

# **STORMWATER MANAGEMENT STRATEGY**

## **HOPETON LANDING SAVANNAH, GA**

**09.17.2021**

**Project# 17-431**





## **CONTENTS**

**SITE OVERVIEW..... 3**

**STORMWATER MANAGEMENT CRITERIA..... 4**

STORMWATER RUNOFF REDUCTION ..... 4

STORMWATER QUALITY PROTECTION ..... 5

AQUATIC RESOURCE PROTECTION ..... 5

OVERBANK FLOOD PROTECTION..... 6

EXTREME FLOOD PROTECTION ..... 6

### **EXHIBITS:**

STORMWATER MANAGEMENT EXHIBIT



## **SITE OVERVIEW**

The (+/-) 478-acre Hopeton Landing Development is located on the north side of Little Neck Road between Interstate 95 and U.S. Highway 17 in Savannah, Georgia which consists of approximately 293 acres developable uplands and 185 acres of salt and fresh water wetlands. The property is proposed to be developed as a Planned Development (PD) with a mix of uses that include Single Family Residential, Multi-Family Residential, Institutional, and Commercial.

The post-developed site is expected to be developed as ten parcels with a mix of residential, commercial, and institutional and the infrastructure necessary to support it. Best management practices will be utilized to address water quality and increased runoff. It is the intent of Hopeton Landing to be good stewards of the Little Ogeechee River and other adjacent natural resources by meeting and exceeding the federal, state, and local stormwater standards that have been developed pursuant to the Clean Water Act. The City of Savannah Stormwater Ordinance and Local Design Manual was most recently updated in 2018 and includes development standards and design criteria as set forth in the Georgia Stormwater Management Manual and in the Georgia Coastal Stormwater Supplement. In addition to the adoption of the updated Stormwater Ordinance, the City of Savannah also included a Natural Resource Section to their code of ordinances which requires Protected River Corridor Buffers as well as Wetland Buffers. Hopeton Landing's strategy to stormwater management will be a multistage approach that includes best management practices, buffering, water quality, run-off reduction, extended detention, sedimentation and erosion control, and flood protection.



## STORMWATER MANAGEMENT CRITERIA

The City of Savannah Stormwater Ordinance and the Georgia Coastal Stormwater Supplement has five criteria for Post-Construction Stormwater Management that Hopeton Landing will require in all of its development:

1. Stormwater Runoff Reduction
2. Stormwater Quality Protection
3. Aquatic Resource Protection
4. Overbank Flood Protection
5. Extreme Flood Protection

Below are the approaches taken to meet or exceed these requirements:

### STORMWATER RUNOFF REDUCTION

Post-Construction Stormwater Management for Hopeton Landing will meet the criteria, recommended by the GA Coastal Stormwater Supplement to the maximum extent practical. Stormwater runoff reduction is really the first line of defense when it comes to water quality and runoff reduction. This criterion requires that a development site must be designed with the use of green infrastructure practices to reduce the first 1.2 inches of any rainfall event.

Just as the proposed development is comprised of a mix of use types a mix of best management and green infrastructure practices will be implemented to achieve this requirement. Commercial, residential, and institutional uses are developed differently and shall use a combination of infiltration practices that includes bio-retention, dry swales, infiltration trenches, and pervious paving. In addition to infiltration practices vegetated filters will also be used in the form of disconnected downspouts, vegetated filter strips (grassed open space) in conjunction with outfalls into undisturbed pervious area. These practices provide runoff reduction “credits” to meet the runoff reduction criteria to the maximum extent practical.

The amount of Stormwater runoff reduction needed to satisfy the Stormwater runoff reduction criteria, known as the runoff reduction volume (RRV), can be calculated using the following equations:

$$RRV = \frac{(P)(R_v)(A)}{12}$$

Where:

- RRV = runoff reduction volume (Ac-Ft)
- P = target runoff reduction rainfall, 1.2 inches
- R<sub>v</sub> = volumetric runoff coefficient
- A = site area (Ac)
- 12 = unit conversion factor (in./ft.)

A site’s volumetric runoff coefficient, RV, is directly related to the amount of impervious cover found on the site:

$$RV = 0.05 + 0.009(I)$$



Where:

I = Site Imperviousness (%)

Reducing the stormwater runoff volume generated by the 1.2-inch storm event can be expected to reduce annual post-construction stormwater runoff volumes and pollutant load by more than 80% on development sites.

## STORMWATER QUALITY PROTECTION

Per Section 4.4.1 of the GCSS, Stormwater generated from the 1.2-inch rain event that is not reduced on the developed site should be intercepted and treated in one or more stormwater management practices that provide at least an 80 percent reduction in the total suspended solids and that reduce nitrogen and bacteria loads to the maximum extent practical. The proposed wet stormwater ponds located throughout the individual pods will serve as the treatment method. This criterion will be met by intercepting the runoff from the project areas into these stormwater ponds prior to outfalls into undisturbed pervious areas that then drain through the freshwater wetlands before entering the Little Ogeechee River.

The proposed stormwater ponds will have permanent pools of water, meaning they will retain water all the time where stormwater is detained and treated over an extended period of time mainly through gravitational settling and biological uptake. These ponds can also provide stormwater storage for quantity control allowing the ponds to function as both treatment and manage stormwater runoff rates and volumes generated by larger less frequent rainfall events.

Wet ponds provide moderate to high removal rates of many of the pollutants contained in post-construction runoff and can be attractively integrated into the development sites and provide aquatic wildlife habitat. Expected annual pollutant removal rates are 80% total suspended solids, 50% total phosphorus, 30% total nitrogen, 50% metals, and 70% pathogens.

## AQUATIC RESOURCE PROTECTION

This criterion requires protection to aquatic resources by identifying primary conservation areas and protecting them by direct impacts of land development by providing buffers adjacent to all freshwater wetlands and by providing 24 hours of extended detention for the stormwater runoff volume generated by a 1-year, 24-hour storm event. The purpose of this requirement is to protect stream channels from scour and enlargement from frequent high velocity discharges, control surface water temperatures, and protect against increased salinity fluctuations.

This criterion will be met by establishing 35ft upland buffers adjacent to all freshwater wetlands and the use of wet ponds and other stormwater storage practices within each developed pod to provide extended detention and release rates. The drainage outfall structures will be designed to allow a slow release of the volume of stormwater generated by the 1-years storm event to emulate the runoff from an undeveloped parcel. Additionally, the freshwater wetlands located in Hopeton Landing provide a natural buffer to the Little Ogeechee River. The City of Savannah Natural Resource Ordinance requires a 100ft buffer to river corridors and the existing freshwater wetlands that are being preserved provide a natural buffer ranging from 585ft to 1,285ft in addition to the 35ft upland buffer being provided.



## OVERBANK FLOOD PROTECTION

This criterion requires that the peak discharge generated by the 25-year, 24-hour storm event under the post-development conditions does not exceed the peak discharge generated by the same storm event under pre-developed conditions. This prevents an increase in the duration, frequency, and magnitude of downstream overbank flooding. While this criterion is primarily in place to protect downstream properties from developments occurring up stream and the City of Savannah Stormwater Ordinance can waive this requirement if the property has direct discharge to open water bodies such as the Little Ogeechee River, Hopeton Landing will require this criterion be met on all the developed sites within the PD.

## EXTREME FLOOD PROTECTION

This criterion requires that the peak discharge generated by the 100-year, 24-hour storm event under the post-development conditions does not exceed the peak discharge generated by the same storm event under pre-developed conditions. Like the Overbank Flood Protection, this criterion prevents an increase in the duration, frequency, and magnitude of downstream extreme flooding and can be waived by the City of Savannah if the property has direct discharge to an open water body. Hopeton Landing will require this criterion be met on all sites as it does provide a benefit to help maintain the boundaries of the 100-year flood plain and physical integrity of downstream conveyance features.



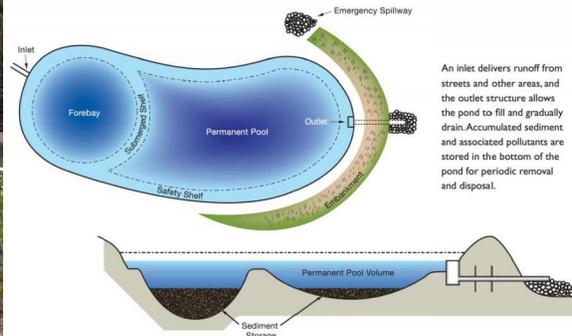
# **STORMWATER MANAGEMENT EXHIBIT**

# HOPETON LANDING STORMWATER MANAGEMENT PLAN

## STORMWATER RUNOFF REDUCTION

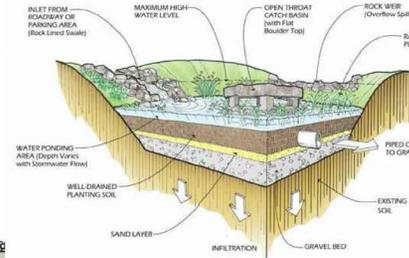


## STORMWATER QUALITY PROTECTION



An inlet delivers runoff from streets and other areas, and the outlet structure allows the pond to fill and gradually drain. Accumulated sediment and associated pollutants are stored in the bottom of the pond for periodic removal and disposal.

## AQUATIC RESOURCE PROTECTION



## OVERBANK FLOOD PROTECTION



## EXTREME FLOOD PROTECTION

### Varying Depths of Water

Varying depths of water increase plant diversity, promote plant growth allowing for biological uptake which helps remove pollutants.

### Pools

Deep pools reduce the suspension of sediments, cool water to reduce thermal pollution, and increase habitat.

