

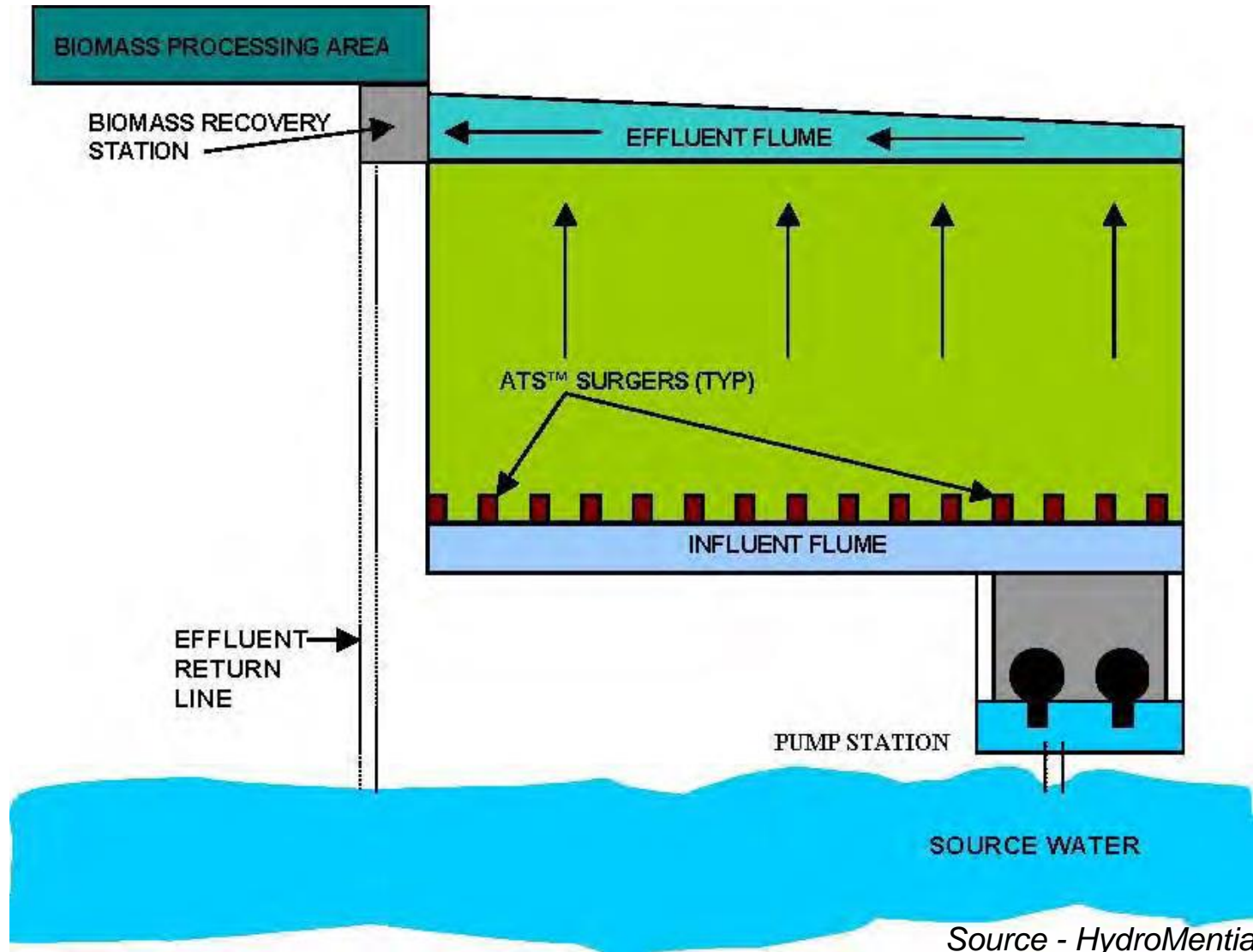


# **Alternatives to traditional SCMs for nutrient removal: *An Algae Turf Scrubber®***

Jonathan Baker and Michelle Woolfolk  
Public Works Department, Stormwater & GIS  
Presented at the UNRBA Board Meeting,  
November 15, 2017

# What is an Algal Turf Scrubber®?

# ATS™ Full Scale System Schematic



Source - HydroMentia

# ATS™ Full Scale System

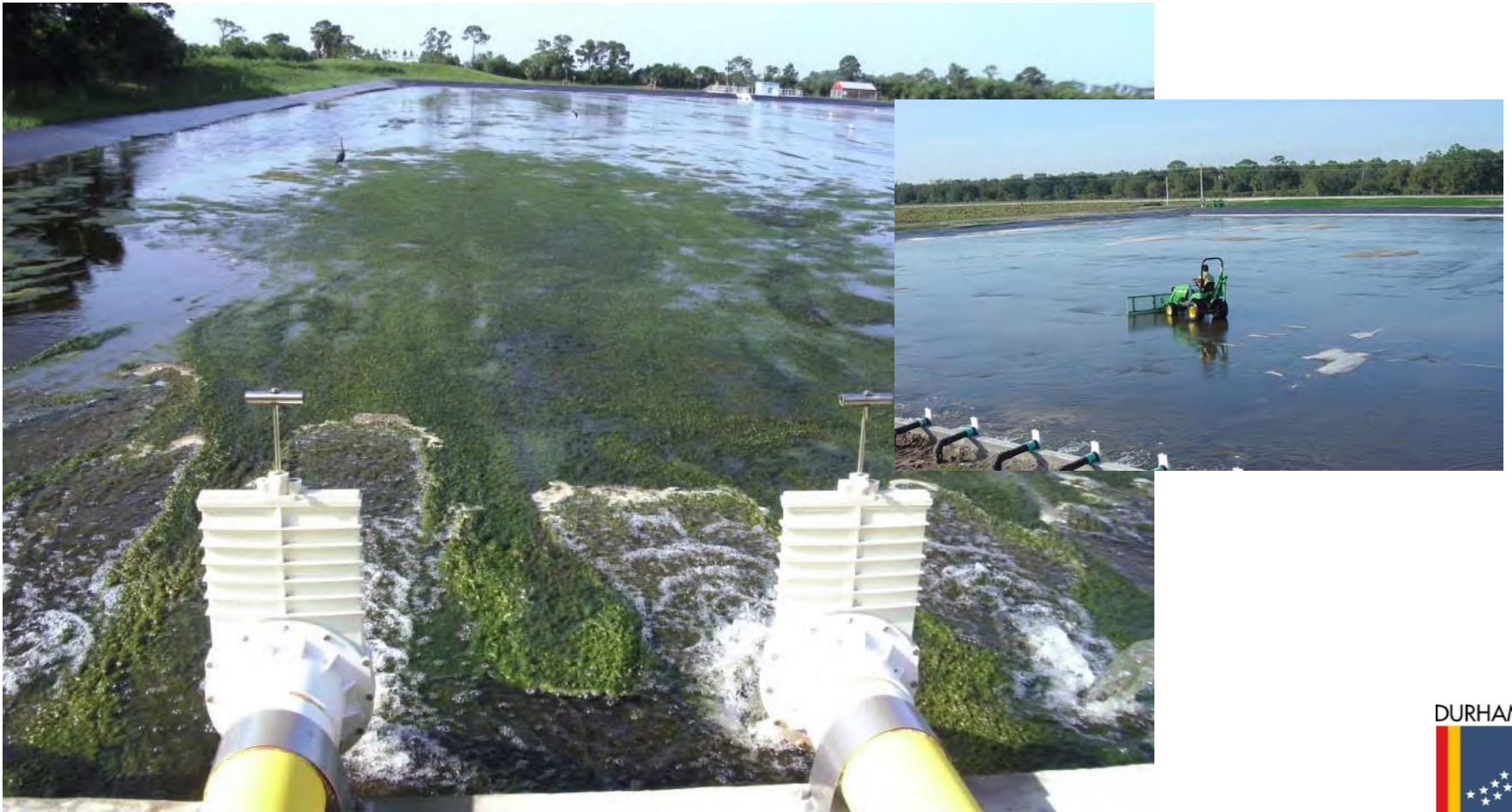
Water is pulsed down a sloped floway. The pulsing surge stimulates algal growth.



Source - HydroMentia

# ATS™ Full Scale Floway Design

The algal turf biomass is recovered every 7-14 days.



Source - HydroMentia

# Centralized Biomass Recovery

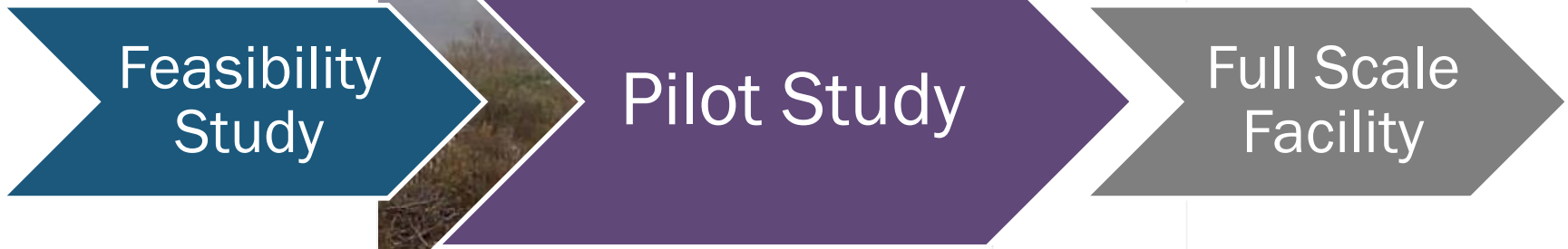


Harvested algae is conveyed to a concrete spillway.



# Why did the City do a Pilot Study?

# A 3-Step Process



**Falls Lake  
Algal Turf Scrubber®  
Pilot Program**

**Final Report**

The City of Durham  
Stormwater Services

Prepared by:

**HydroMentia**  
WATER TREATMENT TECHNOLOGIES

**Biohabitats**  
SOUTHEAST ATLANTIC BIOREGION








**ATS Pilot**  
*Physical Address:*  
*Facility Includes the Following:*

One (1) 0.75 HP self-priming centrifugal pump (115V, Single Phase) with secondary backup pump to deliver water to portable Pilot Algal Turf Scrubber (ATS™) test unit.

**LEGEND**

-  Existing Pole with Transformer
-  Pump Location
-  ATS™ Portable Pilot Unit



HydroMentia Technologies  
 PO Box 2164  
 Ocala, Florida 34478

Corporate: 352.433.0771  
 www.hydromentia.com

**Falls Lake  
 Algal Turf Scrubber® Pilot  
 Durham, NC**

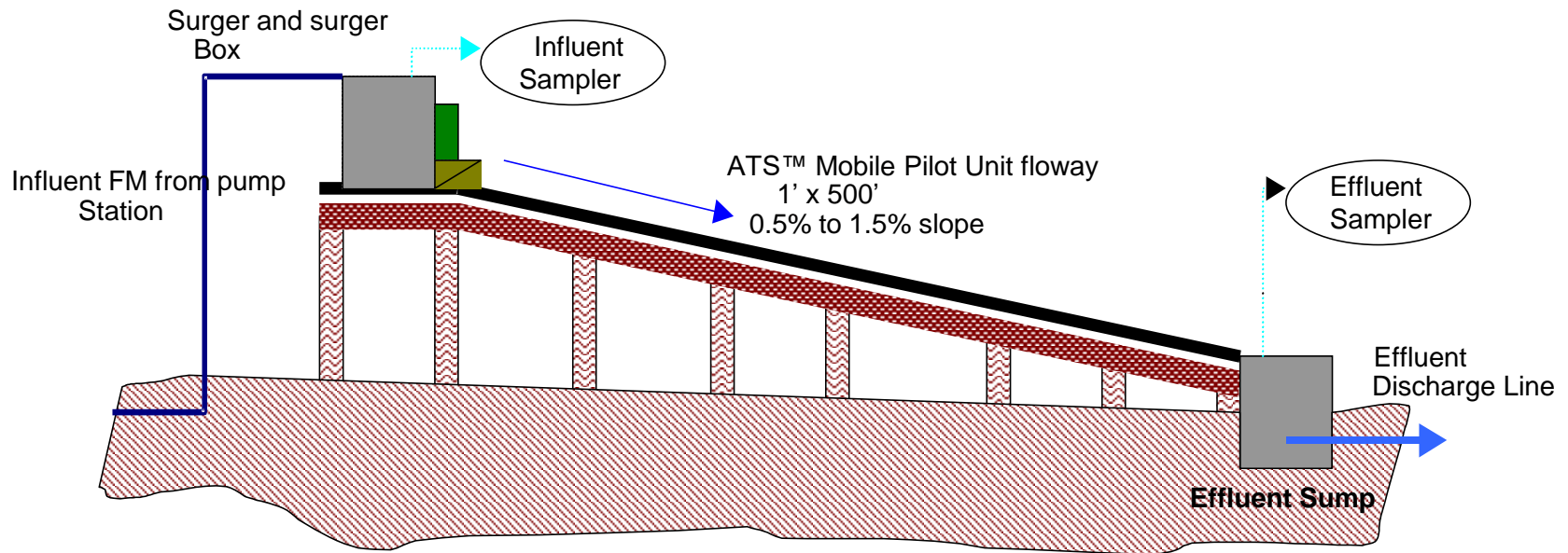
**City of Durham Contract No. 12104**

**ATS™ Pilot  
 Site Layout  
 Plan**

SCALE:  
 1" = 195'

DATE:  
 Jan 31, 2016

# ATS™ Pilot Study Unit Schematic



Source - HydroMentia

# ATS™ Pilot Unit Floway







# What were the results of the Pilot Study?

Or what did we learn from an elevated ramp 1  
foot wide and 500 feet long?



10,830 pounds of algae and solids harvested  
(Dry weight harvested: 727 pounds)

# Nitrogen reduced



**12%**  
(0.13 mg/L)

In calendar  
year 2016



**23%**  
(0.27 mg/L)

In calendar year  
2016 warm season



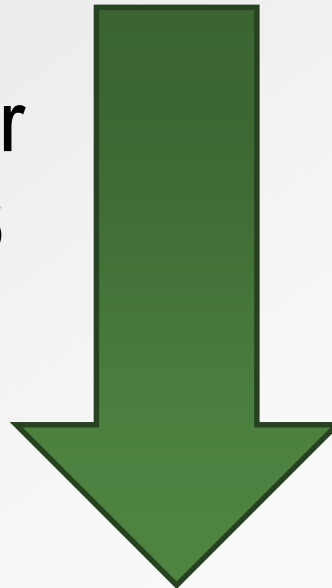
# Phosphorus reduced



**32%**

(0.018 mg/L)

In calendar  
year 2016

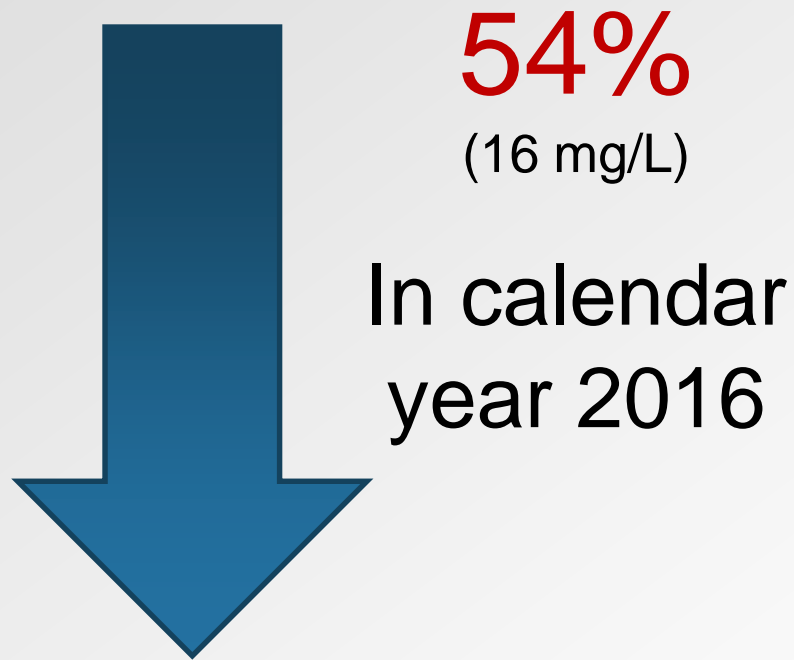


**40%**

(0.022 mg/L)

In calendar year  
2016 warm season

# Suspended Solids reduced



**Any operational concerns?**

# Flooding



# Winter Weather/Cold



# Sediment



**What's next?**

# Cost per pound of nitrogen and phosphorus removed- Updated

		Nitrogen	Phosphorus
Algae Scrubber	Most Efficient	\$19	\$67
	Least Efficient	\$648	\$1,534
Turf	Pilot Study-Falls	\$67 to \$100	\$381 to \$565
SCM	Most Efficient	\$2,450	\$11,270
	Least Efficient	\$39,573	\$195,214



# What size to build?

## 10 MGD

4 acres

Remove

2,856 lbs nitrogen

504 lbs phosphorus

## 25 MGD

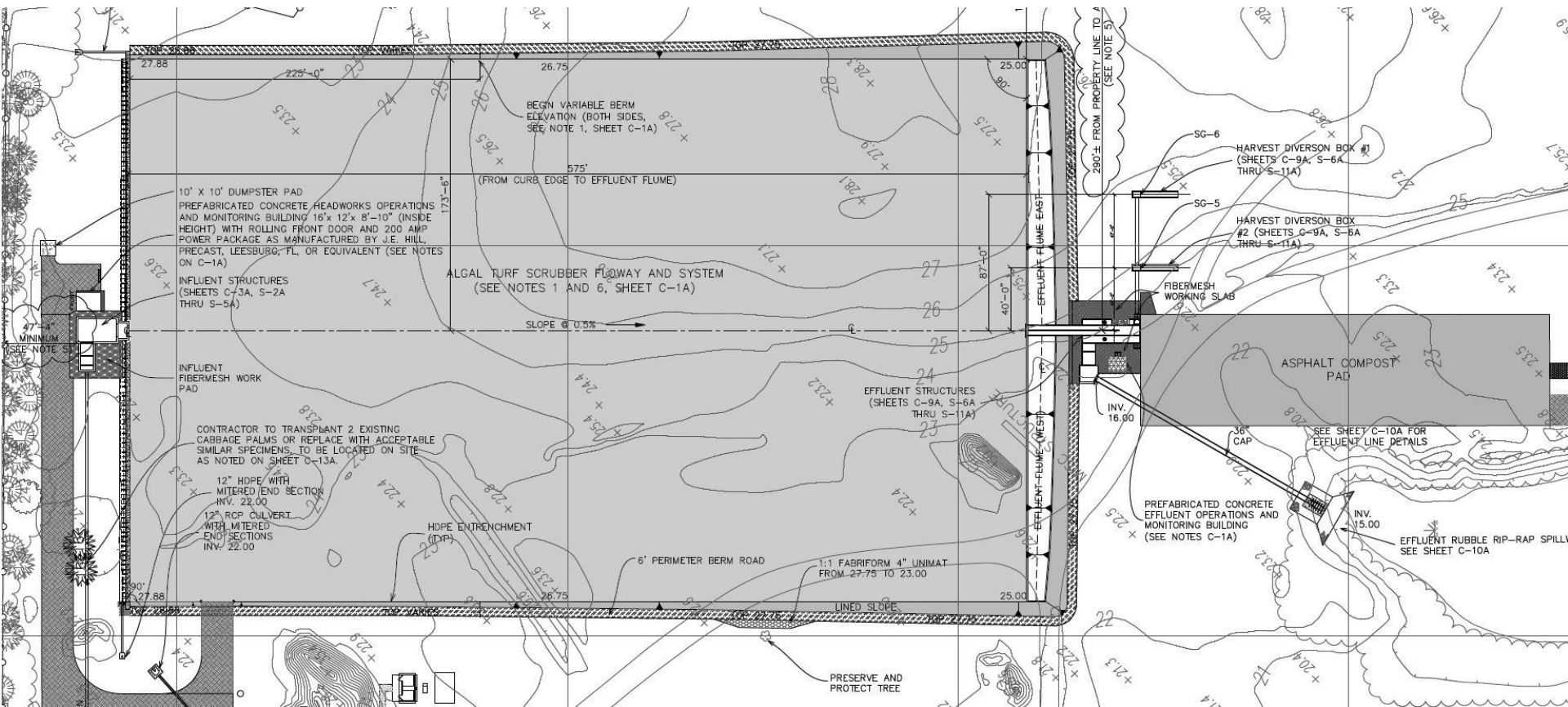
10 acres

Remove

7,140 lbs nitrogen

1,260 lbs phosphorus

# Final site selection and preliminary design

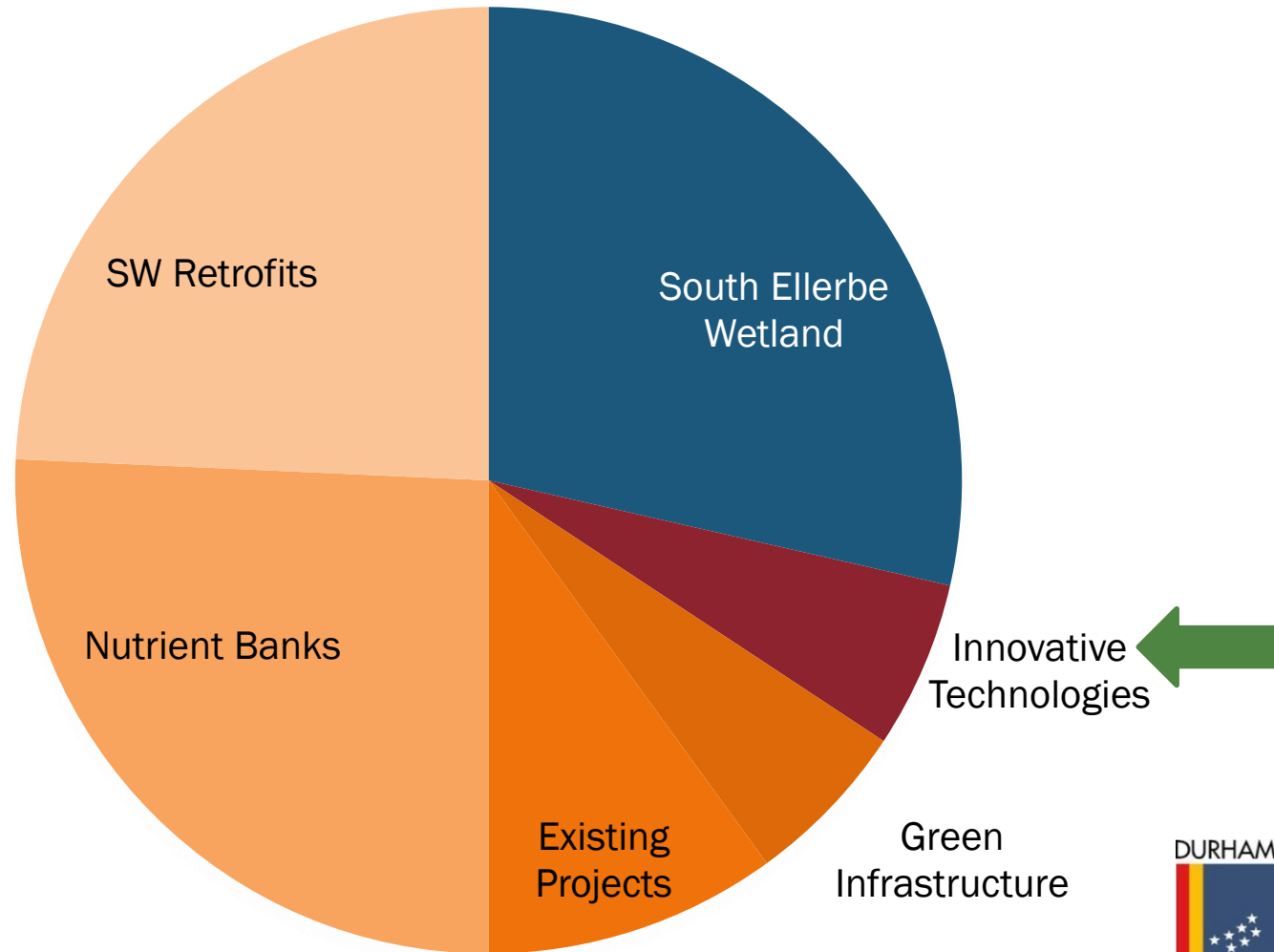


# algae conversion to compost/container media



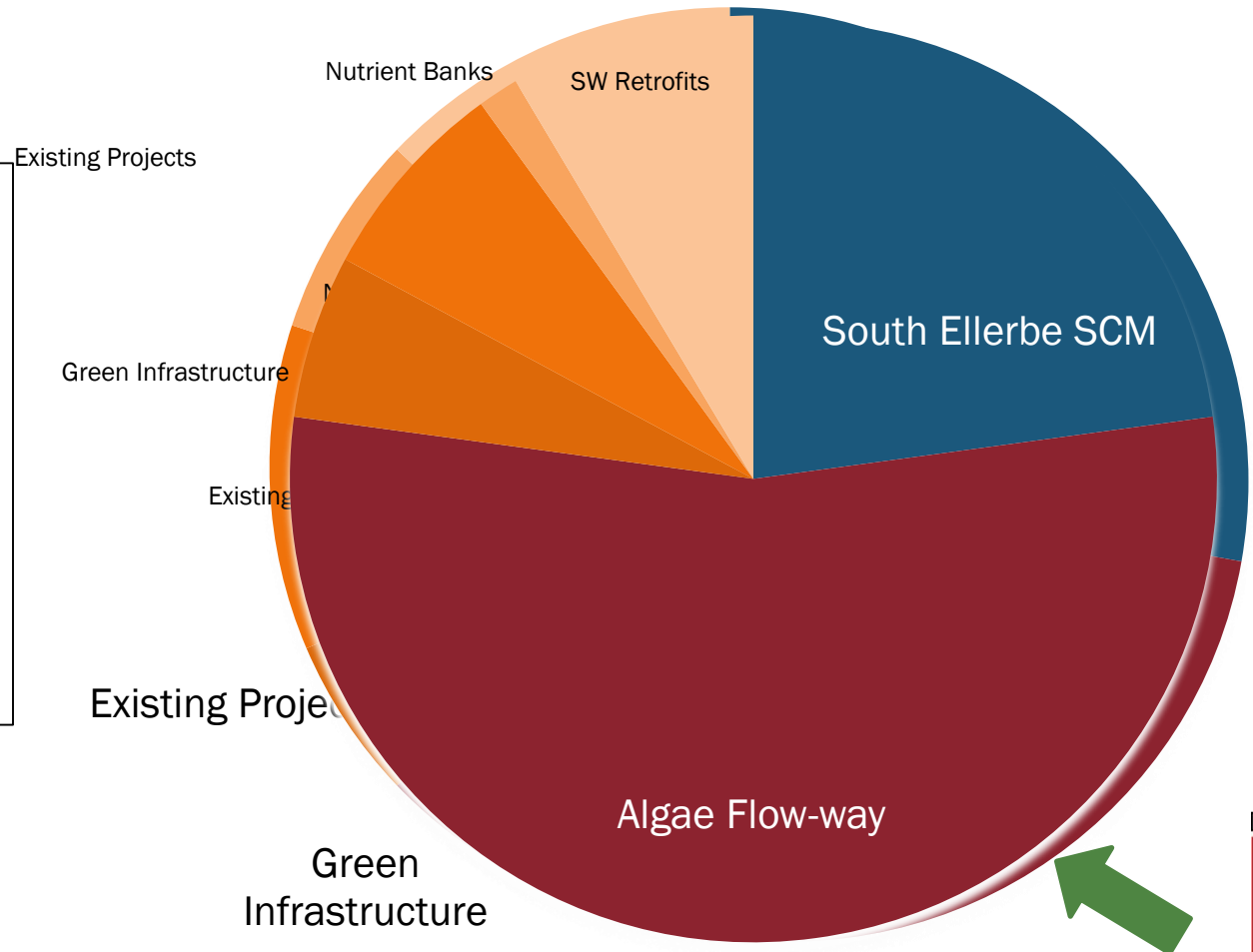
# Falls Stage 1

Stage 1 Existing  
Development  
Goal:  
Reduce Nitrogen  
to 2006 levels



# Falls Stage 1, Revised?

Stage 1 Existing Development Goal:  
Reduce Nitrogen to 2006 levels  
(Assumes 10 MGD ATS)





Questions?