

**REQUEST FOR BOARD ACTION**

ITEM NO. 20.

**DATE OF MEETING:** August 17, 2009

**REQUESTED BY:** Kyle M. Breuer, Planner II, Planning & Community Development

**SHORT TITLE:** Resolution to approve a Special Use Permit – Sewer/Water Treatment, Storage & Processing Facilities, Including Lifts and/or Pump Stations

**BACKGROUND:** This is an amended request for the construction of a waste water treatment facility (WWTF) from a previous denied application (August 18, 2008). This item was tabled from the May 18, 2009 and June 15, 2009 regularly scheduled meetings (please find attached the staff report, applicants narrative, and all relating materials previously presented).

**SPECIFIC ACTION REQUESTED:** To hold a public hearing and consider the approval of Sewer/Water Treatment, Storage & Processing Facilities, Including Lifts and/or Pump Stations

**PLANNING STAFF REPORT**  
**Special Use Permit**

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**SUMMARY:****Hearing Date:** August 17, 2009**Case Number:** 09-05-18-13 Stroud**Applicant:** Stroud Engineering, P.A.**Property Owner:** Shaw Holding Group, L.L.C.

**Land Use Proposed:** The applicant is requesting the approval of a Special Use Permit (SUP) for the construction of a waste water treatment facility.

**Property Record Number and Location:** The property is identified by record number 3256-52-1696-0000 and is located along the east side of Shaw Highway, approximately 1 mile north of NC Hwy 210, Rocky Point, NC.

**Zoning District of Property:** The property is zoned R-20, Residential District, and Sewer/Water Treatment, Storage & Processing Facilities, Including Lifts and/or Pump Stations are permitted via Special Use Permit.

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**PROJECT DESCRIPTION:**

This is an amended request for the construction of a waste water treatment facility (WWTF) from a previous denied application which was heard August 18, 2008, it was denied by a unanimous vote. The applicant's amended request addresses the concerns that were voiced at the previous denial.

The plant will provide wastewater service to accommodate future growth in the area, however, no developments have been submitted with this request nor are there any applications for development plans on file with the Planning and Community Development Office. The facility will have a somewhat centralized location in relation to the 355 acre tract, approximately 900 feet east of the Shaw Highway right of way. Access will be provided to the WWTF via an existing driveway, which will be reviewed by the North Carolina Department of Transportation (NCDOT).

On May 9, 2009, project engineers met with the citizens of this community to discuss options available for design and construction of the WWTF. It was agreed to at this meeting that the method of disposal of the re-use water generated from the treatment of waste water would need to utilize an irrigation method as opposed to an infiltration method. The applicant revised the project narrative and site plans to reflect this change.

The project will consist of a 400,000 gallons per day treatment plant, classified as an irrigation system which will be discharged to a network of irrigation sprinklers located throughout open space on the site. The facility will treat the water to re-use standards, which is a quality exceeding that required for consideration as clean groundwater and may be used as irrigation.

All mechanical equipment associated with the operation of a waste water treatment plant will be located within an enclosed building to minimize any noise associated with this project; also, catalytic air scrubbers will be utilized to neutralize any associated odors with this project as well.

A maximum of two feet of tank will be visible above ground, the installation of appropriate buffers and landscaping will be consistent with Pender County's Zoning Ordinance and commercial site plan review. In addition to a commercial site plan review by county planning staff, all applicable local, state, and federal permits must be obtained prior to operation of the facility.

**EVALUATION:**

- A) Public Notifications:** Advertisements for the proposal have been placed in the Topsail Voice and Pender Post. Adjacent property owners were notified by first class mail.
- B) Basis for Granting SUP:** See attachment A for approval procedures (15.3 of Zoning Ordinance) and revocation procedures (15.4b of Zoning Ordinance).
- C) Zoning Ordinance Compliance:** The project location is zoned R-20, Residential District, and wastewater treatment facilities are permitted via a special use permit (see attached zoning map).
- D) 2005 Land Use Plan Compliance:** This infrastructure project is to accommodate future growth in the immediate area. Such future proposals will be evaluated on the CAMA Land Use Plan for prescribed density and compliance. This area is classified as Rural Clusters, which is planned for low net density (two (2) residential units per usable acre of project land, based on services available). The surrounding acreage of the tract contains Rural Areas and Conservation areas I and II. The Conservation Area II loosely mimics the "A" Flood Zone as prescribed by FEMA FIRM panel #3256, dated February 16, 2007.
- E) Existing Land Use in Area:** The surrounding property contains single-family residential dwellings at a very low net density (one (1) residential unit per usable acre of project land). Conservation lands and open space are also present nearby.
- F) Site Access Conditions:** Access to the waste water treatment plant will be provided via an existing driveway off of Shaw Hwy. Prior to county permitting, a valid NCDOT driveway permit will need to be obtained, prescribing any necessary improvements.
- G) Conditions To Consider In Issuing A Revision of the Special Use Permit For This Project:**
1. No junk, debris trash or inoperable vehicles, recycled or salvaged materials shall be stored on the site outside a completely enclosed building.
  2. No project activity shall commence on the site including clearing and grading until a Final Zoning Permit has been issued.
  3. No permanent personnel occupancy on-site will be allowed.
  4. All operations must follow federal, state, and local standards, regulations, ordinances, permits, statutes, and/or laws.
  5. The project must have commercial site plan review for a zoning permit.
  6. The project shall be developed in accord with the provisions of the Pender County Zoning Ordinance and the applicant's final revised site plan as approved by the Zoning Administrator and the conditions contained in this permit.
  7. Any physical relocation and/or improvements after completion of the original waste water treatment facility will require an amendment to the original Special Use Permit.
  8. The obligations imposed by this permit will be the responsibility of the property owner and operator and shall continue in affect until all conditions of this permit and other permits have been complied with and the Pender County Planning Department has made a final inspection of the site and provided a written certification that the site is in compliance and throughout the life of the permit.

ITEM NO: \_\_\_\_\_

**RESOLUTION: NOW, THEREFORE, BE IT RESOLVED**, that on August 17, 2009 the Pender County Board of Commissioners (approved, modified, denied) a special use permit for Sewer/Water Treatment, Storage & Processing Facilities, Including Lifts and/or Pump Stations as described herein, and Jimmy T. Tate, Chairman to the Board, is authorized to execute the order implementing this resolution and provide notice to the applicant of the action taken herein.

**AMENDMENTS:**

**MOVED** \_\_\_\_\_ **SECONDED** \_\_\_\_\_

**APPROVED** \_\_\_\_\_ **DENIED** \_\_\_\_\_ **UNANIMOUS** \_\_\_\_\_

**YEA VOTES:** Tate \_\_\_ Brown \_\_\_ Blanchard \_\_\_ Rivenbark \_\_\_ Williams \_\_\_

\_\_\_\_\_  
**Jimmy T. Tate,**  
**Chairman**

8/17/2009  
**Date**

\_\_\_\_\_  
**ATTEST**

8/17/2009  
**Date**

# PLANNING AND COMMUNITY DEVELOPMENT

PLANNING • CODE ENFORCEMENT • BUILDING INSPECTIONS • CENTRAL PERMITTING



## APPLICATIONS COVER SHEET

Date Application Filed: \_\_\_\_\_

### I. REQUIRED NAMES:

Applicant Stroud Engineering, PA Owner Shaw Holding Group, LLC  
Address 102D Cinema Drive Address 211 North Fifth Ave.  
Wilmington, N.C. 28403 Wilmington, N.C. 28402

Phone (910)815-0775 Fax (910)815-0593 Phone (910)520-3083 Fax \_\_\_\_\_

Email JFentress@stroudengineer.com Email \_\_\_\_\_

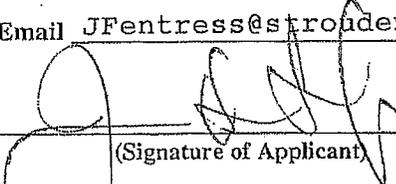
Legal Relationship of Applicant to Property Owner: Engineer

Consultant Name/Company Stroud Engineering, PA

Address 102D Cinema Drive Wilmington, N.C. 28403

Phone (910)815-0775 Fax (910)815-0593

Email JFentress@stroudengineer.com

  
\_\_\_\_\_  
(Signature of Applicant)

See Application  
\_\_\_\_\_  
(Signature of Owner)

\*If owner is different from applicant, both signatures are required.\*

### II. TYPE OF APPLICATION:

(Please check one)

Board of Adjustment:

Variance  
 Appeal

Zoning:

Text Amendment  
 Map Amendment  
 Special Use Permit

Plans:

Planned Development  
 Subdivision Preliminary Plat

## FEE SCHEDULE FOR BOARD HEARINGS

Board of Adjustment:	Applicable Fees:	Fee Calculation:
Variance	\$125.00	
Appeal	\$150.00	
<b>Zoning:</b>		
Text Amendment	\$200.00	
Map Amendment	\$200.00 & \$10.00 per acre over 5 acres	
Special Use Permit	\$200.00 & \$10.00 per acre over 5 acres	Per Application
SUP, Part of AEC	\$300.00 & \$10.00 per acre over 5 acres	
SUP, Tower over 75 ft.	\$400.00 & \$3.00 per acre over 200 ft.	
SUP, Mining Borrow Pit	\$400.00 & \$10.00 per acre over 5 acres	
SUP, Mining other	\$800.00 & \$10.00 per acre over 5 acres	
<b>Plans:</b>		
Planned Development Master Plan	\$10.00 per acre with a min. of \$50.00	
Preliminary Plat	\$10.00 per lot/parcel with a min. of \$125.00	
Final Plat	\$5.00 per lot/parcel with a min. of \$50.00	
	<b>Total Fees Due:</b>	

Attachments Included with Application:  
(Please include # of copies)

CD  2 Plan Sets  Other Documents/Reports

Please list documents included: 2 24X36 Plan Sets, 20 11X17 Sets, Project Narrative  
List of Adjoiners with Envelopes, Fee Check

Method of Payment:  Cash  
 Credit Card, We accept VISA  and MasterCard  only.  
 Check, Ck. # ( )

For Office Use Only:

Receipt # 084578

Received By: Kyle M. Brewer

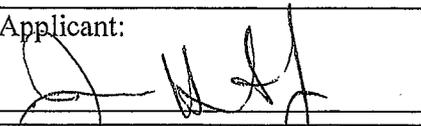
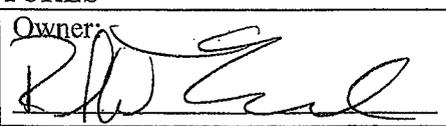
Date: April 27, 09

**PLANNING AND COMMUNITY DEVELOPMENT**

PLANNING • CODE ENFORCEMENT • BUILDING INSPECTIONS • CENTRAL PERMITTING



**SPECIAL USE PERMIT APPLICATION**

THIS SECTION FOR OFFICE USE			
Application No.		Date	
Permit Fee		Receipt No.	
APPLICANT INFORMATION			
Applicant Name <u>Stroud Engineering, PA</u>		Owner Name <u>Shaw Holding Group, LLC</u>	
Address: <u>102-D Cinema Drive</u> <u>Wilmington, NC 28403</u>		Address: <u>211 North Fifth Ave.</u> <u>Wilmington, NC 28402</u>	
Phone No: <u>(910) 815-0775</u>		Phone No: <u>(910) 520-3083</u>	
Legal relationship of applicant to owner: <u>Engineer</u>			
PROJECT INFORMATION			
Property tax record No. <u>3256-52-1696-0000</u>		Total property acreage: <u>355.2 Ac.</u>	
Zoning Designation: <u>R-20</u>		Acreage to be disturbed: <u>26.0 Ac.</u>	
Acreage to be used for project: <u>16.8 Ac.</u>			
Project location and address: <u>Shaw Highway (Secondary road #1520)</u> <u>(See Vicinity Map on Sheet 1)</u>			
Describe activities to be undertaken on project site: <u>(See Narrative)</u>			
SIGNATURES			
Applicant: 	Date: <u>4/3/2009</u>	Owner: 	Date: <u>4/1/09</u>
<b>NOTICE TO APPLICANT</b>			
<ol style="list-style-type: none"> <li>1. Applicant must also submit the information described on page two of this form.</li> <li>2. Applicant or agent authorized in writing must attend the public hearing.</li> <li>3. Once the public hearing has been advertised, the case will be heard unless the applicant withdraws the application or unless the Board of Commissioners or other authorized person agrees to table or delay the hearing.</li> <li>4. Applicant may wish to review the required findings for approval of a Special Use Permit (p. 3).</li> <li>5. <b>Permit will become void after 12 months if a final zoning permit is not obtained, unless specifically requested at the time of public hearing.</b></li> </ol>			

WWTP SPECIAL USE PERMIT NARRATIVE  
FOR  
SHAW HOLDING GROUP, LLC

Stroud Engineering  
PW-795  
May 12, 2009

**Project Summary**

Shaw Holding Group, LLC is proposing to construct a wastewater treatment plant on approximately 355 acres of land. The proposed 400,000 gallon per day plant is to be located approximately nine hundred feet off of Shaw Highway near Rocky Point, NC in Pender County in preparation for future development in the immediate area. Pender County requires waste water treatment facilities to obtain a Special Use Permit. Establishing the zoning right to construct the wastewater treatment plant is the initial step. There are many other permits that will be necessary in this process. It would not be prudent to expend the effort necessary to prepare and file these other applications prior to establishing the zoning right through this Special Use process. This submittal is fashioned to address the requirements of the Pender County Special Use Permit application in hopes of securing the zoning right and enabling the development of the required environmental permit applications.

The proposed waste water treatment process shall be tertiary treatment with both chemical and ultraviolet disinfection. The waste water disposal method will be classified as an irrigation system as defined by NCAC Title 15A subchapter 2T. To meet this administrative code the waste water treatment plant will treat the water to a quality exceeding that required for consideration as re-use. Re-use waste water can be used for irrigation without buffering. The treatment processes will include aeration, flocculation, filtration, and disinfection. The treated water will be discharged to a network of irrigation sprinklers located throughout green space on the site. All of these facilities and processes will require permitting through the North Carolina Department of Environment and Natural Resources, Water Quality Section.

**Site Description**

The wastewater treatment facility will be located in the southern most portion of the boundary. The topography of the site varies, with slopes ranging from 0% to 5% on upland sections and slopes from 5% to 10% around wetlands. The site presently exists as managed timber. There are wetlands on the site along the southwestern boundary. The majority of the site drains to the North East Cape Fear River, which is classified as C, Sw. The property is zoned R-20 by Pender County. The CAMA Land Use classification is Rural Clusters.

**Permits Required**

Shaw Holding Group, LLC will solicit permits for wastewater treatment and disposal, stormwater management, soil erosion and sedimentation control all from the North Carolina Department of Environment and Natural Resources, Water and Land Quality Sections. The proposed improvements to an existing driveway onto Shaw Highway will require North Carolina Department of Transportation approval. A jurisdictional Determination will be obtained from the United States Army Corps of Engineers however at this time no wetland encroachments are proposed.

**Adjoining Property**

Adjoining property is primarily undeveloped R-20. There are a few existing residences fronting on Shaw Highway to the west and northwest.

**Soils**

Soils in the project area are mapped in the Pender County Soil Survey as Baymeade fine sand, Foreston loamy fine sand, Murville, and Leon fine sand. Baymeade sands are characterized as well drained with rapid infiltration and slow surface runoff. Foreston is characterized as a moderately drained soil with medium infiltration and slow surface runoff. Murville and Leon are characterized as poorly drained soil with medium infiltration and slow surface runoff. The locations of these soils has been given due consideration in the siting of the treatment facility.

## Potential Impacts

Adjacent surface waters will be protected through utilization of the sophisticated treatment process proposed and required to permit the facility with NCDENR. The availability of sanitary sewer should increase values of surrounding undeveloped properties by negating the need for continued septic leach field development.

### Supporting Information-Required Findings

A. *The use is listed among special uses in the district for which application is made; or is similar in character to those listed in that district.*

Wastewater treatment facilities are allowed in R-20 zones by Special Use per the Pender County Zoning Ordinance.

B. *The requested use will not impair the integrity or character of the surrounding or adjoining districts, nor adversely affect the safety, morals, or welfare of the community or of the immediate neighbors of the property;*

The requested use will enable the development of the subject property in a manner which is consistent with trends of adjacent uses while minimizing the impacts of said development in an environmentally and economically valuable portion of the county.

C. *The proposed use shall not constitute a nuisance or hazard.*

Measures will be taken to reduce or eliminate sights, sounds, and odors which can accompany wastewater treatment facilities. The use of catalytic air scrubbers effectively neutralizes odors. Noisy mechanical equipment will be placed inside a building to eliminate the sound and prolong the life of the components. The treatment facility will be installed such that no more than 2' of the tanks are visible above grade. These measures, paired with setbacks and vegetative screening will mitigate nuisances commonly associated with such facilities. Fencing will be installed around the facility to prevent unauthorized entry.

D. *The requested use will be in conformity with the land use plan;*

The requested use will enable the development of the subject property in a manner which is consistent with the Pender County Land Use Plan. The subject property is identified as rural clusters.

E. *Adequate utilities, access roads, drainage, sanitation or other necessary facilities have been or are being provided;*

Proposed improvements, in addition to a community wastewater system, include extension of adjacent public waterlines, a stormwater collection system with ponds for flood and pollution control, and recreational areas.

F. *That adequate measures have been or will be taken to provide ingress and egress so designed as to minimize the traffic congestion in the public roads; and*

Driveway connectivity to Shaw Highway will be provided at an existing logging road driveway. Existing adjacent roads display adequate connectivity, offering multiple routes for ingress and egress onto I-40 via NC 210 and NC 53. Future roadways internal to the property are proposed as private and will be built to NCDOT specifications.

G. *That the special use shall, in all other respects, conform to the applicable regulations of the district in which it is located;*

Proposed improvements associated with the treatment facility will be compliant with all local, state, and federal regulations.

H. *The proposed use shall not adversely affect surrounding uses and shall be placed on a lot of sufficient size to satisfy the space requirements of said use.*

Due consideration has been given to soil characteristics, topography, and proximity to adjacent properties in determining the size and location of the site. State guidelines created to minimize impacts to adjacent properties and public health will be adhered to.

#### **Summary of Revisions Aimed to Address Adjoining Property Owner Concerns**

This revised plan is in response to the August 18, 2008 meeting in hopes of addressing concerns presented by adjacent homeowner's near the proposed site. One of the primary concerns was the location of the proposed facility with respect to setbacks, environmental implications, property devaluation, and visual aesthetics. Each of these will be addressed in this portion of the project narrative. A new revised site plan has been developed which shows the relocation of the proposed plant. The current location of the plant is approximately 850 feet from the right of way of Shaw Highway, and approximately 1200 feet from the nearest dwelling. This location increases physical buffer distance as well as a visual buffer distance from existing dwellings. The current location provides a vegetated and forested buffer between the plant and Shaw Highway. The new location conceals the proposed plant remotely within the confines of the existing woodland. All aspects of the treatment plant and disposal ponds will be shielded from view on Shaw Highway. Current property values in this area should not be affected given the remote location now proposed. This location meets all setback requirements without the need for enhanced treatment. The location affords adequate buffer to adjacent wetlands and drainage areas. Steps have been taken to ensure that storm water runoff from the plant is properly routed to have no adverse effects on these areas. The new location is out of the 100 year flood plain as according to FEMA's Flood Insurance Rate Map #37203256 00J effective February 02, 2007. This flood map was based on post Floyd flood datum and currently depicts the most sensitive areas prone to flooding. The plan now depicts the general plant piping to the irrigation system. The plan is signed and sealed by a Professional Engineer. I am also including a list of similar type waste water treatment facilities and the respective developments for which they were constructed. All of these developments, as that which is proposed, provide equal opportunity housing.

The applicant has secured the services of Walton Engineering. Mark Walton is a reputable Environmental Engineer who is knowledgeable of local environmental issues and regulation. He will be providing separate narrative pertaining to the perceived environmental issues regarding this proposal.

Additional revisions stemming from a community meeting held on May 9, 2009 include a change from an infiltration basin to a green space irrigation system as the means of treated water disposal. Concerns were raised over the effects that a centralized infiltration basin would have on groundwater levels in the immediate area. The proposed irrigation system would decentralize the disposal area and allow water to be evaporated, infiltrated, and utilized to maintain vegetation. Irrigation areas must be set back from wells, surface waters, and pools in accordance with NCAC Title 15A subchapter 2T rules.

# WALTON ENGINEERING

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April 3, 2009

Mr. Kyle Breuer,  
Pender County Planning Department  
PO Box 1395  
Burgaw, NC 28425

re: EFS Properties, LLC, Environmental Issues

Dear Kyle,

I have been asked by the applicant to address environmental concerns and other concerns about the Wastewater Treatment Plant (WWTP) proposed by EFS Properties, LLC (EFS.)

I have reviewed the plans, SUP application, and Minutes from the August 18, 2008 BOCC public hearing.

My comments are as follows:

The wastewater treatment system will have to go through a very thorough and extensive process and meet a stringent set of rules to be permitted as a High-Rate Infiltration System by NC DENR Division of Water Quality (DWQ.) DWQ encourages such systems because they must treat wastewater to "reclaimed water standards." This process will require:

- Determination by the NC Utilities Commission that an authorized Privately-Owned Public Utility will own operate the WWTP.
- Operational agreements between the Public Utility and the Homeowners Association or Developer.
- Detailed Soil Evaluation by a Licensed Soil Scientist
- Accurate water balance report.
- Agronomist Evaluation report.
- Hydrogeologic Report.
- Detailed Plans and Specifications prepared and sealed by a Professional Engineer.
- Reliability Analysis with plans and specifications for meeting Reliability requirements.
- Operation and Maintenance Plan.
- Residuals Management Plan.

All of the above must demonstrate that the system meets all State and Federal requirements, setbacks, laws and rules. These include:

- No construction in wetlands.

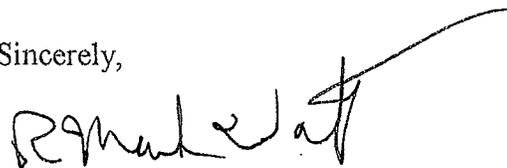
# WALTON ENGINEERING

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- No detrimental impact on nearby wetlands.
- Upset containment basin with liner to hold five days of WWTP discharge at full capacity.
- No portion of the WWTP may be constructed in wetlands or flood hazard areas.
- Wastewater must be treated to reclaimed water standards.
- Setbacks must be met.
- Soils, Agronomy, and Hydrogeological studies must show that the site has the capacity for high-rate infiltration treated water without coming to the surface at full capacity. This includes soils testing, vegetative uptake and transpiration of water, depth to seasonal high water table, installation of test wells, and pumping tests of the wells to show the capacity of the site for infiltration of water as well as vertical and horizontal impacts to the water table.
- Additional requirements are too numerous to list in this letter. More detail can be presented at the meeting.

In order to meet the above requirements, the applicant has agreed to request the assistance of the NC Division of Pollution Prevention and Environmental Assistance (DPPEA) whose "goal is to foster an "Ethic of Environmental Stewardship" within businesses, industries, governments and the citizens of North Carolina." To that end, I have already contacted Mr. Keyes McGee of NC DPPEA and asked for their involvement.

Sincerely,



Mark Walton  
N.C. Professional Engineer  
Registration No. 16879

P.S. I have read several comments about the plans not bearing the seal of a Professional Engineer. North Carolina law prohibits engineers from sealing preliminary plans as final. It is not prudent to prepare final plans and secure State Permits prior to securing a Special Use Permit when required.

## Main Identity

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**From:** "Mark Walton" <walton8@eastnc.twcbc.com>  
**To:** "Keyes McGee" <keyes.mcgee@ncmail.net>  
**Cc:** "Jimmy Fentress" <jfentress@stroudengineer.com>  
**Sent:** Friday, April 03, 2009 2:37 PM  
**Subject:** EFS Properties LLC

Dear Keyes,

I am writing to request the assistance of the NC DPPEA in securing the necessary North Carolina permits for the proposed High-Rate Infiltration System for EFS Properties, LLC (EFS.) As you know, EFS has applied to Pender County for a Special Use Permit for a WWTP on Shaw Highway in Pender County.

We understand that you have concerns about this system. Since the "goal of the Division of Pollution Prevention and Environmental Assistance is to foster an "Ethic of Environmental Stewardship" within businesses, industries, governments and the citizens of North Carolina" we would like to work together with NC DPPEA to that end.

I have read the minutes of the August 18, 2008 Pender County Board of County Commissioners (BOCC) meeting and noted your concerns. There is one concern that I did not understand. Could you please clarify your concern about an Environmental Justice issue.

I look forward to working with your department on this

Sincerely,  
Mark Walton  
Walton Engineering  
PO Box 895  
Burgaw, NC, 28425  
910-259-4800

RECEIVED

APR 03 2009

4/3/2009

PENDER PLANNING DEPT.

## **ONSITE SEWER SYTEM COMMUNITIES**

### **1. Mimosa Bay – Sneads Ferry, NC**

This is a waterfront community that is approximately 300 acres. The community will consist of single family homesites with lighted tennis courts, exercise facilities, and the Owner's clubhouse.

Mimosa Bay has a WWTF with a permitted flow of 118,080GPD.

### **2. Summerhouse on Everett Bay – Onslow County**

This is a gated colonial community located on Everett Bay. This community provides a fitness center/clubhouse, pool, boardwalk/walking trails, boat storage and day docks and so much more.

### **3. Cannonsgate at Bogue Sound – Carteret County**

This community features Charleston-Style water front homes. It provides a gated entrance, plantation style clubhouse, 75-slip marina, community boat storage and so much more.

Cannonsgate has a WWTF with a permitted flow of 200,000GPD.

### **4. Governor's Club – Chapel Hill, NC**

This is a 1600 acre private golf community. The residents are offered a variety of medical services, educational opportunities, activities and sporting events. Homes are priced between the high \$200's to the million dollar range.

Governor's Club has an on-site sewer system facility that has a permitted flow of 300,00GPD.

### **5. The Highlands at Castle Bay – Hampstead, NC**

This community was built around the area's only true Scottish-links style golf course. It features brick homes on lots adjoined with the golf course. Each home includes a membership to the Castle Bay Golf and Country Club.

Castle Bay has a WWTF with a permitted flow of 100,000GPD.

**6. Sea Trail – Brunswick County**

Sea Trail offers memberships for three area golf courses, options in condos, townhomes, single-family homesites and more. This community also offers indoor & outdoor pools, spa, fitness center, a massage therapist and so much more.

Sea Trail has a WWTF with a permitted flow of 500,000GPD.

**7. Ocean Ridge Plantation – Brunswick County**

This community is one of the most luxurious golf and beach communities in Southeastern North Carolina, with a country club lifestyle and luxury homes. You will find 5 championship golf courses and a private oceanfront beach club.

Ocean Ridge Plantation has a WWTF with a permitted flow of 900,000GPD.



## STROUD ENGINEERING, P.A.

CONSULTING ENGINEERS  
102-D CINEMA DRIVE  
WILMINGTON, NORTH CAROLINA 28403  
(910) 815-0775

# PRELIMINARY DRAINAGE STUDY OF TRACT ADJOINING SHAW HIGHWAY

July 28, 2009

## Objective

To provide a cursory study of current drainage conditions, consisting of site observation, mapping associated with these conditions, and recommendations to affect current impacts that have resulted in alterations of the existing floodplain limits.

## Site Observations

A field study was conducted on July 15, 2009 to determine the existing drainage condition of an unnavigable creek which flows westward from Shaw Highway to the Cape Fear River. The creek is locally known as Adkinson Creek. Reference to this name, in addition to some others, can only be found in the adjoining deeds. Some of the more recent deeds refer to this same creek as Hawkins Creek. The author could find no other publication that indicates a name for this creek. The study consisted of GPS mapping of potential areas that have undergone stream alteration and modification of adjacent floodplain. Observations concluded that the floodplains associated with the stream have been modified in certain areas due to beaver dams. Evidence of beavers can be found along the entire run of this creek. Several significant beaver dams were located by GPS as well as the floodplain area affected by the dam. Some of the areas which have been dammed have undergone extensive floodplain modification as a result of the dams. An area of particular concern has resulted in a net increase of the floodplain by over five acres. The water level in this affected floodplain area is approximately three feet higher than the stream at the outlet of the dam. All of the areas in which dams have been constructed have realized appreciable restriction to the stream flow. In addition to the dams there is a considerable amount of vegetative debris in the creek run that had been fell by beaver and storms. Stream widths in areas not affected were approximately seven to eight feet. Average depths in these areas ranged from one half to three feet. There exists a dike that historically created a mill pond just west of Shaw Highway. This dike was reportedly compromised subsequent to the paving of

Shaw Highway. The flow from headwaters east of this location is restricted in this area. This restriction likely causes the flooding that has been historically observed in this location of Shaw Highway. This flooding is the result of the downstream condition whereby the elevation of the water level in this mill pond simply overcomes the elevation of the road.

### **Mapping Associated with Site Conditions**

All mapping performed by this study was done with a mapping grade GPS. The attached map represents the affected areas as a result of beaver activity. The map shows the location of existing dams and the run of the stream, relative to Shaw Highway as well as the Cape Fear River. Adjoining tracts are also shown on the map. There is an additional map which shows the approximate overall drainage area for this creek. There are approximately thirteen hundred acres that drain to the creek as represented by this map.

### **Recommendations**

The most effective proposal to improve the drainage efficiency of Adkinson Creek would be to remove the beaver dams followed immediately by a snag and drag campaign along the subject three thousand feet run of the creek. This would typically require grant funding. The grant application and award process would likely be considered too time consuming given the present condition of the creek. In light of this, I would suggest that the beaver dams be removed immediately through process that is considered compliant to environmental regulations governing this type of activity. There are three dams in this run that once removed would substantially affect the area presently inundated as well as the creek's ability to pass a significant rainfall event. Having removed the dams the grant application process could then be initiated in the absence of the immediate urgency. Once the funding is secured, the most effective proposal could be undertaken. Under any scenario, the maintenance of efficient drainage in this creek is a perpetual endeavor. The beavers will likely persist to establish residence in the run of the creek. The condition of the creek should be assessed each spring to afford ample time for maintenance before the hurricane season. In its present condition, and absent any immediate effort, there will likely be flooding of properties adjacent the creek should a storm of medium magnitude be realized.

Attachments

JHF/jf  
File F:\Master\PW-795\wpd\drainageprop.doc



*JHF* 7/25/2007