

# **STORMWATER DRAINAGE SYSTEM MAINTENANCE SCHEDULING & TRACKING**

**ANH TON, PE, DIRECTOR**

**HIGHWAY & BRIDGE MAINTENANCE DIVISION**

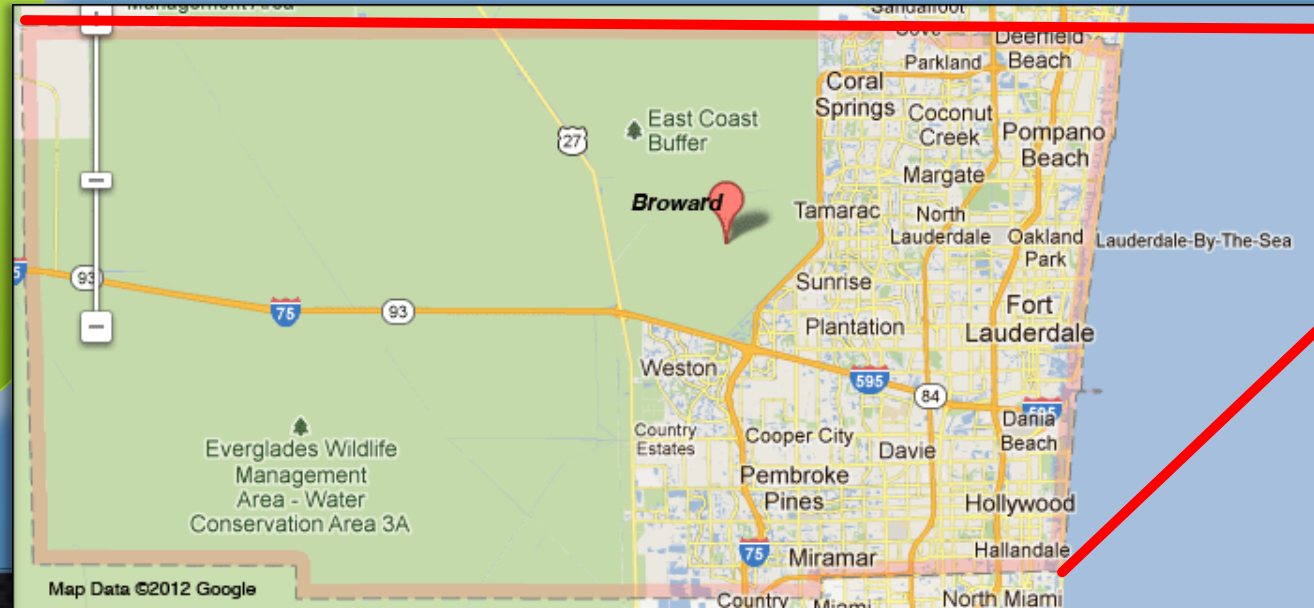
**PUBLIC WORKS DEPARTMENT**

**FSA Fall Seminar: Maintenance of Stormwater BMPs  
September 13, 2019**



# BROWARD COUNTY

- 1.89 mil. people
- >15 U.S. States!
- 430 sq. mi. urban area
- 31 municipalities







**~1200  
Lane Miles**



**~230 miles  
MS4 Pipes**

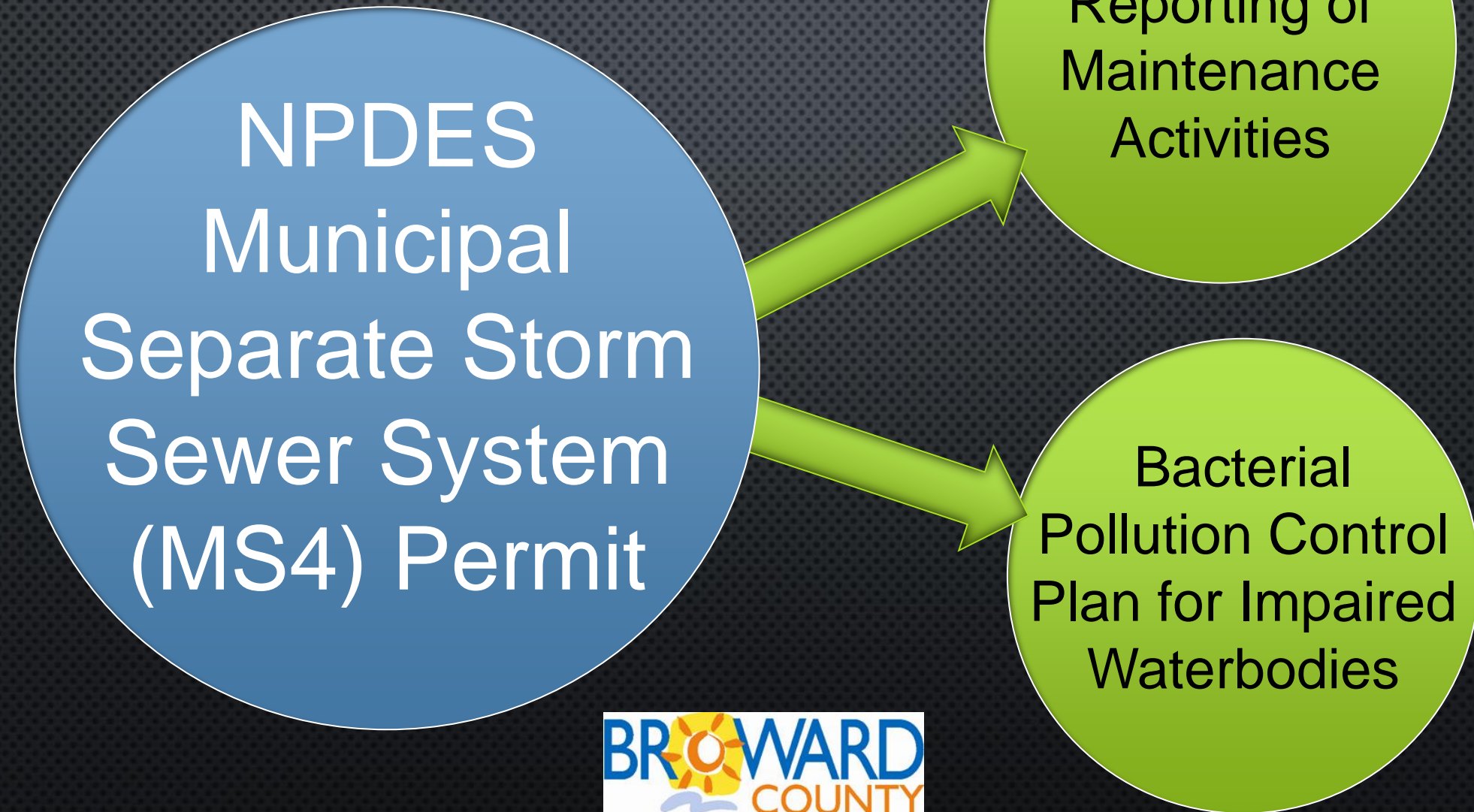


**~235  
miles  
swales**



**~13,000  
inlets &  
catch basins**

# CLEAN WATER ACT





# STORMWATER MAINTENANCE EQUIPMENT



SWEEPER TRUCKS



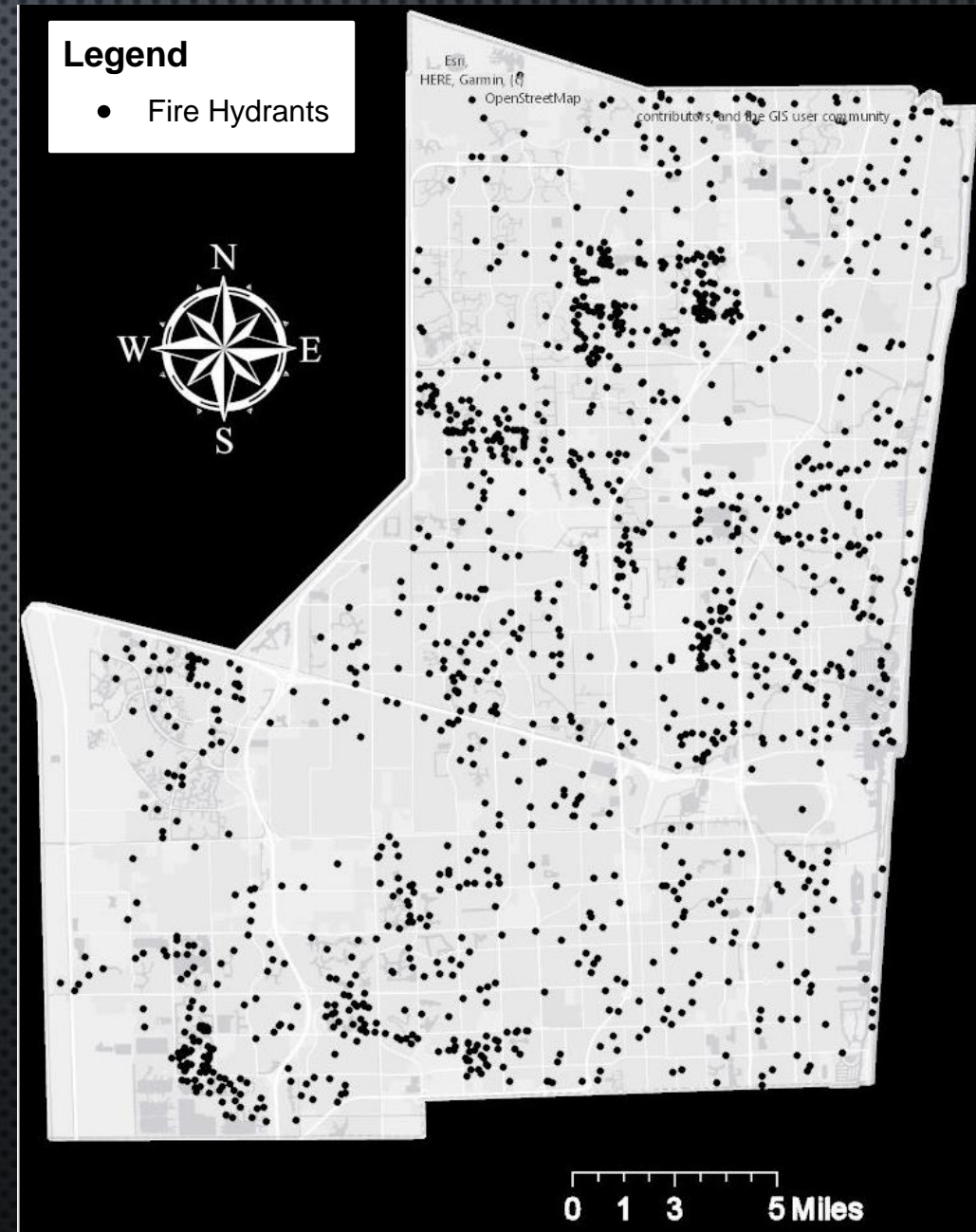
VAC TRUCKS



# Sweeper Trucks get Thirsty



**Savings:  
\$200K/year**





# DEBRIS CLOGS INLETS → POLLUTION & FLOODING



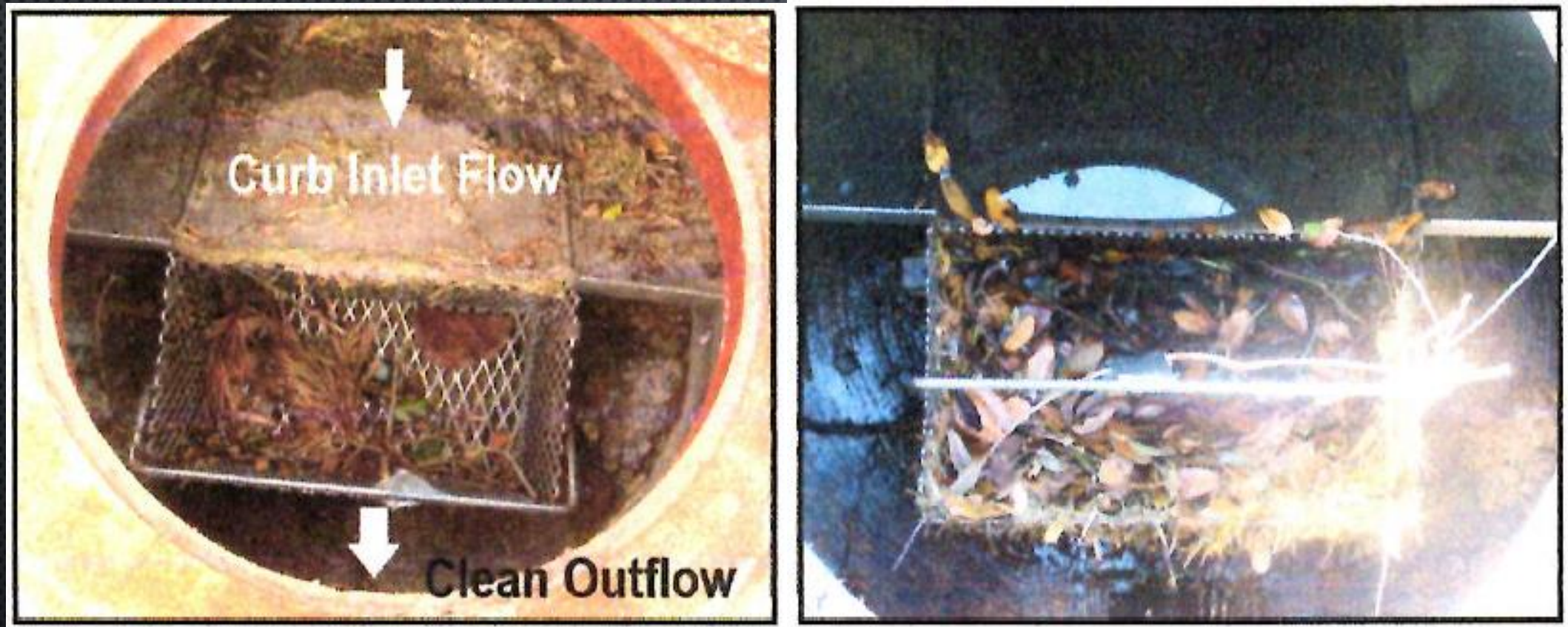


# Solution: “The Basket”





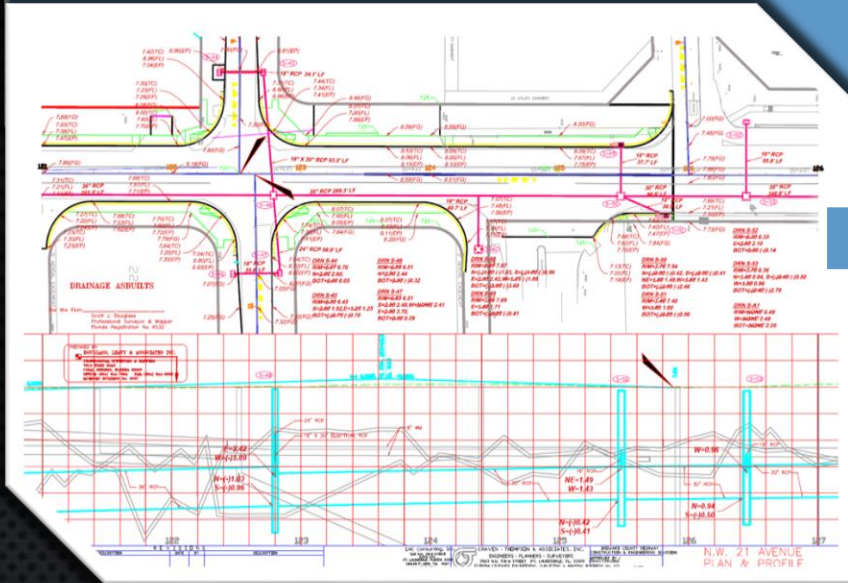
# DEBRIS CAN BE REMOVED WITHOUT VAC TRUCK



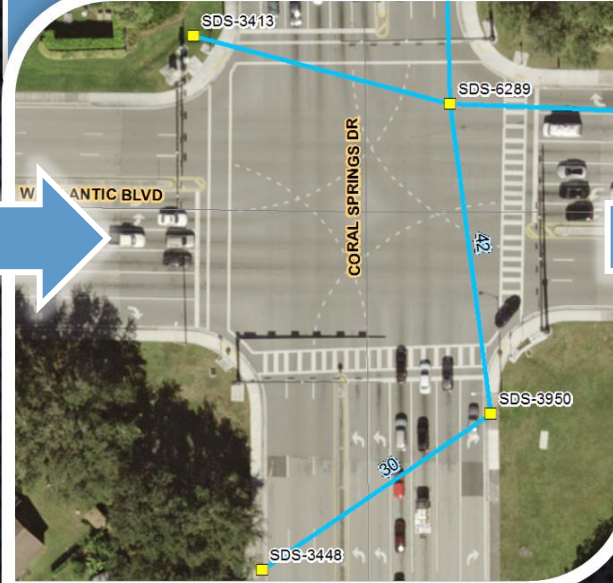


# DRAINAGE SYSTEM MAPPING

Aerials & Historical  
As-Builts



Baseline Map  
in ArcGIS



In-House Vac Truck  
Crew Verification



Saves  
\$600k/  
year



## 5. Size of Pipe



**BROWARD**  
COUNTY  
FLORIDA







# SCHEDULING PIPE & STRUCTURE MAINTENANCE

## PRIORITY LIST SCORING CRITERIA

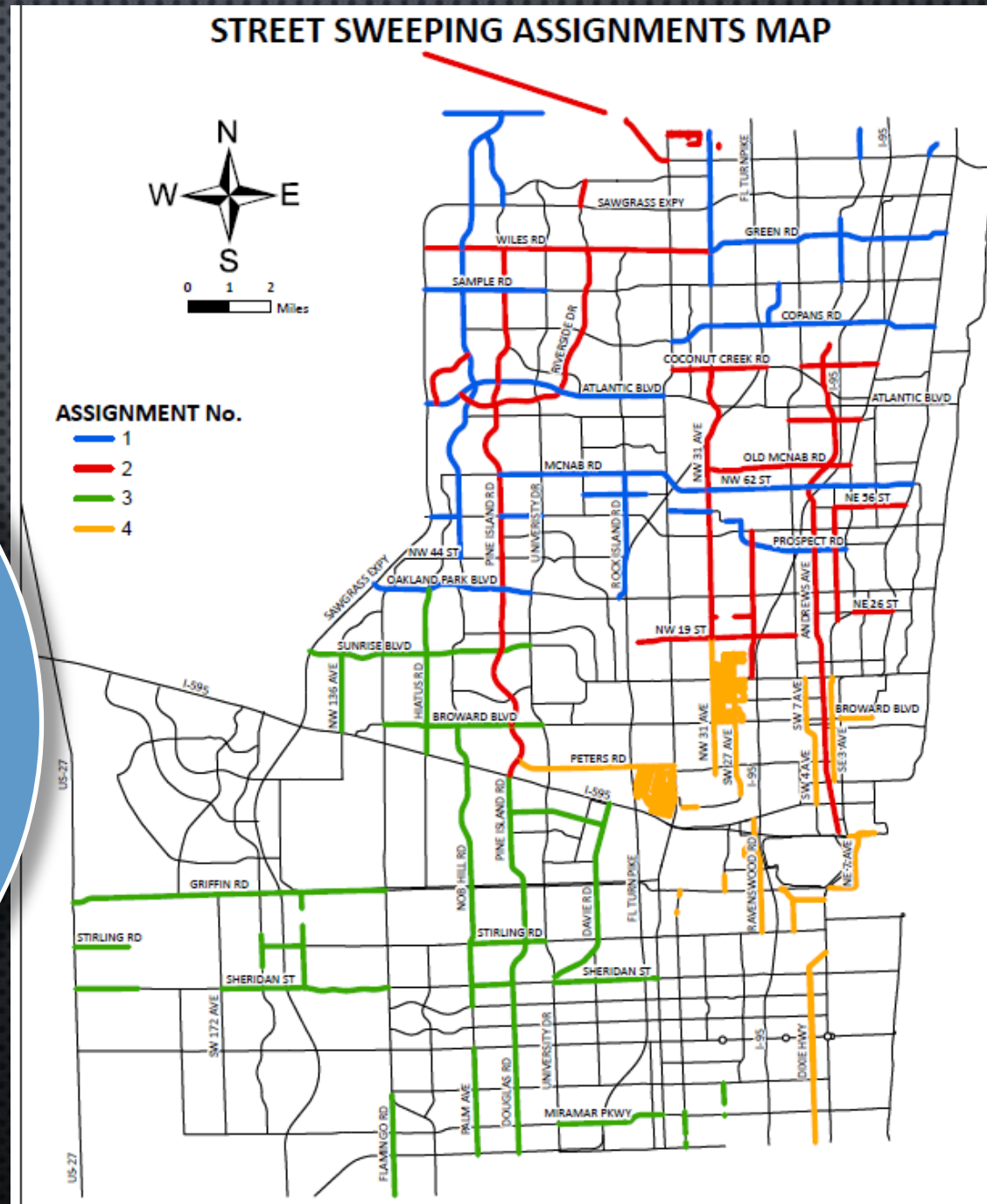
1. Roadway Classification
2. Impact to Traffic & Ped
3. Pavement Failures
4. Rain or Permanent
5. Further Deterioration Likelihood
6. Threats to Property
7. Impact on Whole Drainage System





# STREET SWEEPER ROUTING & SCHEDULING

All Swept  
Every 6  
Weeks  
On Rotational  
Scheduling






# SWEEPER REPORTING AND TRACKING

## Crews Report using Daily Report Form

- Crew Members
- Equipment
- Roads Swept
- Direction
- Lanes
- Gallons of Debris Disposal
- Comments



**HBMD Daily Report Sweeper Crew** Rev. 6/11/19

PROJECT: 2019-X-017

Date: \_\_\_\_\_

Driver Name: \_\_\_\_\_ Supervisor: \_\_\_\_\_ Commission District: \_\_\_\_\_

Truck #: \_\_\_\_\_ Total Miles Complete: \_\_\_\_\_

County Road Name: \_\_\_\_\_

From: \_\_\_\_\_ To: \_\_\_\_\_

Direction: \_\_\_\_\_ Road Assignment No.: \_\_\_\_\_

Lane: \_\_\_\_\_ Northbound \_\_\_\_\_ Southbound \_\_\_\_\_ Eastbound \_\_\_\_\_ Westbound

Inside Lane \_\_\_\_\_ Outside Lane \_\_\_\_\_

MILES COMPLETE: \_\_\_\_\_

County Road Name: \_\_\_\_\_

From: \_\_\_\_\_ To: \_\_\_\_\_

Direction: \_\_\_\_\_ Road Assignment No.: \_\_\_\_\_

Lane: \_\_\_\_\_ Northbound \_\_\_\_\_ Southbound \_\_\_\_\_ Eastbound \_\_\_\_\_ Westbound

Inside Lane \_\_\_\_\_ Outside Lane \_\_\_\_\_

Street Debris Disposal (Gal): \_\_\_\_\_

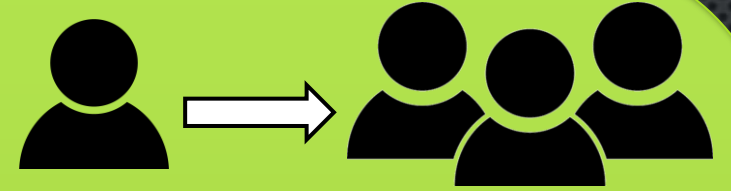
Comments: \_\_\_\_\_

Data Tracked  
in Construction  
Database

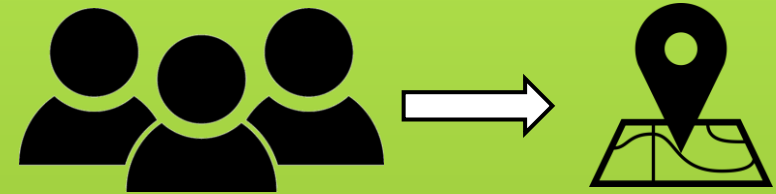


# CUSTOM SOFTWARE TO MANAGE OPERATIONS

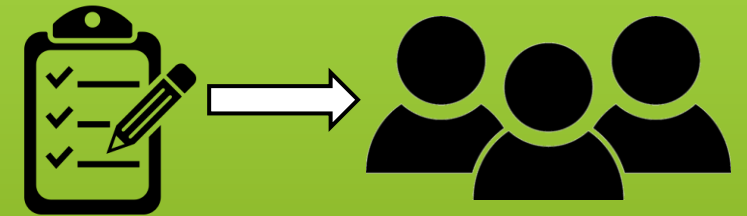
1. Assign Crew Members to Crews



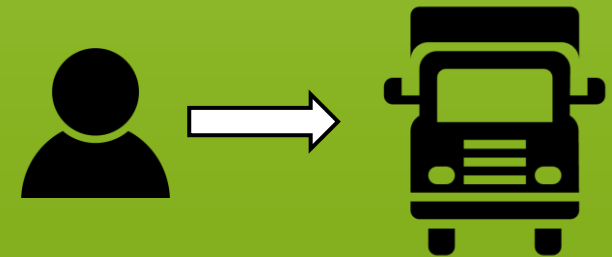
2. Assign Crews to Locations



3. Assign Tasks to Crews



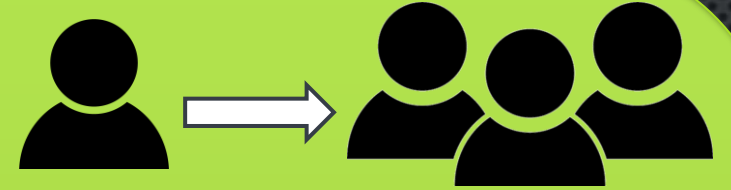
4. Associate Crew Members with Vehicles





# CUSTOM SOFTWARE TO MANAGE OPERATIONS

## 1. Assign Crew Members to Crews



**Sweeper 1**  
OSORIO, EUSEBIO G  
MAHARAJ, ANAND R

**Sweeper 2**  
OSORIO, EUSEBIO G  
NELSON, KENNETH E

**Vac 1**

**Vac 2**  
OSORIO, EUSEBIO G  
CHANCE, CLIFFORD M  
MCNEAL, ANTONIO L

**Dispatchers**  
BARBER, BRANDIE M  
LUCIEN, BERLINE

**Unassigned**  
MELENDEZ, JOSE L

**In Training**

Find Worker by Name  
ALDEN, DANIEL S  
Find

**BROWARD COUNTY FLORIDA**

**Drag-n-Drop Personnel to Assigned Crew**

| On Leave          | Leave Type       |
|-------------------|------------------|
| SHEPARD, ELLERY E | Sick-Unscheduled |
| SOPER, JOHN C     | Sick-Unscheduled |
| MASON, WILLIAM R  | Annual-Scheduled |
| RENNER, JOHN G    | Annual-Scheduled |
| DOOKIE, RICARDO   | Annual-Scheduled |
| HALL, HARRIS R    | Sick-Unscheduled |
| LABOY, CARLOS J   | Sick-Unscheduled |
| TELFER, DEVON A   | Annual-Scheduled |



# CUSTOM SOFTWARE TO MANAGE OPERATIONS

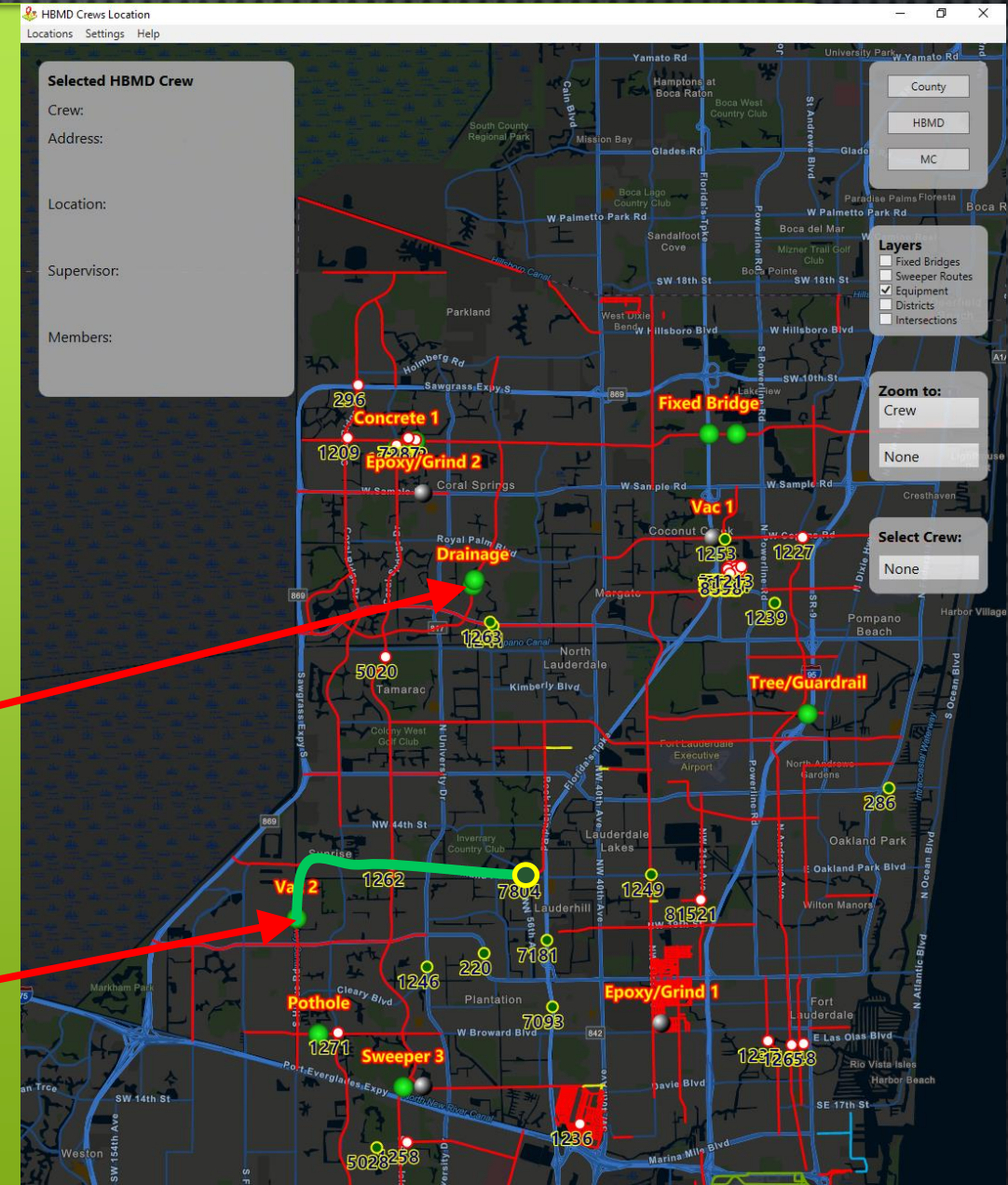
## Assign Crews to Locations

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Drainage



Vac 2

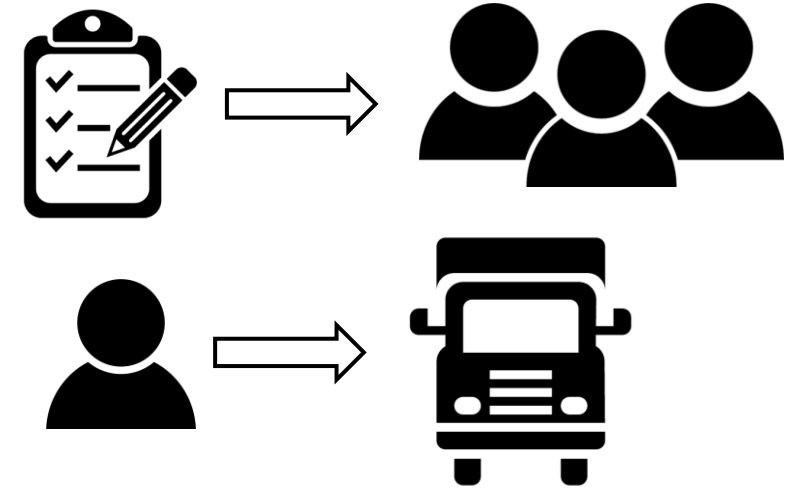




# CUSTOM SOFTWARE TO MANAGE OPERATIONS

3. Assign Tasks to Crews

4. Associate Crew Members with Vehicles



Crew  
↓

Tasks  
↓

Equipment  
↓

| Crew      | OpCode   | Description          | Qty | Unit  | Crew Member         | Equipment                              |
|-----------|----------|----------------------|-----|-------|---------------------|--|
| Sweeper 1 | 01-08-01 | Broom NPDES Roadways |     | Miles | MAHARAJ, ANAND R    | 81522 VACUUM STREET SWEEPER, NPDES ... |
|           |          |                      |     |       |                     |  |
| Sweeper 2 | 01-08-01 | Broom NPDES Roadways |     | Miles | NELSON, KENNETH E   | 81520 VACUUM STREET SWEEPER, NPDES ... |
|           |          |                      |     |       |                     |  |
| Sweeper 3 | 01-08-01 | Broom NPDES Roadways |     | Miles | HODOR II, PHILLIP D | 81521 VACUUM STREET SWEEPER, NPDES ... |



GENERATE REPORT





# CUSTOM SOFTWARE TO MANAGE OPERATIONS

## Generated Report



| Crew       | Sweeper 2  |
|------------|--|
| Supervisor | OSORIO, EUSEBIO G  |
| Members    | NELSON, KENNETH E  |
| Location   | Stirling <u>Rd</u> Fort Lauderdale Florida 33328                     |
| Directions | 0.01 mi from intersection of<br>STIRLING ROAD<br>and<br>SW 90 AVENUE |

OpCode: 01-08-01 Broom NPDES Roadways Miles

Crew Member: NELSON, KENNETH E

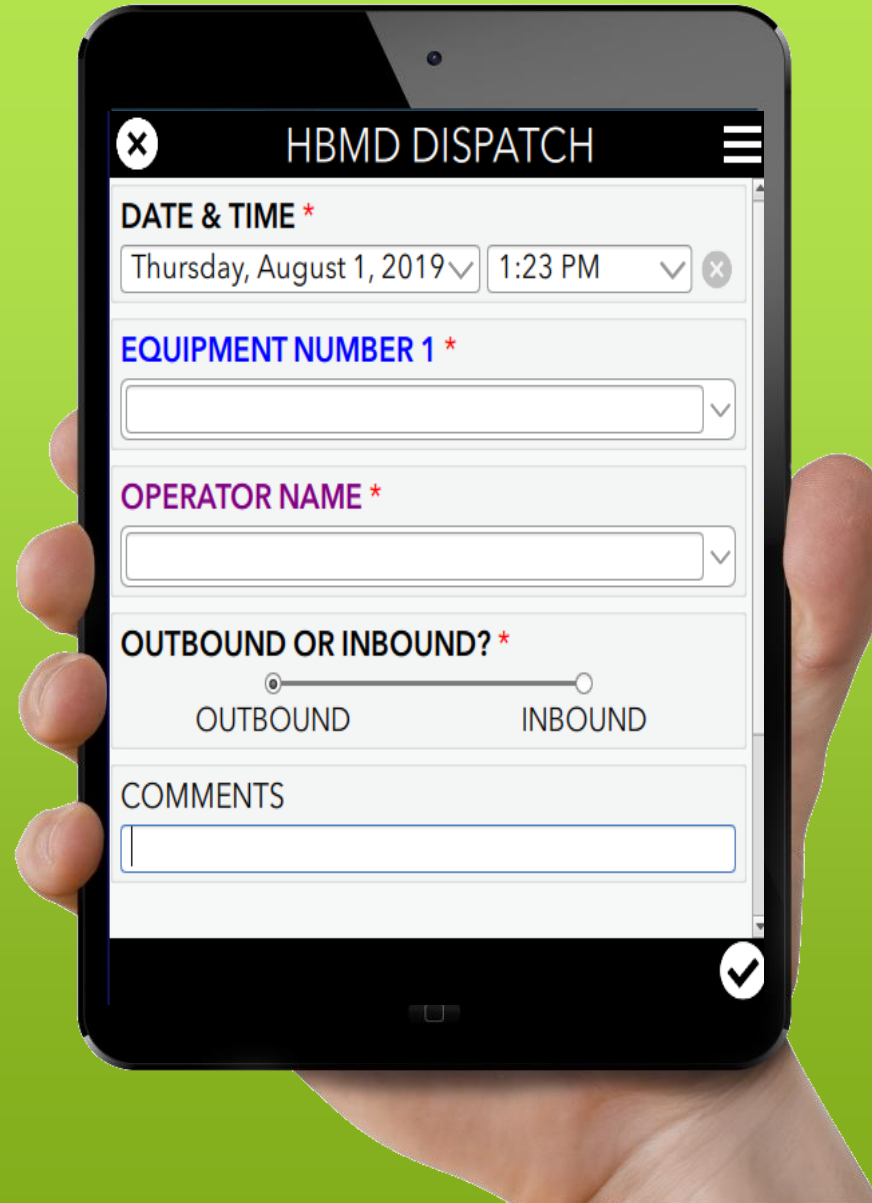
Equipment: 81520 VACUUM STREET SWEEPER, NPDES JOHNSON SWEEPER

Notes: Route #60 Stirling Rd from Palm Ave to University Dr



# Mobile Application Identifies:

- Date & Time
- Equipment Number
- Operator Name
- Outbound or Inbound



The image shows a hand holding a smartphone displaying the HBMD DISPATCH mobile application. The app interface includes a title bar with a close button (X) and a menu icon (three horizontal lines). Below the title bar, the form contains several sections: 'DATE & TIME \*' with a date dropdown (Thursday, August 1, 2019) and a time dropdown (1:23 PM); 'EQUIPMENT NUMBER 1 \*' with a dropdown menu; 'OPERATOR NAME \*' with a dropdown menu; 'OUTBOUND OR INBOUND? \*' with a slider control between 'OUTBOUND' and 'INBOUND'; and 'COMMENTS' with a text input field. A checkmark icon is visible in the bottom right corner of the app screen.



# Interactive Kiosks Answer Questions:

- What crew am I on?
- What is my crew working on today?
- Where is my crew supposed to be?
- Are crews where they are supposed to be?

