

## Stormwater Management Strategies for Town of Kiawah Island

Currently the only construction projects on Kiawah Island which are regulated for stormwater management are projects which are larger than 1 acre and require a NPDES (National Pollutant Discharge Elimination System) Construction General Permit from South Carolina Department of Health and Environmental Control. These projects are generally limited to the multi family or resort projects which account for a small percentage of the ongoing construction projects on the island.

Most of the coastal communities around the area have adopted ordinances to create their own utility and become MS4's which is a Municipal Separate Storm Sewer Systems that own the stormwater infrastructure. Several of them partner with Charleston County for administrative and regulatory support. The Town of Kiawah would not qualify for that partnership as KICA, a private entity, owns and operates the master drainage system for the island. The State of South Carolina has over 70 regulated small MS4s.

Many of the coastal MS4's have adopted additional requirements above the DHEC and Charleston County Stormwater Program. Mt. Pleasant has a specific ordinance for Single Family Stormwater Management and the Town of James Island has Supplemental Stormwater Design Standards for both single family residences and non-single-family sites.

*“It is important to understand that while the pond system is very effective in dealing with most precipitation events, no stormwater pond system can manage flooding from storm surges or increasingly frequent nuisance tidal flooding resulting from rising sea levels. No pond has the capacity to hold the ocean! Following a storm surge or tidal flooding, the critical requirement of a stormwater system is to drain the runoff quickly. In the future, higher tides will also decrease the effectiveness of the pond system by slowing the flow of water from the ponds into the outfalls and out to the estuary.”* – Kiawah's Flood Mitigation and Sea Level Rise Adaptation Report.

**The Town's Comprehensive Plan Natural Resource Element Goal 1** states *“Complete the Island's development in a way that maintains the Island's environmental integrity and natural beauty and is consistent with the Vision of the Town.”* and **Implementation Strategy a.** *“Utilize site design and construction standards, methods, and practices to minimize natural area disturbance resulting from building design, location and*

construction. Standards in the ARB Building and Landscaping Guidelines, “Designing with Nature” should be used as a guide.”

**Kiawah’s Flood Mitigation and Sea Level Rise Adaptation Report recommendations relative to stormwater and Low Impact Development strategies.**

*Rules and Regulations: “Kiawah’s regulating entities, property owners and developers should review Low Impact Development in Coastal South Carolina: A Planning and Design Guide referenced below to identify and adopt new practices to improve stormwater management on existing and new developments.” Pg 57*

*Salt Marsh Environment: “Support Low Impact Development practices and required vegetative buffers to reduce pollutants from entering the salt marshes through stormwater runoff.” Pg 69*

**The Comprehensive Marsh Management Plan recommendation regarding stormwater management is to “strictly limit impermeable surfaces and formalize stormwater BMPs for private properties.”**

***“Justification:** Current stormwater regulations simply direct designers to convey water to the critical line or other outfall point, without consideration of its potential effects on the marsh. Low Impact Development (LID) is an integrated, comprehensive approach to land development or redevelopment that works with nature to manage stormwater as close to its source as possible. LID practices can protect local water quality and reduce urban flooding through best practices in stormwater management. Widespread implementation will also reduce pollution of the marsh by filtering and nutrient retention.”*

**Staff has outlined the following recommendations, which are consistent with these goals and recommendations of the Comprehensive Plan, the Flood Mitigation and Sea Level Rise Report and the Comprehensive Marsh Management Plan to prevent or correct trajectories leading to impairments to the marsh and our natural resources by recommending stormwater management regulation. In addition to ensuring the Town can appropriately enforce stormwater standards, the staff’s recommendation includes the implementation of Low Impact Development Strategies for Kiawah.**

## RECOMMENDATION

1. **Adopt the following language to allow enforcement of current DHEC standards for all construction sites on the island.** (Based on Town of Sullivan’s Island)

### Stormwater Management Plan

No lot shall be built upon, graded or filled without the Building Officials or Zoning Administrator’s prior approval of a stormwater management plan. The stormwater management plan and construction specifications must be stamped and signed by a professional engineer or landscape architect actively licensed in the state of South Carolina. All stormwater plans must include a scaled site plan and survey illustrating all existing and proposed topographical features of the lot, existing and proposed drainage flow patterns, with a site narrative describing the means and methods of preventing adverse impacts to adjacent and/or downstream properties. The following site changes shall require the submittal of a stormwater management plan:

- a. Any new building construction, new impervious surface , or replacement of impervious surfaces , which cumulatively exceed 500 square feet in area; ( All development shall be cumulative over time when considering the square footage threshold for requiring a stormwater management plan)
- b. Adding fill or recontouring of twenty (20) percent or more of the existing lot area.

Additional submittal materials, design specifications and maintenance schedules may be requested to ensure compliance with DHEC and the Town of Kiawah Island standards.

2. **Develop a Stormwater Management Plan Application.**

The stormwater management plan application is to provide ease of administrative processing and review via the Town’s Online Citizenserve Portal.

3. **Hire a consulting engineer to review stormwater management plans for larger projects and require applicants to submit inspection reports as recommended.**

Where Town staff does not have a professional engineer on staff, an external engineer provides capacity for review of large-scale development projects.

Additionally, to ensure plans are executed to approval, including inspections reports

as required or recommended will provide greater assurance to best management practices being installed or implemented.

**4. Provide advance training for TOKI staff to review and inspect single family projects.**

#### FUTURE RECOMMENDATIONS

Subsequently it is important to consider advancing our current performance standards of review to ensure Kiawah adequately responds to changing conditions. The Marsh Management Impervious/Pervious Subcommittee continues to evaluate Kiawah's existing conditions to provide the community with corresponding data of base conditions pertaining to impervious surfaces. Additionally, incorporated is a staff update report from Kiawah Island Community Association regarding efforts of stormwater management system. Below are next step recommendations regarding stormwater management on Kiawah Island.

1. Develop supplemental stormwater design standards similar to the Town of James Island that would require higher and additional performance standards from DHEC addressing specific issues important to Kiawah Island.
2. Adopt a *Water Quality Fee* that can be used to encourage green infrastructure and LID strategies. This also provides minimal revenue to help offset department costs, particularly for costs associated with consulting an external engineer. Most communities have a similar fee in place per development project or annually.
  - Folly Beach – Base \$72 annually
  - Isle of Palms – Base \$36 annually
  - Mt. Pleasant – Base \$225
  - Charleston County – Residential \$72 annually

## COO Report 5-06-2024

I have been asked to address drainage, our current projects and future plans related to flooding and flood management.

KICA is responsible for a large master drainage system throughout the island, which runs through every residential neighborhood and under most of the golf courses and open spaces. There are numerous factors that contribute to the successful operation of the drainage system and which our staff team is focusing on.

### (1) Operation of the Pipes Themselves

During the development of the Kuwaitis, primarily between 1975-1981, over 78,000 feet of corrugated metal pipe was installed. We have been actively working on metal pipe repair/replacement for the last decade. Today, we budget approx. \$1M of metal pipe repairs annually. This permits our engineer to work on larger drainage lines, instead of just working on specific drainage problem locations. The result of this work is that we are not experiencing the issues with sinkholes and collapsing pipes, as we were in earlier years. Pipe repair technology has continued to improve, which has both lowered our cost and the disturbance. This work continues today.

### (2) Bathymetry of the Ponds Themselves

In 2024, KICA is having bathymetry of its 122 ponds done. Once complete in June, KICA will receive three-dimensional maps illustrating the land that lies under the water. These results will be compared to the results of KICA's 2015 bathymetry survey, to understand how the topography has changed over time & to identify any areas that may need to be looked at more closely. For instance, there may be areas where sediment buildup is affecting drainage flow that we can proactively address with spot dredging projects.

### (3) Vegetation Surrounding the Ponds

In 2019, KICA first undertook a major pruning project around its ponds. KICA had generally left its pond edges in a natural state, with the exception of selected view windows or areas maintained by members/golf courses. In addition to causing problems for the health of the ponds, the significant overgrowth was also providing debris into the drainage system and weakening the banks of the ponds. We have now completed 52 ponds and are in our 5<sup>th</sup> year of this project.

### (4) Operation of the Largest Drainage Basins

KICA's drainage basins release water at low tide. A significant step forward was the installation of electronic gates at our 2 largest drainage basins – Beachwalker & Canvasback – which handle 70% of the island's storm water. Completed in 2023, both of

these large drainage basins now have electronic gates, which permit us to more efficiently operate these basins with the tides, either pre- or post-storm.

#### (5) Flood Management Projects

In 2020, 82% of members voted to support a series of 6 flood management projects. To date, 5 of the projects are complete. Work continues on the final project area – the Trumpet Creeper drainage basin, which is a small drainage basin containing 2 ponds, but which impacts the drainage of Governors Drive, in this location.

- Currently under contract is work at the pond 056 outfall to the marsh. We are installing a new outfall structure at the marsh. The previous outfall would continuously clog with debris and its design only permitted a limited draining of this drainage basin. The new outfall structure is larger, with a mechanical gate which will increase the amount of water we can release from this basin. Approximately 130' of metal pipe is also being replaced as part of this project. This project will be completed this summer.
- The most visible part of this project is how to manage rainfall at the intersection of Governors Drive at Trumpet Creeper. Governors Drive is the last thing to drain in the small Trumpet Creeper drainage basin, so water is currently staying on the road until everything ahead of it drains.
  - Stantec is now in its 3<sup>rd</sup> design of this part of the project, as the first two designs met with significant & costly challenges. The 3<sup>rd</sup> design is going to redirect this water from the Trumpet Creeper drainage basin to the larger Pintail drainage basin, down Yellow Throat Lane. This basin can absorb more water during a storm, than the very small basin at Trumpet Creeper. Stantec should be completing this redesign shortly. The last thing to resolve is how the new drainage line will cross over a KIU sewer force main. Stantec, our engineering team and KIU are working on this now. We are pushing to be out to bid on this project in late May.

So, what's coming...

#### Flood Management 2.0

As we near completion of the 6 flood management projects, we have set Stantec to work on potential areas to consider for Flood Management 2.0. Their current scope of work includes:

- Update the hydrology modeling for the stormwater management system, based on the completed flood management projects.

- Identify up to 10 potential locations for improvements, preparing a memo documenting the locations with maps & photos. They are doing this through:
  - Reviewing existing known flooding locations, as identified by our civil engineer. These include areas impacted by rainfall &/or by tidal influence.
  - Performing a field review of the island during & after storm events
  - Reviewing Charleston County lidar of areas with low lying elevations.

We currently expect this initial work to be completed by late May.

We have also recently had Stantec update our outfall procedures report, which provides a framework for our team, as we make decisions about lowering drainage basins.

#### Cleanout of Drainage Lines

Prior to large, forecasted storms, we often bring a vacuum truck on island to clear out drainage lines in known problem areas. As we saw in the April 11 storm, we had several drainage lines that were clogged with debris, causing flooding onto the major roadways. These areas have all been cleaned out now. However, our civil engineer is considering adding funding to the 2025 operations budget to more systematically clean major drainage lines on the island.

# Town of Kiawah Island

Town of Kiawah Island Municipal Center  
4475 Betsy Kerrison Parkway  
Kiawah Island, SC 29455

## June 5, 2024



# Stormwater

What is it and what do we do to control it?

## What is stormwater?



Stormwater is water that originates from precipitation events, snowmelt, or runoff

**Stormwater is  
urban and  
agricultural – rain  
falls everywhere!**

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## How is stormwater managed?

- **Control flooding** by installing, cleaning, and maintaining stormwater infrastructure such as curbs and gutters, street inlets, pipes, ditches, culverts, detention ponds, etc.
- **Regulate development** by setting design standards, providing technical guidance, reviewing plans for development and redevelopment, inspecting construction sites, and enforcing regulations.
- **Prevent pollution** by educating the public, implementing clean water programs, inspecting and monitoring runoff, complying with federal and state regulations, and enforcing water quality standards set by the Clean Water Act.

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# Stormwater Management Plan Components

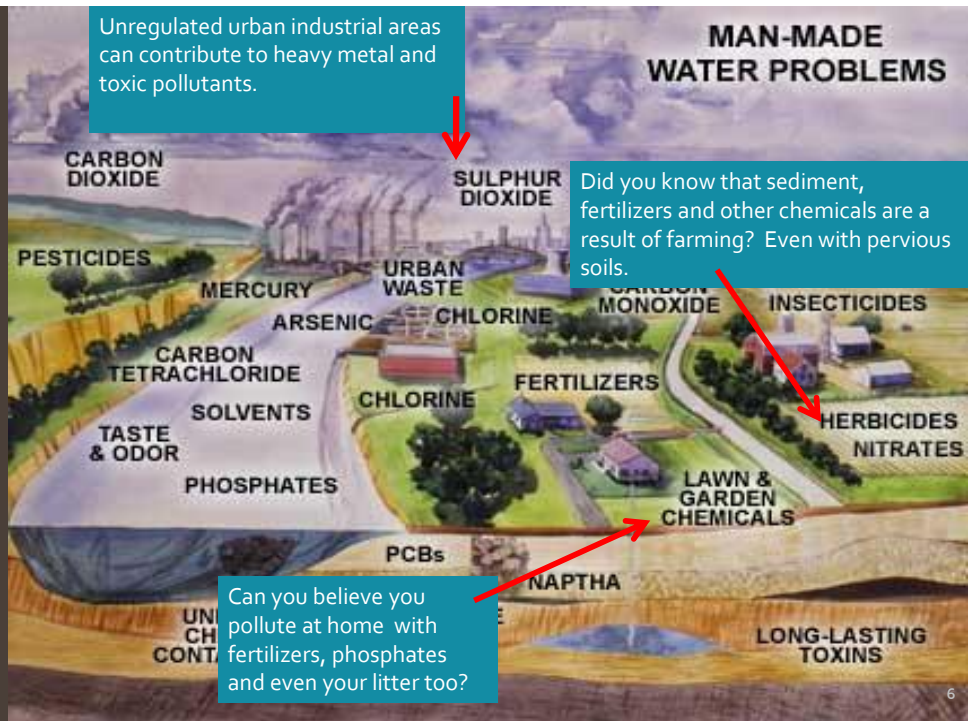
- Water Quantity Controls
- Water Quality Controls
- Erosion and Sedimentation Controls
- Stormwater Conveyance Controls
- Maintenance Scheduled for Construction and Post Construction.

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# Controlling Runoff = Controlling Stormwater

The three types of runoff that contribute to controlling stormwater quality are:

- Rural Runoff.
- Urban Runoff
- Suburban Runoff



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Currently only approx. 2.5% of construction projects on Kiawah Island are regulated for stormwater management.

South Carolina Department of Health and Environmental Control (SCDHEC) requires projects larger than 1 acre to get a NPDES (National Pollutant Discharge Elimination System) Construction General Permit.

Most of our local coastal communities have created their own utility and become a MS4 (Municipal Separate Storm Sewer System) that own the stormwater infrastructure. Several partner with Charleston County for administrative and regulatory support. The Town of Kiawah would not qualify for that partnership as KICA, a private entity, owns and operates the master drainage system for the island. The State of South Carolina has over 70 regulated small MS4s.

Many of the coastal MS4s have adopted additional requirements above the DHEC and Charleston County Stormwater Program.

Mt. Pleasant – specific ordinance for Single Family Stormwater Management  
Town of James Island – supplemental Stormwater Design Standards for both single family residences and non single family sites.

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## Recommendations

1. Adopt language to allow enforcement of current DHEC standards for all construction sites on the island. (Town of Sullivans Island)
2. Develop a Stormwater Management Plan Application
3. Hire a consulting engineer to review stormwater management plans for larger projects and require applicants to submit inspection reports as recommended.
4. Provide for advance training for TOKI staff to review and inspect single family projects.

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**INTRODUCTION OF  
STORMWATER MANAGEMENT  
STRATEGIES AND PROPOSED  
REGULATORY CHANGES**

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**PROPOSED  
ZONING TEXT  
AMENDMENT**

AZO24-000007  
  
Stormwater  
Management  
Plan

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## Comprehensive Marsh Management Plan

- **Recommendation: Strictly limit impermeable surfaces, formalize stormwater BMPs for private properties.**
  - **Justification:** Current stormwater regulations simply direct designers to convey water to the critical line or other outfall point, without consideration of its potential effects on the marsh. Low Impact Development (LID) is an integrated, comprehensive approach to land development or redevelopment that works with nature to manage stormwater as close to its source as possible. LID practices can protect local water quality and reduce urban flooding through best practices in stormwater management. Widespread implementation will also reduce pollution of the marsh by filtering and nutrient retention.

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### Proposed Text Amendment

#### #AZO24-000007 Stormwater Management Plan

**Objective: To require a stormwater management plan for construction projects**

#### **Division 5. General Procedural Requirements; Section 12-169 Stormwater Management Plan**

No lot shall be built upon, graded or filled without the Building Officials or Zoning Administrator's prior approval of a stormwater management plan. The stormwater management plan and construction specifications must be stamped and signed by a professional engineer or landscape architect actively licensed in the state of South Carolina. All stormwater plans must include a scaled site plan and survey illustrating all existing and proposed topographical features of the lot, existing and proposed drainage flow patterns, with a site narrative describing the means and methods of preventing adverse impacts to adjacent and or downstream properties. The following site changes shall require the submittal of a stormwater management plan:

- a. Any new building construction, new impervious source or replacement of impervious surfaces, which cumulatively exceed 500 square feet in area.
- b. Adding fill or recontouring of twenty (20) percent or more of the existing lot area.

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## **Sec. 12-169. Stormwater Management Plan Review.**

The purpose of this article is to provide for review and use of best management practices for stormwater management and construction practices for the purposes of reducing flooding, protecting local water quality, managing storage and treatment of stormwater runoff, reducing pollution of the marsh, reducing erosion, and managing fill as a result of construction activities.

1. *Applicability.*
  - a. *Generally.* A stormwater management plan shall be required for review for the following site changes:
    - i. All new construction, exterior remodeling involving a change in the building footprint, parking areas or other impervious surfaces, change of use that results in a more intense use, or additions to any site which cumulatively exceeds 500 square feet in area.
    - ii. Adding fill or recontouring of twenty (20) percent or more of the existing lot area.
2. *Application.* No zoning or building permit shall be issued for a development project until a stormwater management plan has been reviewed and approved in accordance with the provisions contained within this article.
3. *Procedures for issuance of stormwater management plan approval.*
  - a. Stormwater Management Plans shall be reviewed and approved by the Planning Director or Building Official. For development projects requiring site plan review approval, pursuant to Sec. 12-162 Site Plan Review, the Planning Director may consult with an external engineer to provide review of submitted stormwater management plans.
  - b. A storm management plan may be approved, approved with conditions, or denied.
4. *Submittal Requirements.* The property owner or designated representative may initiate stormwater management review by filing an application with the Planning Director. The contents of the application shall be included on a form developed by the Town.
  - a. The stormwater management plan and construction specifications must be stamped and signed by a professional engineer or landscape architect actively licensed in the state of South Carolina.
  - b. All stormwater plans must include:
    - i. A scaled site plan and survey illustrating all existing and proposed topographical features of the lot;
    - ii. Existing and proposed drainage flow patterns;
    - iii. A site narrative describing the means and methods of preventing adverse impacts to adjacent and or downstream properties; and
    - iv. Such other reasonable and pertinent information, materials, design specifications and maintenance schedules with regard to the stormwater, the subject property, or neighboring lots as the Planning Director may find necessary to carry out the purposes and intent of this article and to ensure compliance with DHEC and the Town of Kiawah Island standards.
  - c. Inspection reports shall be submitted for review by development projects greater than 20,000 square feet in size or as recommended by the Planning Director or designee.

# PERVIOUS IMPERVIOUS REQUIREMENTS

Discussion Item

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## Opportunities and Pathways

### Incentives

Driveway Replacement Program

Rain Barrel & Rain Garden Programs

Financial  
Grants, Expedited Permitting, Waived Fees

Special Recognition

### Permeable Requirements

Driveways

Parking

Non-Primary Trails

### Stormwater Regulations

LID and Green Infrastructure  
Requirements based on BMPs

"Water Quality Fee"  
Stormwater Fees

Modified onsite retention requirements  
prior to entering the master drainage  
system

Modified buffer standards for marsh and  
ponds

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## Impervious / Pervious Surfaces

- Assessed what other communities are doing where many communities already have regulations regarding pervious requirements.
  - **City of Folly Beach** | *"All driveways and parking areas in residential zones shall be constructed of pervious materials. Parking areas underneath the footprints of existing and proposed structures are exempt. City Council or its designee may grant exemptions to this requirement when no option for pervious material exists"*
  - **Tybee Island** | *"For water quality purposes, all newly-constructed driveways and replacements of more than 50 percent of existing driveways serving residential uses shall be constructed of materials designed to allow retention of the first one inch of stormwater."*
  - **Sullivans Island** | *"Permeable materials shall be used for on-site parking and drives"*
- Continue to study Kiawah's existing conditions (impervious to pervious ratio, canopy, built environment, opportunities for conversion) to be able to measure success.
- Measuring success and implementation is important. The subcommittee continues evaluate what metrics should be measured and how best to measure metrics and success. As a result, our success as a community can be marketed.
  - What is our current pervious to impervious ratio?
  - Measuring the reduction of impervious materials on the island by volume, project sites, etc.
  - Measuring number of conversions have taken place within the last year?

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## Pervious Driveway Requirements

- Considering Kiawah enters a redevelopment phase of many single-family homes, this requirement would allow a natural transition of all or percentage of residential driveways, a large component to impervious surfaces on Kiawah, to become pervious elements as property owners consider redevelopment.
- As considered this would only apply to new construction and major redevelopment projects.
- Other municipalities require all driveways to be constructed of with a pervious surface. Similarly creating a new normal for Kiawah regarding pervious driveways.
- Encouraged consultation with KIARB to ensure there are standard product types supported for ease of implementation through the design process.
- Installation and maintenance requirements of supported product types must be considered.
- Research continues to understand cost implications to property owners of various product types.

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# Pervious Parking Requirements

- Developments would require parking surfaces to be implemented with pervious element as competed at The Sandcastle. Pervious parking areas would become the new normal for parking areas.
- Factors could include scope and scale of the proposed development, percentage of parking spaces, percentage of development size.
- Installation and maintenance requirements of supported product types must be considered.
- Research continues to understand cost implications to property owners of various product types.

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