

# Stormwater Drainage Workshop #2

OCTOBER 6<sup>TH</sup>, 2015

Village Council Chamber  
560 Crandon Boulevard





# Outline

- **Informal Public Outreach Stations**
- **Opening Remarks** - Village Mayor & City Manager
- **Maintenance & Ongoing Work** - Tony Brown - Village Public Works Superintendent
- **Emergency Projects** - Jose Lopez - Village Stormwater Utility & Sewer Representative
- **Community Rating System (CRS) Updates** - Mariana Dominguez Hardie, Village CRS Coordinator
- **Stormwater Implementation Infrastructure Plan / Future Projects Plan** - EAC Consulting, Inc
- **Financing of Improvements** – Ana de Varona, Village Administrative Services Manager
- **Question & Answer Public Forum**



# Opening Remarks



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Village Mayor  
& City Manager



# Maintenance & Ongoing Work



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**Tony Brown**  
*Village Public Works Superintendent*



# Maintenance & Ongoing Work

## Existing Drainage Wells

- Redevelop 8 wells - *Completed* - June 10, 2014
- Redevelop 9 more wells - 2015 Budget - *Completed*
- Plans are in Place to Deepen 2 wells - 2016 Budget





# Maintenance & Ongoing Work

## Existing Pipe Infrastructure

- Lining pipes in Ocean Lane Dr. *Completed*
- Additional Lining of Pipes planned for 2016
  - Identify Metal/Cast Iron Pipes (Estimated 4,000 Linear feet)
  - Additional Drainage Inspections by A&A Drainage
  - Prioritize and Implement Piping Lining Needs
- Outfalls and Shore Metal pipes is the first priority





# Maintenance & Ongoing Work

## Sonesta Drive Wall Updates

- Key Colony – Stormwater System Evaluation
  - Field Observation & Inspections
  - Pending approval of Key Colony BOD.
  - Village will oversee the implementation of Key Colony Onsite improvements
- Determine wells redevelopment requirements
  - Key Colony to contract wells redevelopment

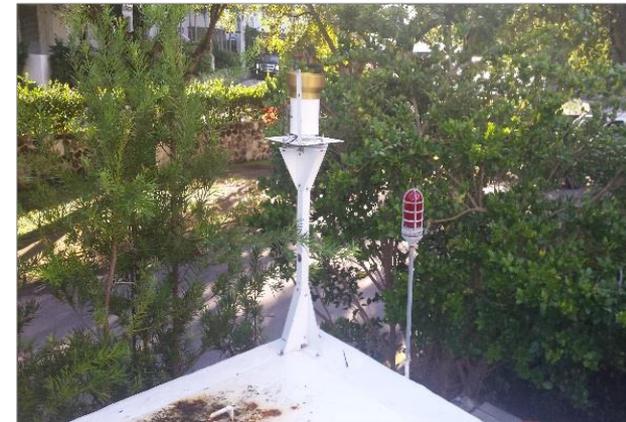




# Maintenance & Ongoing Work

## Existing Pump Stations

- East Heather Pump Station Rehabilitation *Completed*
- Install SCADA Systems (RTUs) in all Pump stations
  - Identification flooding monitoring locations in implementation plan
- Ocean Lane Drive PS West Well #4
  - *Completed*, As-builts pending
- Inspecting and Cleaning Drainage Structures (A&A Drainage)
  - Update GIS





# Emergency Projects



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**Jose Lopez**  
*Village Stormwater Utility & Sewer Representative*



# Emergency Projects

## Completed & Ongoing Projects

- 10 Harbor Point Outfall O-13
  - Negotiating Easement
- 260 Harbor Dr. O-16 *(Completed)*
- 398 Harbor Drive Outfall O-15R  
*(Completed)*





# Emergency Projects

## K-8 area Drainage Improvements

- Work *Completed* within the summer of 2015





# CRS Updates & Priorities

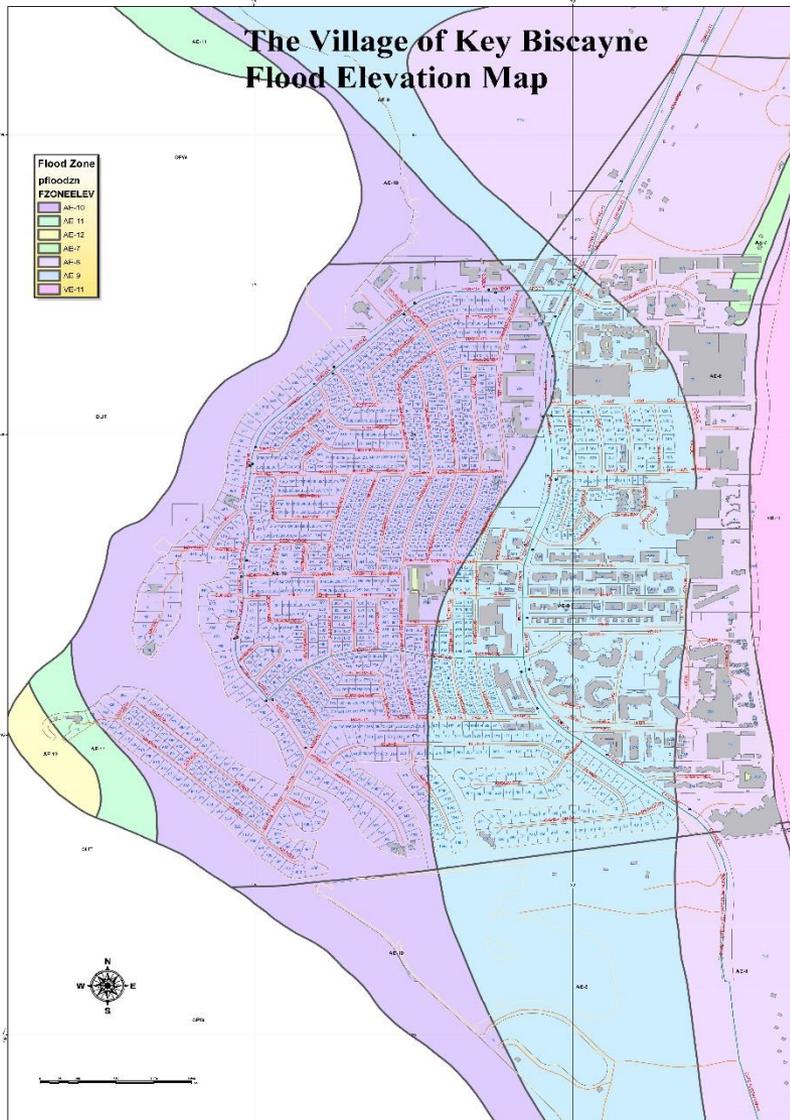


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**Mariana Dominguez-Hardie**  
*Village CRS Coordinator*



# CRS Updates & Priorities



## 1. Know Your Flood Hazard

- We are in a repetitive flood area
- Your property is subject to flooding
- Drainage is subject to tides
- Stormwater improvements projects will alleviate flooding due to rainfall but not due to significant surges or storms



# CRS Updates & Priorities

## 2. Insure Your Property For Your Flood Hazard

- You need flood insurance!
- Renters need flood insurance for their contents
- Lender institutions, insurance and real estate agents must disclose to prospective buyers that Key Biscayne is a flood hazard area and flood insurance is required





# CRS Updates & Priorities

## 3. Protect People From Hazard

- Turn around, don't drown. Do not walk through flowing water
- Drive safely: Flooding causes almost 200 deaths per year in the U.S. Over 50% of these are vehicle related
- Stay away from power lines; look out for animals
- Know the flood warning signs.



**FLOOD ALERT**  
FLOODING IS POSSIBLE. BE PREPARED



**FLOOD WARNING**  
FLOODING IS EXPECTED. IMMEDIATE ACTION REQUIRED.



**SEVERE FLOOD  
WARNING**

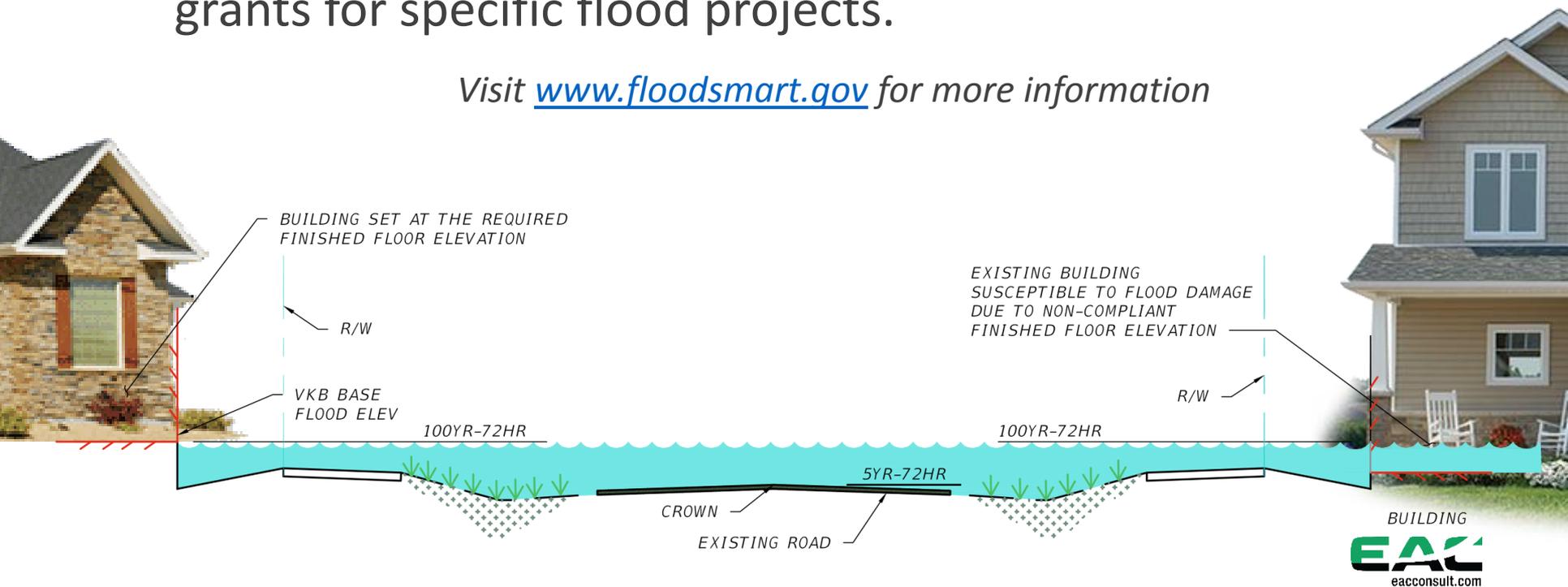


# CRS Updates & Priorities

## 4. Protect Your Property From Hazard

- Raise your A/C compressor above flood elevation
- Do not place bulk trash over drains; keep drains clear of debris
- Upon declaration of an emergency you might be eligible for grants for specific flood projects.

Visit [www.floodsmart.gov](http://www.floodsmart.gov) for more information





# CRS Updates & Priorities

## 5. Build Responsibly



- Find out your Base Flood Elevation (BFE) and make sure your design team has this information
- Get a permit from the Building, Zoning and Planning Department before you build.
- For more information contact (305) 365-5501



# CRS Updates & Priorities

## 6. Protect Natural Floodplain Functions



- Protect Our Dunes!
- Don't pump in storm drains
- Report illicit connections and dumping to the Code Enforcement Department at (305) 365-8917
- Protect Turtle Nesting areas; comply with the Village's Lighting Regulations during Turtle Season (*May 1 - Oct 31*)



# Stormwater Implementation Infrastructure Plan / Future Projects



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*EAC Consulting, Inc.*



# SWMP Implementation

## Public Meeting Objectives

- Update Residents and Stakeholders on Progress of Storm water Initiatives, since February 2014
- Inform Residents of Regulatory Thresholds for Stormwater Staging
- Inform Residents on the Village's Infrastructure Plans for the Future
- Obtain Feedback from Residents



# SWMP Implementation

## Phase 1 - Schedule <sup>Funded</sup>

| Milestone                              | Due Dates         | Remarks |
|--|-------------------|---------|
| SWMP Public Meeting No. 2              | October 6, 2015   |         |
| Final Analyses Report                  | November 20, 2015 |         |
| Complete Design - Package No. 1        | January, 2016     |         |
| Permitting & Approvals - Package No. 1 | April 2016        |         |
| Begin Construction - Package No. 1     | July 2016         |         |
| Complete Design - Package No 2         | March 2016        |         |
| Permitting & Approvals - Package No. 2 | June 2016         |         |
| Begin Construction - Package No. 2     | September 2016    |         |



# SWMP Implementation

## Phase 2 Schedule Future Funding Required

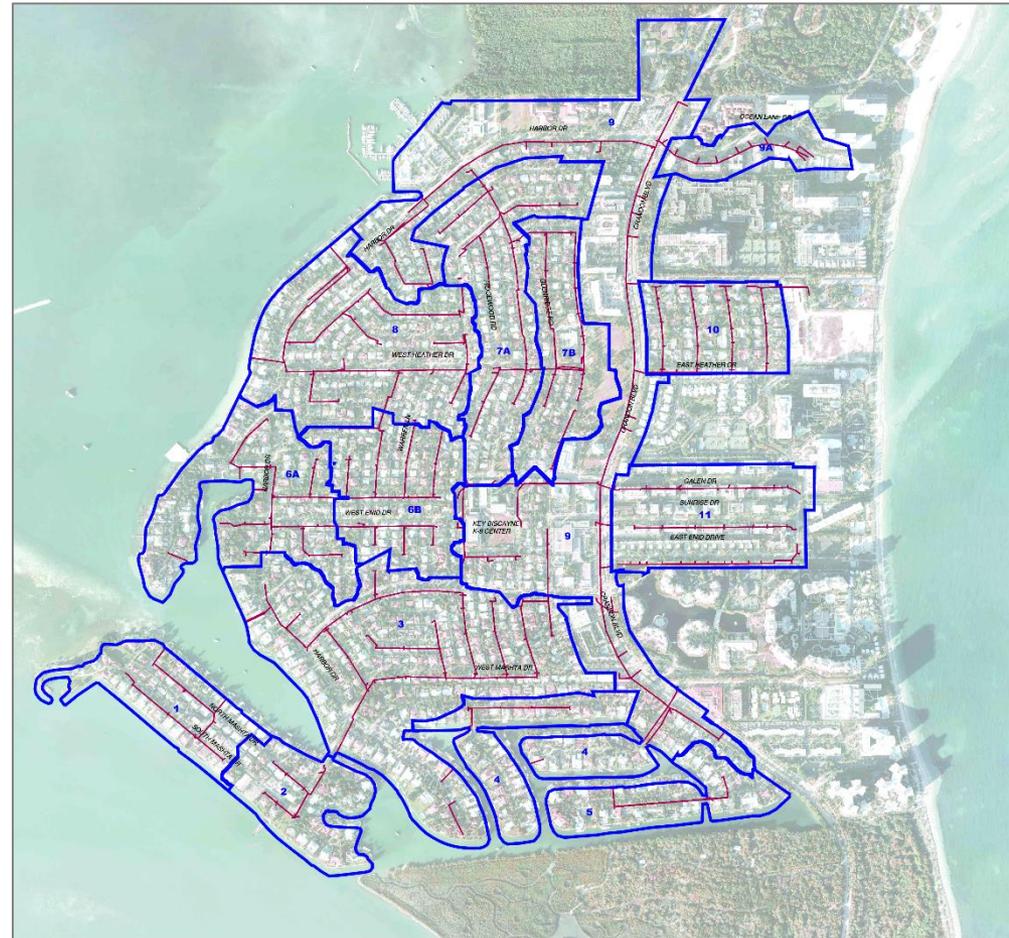
| Milestone                            | Scheduled Dates | Remarks |
|--------------------------------------|-----------------|---------|
| Complete Design Package No. 3        | May 2016        |         |
| Permitting & Approvals Package No. 3 | August 2016     |         |
| SWMP Public Meeting No. 3            | September 2016  |         |
| Begin Construction Package No. 3     | October 2016    |         |
| Complete Design Package No 4         | July 2016       |         |
| Begin Construction Package No. 4     | October 2016    |         |
| Complete Design Package No. 5        | December 2016   |         |
| Permitting & Approvals Package No. 5 | September 2016  |         |
| Begin Construction Package No. 5     | December 2016   |         |



# SWMP Implementation

## 1. Evaluate Village as a Single Watershed comprised of interconnected Basins & Sub Basins

- More Realistic Representation of Field Conditions
- Results in Capital Improvements that have Village-wide Benefits
- Cost & Schedule Savings (Stretches Limited Funds)
- “Fix it Once” Approach

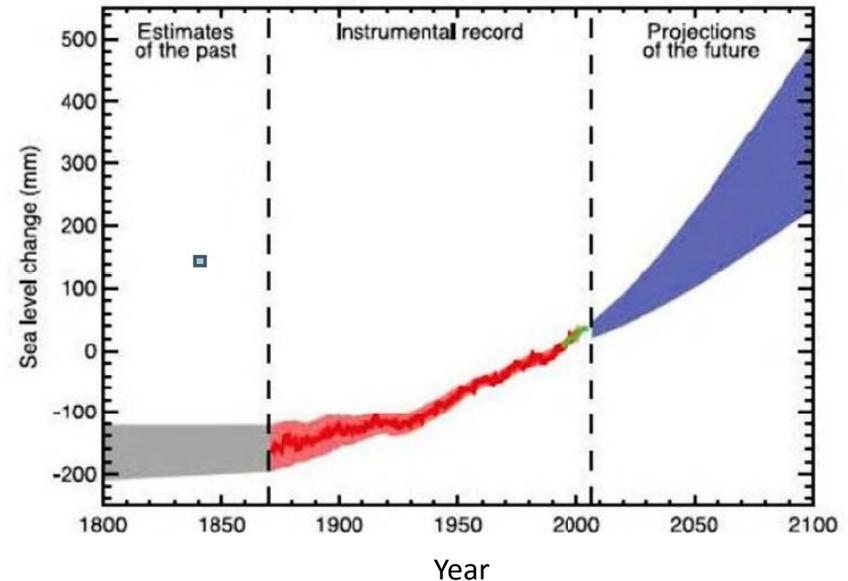




# SWMP Implementation

## 2. Update 2011 Hydraulic & Hydrologic Model (2015 Baseline Model)

- Establish “Control” Model (Software Update)
- Incorporate all Maintenance Improvements / Testing Results
- Incorporate all Emergency Projects (As-Built Conditions)
- Incorporate Representative High Tide Data
- Calibrate to Simulate Representative Conditions
- Incorporate Sea Level Rise Projections (2015-2030)



Courtesy of City of Miami Beach & Coastal Engineering International, Inc. Source: IPC, 2007



# SWMP Implementation

## 3. Re-Establish & Validate Village Priorities

| Flooding Depths Table |   |                    |                    |
|-----------------------|---|--------------------|--------------------|
| Number                | Color   | Minimum Depth (FT) | Maximum Depth (FT) |
| 1                     |  | 0.010              | 0.500              |
| 2                     |  | 0.500              | 1.000              |
| 3                     |  | 1.000              | 1.500              |
| 4                     |  | 1.500              | > 1.500            |

- Priority Levels Flooding vs Priority Areas
- Assign Numerical Values to Priorities
- Identify & Implement Improvements Based on Priorities



# SWMP Implementation

## 4. Year 2015 – Hydraulic Analyses

### ("Solution" Improvements Conditions)

- Incorporate Effects of Sea Level Rise
- Incorporate Credits due to Opportunities to Implement Green Infrastructure
- Incorporate Backflow Prevention at Strategic Locations
  - ✓ Outfalls
  - ✓ Crandon Interceptor
- Incorporate New Infrastructure Improvements





# SWMP Implementation

## LOS Analyses Criteria

### **5 year – 72 hour Event (8.2 inches)**

- Staging Allowed to Crown of Road for Residential Streets
- Recovery Goal is less than 36 Hours but No Longer than 54 Hours

### **10 year – 72 hour Event (9.5 inches)**

- Staging Allowed to Crown of Road for 2-Lane Major Streets
- Recovery Goal is less than 36 Hours but No Longer than 60 Hours

### **25 year – 72 hour Event (10.9 inches)**

- Reduced Outfall Discharge Goal

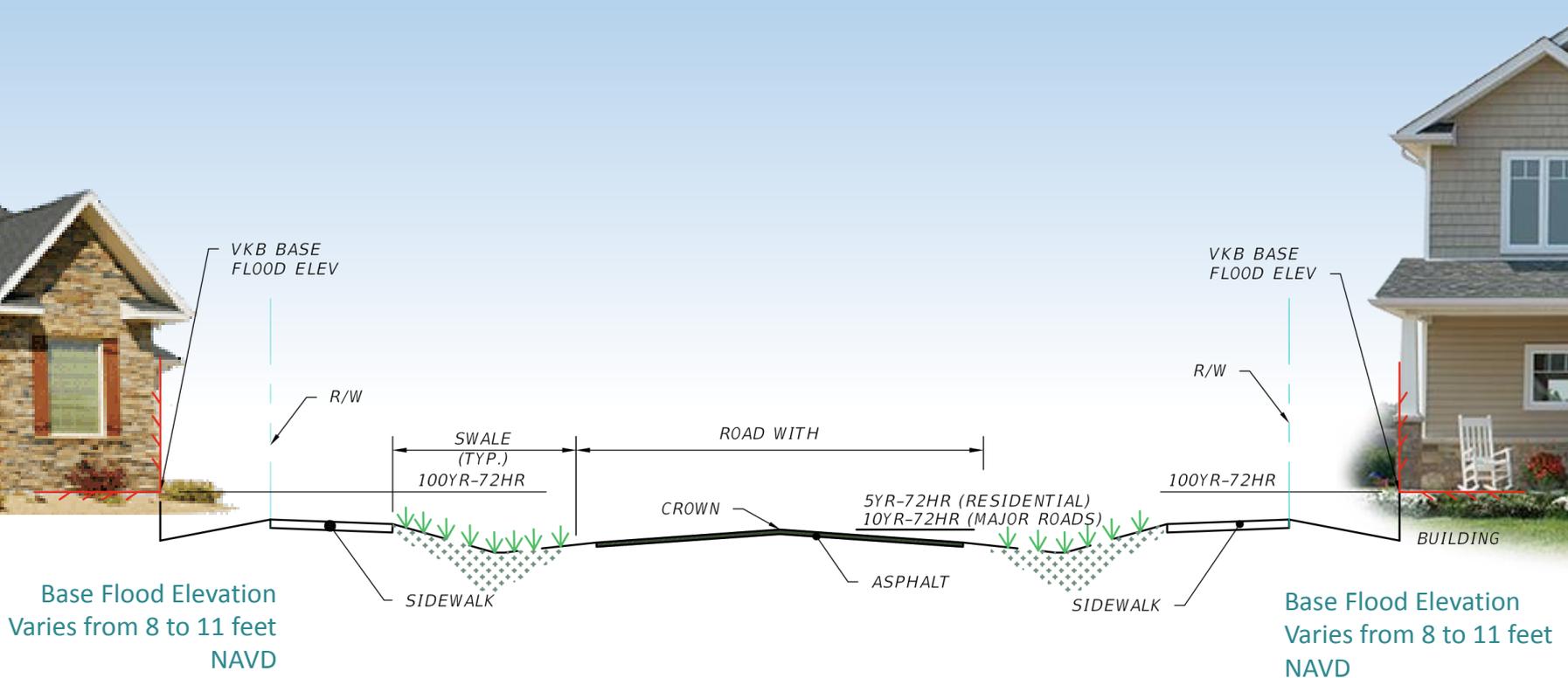
### **100 year – 72 hour Event (13.5 inches)**

- Staging Allowed to Base Flood Elevation (Min. FFE)
- Recovery Goal is less than 60 Hours but No Longer than 72 Hours



# SWMP Implementation

## Acceptable Staging Limits





# 2015 Baseline Conditions

STAGING LEVELS





# SWMP Implementation

## Levels of Improvements

### TIER 1 : Strategic Implementation of Back Flow Prevention

- All Biscayne Bay Outfalls
- All Critical Points to Crandon Boulevard Interceptor
- Total Back Flow Prevention Locations = 20
- Estimated Cost = **\$500,000**





# Proposed Improvements

## TIER 1 - BACKFLOW PREVENTION





# SWMP Implementation

## Levels of Improvements

### TIER 2: Low Lying Areas

(i.e. Locations with Ground Elevations less than 4 feet NAVD)

- **Area 1 - Holiday Colony (Basin #10)**
- **Area 2 – Basin #11** ( Boundaries - Galen Dr, Ocean Dr. East Enid Dr and Crandon Boulevard
- **Area 3 - Ocean Lane Drive (Basin #9A)**

### TIER 3: Other Excessively Flood Areas

- Area 4 – K-8 School Area (Boundaries - West Mashta St, West McIntyre St., Ridgewood Rd and Fernwood Rd)
- Area 5 – Bound by West McIntyre St, Fernwood Rd, West Heather Rd & Allendale Rd
- Area 6 – Bound Harbor Dr, Hampton Rd & Fernwood Rd
- Area 7 – Bound by Redwood Ln, Palmwood Ln & Allendale Rd
- Area 8 – Harbor Dr, Harbor Ln and Curtiswood Dr





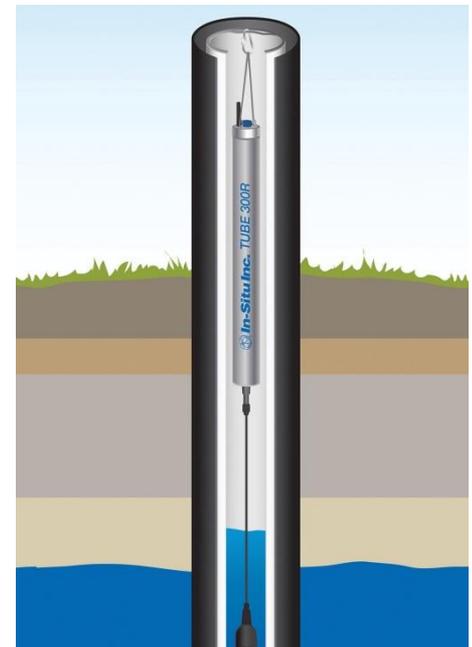




# SWMP Implementation

## Stage Monitoring Locations

- 12 Locations Proposed
- Remote Monitoring & Data Logging (SCADA/ RTUs)
- Critical Locations
  - Pump Stations
  - Selected Outfalls
  - Village-wide Coverage
- Benefits
  - Multiple methods for getting to the data
  - Make informed decisions
  - Stay organized
  - Save time and money and Reduce risk
- Approximate Costs
  - **\$250,000**

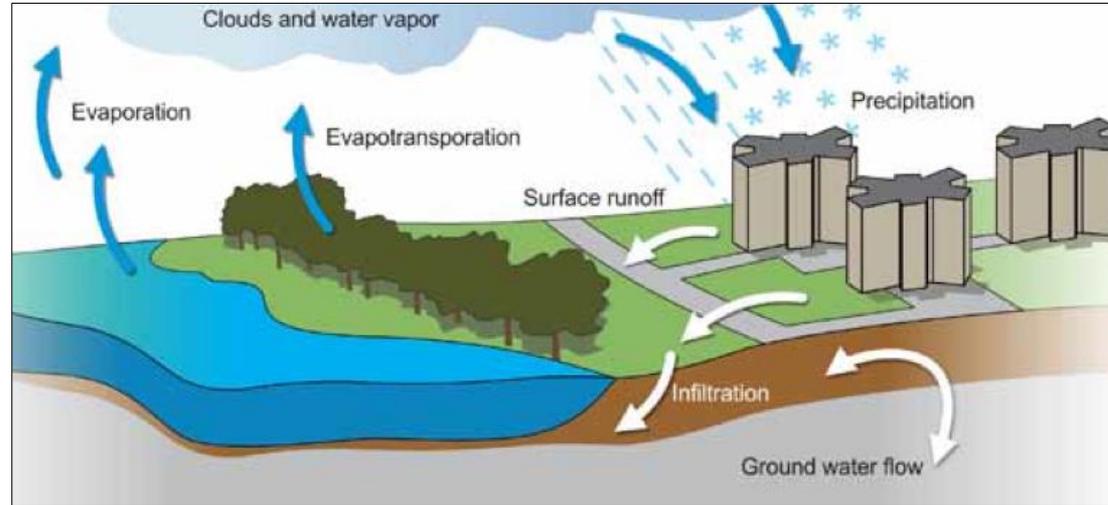




# SWMP Implementation *Green Infrastructure*

## Hydrologic Cycle

- Reduction of runoff and increase of infiltration to counteract effect of development
- Addition of vegetation provides benefits for reducing the urban heat island effect, improving air quality, saving energy, increasing property value and mitigating climate change.
- Stormwater retention on multiple scales:
  - Larger retention ponds along the streams to provide storage that will capture the majority of the runoff
  - Source water control to reduce the runoff at the source





# SWMP Implementation *Green Infrastructure*





# SWMP Implementation

## Recommendations

- Preserve the Natural Hydrologic Cycle
- Optimize the open areas, the green infrastructure components and costs of implementation and maintenance for source controls on rooftops, driveways, parking lots, and open spaces and for greenways and wetlands
  - **Storage** – storage components will be implemented on all scales: lot, block, neighborhood
  - **Filtration** – Filtration components will be integrated within storage and will be developed based on transect zone and scale
  - **Channeling** – The surface water will be routed downstream through channels which will be designed to reduce erosion, to provide local retention and connect GI components
  - **Paving** – The site will predominantly use pervious roads for light traffic, for heavy traffic semipervious pavement will be considered



# Financing of Improvements



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**Ana de Varona**  
*Administrative Services Manager*



# Stormwater Financing

Everyone in the Village benefits from the Stormwater Management Program

## Fees Collection for residences, condo and commercial properties:

- Single Family Dwelling Units: 1.5 ERU's (\$13.35 per SFDU)
- Multi-Family Dwelling Units: 1.0 ERU's (\$8.90 per MFDU)
- Non-Residential Developed Properties: 1.0 ERU per 1,083 square feet of impervious area

## 2016 Budget of SWU Enterprise Fund – Self Financed

- The FY 2016 Budget is \$982,311
- Debt Service is \$508,488
- Operating Budget is \$473,823



# Stormwater Financing

Everyone in the Village benefits from the Stormwater Management Program

## Capital Projects Financing

- Series 2013 Bonds extend the terms of Series 2011 Bonds from mature date of October 1, 2019 to October 1, 2030.
- Financing of \$6,575,000 includes \$3.4 Million dollars in Projects. Approximately \$500,000 has spent to date on emergency projects and professional services

## Grants

- The Village will continue to apply for stormwater improvement grants.



# Question & Answer Public Forum

