



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: **NNP IV - Cape Fear River, LLC**
PROJECT: **Riverlights - Marina Village**
ADDRESS: **4410 River Road**
PERMIT #: **2015021**
DATE: **9/3/2015**

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 9/4/2015 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 8/27/2015.
2. This project is part of the Riverlights project and is also subject to the terms and conditions of the Riverlights Master Permit – City Stormwater Permit #2015024.
3. 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.
4. 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.
5. 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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6. 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.
7. A copy of the approved plans and specifications shall be maintained on file by the Permittee.
8. During construction, erosion shall be kept to a minimum and any eroded areas of the system will be repaired immediately.
9. 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.
10. 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.
11. 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.
12. 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.



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13. 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.
14. 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.
15. 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 Engineering personnel will be required prior to issuance of a certificate of occupancy or operation of the permitted facility.
16. 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.
17. 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.

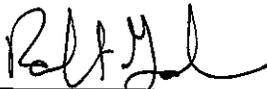


Public Services

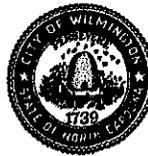
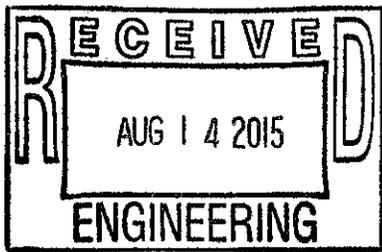
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18. The City of Wilmington may notify the permittee when the permitted site does not meet one or more of the minimum requirements of the permit. Within the time frame specified in the notice, the permittee shall submit a written time schedule to the 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.
19. 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.
20. 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.
21. 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.
22. 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.
23. 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.
24. 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.
25. 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 4th day of September, 2015



for Sterling Cheatham, City Manager
City of Wilmington



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SCANNED

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.):

Riverlights- Marina Village

2. Location of Project (street address):

4410 River Road

City: Wilmington County: New Hanover Zip: 28412

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

From Carolina Beach Road (US-421), turn right at Independence Boulevard (SR1209) and a left at River Road (SR1100). This site is located between Barnard's Creek and Mott's Creek.

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: 2015001 State - NCDENR/DWQ: SW8-070672, SW8-070526

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

CAMA Major Sedimentation/Erosion Control
 NPDES Industrial Stormwater 404/401 Permit: Proposed Impacts: 0.25 acres of non-404

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:

CAMA- RiverLights #92-07, 01/10/2014; 401-RiverLights DWQ Project # 07-1335, 07/16/2013

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: NNP IV- Cape Fear River, LLC

Signing Official & Title: Bill Mumford, Vice President - Development

- a. Contact information for Applicant / Signing Official:

Street Address: 3410 River Road, Suite 103

City: Wilmington State: NC Zip: 28412

Phone: (704)877-5946 Fax: (704)877-5955 Email: bmumford@newlandco.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: Doug Brown

Signing Official & Title: Construction Manager

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

Street Address: 3410 River Road, Suite 103

City: Wilmington State: NC Zip: 28412

Phone: (910)442-2840 Fax: _____ Email: dbrown@newlandco.com

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 using permeable pavement and three infiltration trenches.

- 2. Total Property Area: 1,684,343 square feet
- 3. Total Coastal Wetlands Area: 678,424 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: 1,005,919 square feet.
- 6. Existing Impervious Surface within Property Area: 32,773 square feet
- 7. Existing Impervious Surface to be Removed/Demolished: 32,773 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	52,249
Impervious Pavement	89,608
Pervious Pavement (adj. total, with 75 % credit applied)	3,184
Impervious Sidewalks	35,408
Pervious Sidewalks (adj. total, with % credit applied)	0
Other (describe) River Road Realignment (NCDENR 070526)	0
Future Development	75,541
Total Onsite Newly Constructed Impervious Surface	255,990

10. Total Onsite Impervious Surface
 (Existing Impervious Surface to remain + Onsite Newly Constructed Impervious Surface) = 255,990 square feet

11. Project percent of impervious area: (Total Onsite Impervious Surface / Total Project Area) x100 = 25.4 %

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

Impervious Pavement	
Pervious Pavement (adj. total, with % credit applied)	
Impervious Sidewalks	
Pervious Sidewalks (adj. total, with % credit applied)	
Other (describe)	
Total Offsite Newly Constructed Impervious Surface	0

13. Total Newly Constructed Impervious Surface

(Total Onsite + Offsite Newly Constructed Impervious Surface) = 0 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 #1	BMP #2	BMP #3
Receiving Stream Name	Cape Fear	Cape Fear	Cape Fear
Receiving Stream Index Number	18-(71)	18-(71)	18-(71)
Stream Classification	SC	SC	SC
Total Drainage Area (sf)	88,013	102,460	327,091
On-Site Drainage Area (sf)	88,013	102,460	327,091
Off-Site Drainage Area (sf)			
Total Impervious Area (sf)	64,226	59,765	131,999
Buildings/Lots (sf)	10,969	28,484	12,796
Impervious Pavement (sf)	31,959	20,367	37,282
Pervious Pavement (sf)	0	910	2,274
Impervious Sidewalks (sf)	6,169	10,004	19,235
Pervious Sidewalks (sf)	0	0	0
Other (sf)	0	0	0
Future Development (sf)	15,129	0	60,412
Existing Impervious to remain (sf)	0	0	0
Offsite (sf)	0	0	0
Percent Impervious Area (%)	73	58	40

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

BMP Drainage area information (continued)

Basin Information	Village Green BMP # 4	BMP #	BMP #
Receiving Stream Name	Cape Fear		
Receiving Stream Index Number	18-(71)		
Stream Classification	SC		
Total Drainage Area (sf)	49483	0	0
On-Site Drainage Area (sf)	49483		
Off-Site Drainage Area (sf)			
Total Impervious Area (sf)	1943	0	0
Buildings/Lots (sf)	294		
Impervious Pavement (sf)			
Pervious Pavement, % credit (sf)			
Impervious Sidewalks (sf)			
Pervious Sidewalks, % credit (sf)			
Other (sf)	1649		
Future Development (sf)			
Existing Impervious to remain (sf)			
Offsite (sf)			
Percent Impervious Area (%)	4		
Basin Information	BMP #	(Type of BMP) BMP #	(Type of 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 (%)			

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, LEED AP

Consulting Firm: McKim & Creed, Inc.

a. Contact information for consultant listed above:

Mailing Address: 243 N. Front Street

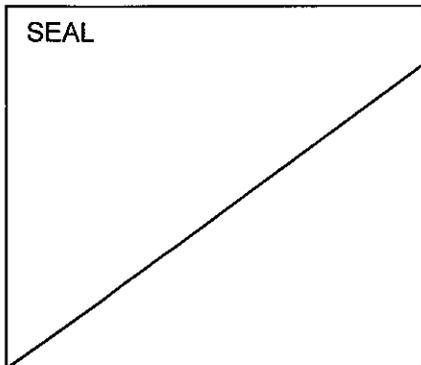
City: Wilmington State: NC Zip: 28401

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), 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) with (print or type name of organization listed in Contact Information, item 1) 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: _____

Date: _____

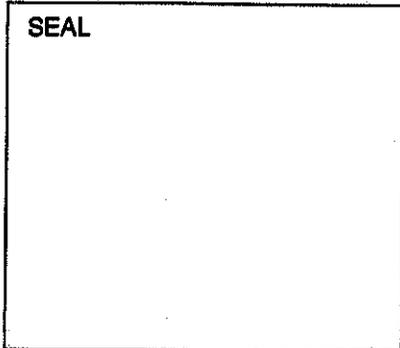
I, _____, a Notary Public for the State of _____, County of _____, do hereby certify that _____ personally appeared before me this day of _____,

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

My commission expires: _____

VIII. APPLICANT'S CERTIFICATION

I, (print or type name of person listed in Contact Information, item 1) Bill Mumford 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.

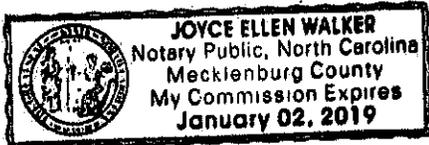


Signature: [Handwritten Signature]
Date: 5-19-2015

I, JOYCE ELLEN WALKER, a Notary Public for the State of NORTH CAROLINA, County of MECKLENBURG do hereby certify that WILLIAM MUMFORD personally appeared before me this day of 19th, May, 2015 and acknowledge the due execution of the application for a stormwater

permit. Witness my hand and official seal,

Joyce Ellen Walker
My commission expires: January 2, 2019





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	RiverLights - Marina Village
Contact Person	Nick Laurreta, PE
Phone Number	910-343-1048
Date	5/13/2015
Drainage Area	1-2/1-3

II. DESIGN INFORMATION

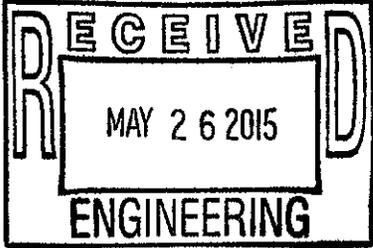
Soils Report Summary

Hydrologic soil group (HSG) of subgrade	A
Infiltration rate	25.80 in/hr

Pavement Design Summary

Permeable Pavement (PP) design type	Infiltration - HSG A/B	
SA of PP being proposed (A _p)	12,734	ft ²
Resulting BUA counted as impervious for main application form	3,183	ft ²
Adjacent BUA directed to PP (A _c)	12,700	ft ²
Ratio of A _c to A _p	1.00	(unitless) OK
Flow from pervious surfaces is directed away from PP?	Yes	OK
Design rainfall depth	1.0"	in
Permeable pavement surface course type	PC	
Layer 1 - Washed aggregate size (ex. No. 57)	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})	5.0	in
Drawdown/infiltration time for D _{wq}	0.0	days
How is 10-yr, 24-hr storm handled?	bypassed	OK
Aggregate depth to infiltrate 10-yr, 24-hr storm (D ₁₀)	20.6	in
Drawdown/infiltration time of 10-yr, 24-hr storm	0.22	days
Actual provided total aggregate depth	6.0	in
Top of aggregate base layer elevation	10.50	fmsl
Storage elevation of design rainfall depth	10.42	fmsl
Overflow elevation	11.00	fmsl
Bottom elevation at subgrade	10.00	fmsl
SHWT elevation	3.83	fmsl
Underdrain diameter		in

BUA Credit for Permeable Pavement Footprint:
75% BUA Credit



#REF!

SCANNED

Detention Systems (skip for infiltration systems)

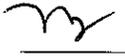
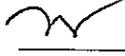
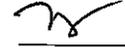
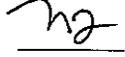
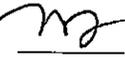
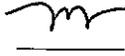
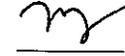
Diameter of orifice	_____	in
Coefficient of discharge (C _D)	_____	(unitless)
Driving head (H _o)	_____	ft
Storage volume discharge rate (through discharge orifice)	_____	ft ³ /sec
Storage volume drawdown time	_____	days
Pre-development 1-yr, 24-hr peak flow	_____	ft ³ /sec
Post-development 1-yr, 24-hr 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
<u>Washed</u> stone is specified for the aggregate?	Yes		OK
Required signage specified on plans?	No		Signage must be specified on the plans
Number of observation wells provided	1		OK
Distance to structure	60.00	ft	
Distance to surface waters	100.00	ft	OK
Distance to water supply well(s)	--	ft	OK

Permeable Pavement

Please indicate the page or plan sheet numbers where the supporting documentation can be found. **An incomplete submittal package will result in a request for additional information. This will delay final review and approval of the project.** Initial in the space provided to indicate the following design requirements have been met. If the applicant has designated an agent, the agent may initial below. **If a requirement has not been met, attach justification.**

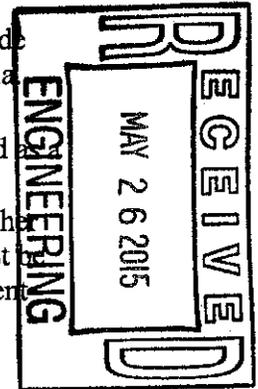
Initials	Page/ Plan Sheet No.	Version 1.0
	CG101	Plans (1" = 50' or larger) of the entire site showing: - Design at ultimate build-out, 1. - Location of permeable pavement, - Roof and other surface flow directed away from permeable pavement,
	CS501	Section view of the permeable pavement (1" = 20' or larger) showing: 2. - Layers, and - SHWT
	Narrative	A soils report that is based upon an actual field investigation, soil borings, and 3. infiltration tests. County soil maps are not an acceptable source of soils information.
	CG502	4. A construction sequence that shows how the permeable pavement will be protected from sediment until the entire drainage area is stabilized.
	Narrative	5. The supporting calculations.
	Attached	6. A copy of the signed and notarized operation and maintenance (O&M) agreement.
	To be provided	7. A copy of the deed restrictions (if required).
	Noted	8. Installation must be at a slope of 0.5% or less.

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.

Important operation and maintenance procedures:

- Stable groundcover will be maintained in the drainage area to reduce the sediment load to the permeable pavement.
- The area around the perimeter of the permeable pavement will be stabilized and mowed, with clippings removed.
- Any weeds that grow in the permeable pavement will be sprayed with pesticide immediately. Weeds will not be pulled, since this could damage the fill media.
- Once a year, the permeable pavement surface will be vacuum swept.
- At no time shall wet sweeping (moistening followed by sweeping) be allowed as a means of maintenance.
- There shall be no repair or treatment of Permeable Pavement surfaces with other types of pavement surfaces. All repairs to Permeable Pavement surfaces must be accomplished utilizing permeable pavement which meets the original pavement specifications.
- Concentrated runoff from roof drains, piping, swales or other point sources, directly onto the permeable pavement surface shall not be allowed. These areas must be diverted away from the permeable pavement.



Initial Inspection: Permeable Pavements shall be inspected monthly for the first three months for the following:

BMP element:	Potential problem:	How to remediate the problem:
The perimeter of the permeable pavement	Areas of bare soil and/or erosive gullies have formed.	In the event that rutting or failure of the groundcover occurs, the eroded area shall be repaired immediately and permanent groundcover re-established. Appropriate temporary Erosion Control measures (such as silt fence) shall be installed in the affected area during the establishment of permanent groundcover, and any impacted area of permeable pavement is to be cleaned via vacuum sweeping.
The surface of the permeable pavement	Rutting / uneven settlement	This indicates inadequate compaction of the pavement base / sub-base. If rutting or uneven settlement on the order of ½ inch or greater occurs, permeable pavement shall be removed and base / sub-base re-compacted, smoothed, and permeable pavement shall then be re-installed. Base and sub-base compaction shall be monitored by a licensed geotechnical engineer to ensure that infiltration capacity of base and sub-base are not compromised by compaction and smoothing processes.
	The pavement does not dewater between storms, or water is running off.	Vacuum sweep the pavement. If the pavement still does not dewater, consult a professional.

Permit Number: _____
 (to be provided by City of Wilmington)
 Drainage Area / Lot Number: _____

The permeable pavement 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 to remediate the problem:
The perimeter of the permeable pavement	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.
	Vegetation is too short or too long.	Maintain vegetation at a height of 3 to 6 inches (remove clippings).
The surface of the permeable pavement	Trash/debris is present.	Remove the trash/debris.
	Weeds are growing on the surface of the permeable pavement.	Do not pull the weeds (may pull out media as well). Spray them with pesticide.
	Sediment is present on the surface.	Vacuum sweep the pavement.
	The structure is deteriorating or damaged.	Consult an appropriate professional. Damaged areas of the pavement shall be removed and repaired.
	The pavement does not dewater between storms.	Vacuum sweep the pavement. If the pavement still does not dewater, consult a professional. Permanently clogged pavement shall be removed and repaired.

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: RiverLights- Marina Village Phase 1

BMP drainage area or lot number: 12,734 SF

Print name: Bill Mumford

Title: Vice President, Development

Address: 3410 River Road, Suite 103, Wilmington, NC 28412

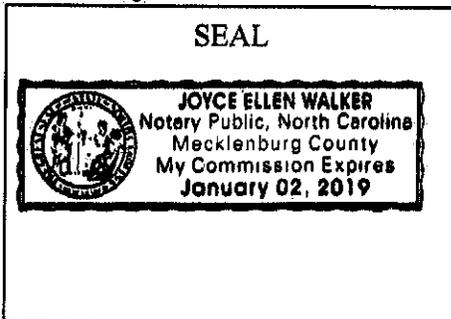
Phone: 704-877-5946

Signature: *William Mumford*

Date: 5-19-2015

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, Joyce Ellen Walker, a Notary Public for the State of North Carolina, County of Mecklenburg, do hereby certify that William Mumford personally appeared before me this 19th day of May, 2015, and acknowledge the due execution of the forgoing permeable pavement maintenance requirements. Witness my hand and official seal, Joyce Ellen Walker



My commission expires January 2, 2019



**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	RiverLights - Marina Village
Contact person	Nick Lauretta, PE
Phone number	910-343-1048
Date	8/11/2015
Drainage area number	1

II. DESIGN INFORMATION

Site Characteristics

Drainage area	88,013.00	ft ²
Impervious area	64,226.00	ft ²
Percent impervious	73.0%	%
Design rainfall depth	1.00	in

Peak Flow Calculations

1-yr, 24-hr rainfall depth	3.94	in
1-yr, 24-hr intensity	0.16	in/hr
Pre-development 1-yr, 24-hr discharge	0.00	ft ³ /sec
Post-development 1-yr, 24-hr discharge	4.65	ft ³ /sec
Pre/Post 1-yr, 24-hr peak flow control	4.65	ft ³ /sec

Storage Volume: Non-SA Waters

Minimum volume required	5,184.00	ft ³
Volume provided	7,690.00	ft ³

OK for non-SR waters

Storage Volume: SA Waters

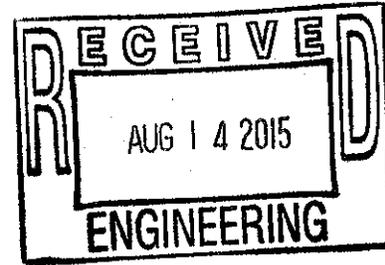
1.5" runoff volume		ft ³
Pre-development 1-yr, 24-hr runoff volume		ft ³
Post-development 1-yr, 24-hr runoff volume		ft ³
Minimum volume required		ft ³
Volume provided		ft ³

Soils Report Summary

Soil type	SP	
Infiltration rate	25.50	in/hr
SHWT elevation	4.22	fmsl

Trench Design Parameters

Drawdown time	0.04	days	OK
Perforated pipe diameter	36.00	in	
Perforated pipe length	78.00	ft	
Number of laterals	8		
Stone type (if used)	57		
Stone void ratio	0.4		
Stone is free of fines?	Y	(Y or N)	OK



Trench Elevations

Bottom elevation	6.50	fmsl	OK
Storage/overflow elevation	9.35	fmsl	
Top elevation	10.50	fmsl	

Trench Dimensions

Length (long dimension)	82.00	ft	
Width (short dimension)	38.50	ft	
Height (depth)	4.00	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	6		OK
Distance to structure	70.00	ft	OK
Distance from surface waters	510.00	ft	OK
Distance from water supply well(s)	--	ft	OK
Separation from impervious soil layer		ft	
Depth of naturally occurring soil above SHWT	2.28	ft	OK
Bottom covered with 4-in of clean sand?	Y	(Y or N)	OK
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			



STORMWATER MANAGEMENT PERMIT APPLICATION FORM
401 CERTIFICATION APPLICATION FORM
INFILTRATION TRENCH SUPPLEMENT



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I. PROJECT INFORMATION

Project name	RiverLights - Marina Village
Contact person	Nick Laurretta, PE
Phone number	910-343-1048
Date	8/11/2015
Drainage area number	2

II. DESIGN INFORMATION

Site Characteristics

Drainage area	102,460.00	ft ²
Impervious area	59,765.00	ft ²
Percent impervious	58.3%	%
Design rainfall depth	1.00	in

Peak Flow Calculations

1-yr, 24-hr rainfall depth	3.94	in
1-yr, 24-hr intensity	0.16	in/hr
Pre-development 1-yr, 24-hr discharge	0.00	ft ³ /sec
Post-development 1-yr, 24-hr discharge	6.16	ft ³ /sec
Pre/Post 1-yr, 24-hr peak flow control	6.16	ft ³ /sec

Storage Volume: Non-SA Waters

Minimum volume required	4,909.00	ft ³
Volume provided	11,317.00	ft ³

OK for non-SR waters

Storage Volume: SA Waters

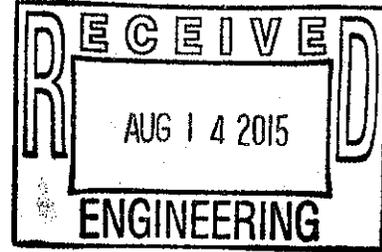
1.5" runoff volume		ft ³
Pre-development 1-yr, 24-hr runoff volume		ft ³
Post-development 1-yr, 24-hr runoff volume		ft ³
Minimum volume required		ft ³
Volume provided		ft ³

Soils Report Summary

Soil type	SP
Infiltration rate	25.50 in/hr
SHWT elevation	4.22 fmsl

Trench Design Parameters

Drawdown time	0.04 days	OK
Perforated pipe diameter	36.00 in	
Perforated pipe length	132.00 ft	
Number of laterals	7	
Stone type (if used)	57	
Stone void ratio	0.4	
Stone is free of fines?	Y (Y or N)	OK



Trench Elevations

Bottom elevation	6.50	fmsl	OK
Storage/overflow elevation	9.80	fmsl	
Top elevation	10.50	fmsl	

Trench Dimensions

Length (long dimension)	136.00	ft	
Width (short dimension)	34.00	ft	
Height (depth)	4.00	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	6		OK
Distance to structure	35.00	ft	OK
Distance from surface waters	275.00	ft	OK
Distance from water supply well(s)	-	ft	OK
Separation from impervious soil layer		ft	
Depth of naturally occurring soil above SHWT	2.28	ft	OK
Bottom covered with 4-in of clean sand?	Y	(Y or N)	OK
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			



STORMWATER MANAGEMENT PERMIT APPLICATION FORM
 401 CERTIFICATION APPLICATION FORM
INFILTRATION TRENCH SUPPLEMENT



Permit No. _____
 (to be provided by DWQ)

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	RiverLights - Marina Village
Contact person	Nick Lauletta, PE
Phone number	910-343-1048
Date	8/11/2015
Drainage area number	3

II. DESIGN INFORMATION

Site Characteristics

Drainage area	327,091.00	ft ²
Impervious area	131,999.00	ft ²
Percent impervious	40.4%	%
Design rainfall depth	1.00	in

Peak Flow Calculations

1-yr, 24-hr rainfall depth	3.94	in
1-yr, 24-hr intensity	0.16	in/hr
Pre-development 1-yr, 24-hr discharge	0.00	ft ³ /sec
Post-development 1-yr, 24-hr discharge	12.37	ft ³ /sec
Pre/Post 1-yr, 24-hr peak flow control	12.37	ft ³ /sec

Storage Volume: Non-SA Waters

Minimum volume required	11,263.00	ft ³
Volume provided	27,391.00	ft ³

OK for non-SR waters

Storage Volume: SA Waters

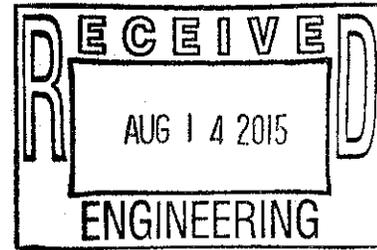
1.5" runoff volume		ft ³
Pre-development 1-yr, 24-hr runoff volume		ft ³
Post-development 1-yr, 24-hr runoff volume		ft ³
Minimum volume required		ft ³
Volume provided		ft ³

Soils Report Summary

Soil type	SP	
Infiltration rate	26.60	in/hr
SHWT elevation	4.50	fmsl

Trench Design Parameters

Drawdown time	0.04	days	OK
Perforated pipe diameter	36.00	in	
Perforated pipe length	85.00	ft	
Number of laterals	27		
Stone type (if used)	57		
Stone void ratio	0.4		
Stone is free of fines?	Y	(Y or N)	OK



Trench Elevations

Bottom elevation	6.50	fmsl	OK
Storage/overflow elevation	9.45	fmsl	
Top elevation	10.50	fmsl	

Trench Dimensions

Length (long dimension)	124.00	ft	
Width (short dimension)	89.00	ft	
Height (depth)	4.00	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	6		OK
Distance to structure	90.00	ft	OK
Distance from surface waters	210.00	ft	OK
Distance from water supply well(s)	--	ft	OK
Separation from impervious soil layer		ft	
Depth of naturally occurring soil above SHWT	1.98	ft	OK
Bottom covered with 4-in of clean sand?	Y	(Y or N)	OK
Proposed drainage easement provided?	Y	(Y or N)	OK
Capures 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			

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.

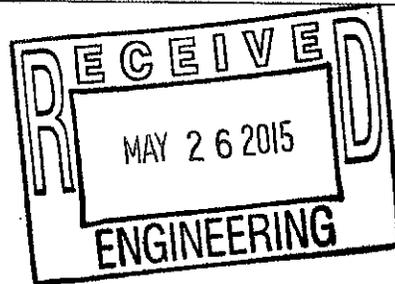
Important maintenance procedures:

- 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: RiverLights- Marina Village Phase 1

BMP drainage basin number: 1,2,3

Print name: Bill Mimford

Title: Vice President, Development

Address: 3410 River Road, Suite 103 Wilmington, NC 28412

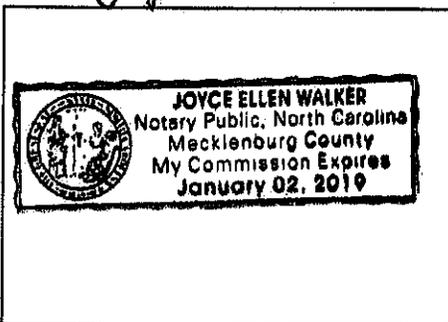
Phone: 704-877-5946

Signature: [Handwritten Signature]

Date: 5-19-2015

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, Joyce Ellen Walker, a Notary Public for the State of North Carolina County of Mecklenburg, do hereby certify that William Mimford personally appeared before me this 19th day of May, 2015, and acknowledge the due execution of the forgoing infiltration trench maintenance requirements. Witness my hand and official seal, Joyce Ellen Walker



SEAL

My commission expires January 2, 2019