



Public Services

Engineering
212 Operations Center Drive
Wilmington, NC 28412
910 341-7807
910 341-5881 fax
wilmingtonnc.gov
Dial 711 TTY/Voice

COMPREHENSIVE STORMWATER MANAGEMENT PERMIT

HIGH DENSITY DEVELOPMENT

SECTION 1 – APPROVAL

Having reviewed the application and all supporting materials, the City of Wilmington has determined that the application is complete and the proposed development meets the requirements of the City of Wilmington's Comprehensive Stormwater Ordinance.

PERMIT HOLDER: **State Street Companies SSG-1, LLC**
PROJECT: **Airlie at Wrightsville Sound**
ADDRESS: **315 Airlie Road**
PERMIT #: **2017038**
DATE: **September 8, 2017**

Therefore, the above referenced site is hereby approved and subject to all conditions set forth in Section 2 of this approval and all applicable provisions of the City of Wilmington Comprehensive Stormwater Management Ordinance.

This permit shall be effective from the date of issuance until September 8, 2027 and shall be subject to the following specified conditions and limitations:

Section 2 - CONDITIONS

1. This approval is valid only for the stormwater management system as proposed on the approved stormwater management plans dated September 7, 2017.
2. The project will be limited to the amount and type of built-upon area indicated in Section IV of the Stormwater Management Application Form submitted as part of the approved stormwater permit application package, and per the approved plans.
3. This permit shall become void unless the facilities are constructed in accordance with the approved stormwater management plans, specifications and supporting documentation, including information provided in the application and supplements.
4. The runoff from all built-upon area within any permitted drainage area must be directed into the permitted stormwater control system for that drainage area.



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5. The permittee shall submit a revised stormwater management application packet to the City of Wilmington and shall have received approval prior to construction, for any modification to the approved plans, including, but not limited to, those listed below:
 - a. Any revision to any item shown on the approved plans, including the stormwater management measures, built-upon area, details, etc.
 - b. Redesign or addition to the approved amount of built-upon area or to the drainage area.
 - c. Further subdivision, acquisition, lease or sale of any part of the project area.
 - d. Filling in, altering, or piping of any vegetative conveyance shown on the approved plan.
 - e. Construction of any permitted future areas shown on the approved plans.
6. A copy of the approved plans and specifications shall be maintained on file by the Permittee.
7. During construction, erosion shall be kept to a minimum and any eroded areas of the system will be repaired immediately.
8. If the stormwater system was used as an Erosion Control device, it must be restored to design condition prior to operation as a stormwater treatment device, and prior to issuance of any certificate of occupancy for the project.
9. All areas must be maintained in a permanently stabilized condition. If vegetated, permanent seeding requirements must follow the guidelines established in the North Carolina Erosion and Sediment Control Planning and Design Manual unless an alternative is specified and approved by the City of Wilmington.
10. All applicable operation & maintenance agreements and easements pertaining to each stormwater treatment system shall be referenced on the final plat and recorded with the Register of Deeds upon final plat approval. If no plat is recorded for the site the operation and maintenance agreements and easements shall be recorded with the Register of Deeds so as to appear in the chain of title of all subsequent purchasers under generally accepted searching standards.
11. The stormwater management system shall be constructed in its entirety, vegetated and operational for its intended use prior to the construction of any built-upon surface unless prior approval is obtained. City Staff must be notified of any deviation prior to construction of the built-upon surface. Any deviation request shall include justification and must propose an alternative timeline or construction sequence. Notification shall not constitute approval. Any alternative timeline approved by City staff shall become an enforceable component of this permit.

12. The permittee shall at all times provide the operation and maintenance necessary to assure the permitted stormwater system functions at optimum efficiency. The approved Operation and Maintenance Agreement must be followed in its entirety and maintenance must occur at the scheduled intervals including, but not limited to:
 - a. Scheduled inspections (interval noted on the agreement).
 - b. Sediment removal.
 - c. Mowing and revegetation of slopes and the vegetated areas.
 - d. Maintenance of landscape plants, including those within the landscape buffer and on the vegetated shelf.
 - e. Immediate repair of eroded areas, especially slopes.
 - f. Debris removal and unclogging of outlet structure, orifice device, flow spreader, catch basins and/or piping.
 - g. Access to the outlet structure must be available at all times.
13. Records of inspection, maintenance and repair for the permitted stormwater system must be kept by the permittee for at least 5 years from the date of record and made available upon request to authorized personnel of the City of Wilmington. The records will indicate the date, activity, name of person performing the work and what actions were taken.
14. Upon completion of construction, before a Certificate of Occupancy shall be granted, and prior to operation or intended use of this permitted facility, the applicant shall submit to the City of Wilmington as-built plans for all stormwater management facilities. The plans shall show the final design specifications and the field location, type, depth, invert and planted vegetation of all measures, controls and devices, as-installed. A certification shall be submitted, along with all supporting documentation that specifies, under seal that the as-built stormwater measures, controls and devices are in compliance with the approved stormwater management plans. A final inspection by City of Wilmington personnel will be required prior to issuance of a certificate of occupancy or operation of the permitted facility.
15. This permit is not transferable except after application and approval by the City of Wilmington. In the event of a change of ownership, name change or change of address the permittee must submit a completed Name/Ownership Change form to the City of Wilmington at least 30 days prior to the change. It shall be signed by all applicable parties, and be accompanied by all required supporting documentation. Submittal of a complete application shall not be construed as an approved application. The application will be reviewed on its own merits by the City of Wilmington and may or may not be approved. The project must be in compliance with the terms of this permit in order for the transfer request to be considered. The permittee is responsible for compliance with all permit conditions until such time as the City of Wilmington approves the transfer request. Neither the sale of the project nor the conveyance of common area to a third party should be considered as an approved transfer of the permit.
16. Failure to abide by the conditions and limitations contained in this permit may subject the Permittee to enforcement action by the City of Wilmington, in accordance with Sections 18-52 and 18-53 and any other applicable section of the Land Development Code.



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17. The City of Wilmington may notify the permittee when the permitted site does not meet one or more of the minimum requirements of the permit. Within the time frame specified in the notice, the permittee shall submit a written time schedule to the City of Wilmington for modifying the site to meet minimum requirements. The permittee shall provide copies of revised plans and certification in writing to the City of Wilmington that the changes have been made.
18. The issuance of this permit does not preclude the Permittee from complying with any and all statutes, rules, regulations, or ordinances, which may be imposed by other government agencies (local, state, and federal) having jurisdiction.
19. In the event that the facilities fail to perform satisfactorily, including the creation of nuisance conditions, the Permittee shall take immediate corrective action, including those as may be required by the City of Wilmington, such as the construction of additional or replacement stormwater management systems.
20. The permittee grants City of Wilmington Staff permission to enter the property during normal business hours for the purpose of inspecting all components of the permitted stormwater management facility.
21. The permit issued shall continue in force and effect until revoked or terminated by the City of Wilmington. The permit may be modified, revoked and reissued or terminated for cause. The filing of a request for a permit modification, revocation and re-issuance or termination does not stay any permit condition.
22. The approved stormwater management plans and all documentation submitted as part of the approved stormwater management permit application package for this project are incorporated by reference and are enforceable parts of the permit.
23. The permittee shall submit a renewal request with all required forms and documentation at least 180 days prior to the expiration date of this permit.
24. If any one or more of the conditions of this permit is found to be unenforceable or otherwise invalidated, all remaining conditions shall remain in full effect.

Stormwater Management Permit issued this the 8th day of September, 2017.

for Sterling Cheatham, City Manager
City of Wilmington



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STORMWATER MANAGEMENT PERMIT APPLICATION FORM (Form SWP 2.2)

I. GENERAL INFORMATION

1. Project Name (subdivision, facility, or establishment name - should be consistent with project name on plans, specifications, letters, operation and maintenance agreements, etc.):

Airlie at Wrightsville Sound

2. Location of Project (street address):

315 Airlie Road

City: Wilmington County: New Hanover Zip: 28403

3. Directions to project (from nearest major intersection):

From north bound Oleander Dr. (US-76), turn right on to Airlie Road. Project is located on
the left approx 0.25 miles from the intersection.

II. PERMIT INFORMATION

1. Specify the type of project (check one): Low Density ☒ High Density ☐
Drains to an Offsite Stormwater System ☐ Drainage Plan ☐ Other ☐
If the project drains to an Offsite System, list the Stormwater Permit Number(s):

City of Wilmington: _____ State – NCDENR/DWQ: _____

2. Is the project currently covered (whole or in part) by an existing City or State (NCDENR/DWQ) Stormwater Permit? Yes ☒ No ☐

If yes, list all applicable Stormwater Permit Numbers:

City of Wilmington: _____ State – NCDENR/DWQ: _____

3. Additional Project Permit Requirements (check all applicable):

CAMA Major ☒ Sedimentation/Erosion Control ☐

NPDES Industrial Stormwater ☒ 404/401 Permit: Proposed Impacts: 0.336 Acres

If any of these permits have already been acquired please provide the Project Name, Project/Permit Number, issue date and the type of each permit:

III. CONTACT INFORMATION

1. Print Applicant / Signing Official's name and title (specifically the developer, property owner, lessee, designated government official, individual, etc. who owns the project):

Applicant / Organization: State Street Companies SSG-1, LLC

Signing Official & Title: Jeff Kentner, President & CEO

- a. Contact information for Applicant / Signing Official:

Street Address: P.O Box 12477

City: Charlotte State: NC Zip: 28220

Phone: (704)372-3703 Fax: (704)973-9804 Email: jkentner@statestreetco.com

Mailing Address (if different than physical address): _____

City: _____ State: _____ Zip: _____

- b. Please check the appropriate box. The applicant listed above is:

☒ The property owner (Skip to item 3)

Lessee* (Attach a copy of the lease agreement and complete items 2 and 2a below)

Purchaser* (Attach a copy of the pending sales agreement and complete items 2 and 2a below)

Developer* (Complete items 2 and 2a below.)

2. Print Property Owner's name and title below, if you are the lessee, purchaser, or developer. (This is the person who owns the property that the project is on.) _____

Property Owner / Organization: _____

Signing Official & Title: _____

- a. Contact information for Property Owner:

Street Address: _____

City: _____ State: _____ Zip: _____

Phone: _____ Fax: _____ Email: _____

Mailing Address (if different than physical address): _____

City: _____ State: _____ Zip: _____

3. (Optional) Print the name and title of another contact such as the project's construction supervisor or another person who can answer questions about the project:

Other Contact Person / Organization: _____

Signing Official & Title: _____

a. Contact information for person listed in item 3 above:

Street Address: --

City: -- State: -- Zip: --

Phone: -- Fax: -- Email: --

Mailing Address (if different than physical address):

City: -- State: -- Zip: --

IV. PROJECT INFORMATION

1. In the space provided below, briefly summarize how the stormwater runoff will be treated.

Stormwater will be treated by use of underground infiltration trenches and a storm filter.

2. Total Property Area: 538,371 square feet

3. Total Coastal Wetlands Area: 0 square feet

4. Total Surface Water Area: 0 square feet

5. Total Property Area (2) – Total Coastal Wetlands Area (3) – Total Surface Water Area (4) = Total Project Area: 538,371 square feet.

6. Existing Impervious Surface within Property Area: 4,105 square feet

7. Existing Impervious Surface to be Removed/Demolished: 4,105 square feet

8. Existing Impervious Surface to Remain: 0 square feet

9. Total Onsite (within property boundary) Newly Constructed Impervious Surface (*in square feet*):

Buildings/Lots	233729	16,602
Impervious Pavement	71,173	
Pervious Pavement (adj. total, with 100 % credit applied)	0	
Impervious Sidewalks	21456	
Pervious Sidewalks (adj. total, with % credit applied)	0	
Other (describe) Mail Kiosk	500	
Future Development	0	
Total Onsite Newly Constructed Impervious Surface	326,858	

10. Total Onsite Impervious Surface

(Existing Impervious Surface to remain + Onsite Newly Constructed Impervious Surface) = 326,858 square feet

11. Project percent of impervious area: (Total Onsite Impervious Surface / Total Project Area) x100 = 60.7 %

12. Total Offsite Newly Constructed Impervious Area (improvements made outside of property boundary, in square feet):

Impervious Pavement	1,898
Pervious Pavement (adj. total, with % credit applied)	
Impervious Sidewalks	3,610
Pervious Sidewalks (adj. total, with % credit applied)	
Other (describe)	
Total Offsite Newly Constructed Impervious Surface	5,508

13. Total Newly Constructed Impervious Surface

(Total Onsite + Offsite Newly Constructed Impervious Surface) = 332,366 square feet

14. Complete the following information for each Stormwater BMP drainage area. If there are more than three drainage areas in the project, attach an additional sheet with the information for each area provided in the same format as below. Low Density projects may omit this section and skip to Section V.

Basin Information	BMP #A	BMP #B	BMP # C
Receiving Stream Name	Bradley Creek	Bradley Creek	Bradley Creek
Receiving Stream Index Number	18-87-24-4-(2)	18-87-24-4-(2)	18-87-24-4-(2)
Stream Classification	SC:#	SC:#	SC:#
Total Drainage Area (sf)	123,646	97,633	340,852
On-Site Drainage Area (sf)	123,646	97,633	340,852
Off-Site Drainage Area (sf)	0 <i>not 8717</i>	0	0
Total Impervious Area (sf)	66,377 70,237	68,366	162,170
Buildings/Lots (sf)	57,885	45,540	114,870
Impervious Pavement (sf)	9,017	18,837	35,500
Pervious Pavement (sf) 100% Credit	0 (8,680) *	0 **	0 (7,922) ***
Impervious Sidewalks (sf)	2,835	3,989	11,800
Pervious Sidewalks (sf)	0	0	0
Other (sf)	500	0	0
Future Development (sf)	0	0	0
Existing Impervious to remain (sf)	0	0	0
Offsite (sf)	0	0	0
Percent Impervious Area (%)	56.8	70.0	47.6

*3,860sf PC over Trench A **6,637sf PC over Trench B ***2,250sf PC over Trench C

15. How was the off-site impervious area listed above determined? Provide documentation:

BMP Drainage area information (continued)

Basin Information	BMP # D	BMP #	BMP #
Receiving Stream Name	Bradley Creek		
Receiving Stream Index Number	18-87-24-4-(2)		
Stream Classification	SC:#		
Total Drainage Area (sf)	52853	0	0
On-Site Drainage Area (sf)	52853		
Off-Site Drainage Area (sf)			
Total Impervious Area (sf)	26085	0	0
Buildings/Lots (sf)	15434	0	
Impervious Pavement (sf)	7819	0	
Pervious Pavement, 100 % credit (sf)	0	0	
Impervious Sidewalks (sf)	2832	0	
Pervious Sidewalks, % credit (sf)	0	0	
Other (sf)	0	0	
Future Development (sf)	0	0	
Existing Impervious to remain (sf)	0	0	
Offsite (sf)	0		
Percent Impervious Area (%)	49.4	0	
Basin Information	BMP #	BMP #	BMP #
Receiving Stream Name			
Receiving Stream Index Number			
Stream Classification			
Total Drainage Area (sf)	0	0	0
On-Site Drainage Area (sf)			
Off-Site Drainage Area (sf)			
Total Impervious Area (sf)	0	0	0
Buildings/Lots (sf)			
Impervious Pavement (sf)			
Pervious Pavement, % credit (sf)			
Impervious Sidewalks (sf)			
Pervious Sidewalks, % credit (sf)			
Other (sf)			
Future Development (sf)			
Existing Impervious to remain (sf)			
Offsite (sf)			
Percent Impervious Area (%)			

V. SUBMITTAL REQUIREMENTS

1. Supplemental and Operation & Maintenance Forms - One applicable City of Wilmington Stormwater BMP supplement form and checklist must be submitted for **each** BMP specified for this project. One applicable proposed operation and maintenance (O&M) form must be submitted for **each type** of stormwater BMP. Once approved, the operation and maintenance forms must be referenced on the final plat and recorded with the register of deeds office.
2. Deed Restrictions and Restrictive Covenants - For all subdivisions, outparcels, and future development, the appropriate property restrictions and protective covenants are required to be recorded prior to the sale of any lot. Due to variability in lot sizes or the proposed BUA allocations, a table listing each lot number, lot size, and the allowable built-upon area must be provided as an attachment to the completed and notarized deed restriction form. The appropriate deed restrictions and protective covenants forms can be downloaded at the link listed in section V (3). Download the latest versions for each submittal.

In instances where the applicant is different than the property owner, it is the responsibility of the property owner to sign the deed restrictions and protective covenants form while the applicant is responsible for ensuring that the deed restrictions are recorded.

By the notarized signature(s) below, the permit holder(s) certify that the recorded property restrictions and protective covenants for this project, if required, shall include all the items required in the permit and listed on the forms available on the website, that the covenants will be binding on all parties and persons claiming under them, that they will run with the land, that the required covenants cannot be changed or deleted without concurrence from the City of Wilmington, and that they will be recorded prior to the sale of any lot.

3. Only complete application packages will be accepted and reviewed by the City. A complete package includes all of the items listed on the City Engineering Plan Review Checklist, including the fee. Copies of the Engineering Plan Review Checklist, all Forms, Deed Restrictions as well as detailed instructions on how to complete this application form may be downloaded from:

<http://www.wilmingtonnc.gov/PublicServices/Engineering/PlanReview/StormwaterPermits.aspx>

The complete application package should be submitted to the following address:

City of Wilmington – Engineering
Plan Review Section
212 Operations Center Dr
Wilmington, NC 28412

VI. CONSULTANT INFORMATION AND AUTHORIZATION

1. Applicant: Complete this section if you wish to designate authority to another individual and/or firm (such as a consulting engineer and /or firm) so that they may provide information on your behalf for this project (such as addressing requests for additional information).

Consulting Engineer: Nick Lauretta, PE

Consulting Firm: McKim & Creed, Inc.

- a. Contact information for consultant listed above:

Mailing Address: 243 N. Front Street

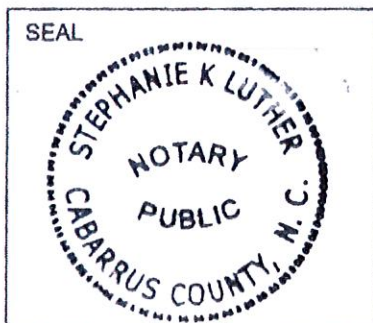
City: Wilmington State: NC Zip: 28401

Phone: 910-398-2882 Fax: 910-251-8282 Email: nlauretta@mckimcreed.com

VII. PROPERTY OWNER AUTHORIZATION (If Section III(2) has been filled out, complete this section)

I, (print or type name of person listed in Contact Information, item 2) Jeffery W. Kentner, certify that I own the property identified in this permit application, and thus give permission to (print or type name of person listed in Contact Information, item 1) Nick Lauretta, PE with (print or type name of organization listed in Contact Information, item 1) McKim & Creed, Inc. to develop the project as currently proposed. A copy of the lease agreement or pending property sales contract has been provided with the submittal, which indicates the party responsible for the operation and maintenance of the stormwater system.

As the legal property owner I acknowledge, understand, and agree by my signature below, that if my designated agent (entity listed in Contact Information, item 1) dissolves their company and/or cancels or defaults on their lease agreement, or pending sale, responsibility for compliance with the City of Wilmington Stormwater Permit reverts back to me, the property owner. As the property owner, it is my responsibility to notify the City of Wilmington immediately and submit a completed Name/Ownership Change Form within 30 days; otherwise I will be operating a stormwater treatment facility without a valid permit. I understand that the operation of a stormwater treatment facility without a valid permit is a violation of the City of Wilmington Municipal Code of Ordinances and may result in appropriate enforcement including the assessment of civil penalties.



Signature: [Signature]

Date: May 24, 2017

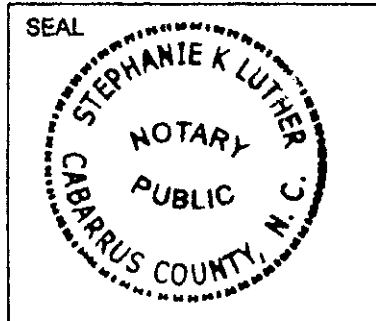
I, Stephanie K. Luther, a Notary Public for the State of North Carolina, County of Cabarrus, do hereby certify that Jeffery W. Kentner personally appeared before me this day of May 24, 2017.

and acknowledge the due execution of the application for a stormwater permit. Witness my hand and official seal,

Stephanie K. Luther
My commission expires: 12-2-2017

VIII. APPLICANT'S CERTIFICATION

I, (print or type name of person listed in Contact Information, item 1) Jeff Kentner, certify that the information included on this permit application form is, to the best of my knowledge, correct and that the project will be constructed in conformance with the approved plans, that the required deed restrictions and protective covenants will be recorded, and that the proposed project complies with the requirements of the applicable stormwater rules under.



Signature: Jeff W. Kentner
Date: May 24, 2017

I, Stephanie K. Luther, a Notary Public for the State of North Carolina County of Cabarrus, do hereby certify that Jeffery W. Kentner personally appeared before me this day of May 24, 2017, and acknowledge the due execution of the application for a stormwater

permit. Witness my hand and official seal,

Stephanie K. Luther
My commission expires: 12-2-2017

STORMWATER MANAGEMENT PERMIT APPLICATION FORM
401 CERTIFICATION APPLICATION FORM

INFILTRATION TRENCH SUPPLEMENT

This form must be filled out, printed and submitted.

The Required Items Checklist (Part III) must be printed, filled out and submitted along with all of the required information.

I. PROJECT INFORMATION

Project name	Airlie at Wrightsville Sound
Contact person	Nick Lauretta, PE
Phone number	910-343-1048
Date	8/8/2017
Drainage area number	A

II. DESIGN INFORMATION

Site Characteristics

Drainage area	123,646.00	ft ²
Impervious area	70,237.00	ft ²
Percent impervious	56.8%	%
Design rainfall depth	1.50	in

Peak Flow Calculations

1-yr, 24-hr rainfall depth		in
1-yr, 24-hr intensity		in/hr
Pre-development 1-yr, 24-hr discharge		ft ³ /sec
Post-development 1-yr, 24-hr discharge		ft ³ /sec
Pre/Post 1-yr, 24-hr peak flow control		ft ³ /sec

Storage Volume: Non-SA Waters

Minimum volume required	8,674.00	ft ³
Volume provided	8,678.00	ft ³

OK for non-SR waters

Storage Volume: SA Waters

1.5" runoff volume		ft ³
Pre-development 1-yr, 24-hr runoff volume		ft ³
Post-development 1-yr, 24-hr runoff volume		ft ³
Minimum volume required		ft ³
Volume provided		ft ³

Soils Report Summary

Soil type	Baymeade	
Infiltration rate	2.97	in/hr
SHWT elevation	12.24	fmsl

Trench Design Parameters

Drawdown time	0.43	days	OK
Perforated pipe diameter	34.00	in	
Perforated pipe length	65.00	ft	
Number of laterals	15		
Stone type (if used)	#57		
Stone void ratio	0.4		
Stone is free of fines?	Y	(Y or N)	OK



Trench Elevations

Bottom elevation	14.25	fmsl	OK
Storage/overflow elevation	16.96	fmsl	
Top elevation	17.58	fmsl	

Trench Dimensions

Length (long dimension)	150.00	ft	
Width (short dimension)	59.00	ft	
Height (depth)	3.33	ft	OK

Additional Information

Maximum volume to each inlet into the trench?		ac-in	
Length of vegetative filter for overflow		ft	
Number of observation wells	8		OK
Distance to structure	15.00	ft	OK
Distance from surface waters	95.00	ft	OK
Distance from water supply well(s)		ft	
Separation from impervious soil layer	2.00	ft	OK
Depth of naturally occurring soil above SHWT	1.00	ft	OK
Bottom covered with 4-in of clean sand?	N	(Y or N)	Must cover bottom with 4-in of clean sand
Proposed drainage easement provided?	Y	(Y or N)	OK
Captures all runoff at ultimate build-out?	Y	(Y or N)	OK
Bypass provided for larger storms?	Y	(Y or N)	OK
Trench wrapped with geotextile fabric?	Y	(Y or N)	OK
Pretreatment device provided	Sump		

STORMWATER MANAGEMENT PERMIT APPLICATION FORM
401 CERTIFICATION APPLICATION FORM

INFILTRATION TRENCH SUPPLEMENT

This form must be filled out, printed and submitted.

The Required Items Checklist (Part III) must be printed, filled out and submitted along with all of the required information.

I. PROJECT INFORMATION

Project name	Airlie at Wrightsville Sound
Contact person	Nick Laurretta, PE
Phone number	910-343-1048
Date	8/8/2017
Drainage area number	B

II. DESIGN INFORMATION

Site Characteristics

Drainage area	97,633.00	ft ²
Impervious area	68,366.00	ft ²
Percent impervious	70.0%	%
Design rainfall depth	1.50	in

Peak Flow Calculations

1-yr, 24-hr rainfall depth		in
1-yr, 24-hr intensity		in/hr
Pre-development 1-yr, 24-hr discharge		ft ³ /sec
Post-development 1-yr, 24-hr discharge		ft ³ /sec
Pre/Post 1-yr, 24-hr peak flow control		ft ³ /sec

Storage Volume: Non-SA Waters

Minimum volume required	8,301.00	ft ³
Volume provided	14,354.00	ft ³

OK for non-SR waters

Storage Volume: SA Waters

1.5" runoff volume		ft ³
Pre-development 1-yr, 24-hr runoff volume		ft ³
Post-development 1-yr, 24-hr runoff volume		ft ³
Minimum volume required		ft ³
Volume provided		ft ³

Soils Report Summary

Soil type	Seagate	
Infiltration rate	4.48	in/hr
SHWT elevation	12.49	fmsl

Trench Design Parameters

Drawdown time	0.15	days	OK
Perforated pipe diameter	51.00	in	
Perforated pipe length	370.00	ft	
Number of laterals	3		
Stone type (if used)	#57		
Stone void ratio	0.4		
Stone is free of fines?	Y	(Y or N)	OK

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AUG 10 2017
ENGINEERING

Trench Elevations

Bottom elevation	14.50	fmsl	OK
Storage/overflow elevation	18.50	fmsl	
Top elevation	19.00	fmsl	

Trench Dimensions

Length (long dimension)	222.00	ft	
Width (short dimension)	169.00	ft	
Height (depth)	4.50	ft	OK

Additional Information

Maximum volume to each inlet into the trench?		ac-in	
Length of vegetative filter for overflow		ft	
Number of observation wells	4		OK
Distance to structure	15.00	ft	OK
Distance from surface waters		ft	
Distance from water supply well(s)		ft	
Separation from impervious soil layer	2.00	ft	OK
Depth of naturally occurring soil above SHWT	1.00	ft	OK
Bottom covered with 4-in of clean sand?	N	(Y or N)	Must cover bottom with 4-in of clean sand
Proposed drainage easement provided?	Y	(Y or N)	OK
Captures all runoff at ultimate build-out?	Y	(Y or N)	OK
Bypass provided for larger storms?	Y	(Y or N)	OK
Trench wrapped with geotextile fabric?	Y	(Y or N)	OK
Pretreatment device provided	Sump		

STORMWATER MANAGEMENT PERMIT APPLICATION FORM
401 CERTIFICATION APPLICATION FORM

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This form must be filled out, printed and submitted.

The Required Items Checklist (Part III) must be printed, filled out and submitted along with all of the required information.

I. PROJECT INFORMATION

Project name	Airlie at Wrightsville Sound
Contact person	Nick Laurretta, PE
Phone number	910-343-1048
Date	8/8/2017
Drainage area number	C

II. DESIGN INFORMATION

Site Characteristics

Drainage area	340,852.00	ft ²
Impervious area	162,170.00	ft ²
Percent impervious	47.6%	%
Design rainfall depth	1.50	in

Peak Flow Calculations

1-yr, 24-hr rainfall depth		in
1-yr, 24-hr intensity		in/hr
Pre-development 1-yr, 24-hr discharge		ft ³ /sec
Post-development 1-yr, 24-hr discharge		ft ³ /sec
Pre/Post 1-yr, 24-hr peak flow control		ft ³ /sec

Storage Volume: Non-SA Waters

Minimum volume required	20,374.00	ft ³
Volume provided	25,625.00	ft ³

OK for non-SR waters

Storage Volume: SA Waters

1.5" runoff volume		ft ³
Pre-development 1-yr, 24-hr runoff volume		ft ³
Post-development 1-yr, 24-hr runoff volume		ft ³
Minimum volume required		ft ³
Volume provided		ft ³

Soils Report Summary

Soil type	Seagate	
Infiltration rate	12.72	in/hr
SHWT elevation	7.25	fmsl

Trench Design Parameters

Drawdown time	0.11	days	OK
Perforated pipe diameter	51.00	in	
Perforated pipe length	117.17	ft	
Number of laterals	16		
Stone type (if used)	#57		
Stone void ratio	0.4		
Stone is free of fines?	Y	(Y or N)	OK

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Trench Elevations

Bottom elevation	9.75	fmsl	OK
Storage/overflow elevation	13.70	fmsl	
Top elevation	14.50	fmsl	

Trench Dimensions

Length (long dimension)	167.00	ft	
Width (short dimension)	159.50	ft	
Height (depth)	4.50	ft	OK

Additional Information

Maximum volume to each inlet into the trench?		ac-in	
Length of vegetative filter for overflow		ft	
Number of observation wells	5		OK
Distance to structure	15.00	ft	OK
Distance from surface waters		ft	
Distance from water supply well(s)		ft	
Separation from impervious soil layer	2.00	ft	OK
Depth of naturally occurring soil above SHWT	1.00	ft	OK
Bottom covered with 4-in of clean sand?	N	(Y or N)	Must cover bottom with 4-in of clean sand
Proposed drainage easement provided?	Y	(Y or N)	OK
Captures all runoff at ultimate build-out?	Y	(Y or N)	OK
Bypass provided for larger storms?	Y	(Y or N)	OK
Trench wrapped with geotextile fabric?	Y	(Y or N)	OK
Pretreatment device provided	Sump		



STORMWATER MANAGEMENT PERMIT APPLICATION FORM
401 CERTIFICATION APPLICATION FORM



PERMEABLE PAVEMENT SUPPLEMENT

This form must be completely filled out, printed and submitted.

The Required Items Checklist (Part III) must be printed, filled out and submitted along with all of the required information.

I. PROJECT INFORMATION

Project Name	Airle at Wrightsville Sound
Contact Person	Eric Seidel, PE
Phone Number	(910) 343-1048
Date	August 8th 2017
Drainage Area	A

II. DESIGN INFORMATION

Soils Report Summary

Hydrologic soil group (HSG) of subgrade	A
Infiltration rate	12.93 in/hr

Pavement Design Summary

Permeable Pavement (PP) design type	Infiltration - HSG A/B
SA of PP being proposed (A_p)	8,680 ft ²
Resulting BUA counted as impervious for main application form	2,170 ft ²
Adjacent BUA directed to PP (A_c)	8,680 ft ² OK
Ratio of A_c to A_p	1.00 (unitless)
Flow from pervious surfaces is directed away from PP?	Yes OK
Design rainfall depth	1.5" in
Permeable pavement surface course type	PC
Layer 1 - Washed aggregate size (ex. No. 57)	No. 57
Layer 1 - Aggregate porosity (n)	0.40 (unitless) OK
Layer 2 - Washed aggregate size (ex. No. 57)	
Layer 2 - Aggregate porosity (n)	(unitless)
Minimum total aggregate depth for design rainfall (D_{wq})	7.5 in
Drawdown/infiltration time for D_{wq}	0.1 days OK
How is 10-yr, 24-hr storm handled?	infiltrated
Aggregate depth to infiltrate 10-yr, 24-hr storm (D_{10})	in
Drawdown/infiltration time of 10-yr, 24-hr storm	days
Actual provided total aggregate depth	8.0 in OK
Top of aggregate base layer elevation	18.50 fmsl
Storage elevation of design rainfall depth	18.50 fmsl
Overflow elevation	19.00 fmsl
Bottom elevation at subgrade	17.83 fmsl
SHWT elevation	15.10 fmsl
Underdrain diameter	0 in

BUA Credit for Permeable Pavement Footprint:

~~75%~~ BUA Credit

100%

#REF!

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Detention Systems (skip for infiltration systems)

Diameter of orifice	N/A	in
Coefficient of discharge (C_D)		(unitless)
Driving head (H_o)		ft
Storage volume discharge rate (through discharge orifice)		ft ³ /sec
Storage volume drawdown time		days
Pre-development 1-yr, 24-hr peak flow		ft ³ /sec
Post-development 1-yr, 24-hr peak flow		ft ³ /sec

Additional Information

Slope of soil subgrade at bottom of permeable pavement	0.50	%	OK
Slope of the permeable pavement surface	0.85	%	OK
Construction sequence minimizes compaction to soils?	Yes		OK
Subsoil preparation specified (must select one)	scarified		
Meets industry standards for structural requirements?	Yes		OK
<u>Washed</u> stone is specified for the aggregate?	Yes		OK
Required signage specified on plans?	Yes		OK
Number of observation wells provided	1		OK
Distance to structure	8.00	ft	
Distance to surface waters	96.00	ft	OK
Distance to water supply well(s)	N/A	ft	OK

Recommended



**STORMWATER MANAGEMENT PERMIT APPLICATION FORM
401 CERTIFICATION APPLICATION FORM**



PERMEABLE PAVEMENT SUPPLEMENT

This form must be completely filled out, printed and submitted.

The Required Items Checklist (Part III) must be printed, filled out and submitted along with all of the required information.

I. PROJECT INFORMATION

Project Name	Airline at Wrightsville Sound
Contact Person	Eric Seidel, PE
Phone Number	(910) 343-1048
Date	August 8th 2017
Drainage Area	C

II. DESIGN INFORMATION

Soils Report Summary

Hydrologic soil group (HSG) of subgrade	A
Infiltration rate	12.72 in/hr

Pavement Design Summary

Permeable Pavement (PP) design type	Infiltration - HSG A/B
SA of PP being proposed (A_p)	7,922 ft ²
Resulting BUA counted as impervious for main application form	1,981 ft ²
Adjacent BUA directed to PP (A_c)	7,922 ft ² OK
Ratio of A_c to A_p	1.00 (unitless)
Flow from pervious surfaces is directed away from PP?	Yes OK
Design rainfall depth	1.5" in
Permeable pavement surface course type	PC
Layer 1 - Washed aggregate size (ex. No. 57)	No. 57
Layer 1 - Aggregate porosity (n)	0.40 (unitless) OK
Layer 2 - Washed aggregate size (ex. No. 57)	
Layer 2 - Aggregate porosity (n)	(unitless)
Minimum total aggregate depth for design rainfall (D_{wq})	7.5 in
Drawdown/infiltration time for D_{wq}	0.1 days OK
How is 10-yr, 24-hr storm handled?	infiltrated
Aggregate depth to infiltrate 10-yr, 24-hr storm (D_{10})	in
Drawdown/infiltration time of 10-yr, 24-hr storm	days
Actual provided total aggregate depth	8.0 in OK
Top of aggregate base layer elevation	14.80 fmsl
Storage elevation of design rainfall depth	14.80 fmsl
Overflow elevation	15.30 fmsl
Bottom elevation at subgrade	14.13 fmsl
SHWT elevation	7.25 fmsl
Underdrain diameter	0 in

BUA Credit for Permeable Pavement Footprint:

~~75%~~ BUA Credit

100%

#REF!

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Detention Systems (skip for infiltration systems)

Diameter of orifice	N/A	in
Coefficient of discharge (C_D)		(unitless)
Driving head (H_o)		ft
Storage volume discharge rate (through discharge orifice)		ft ³ /sec
Storage volume drawdown time		days
Pre-development 1-yr, 24-hr peak flow		ft ³ /sec
Post-development 1-yr, 24-hr peak flow		ft ³ /sec

Additional Information

Slope of soil subgrade at bottom of permeable pavement	0.50	%	OK
Slope of the permeable pavement surface	0.50	%	OK
Construction sequence minimizes compaction to soils?	Yes		OK
Subsoil preparation specified (must select one)	scarified		
Meets industry standards for structural requirements?	Yes		OK
Washed stone is specified for the aggregate?	Yes		OK
Required signage specified on plans?	Yes		OK
Number of observation wells provided	1		OK
Distance to structure	8.00	ft	
Distance to surface waters	556.00	ft	OK
Distance to water supply well(s)	N/A	ft	OK

Recommended



STORMWATER MANAGEMENT PERMIT APPLICATION FORM
401 CERTIFICATION APPLICATION FORM
CONTECH STORMFILTER SUPPLEMENT
ENGINEERED SOLUTIONS



*This form must be filled out on line, printed and submitted with all of the required information.
Make sure to also fill out and submit the Required Items Checklist (Section III) and the O&M Agreement*

I. PROJECT INFORMATION

Project name	Airlie at Wrightsville Sound
Contact name	Nick Laurretta, PE
Phone number	(910) 343-1048
Date	August 8, 2017
Drainage area number	D

II. DESIGN INFORMATION

Site Characteristics

Drainage area (A_D)	52,853.00 ft^2	OK
Impervious area	26,085.00 ft^2	
% Impervious (I_A)	49.4% %	
Design rainfall depth (R_D)	1.50 in	

Peak Flow Calculations

1-yr, 24-hr runoff depth	_____ in
1-yr, 24-hr intensity	_____ in/hr
Pre-development 1-yr, 24-hr runoff	_____ ft^3/sec
Post-development 1-yr, 24-hr runoff	_____ ft^3/sec
Pre/Post 1-yr, 24-hr peak control	_____ ft^3/sec

Storage Volume

Design volume (WQV)	3,265.00 ft^3	
Adjusted water quality volume (WQV_{Adj})	2,448.75 ft^3	OK
Volume contained before filter	2,965.00 ft^3	
Runoff Coefficient (R_v)	0.49 (unitless)	

Mass loading calculations

Mean Annual Rainfall, P	57.00 in	
Agency required TSS% removal	85.00%	
Percent Runoff Capture (% capture)	90.00%	
Event Mean Concentration of Pollutant, EMC	70.00 mg/l	(Suggestion: Use 60 for residential, 70 for Commercial, 100 for Industrial)

Filter System

Cartridge height	27.00 in
Specific Flow Rate, q	7.50 gpm/ ft^2
SHWT elevation	_____ ft amsl
Bottom of the StormFilter vault elevation	_____ ft amsl
Clearance (d_{SHWT})	_____

Time to drain the StormFilter (t)	_____ hours
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Time to drain the StormFilter (t)	_____ days
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SUMMARY

Maximum Treatment Flow Rate, cfs	1.00
Number of Cartridges	8.00

Additional Information

Does volume in excess of the design volume bypass the filter?	Y	Y or N	OK
Is an off-line flow-splitting device used?	Y	Y or N	OK
If draining to SA waters: Does volume in excess of the design volume flow evenly distributed through a vegetated filter?	N/A	Y or N	Enter Data
What is the length of the vegetated filter?	N/A	ft	
Does the design use a level spreader to evenly distribute flow?	N	Y or N	Show how flow is evenly distributed.
Is the BMP located at least 30ft from surface waters (50ft if SA waters)?	Y	Y or N	OK
Are the vegetated side slopes equal to or less than 3:1	N	Y or N	Insufficient vegetated side slopes.
Is the BMP located in a recorded drainage easement with a recorded access easement to a public Right of Way (ROW)?	Y	Y or N	OK

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Infiltration Trench Operation and Maintenance Agreement

I will keep a maintenance record on this BMP. This maintenance record will be kept in a log in a known set location. Any deficient BMP elements noted in the inspection will be corrected, repaired or replaced immediately. These deficiencies can affect the integrity of structures, safety of the public, and the removal efficiency of the BMP.

Important maintenance procedures:

- The drainage area of the infiltration trench will be carefully managed to reduce the sediment load to the sand filter.
- The water level in the monitoring wells will be recorded once a month and after every storm event greater than 1.5 inches if in a Coastal County.

The infiltration trench will be inspected **once a quarter and within 24 hours after every storm event greater than 1.5 inches**. Records of operation and maintenance will be kept in a known set location and will be available upon request.

Inspection activities shall be performed as follows. Any problems that are found shall be repaired immediately.

BMP element:	Potential problem:	How I will remediate the problem:
The entire BMP	Trash/debris is present.	Remove the trash/debris.
The grass filter strip or other pretreatment area	Areas of bare soil and/or erosive gullies have formed.	Regrade the soil if necessary to remove the gully, and then plant a ground cover and water until it is established. Provide lime and a one-time fertilizer application.
	Sediment has accumulated to a depth of greater than six inches.	Search for the source of the sediment and remedy the problem if possible. Remove the sediment and dispose of it in a location where it will not cause impacts to streams or the BMP.
The flow diversion structure (if applicable)	The structure is clogged.	Unclog the conveyance and dispose of any sediment off-site.
	The structure is damaged.	Make any necessary repairs or replace if damage is too large for repair.



BMP element:	Potential problem:	How I will remediate the problem:
The trench	Water is ponding on the surface for more than 24 hours after a storm.	Remove the accumulated sediment from the infiltration system and dispose in a location that will not impact a stream or the BMP.
	The depth in the trench is reduced to 75% of the original design depth.	Remove the accumulated sediment from the infiltration system and dispose in a location that will not impact a stream or the BMP.
	Grass or other plants are growing on the surface of the trench.	Remove the plants, preferably by hand. If pesticide is used, wipe it on the plants rather than spraying.
The observation well(s)	The water table is within one foot of the bottom of the system for a period of three consecutive months.	Contact the DWQ Stormwater Unit immediately at 919-733-5083.
	The outflow pipe is clogged.	Provide additional erosion protection such as reinforced turf matting or riprap if needed to prevent future erosion problems.
	The outflow pipe is damaged.	Repair or replace the pipe.
The emergency overflow berm	Erosion or other signs of damage have occurred at the outlet.	The emergency overflow berm will be repaired or replaced if beyond repair.
The receiving water	Erosion or other signs of damage have occurred at the outlet.	Contact the NC Division of Water Quality 401 Oversight Unit at 919-733-1786.

Permit Number: _____
(to be provided by City of Wilmington)

I acknowledge and agree by my signature below that I am responsible for the performance of the maintenance procedures listed above. I agree to notify City of Wilmington of any problems with the system or prior to any changes to the system or responsible party.

Project name: Airlie at Wrightsville Sound

BMP drainage basin number: A, B, C

Print name: State Street Companies - SSG-1, LLC (Elizabeth Brinkman/Vice President)

Title: Developer

Address: P.O. Box 12477 Charlotte, NC 28220

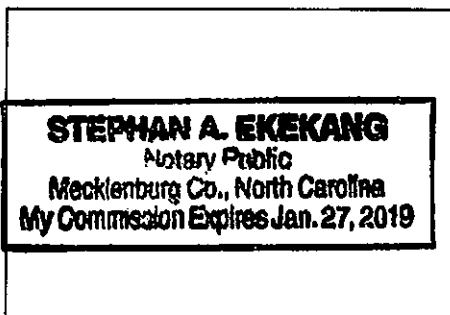
Phone: (704) 372-3703

Signature: Beth K Brinkman

Date: JULY 21, 2017

Note: The legally responsible party should not be a homeowners association unless more than 50% of the lots have been sold and a resident of the subdivision has been named the president.

I, Stephan A. EkeKang, a Notary Public for the State of North Carolina, County of Mecklenburg, do hereby certify that Elizabeth Brinkman personally appeared before me this 21st day of July, 2017, and acknowledge the due execution of the forgoing infiltration trench maintenance requirements. Witness my hand and official seal,



Stephan A. EkeKang

SEAL

My commission expires Jan 27, 2019

StormFilter Operation and Maintenance Agreement

I will keep a maintenance record on this BMP. This maintenance record will be kept in a log in a known set location. Any deficient BMP elements noted in the inspection will be corrected, repaired or replaced immediately. These deficiencies can affect the integrity of structures, safety of the public, and the removal efficiency of the BMP.

Important maintenance procedures:

- The drainage area will be carefully managed to reduce the sediment load to the StormFilter.
- The sedimentation chamber or forebay will be cleaned out whenever sediment depth exceeds six inches.

The StormFilter system will be inspected **quarterly**. Records of operation and maintenance will be kept in a known set location and will be available upon request.

Inspection activities shall be performed as follows. Any problems that are found shall be repaired immediately.

BMP element:	Potential problem:	How I will remediate the problem:
Entire BMP	Trash/debris is present.	Remove the trash/debris.
Adjacent pavement (if applicable)	Sediment is present on the pavement surface.	Sweep or vacuum the sediment as soon as possible.
Flow diversion structure	The structure is clogged.	Unclog the conveyance and dispose of any sediment offsite.
	The structure is damaged.	Make any necessary repairs or replace if damage is too large for repair.
StormFilter Cartridges	Cartridges not performing as designed - see Contech I&M document to determine if cartridge maintenance is required.	Replace cartridges per manufacturer's recommendations.
Outlet device	Clogging has occurred.	Clean out the outlet device. Dispose of the sediment offsite.
	The outlet device is damaged	Repair or replace the outlet device.
Receiving water	Erosion or other signs of damage have occurred at the outlet.	Contact the NC Division of Water Quality 401 Oversight Unit at 919-733-1786.



Permit Number: _____
(to be provided by DWQ)

All other operation and maintenance activities should be in accordance with Contech's **StormFilter Inspection and Maintenance Procedures** document. Any problems that are found shall be repaired immediately. I acknowledge and agree by my signature below that I am responsible for the performance of the maintenance procedures listed above and have received and understand Contech's **StormFilter Inspection and Maintenance Procedures** document. I agree to notify DWQ of any problems with the system or prior to any changes to the system or responsible party.

Project name: Airlie at Wrightsville Sound

BMP drainage area number: D

Print name: State Street Companies - SSG-1, LLC (Elizabeth Brinkman / Vice President)

Title: Developer

Address: P.O. Box 12477 Charlotte, NC 28220

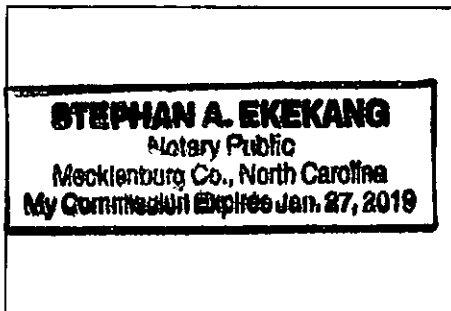
Phone: (704) 372-3703

Signature: Beth K Brinkman

Date: JULY 21, 2017

Note: The legally responsible party should not be a homeowners association unless more than 50% of the lots have been sold and a resident of the subdivision has been named the president.

I, Stephan A. EkeKang, a Notary Public for the State of North Carolina, County of Mecklenburg, do hereby certify that Elizabeth Brinkman personally appeared before me this 21st day of July, 2017, and acknowledge the due execution of the forgoing sand filter maintenance requirements. Witness my hand and official seal,



Stephan A. EkeKang

SEAL

My commission expires Jan. 27, 2019

Permeable Pavement Operation and Maintenance Agreement

I will keep a maintenance record on this BMP. This maintenance record will be kept in a log in a known set location. Any deficient BMP elements noted in the inspection will be corrected, repaired or replaced immediately. These deficiencies can affect the integrity of structures, safety of the public, and the removal efficiency of the BMP.

At all times, the pavement shall be kept free of:

- Debris and particulate matter through frequent blowing that removes such debris, particularly during the fall and spring.
- Piles of soil, sand, mulch, building materials or other materials that could deposit particulates on the pavement.
- Piles of snow and ice.
- Chemicals of all kinds, including deicers.

The permeable pavement will be inspected **once a quarter**. Records of operation and maintenance will be kept in a known set location and will be available upon request.

Inspection activities shall be performed as follows. Any problems that are found shall be repaired immediately.

BMP element:	Potential problem:	How to remediate the problem:
The perimeter of the permeable pavement	Areas of bare soil and/or erosive gullies A vegetated area drains toward the pavement.	Regrade the soil if necessary to remove the gully, then plant ground cover and water until established. Regrade the area so that it drains away from the pavement, then plant ground cover and water until established.
The surface of the permeable pavement	Trash/debris present Weeds	Remove the trash/debris. Do not pull the weeds (may pull out media as well). Spray them with a systemic herbicide such as glyphosate and then return within the week to remove them by hand. (Another option is to pour boiling water on them or steam them.) Vacuum sweep the pavement.
Observation well	Sediment Rutting, cracking or slumping or damaged structure Water present more than five days after a storm event	Consult an appropriate professional. Clean out clogged underdrain pipes. Consult an appropriate professional for clogged soil subgrade.
Educational sign	Missing or is damaged.	Replace the sign.



Permit Number: _____
(to be provided by DWQ)

I acknowledge and agree by my signature below that I am responsible for the performance of the maintenance procedures listed above. I agree to notify DWQ of any problems with the system or prior to any changes to the system or responsible party.

Project name: Airlie at Wrightsville Sound

BMP drainage area or lot number: A, B, C

Print name: State Street Companies - SSG-1, LLC (Elizabeth Brinkman/Vice President)

Title: Developer

Address: P.O. Box 12477 Charlotte, NC 28220

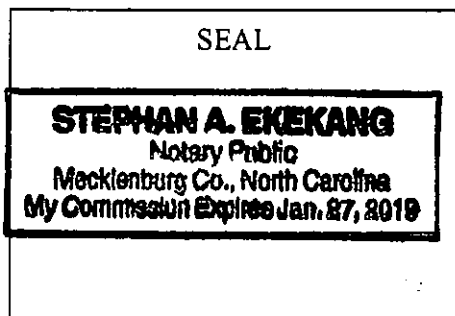
Phone: (704) 3721-3703

Signature: Beth K Brinkman

Date: JULY 21, 2017

Note: The legally responsible party should not be a homeowners association unless more than 50% of the lots have been sold and a resident of the subdivision has been named the president.

I, Stephan A. EkeKang, a Notary Public for the State of North Carolina, County of Mecklenburg, do hereby certify that Elizabeth Brinkman personally appeared before me this day of July 21, 2017, and acknowledge the due execution of the forgoing permeable pavement maintenance requirements. Witness my hand and official seal,



Stephan A. EkeKang

My commission expires Jan. 27, 2019