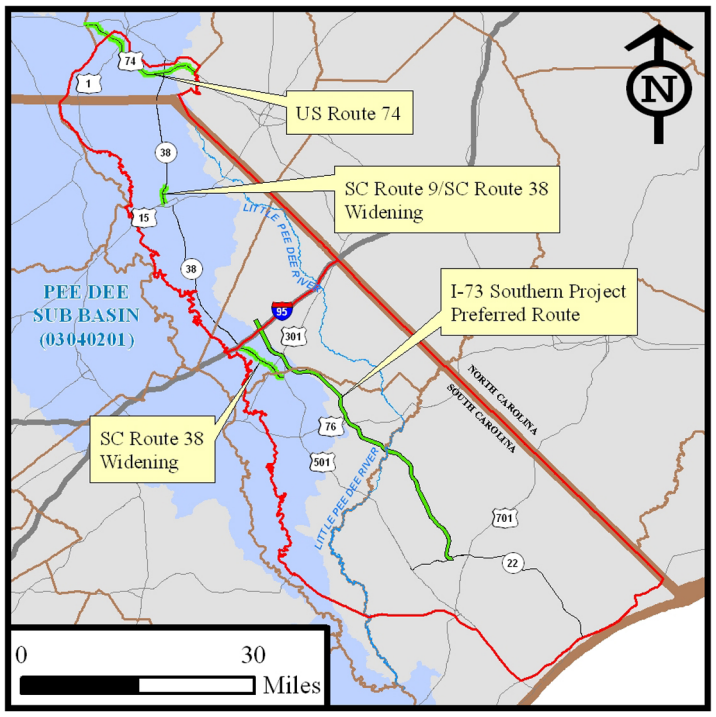

Figure 3-35: Projects within the Pee Dee Basin

Three additional roadway projects are proposed to occur within the Pee Dee Sub-basin. I-73 South, a 44-mile new interstate, is proposed for construction between I-95 and S.C. Route 22 in Dillon, Marion, and Horry Counties, with new right-of-way varying from 300 to 400 feet. S.C. Route 22 would be upgraded to interstate standards until it terminates at U.S. Route 17 in North Myrtle Beach. Funding has not been secured for constructing I-73 South, and it is uncertain when construction for the project will begin. The second project is the widening of S.C. Route 9/S.C. Route 38 from two to five lanes, including a bridge replacement over Crooked Creek. The project extends for three miles from U.S. Route 15/401 to S.C. Route 9 Business in Marlboro County. A timeline for the S.C. Route 9/S.C. Route 38 project has not yet been determined. Although cumulative impacts to water quality could occur, the Section 401 water quality certification process would afford protection of the streams/ditches and watersheds identified within the project study area.

In addition to roadway projects, a new landfill and defense training facility is proposed to occur within the project study area. 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 during construction and subsequent operation of these facilities.