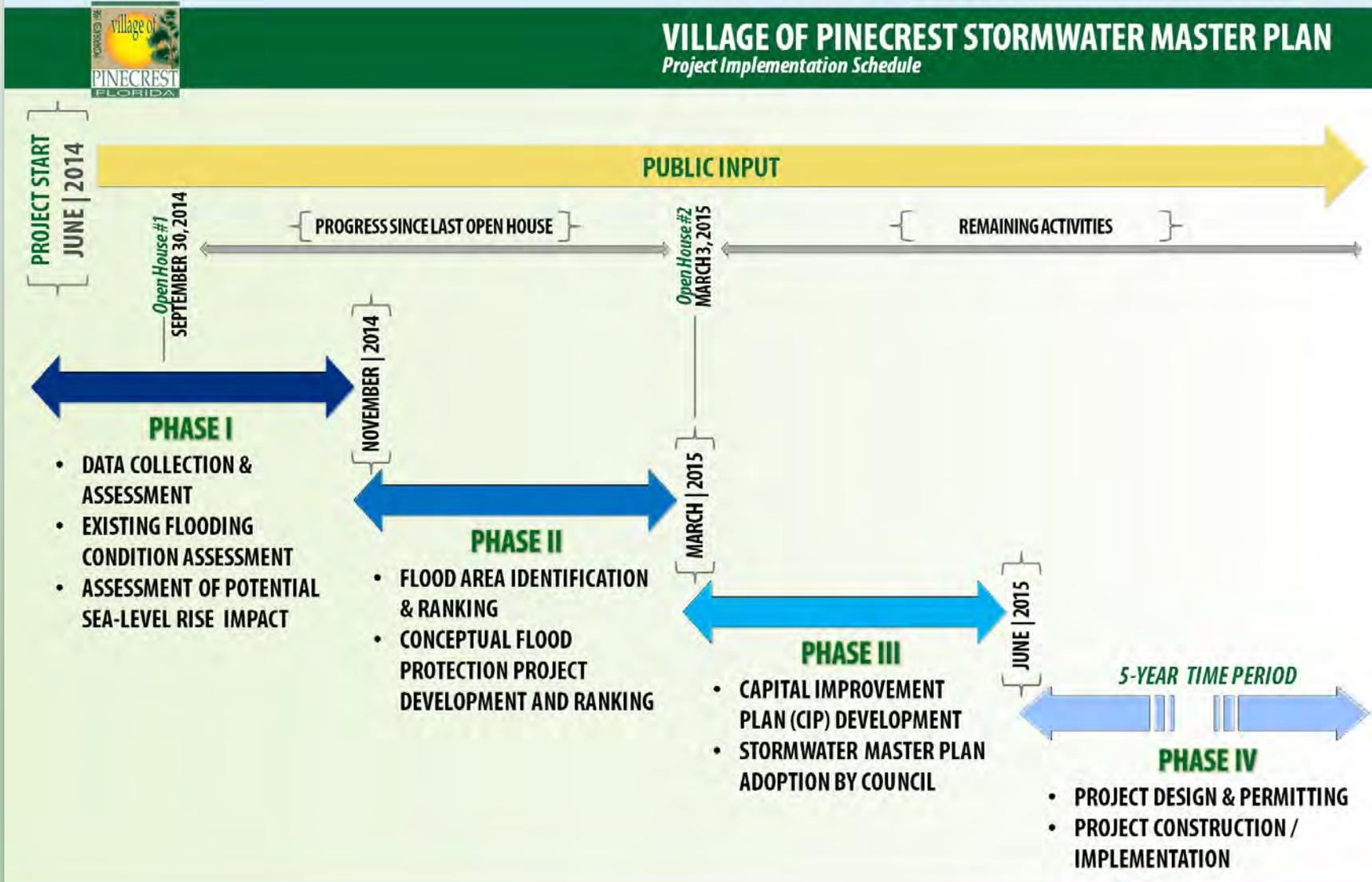


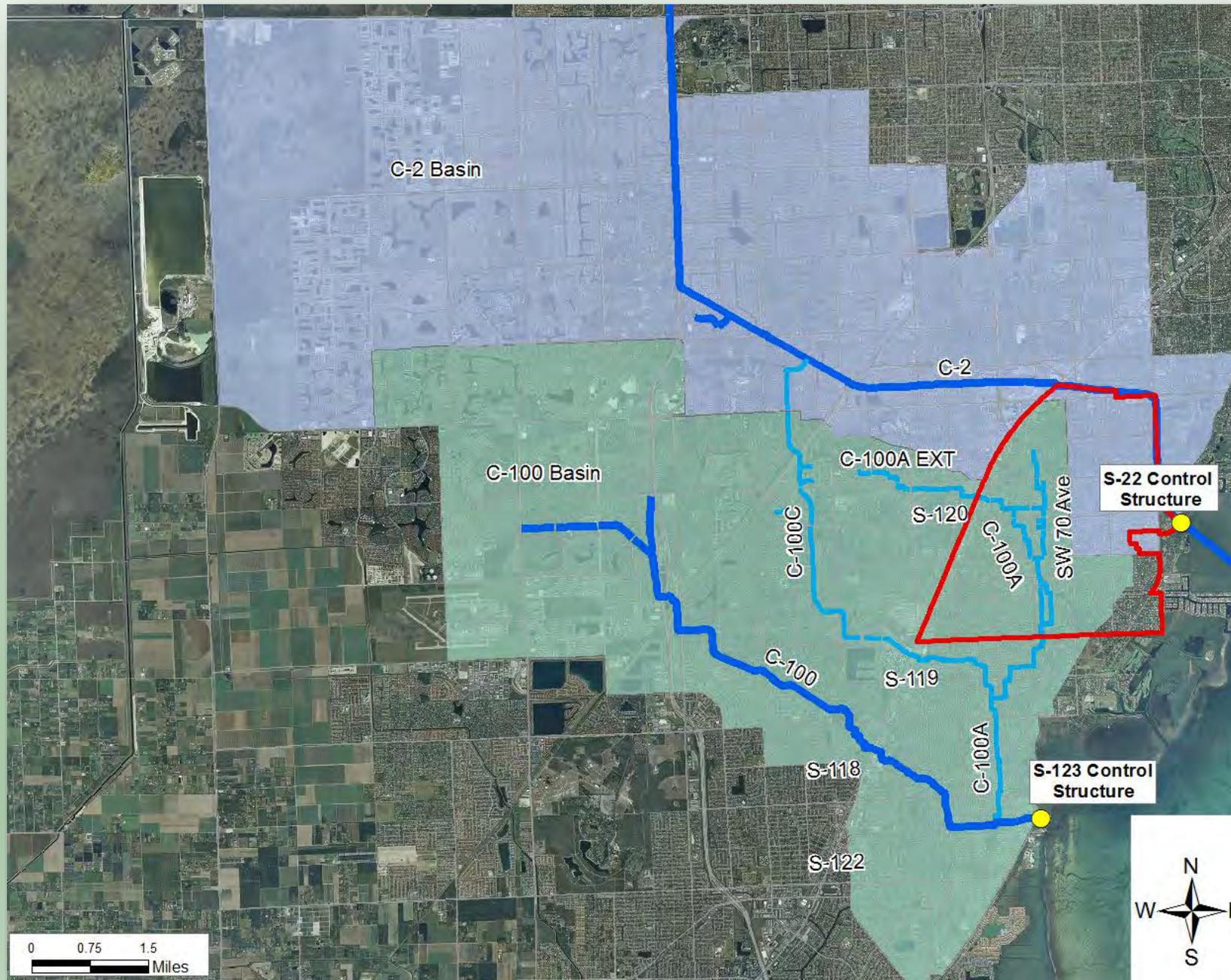
STORMWATER MASTER PLAN STATUS



Prepared by **A.D.A. Engineering, Inc.**

**ASSESSMENT OF EXISTING
FLOODING CONDITIONS**

ASSESSMENT OF EXISTING FLOODING CONDITIONS: PHASE I



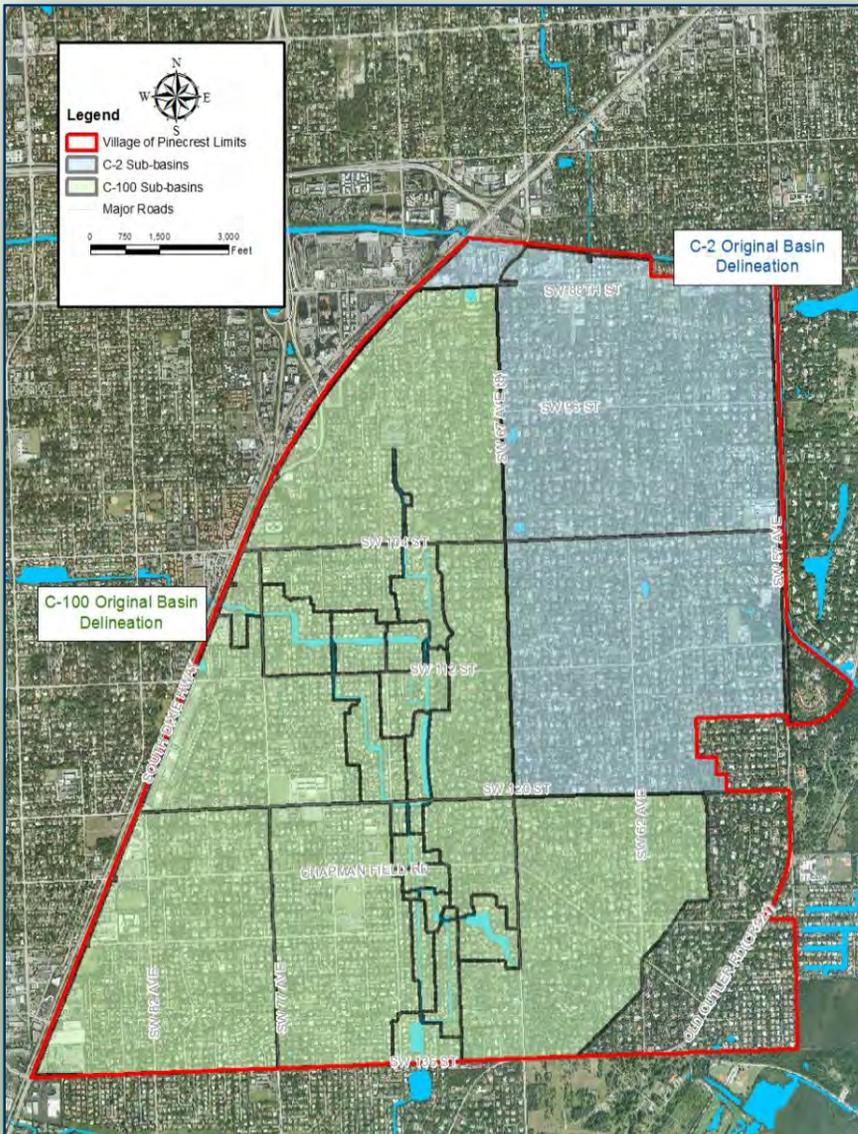
ASSESSMENT OF EXISTING FLOODING CONDITIONS APPROACH: PHASE I

To assess flooding conditions within the Village, a representative hydrologic/hydraulic model is required:

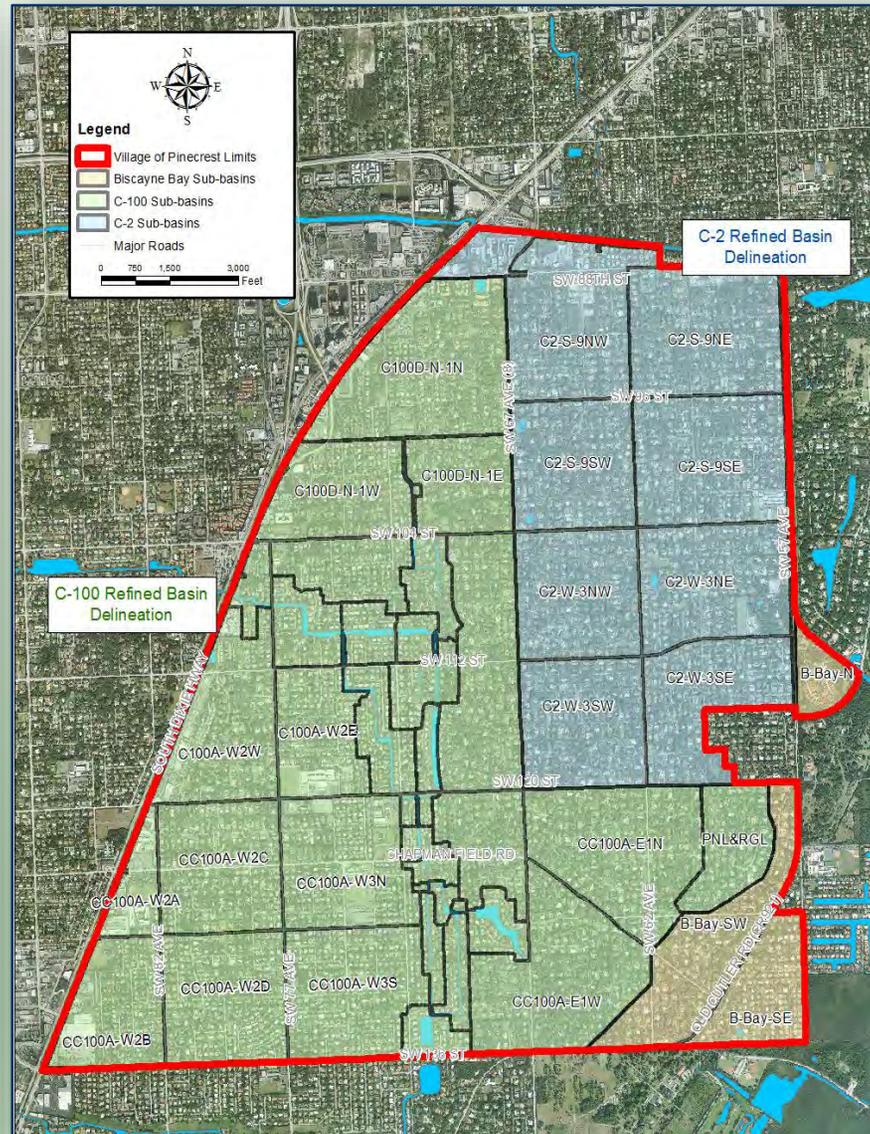
- Miami-Dade County developed hydrologic/hydraulic models for the C-2 and C-100 Basins using the XP-SWMM model:
 - ✓ Models were approved by FEMA.
 - ✓ Models were used to develop the current FEMA flood maps for Miami-Dade County.
- Used existing hydrologic/hydraulic models (XP-SWMM) developed in 2004 by Miami-Dade County for the C-2 and C-100 Basins.
- Refined C-2 and C-100 Basin models:
 - ✓ Updated models to the latest version of XP-SWMM.
 - ✓ Included recent drainage projects constructed by the Village.
 - ✓ Expanded model for areas of Village within the Biscayne Basin, not previously modeled by Miami-Dade County.
 - ✓ Refined sub-basin delineations developed by Miami-Dade County.

ASSESSMENT OF EXISTING FLOODING CONDITIONS APPROACH: PHASE I

C-2 & C-100 Sub-basin Delineations



C-2 & C-100 Refined Sub-basin Delineation

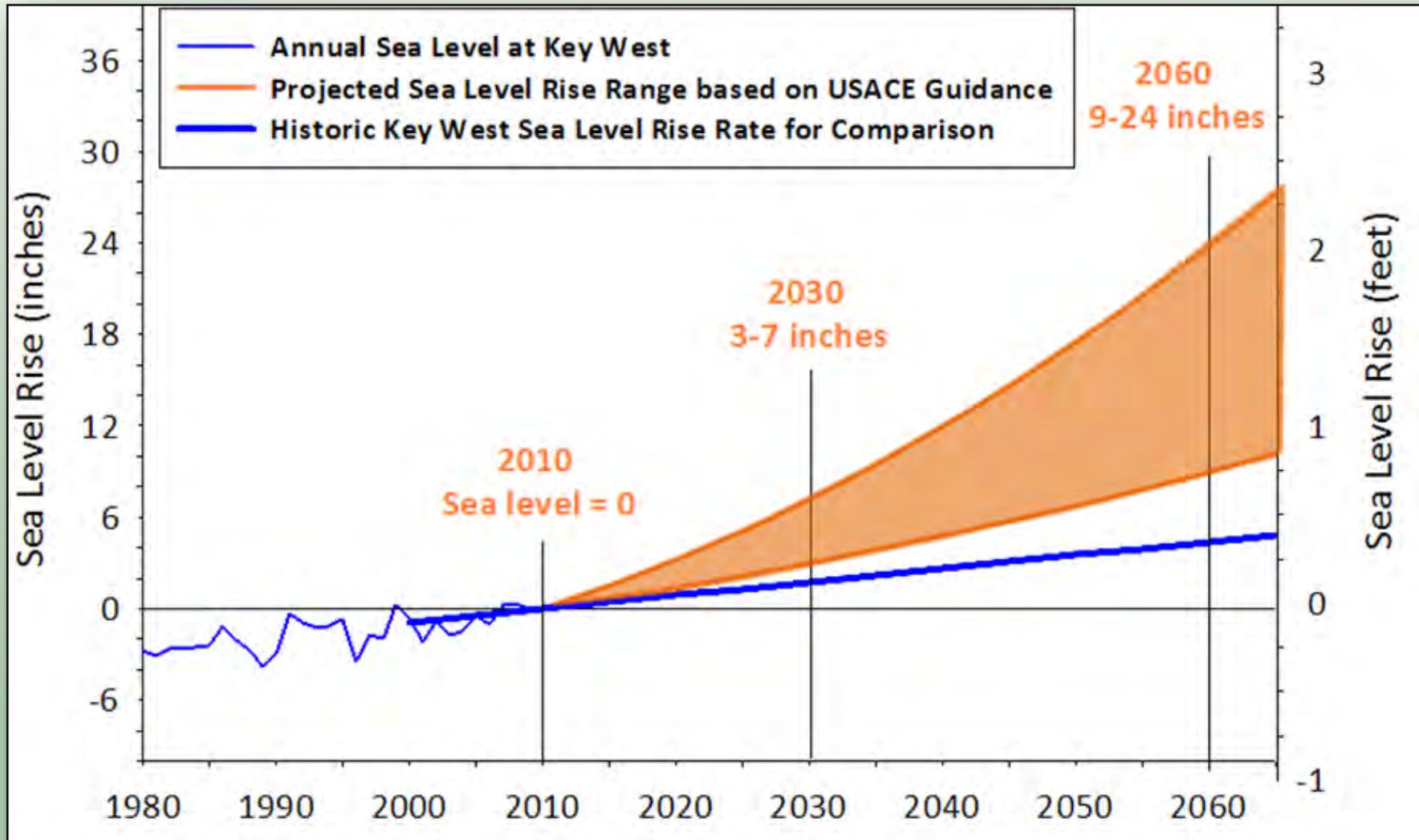


ASSESSMENT OF EXISTING FLOODING CONDITIONS APPROACH: PHASE I

- Executed refined models for critical design storm events and developed flood maps (C-2 & C-100 Basin):
 - ✓ 5-year, 24-hour – (6.3 inches)
 - ✓ 10-year, 24-hour – (7.4 inches)
 - ✓ 10-year, 72-hour – (10.5 inches)
 - ✓ 25-year, 72-hour – (12.0 inches)
 - ✓ 50-year, 72-hour – (13.4 inches)
 - ✓ 100-year, 72-hour – (14.9 inches)
- Validated results with observed flooding and FEMA flood maps.

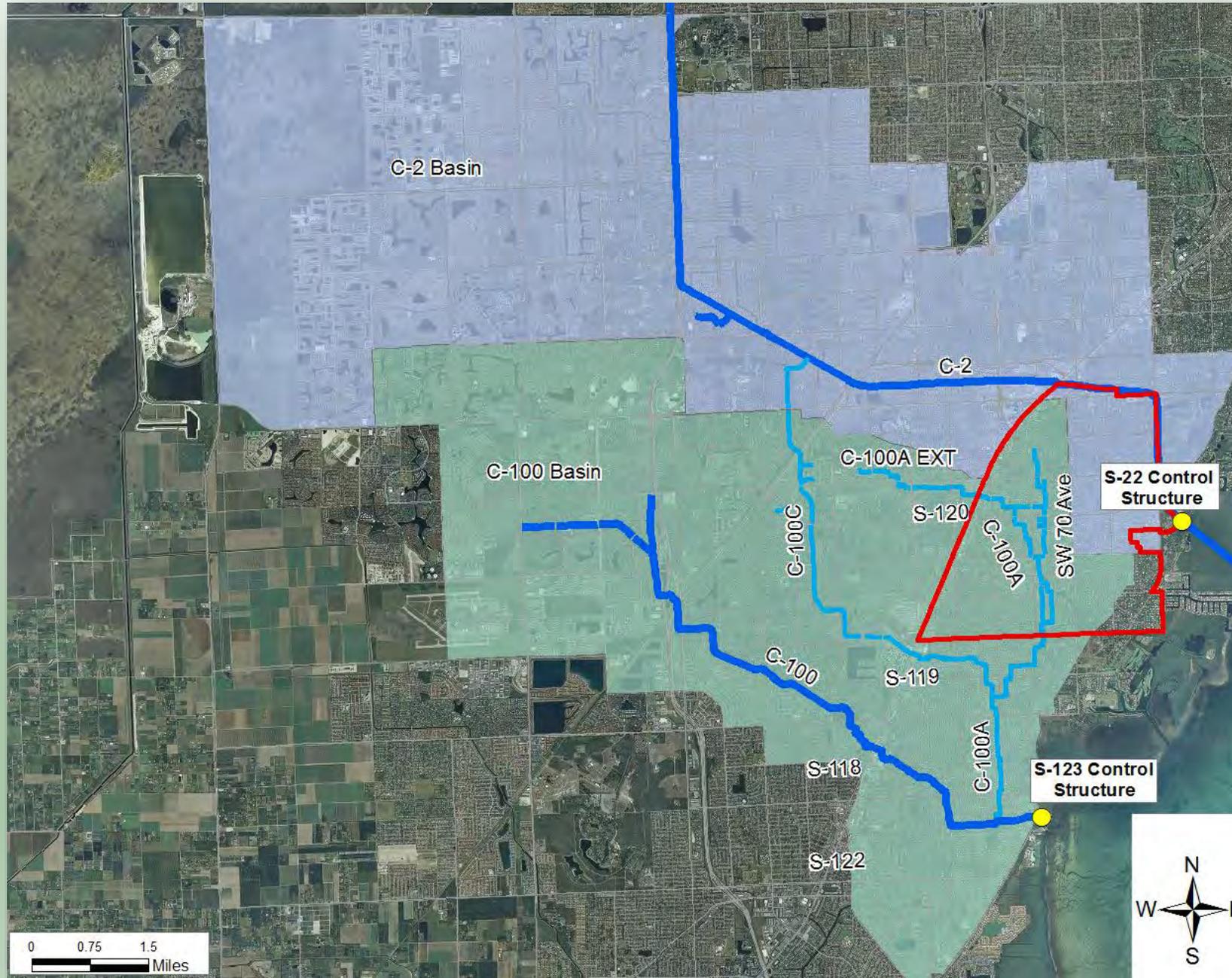
**ASSESSMENT OF POTENTIAL
SEA-LEVEL RISE**

ASSESSMENT OF POTENTIAL SEA-LEVEL RISE: PHASE I



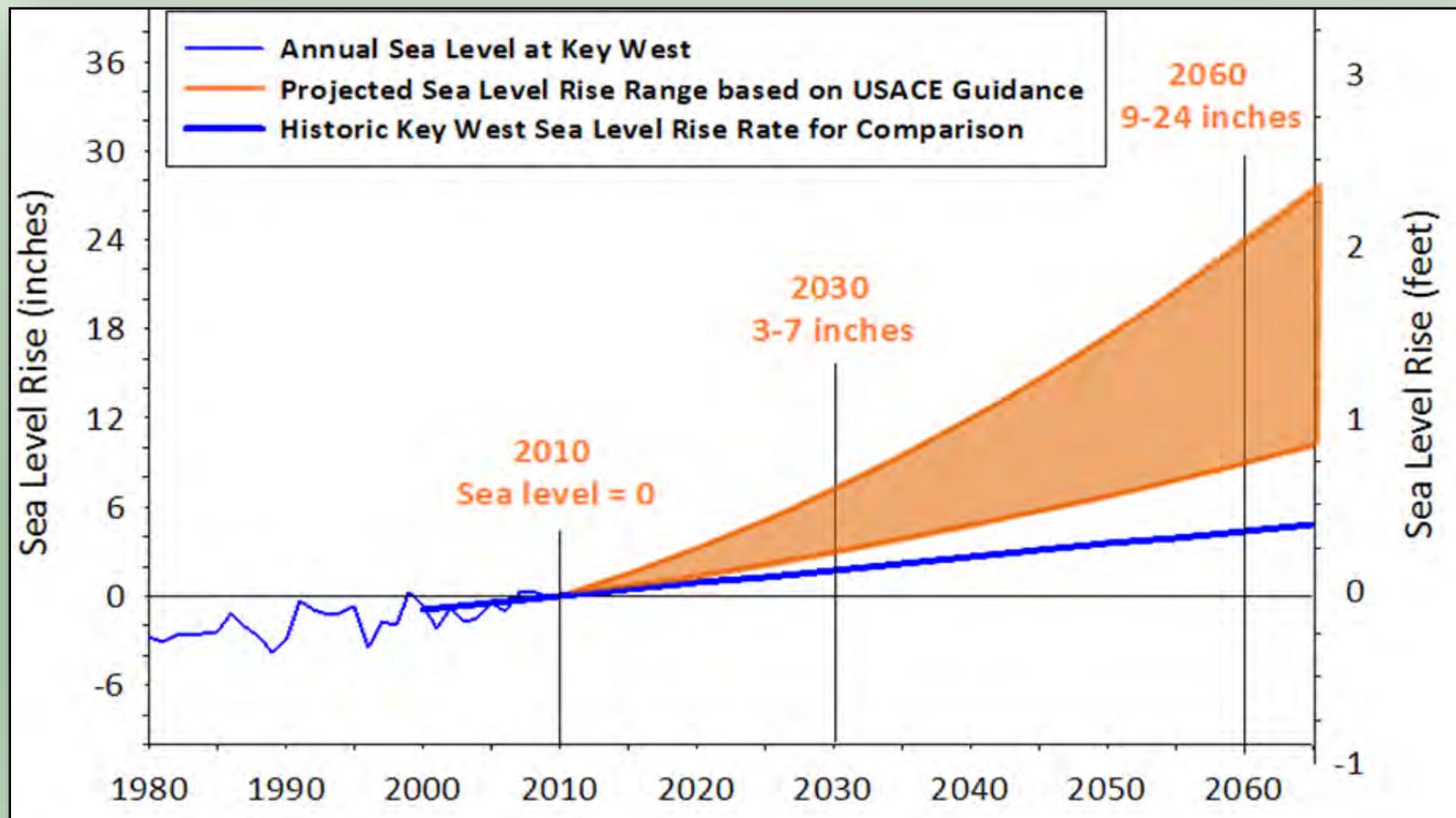
Source: July 2014 Miami-Dade Sea Level Rise Task Force Report

ASSESSMENT OF POTENTIAL SEA-LEVEL RISE (CONT.)



ASSESSMENT OF POTENTIAL SEA-LEVEL RISE (CONT.)

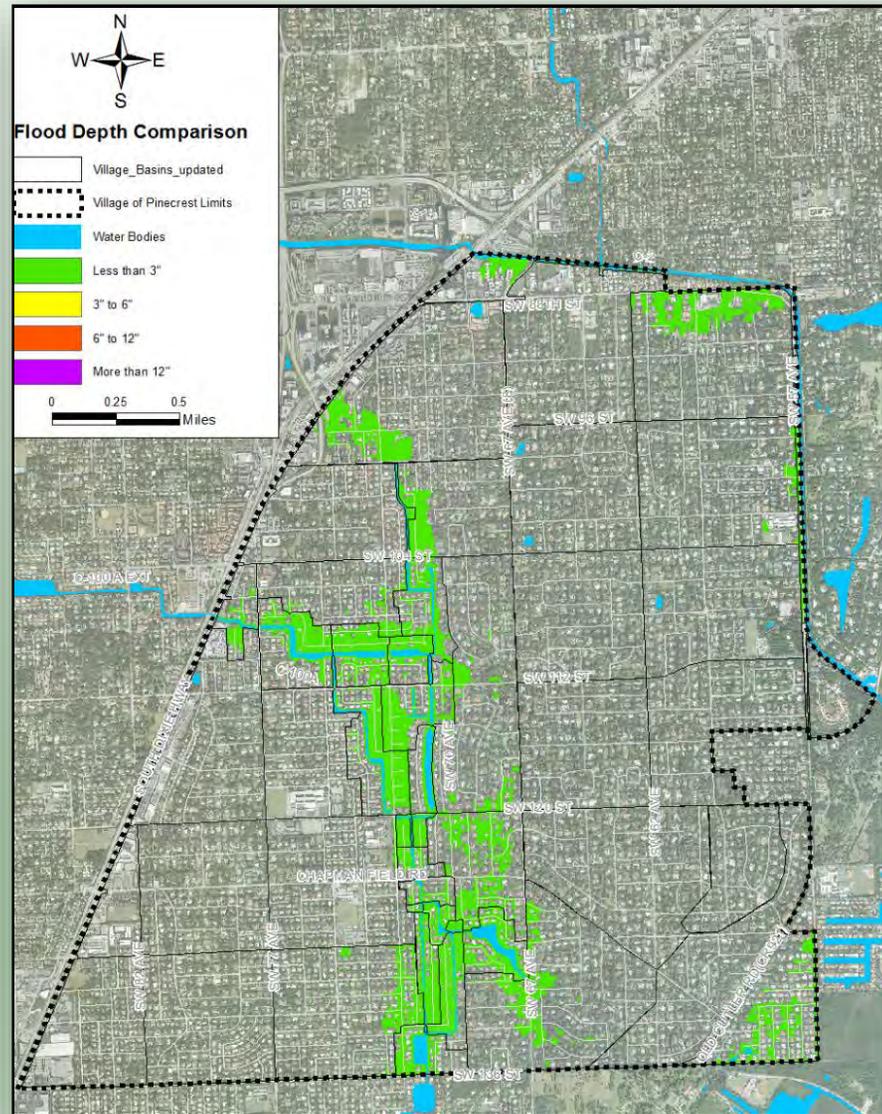
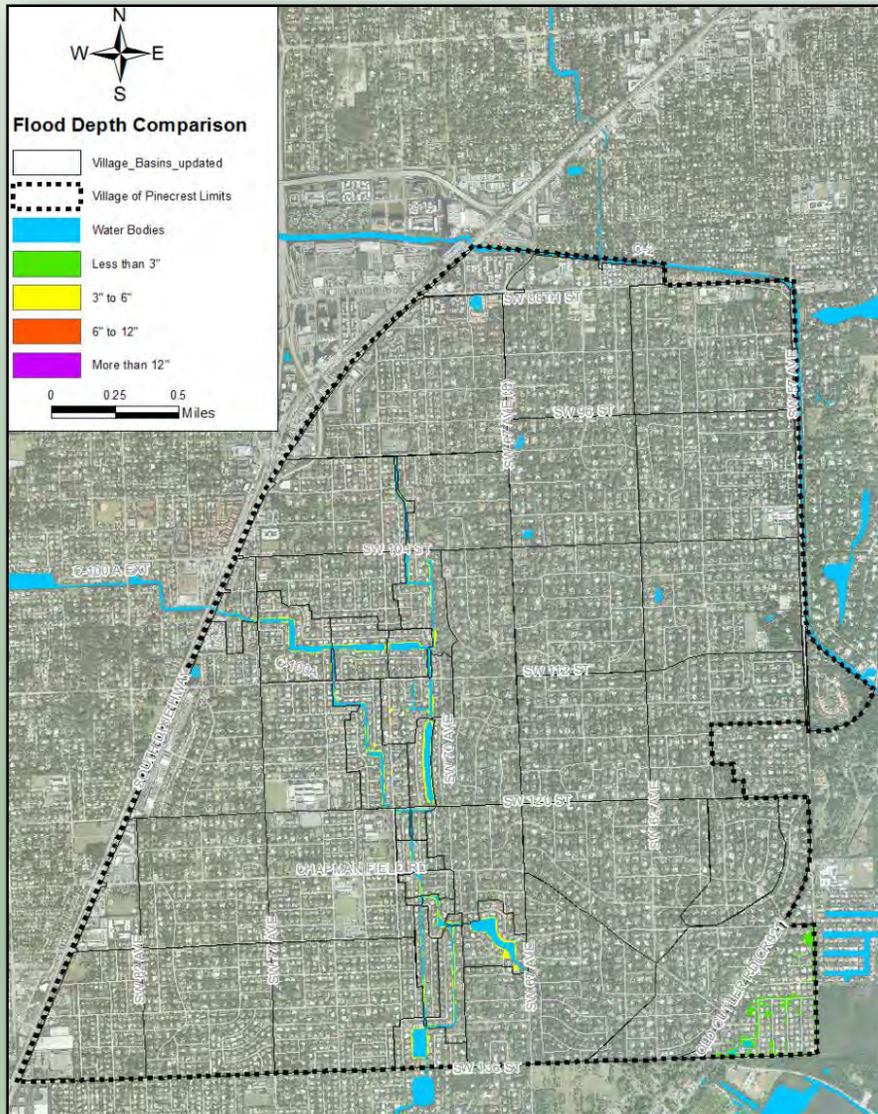
- Assessment of 2030 Projections:
 - Evaluated impacts for 3-inch and 7-inch in sea-level rise.
- Assessment of 2060 Projections:
 - Evaluated impacts for 9-inch and 24-inch in sea-level rise.



ASSESSMENT OF POTENTIAL SEA-LEVEL RISE 2030 PROJECTIONS: PHASE I

5-year Storm with 7-inch Sea-level Rise

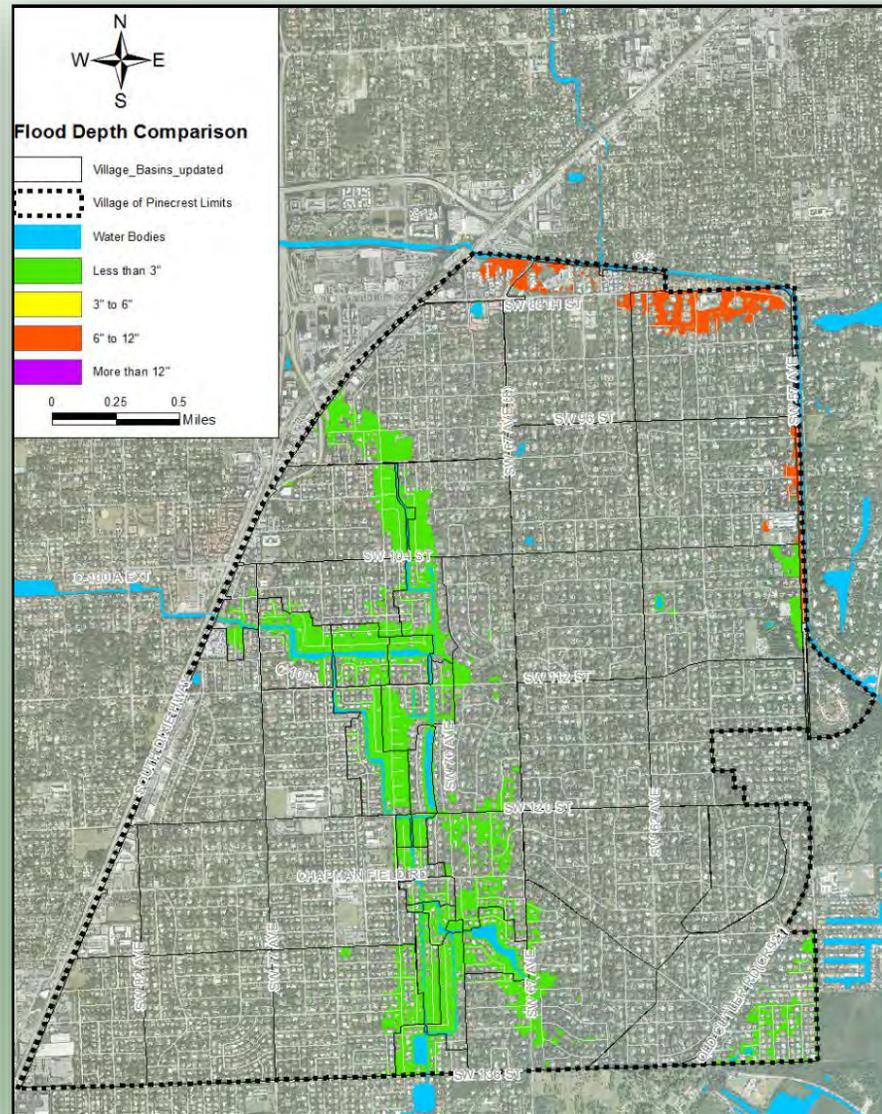
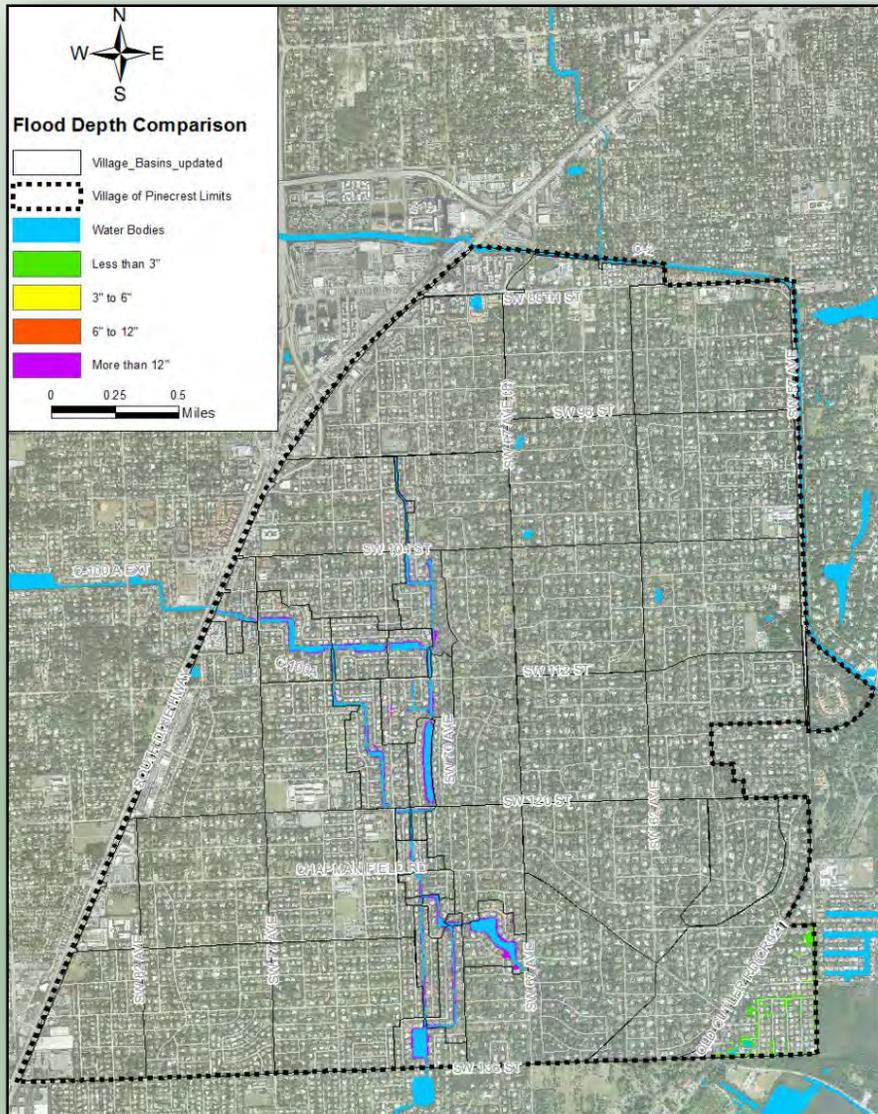
100-year Storm with 7-inch Sea-level Rise



ASSESSMENT OF POTENTIAL SEA-LEVEL RISE 2060 PROJECTIONS: PHASE I

5-year Storm with 24-inch Sea-level Rise

100-year Storm with 24-inch Sea-level Rise

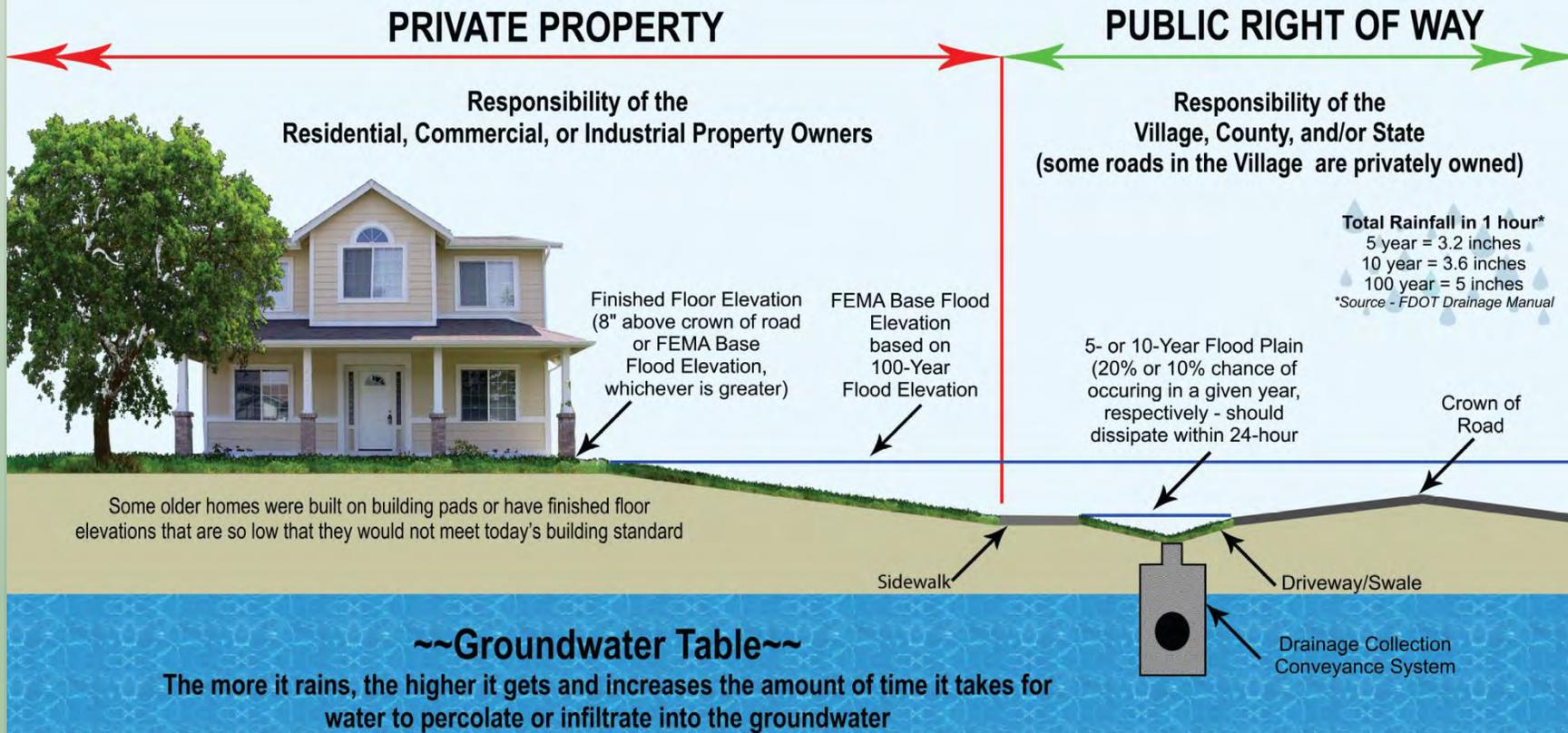


**FLOOD AREA (SUB-BASIN)
RANKING APPROACH**

FLOOD AREA (SUB-BASINS) RANKING: PHASE II



VILLAGE OF PINECREST STORMWATER MASTER PLAN Flooding Determination & Responsibility



Prepared by **A.D.A. Engineering, Inc.**



FLOOD AREA (SUB-BASIN) RANKING APPROACH: PHASE II

- **Used Miami-Dade County Approach Approved by FEMA**
 - **Five (5) Flood Severity Indicators and Weighting Factors (WF) based on systems meeting the indented design level of service:**
 1. **NS**: Number of structures flooded by the 100-year flood (**WF = 4**)
 2. **MER**: Miles of principal arterial roads, including major evacuation routes, which are impassable during the 100-year flood; impassable when flooding exceeds 8 inches above the crown of the road (**WF = 4**) (***US 1***)
 3. **MMAS**: Miles of minor arterial roads, which are impassable during the 10-year flood. (**WF = 4**) (***SW 112th and SW 136th Streets***)
 4. **MCLRS**: Miles of collector and local residential streets impassable during 5-year flood. (**WF = 2**) (***SW 116th Street, SW 75th Ave***)
 5. **BM**: Miles of canal with out-of-bank flow, expressed in bank-miles. The C-100 and C-100A Canals are designed for a 10-year storm event and C-2 Canal Designed for at least a 100-year storm event. (**WF = 3**)

FLOOD AREA (SUB-BASINS) RANKING APPROACH (CONT.)

➤ Refined Miami-Dade County Approach to account for additional Flooding Indicators for the Village:

6. **DEM**: Total area experiencing flooding for the 100-year flood in 10-acre units. (WF = 2)
7. **NFC**: Number of flooding complaints documented by residents and Village staff. (WF = 1)
8. **RPL**: Number of repetitive loss complaints reported to FEMA. (WF = 5)

➤ Implemented County's Approach to Account for Flooding Exceedance:

Depth of Flooding Above Flooding Severity Indicator (E)

Less than or equal to 6 inches:	1
Greater than 6 inches and less than or equal to 12 inches:	2
Greater than 12 inches	3

FLOOD AREA (SUB-BASIN) RANKING APPROACH (CONT.): PHASE II

- Flood Area (Sub-basin) Ranking is derived from the Flood Protection Severity Score (FPSS) which accounts for the eight (8) Flood Severity Indicators, Flooding Exceedance and Weighting Factors:

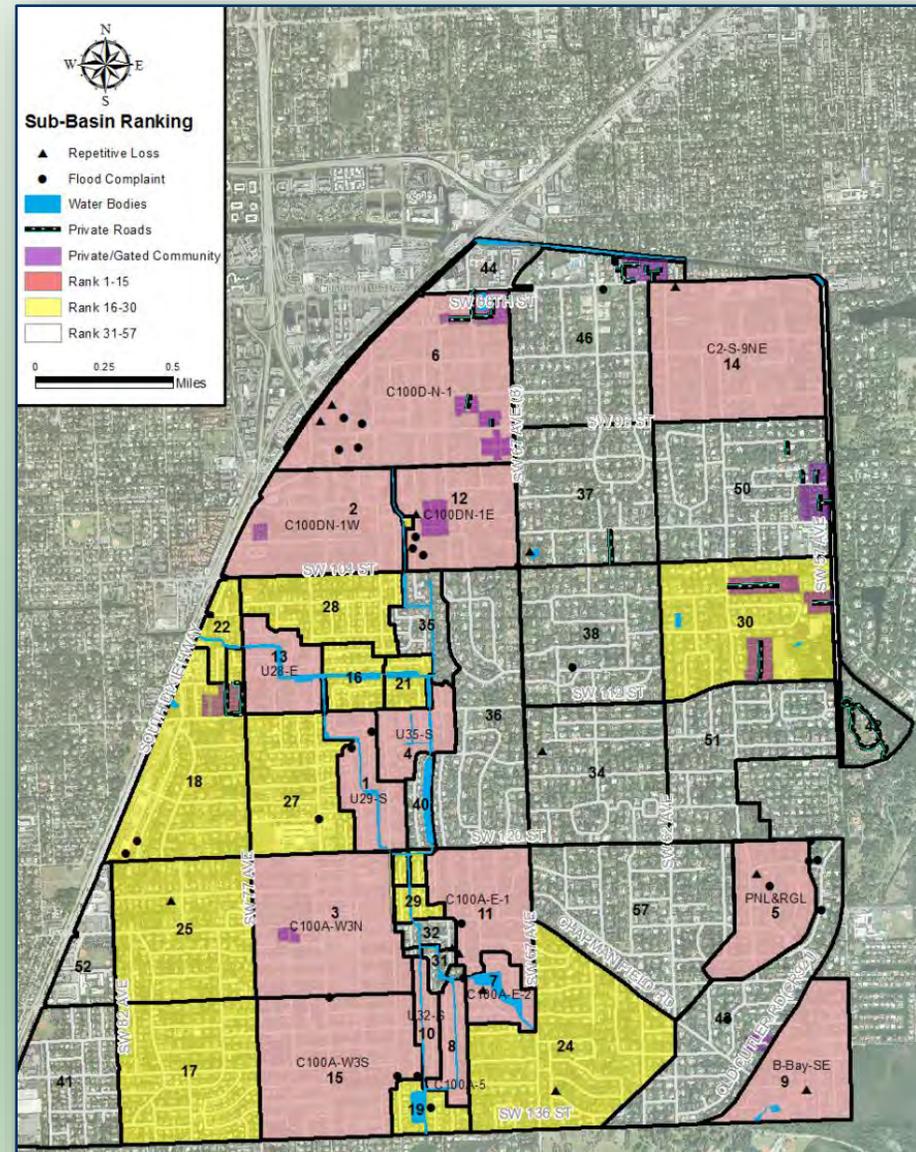
$$\text{FPSS} = [4 \times E_{(i)} \times \text{NS}] + [4 \times E_{(iii)} \times \text{MER}] + [4 \times E_{(iii)} \times \text{MMAS}] + \\ [2 \times E_{(v)} \times \text{MCLRS}] + [3 \times E_{(vi)} \times \text{BM}] + \\ [2 \times E_{(ii)} \times \text{DEM}] + [1 \times \text{NFC}] + [5 \times \text{RPL}]$$

FLOOD AREA (SUB-BASIN) RANKING APPROACH (CONT.): PHASE II

Top 15 Sub-Basins FPSS Score and Rank

Sub-Basin Name	Sub-Basin Area (Acres)	Composite Scores	
		FPSS	Rank
U29-S	60.15	467.1	1
C100DN-1W	136.07	334.2	2
C100A-W3N	172.75	294.3	3
U35-S	42.44	286.7	4
PNL&RGL	86.22	265.7	5
C100D-N-1	247.42	239.2	6
C100A-E-2	33.88	202.4	7
C100A-5	29.60	198.4	8
B-Bay-SE	99.92	160.1	9
U32-S	20.67	159.3	10
C100A-E-1	90.74	157.7	11
C100DN-1E	102.48	153.9	12
U28-E	55.82	151.4	13
C2-S-9NE	204.78	142.8	14
C100A-W3S	177.99	131.4	15

Ranking derived from the Flood Protection Severity Score (FPSS)



**CONCEPTUAL PROJECT
DEVELOPMENT AND RANKING**

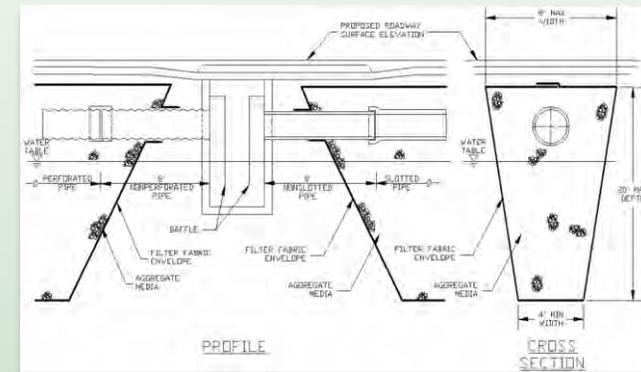
CONCEPTUAL PROJECT DEVELOPMENT AND RANKING: PHASE II

- **Criteria for development of Conceptual Projects:**
 - ✓ **Developed projects for the highest ranking 15 Sub-basins (highest FPSS score).**
 - ✓ **Developed projects based on flooding anticipated for mid-range of 2030 sea-level rise (5 inches of rise).**
 - ✓ **Considered key constraints in development of conceptual project development.**

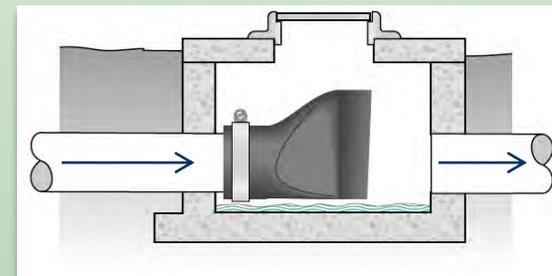
CONCEPTUAL PROJECT DEVELOPMENT AND RANKING (CONT.): PHASE II

➤ Flood protection best management practices evaluated and implemented to reduce FPSS:

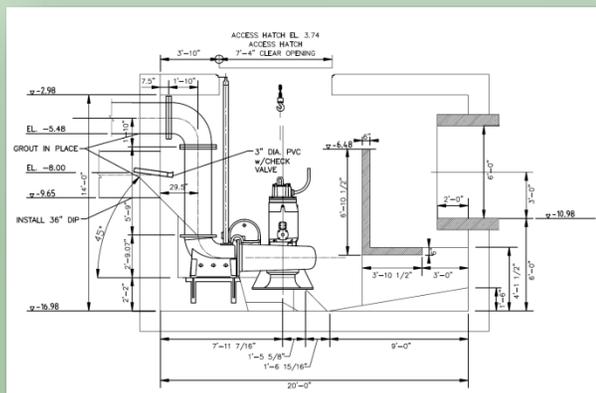
- ✓ Evaluated Canal Culvert Crossing Capacity
- ✓ Exfiltration Trenches
- ✓ Stormwater Pump Stations with Drainage Wells
- ✓ Control structures with outfalls to canals with backflow preventors
- ✓ Containment berms



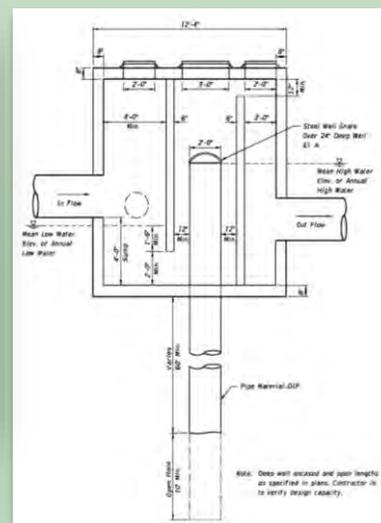
Exfiltration Trenches



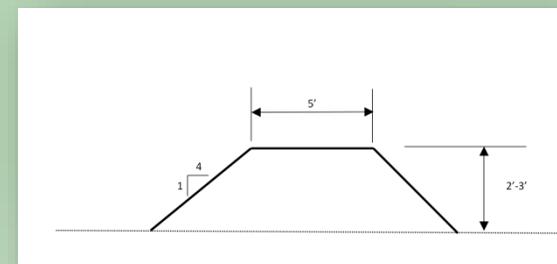
Outfalls with Backflow Preventors



Stormwater Pump Stations

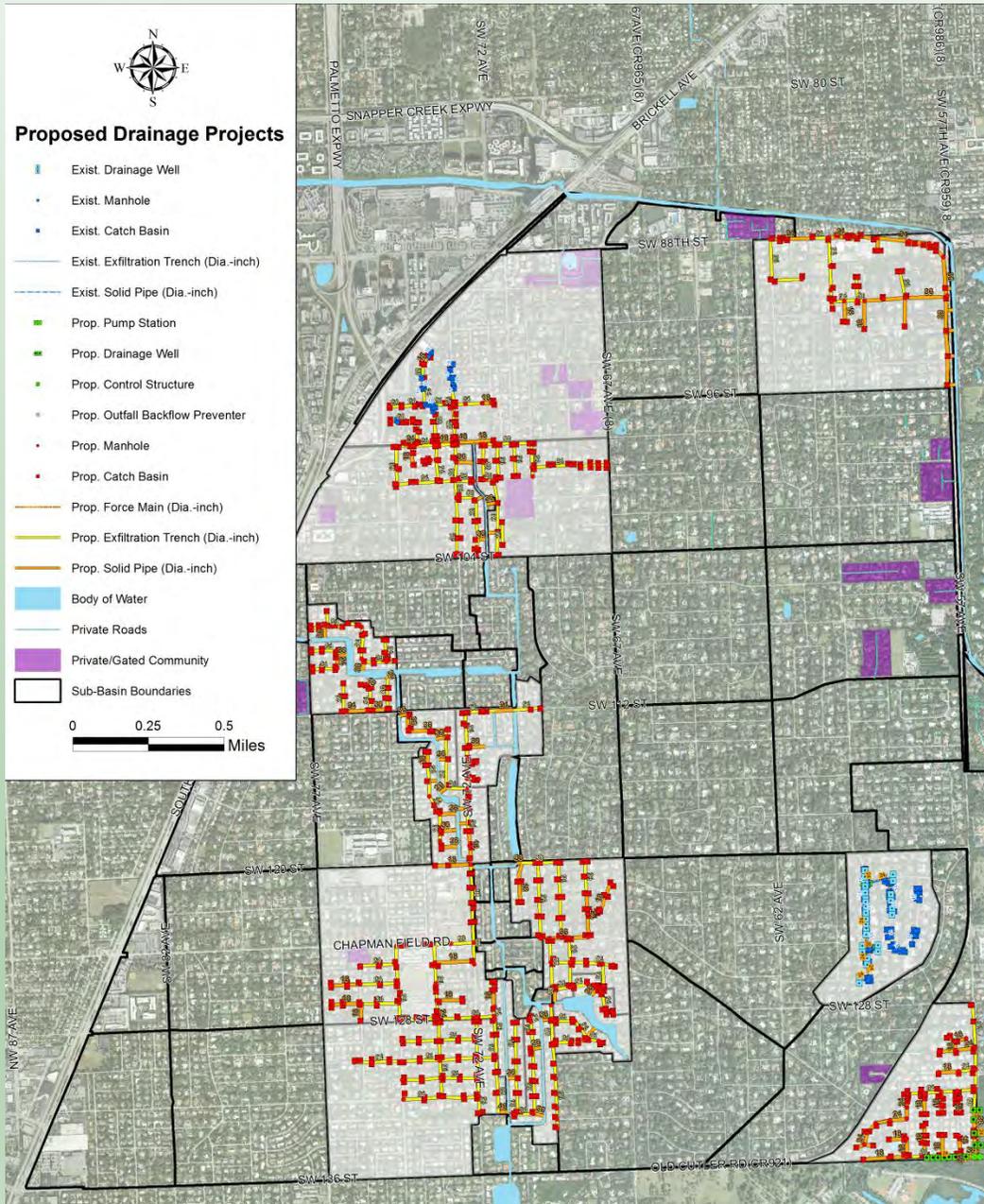


Drainage Wells



Containment Berms

CONCEPTUAL PROJECT DEVELOPMENT AND RANKING (CONT.): PHASE II

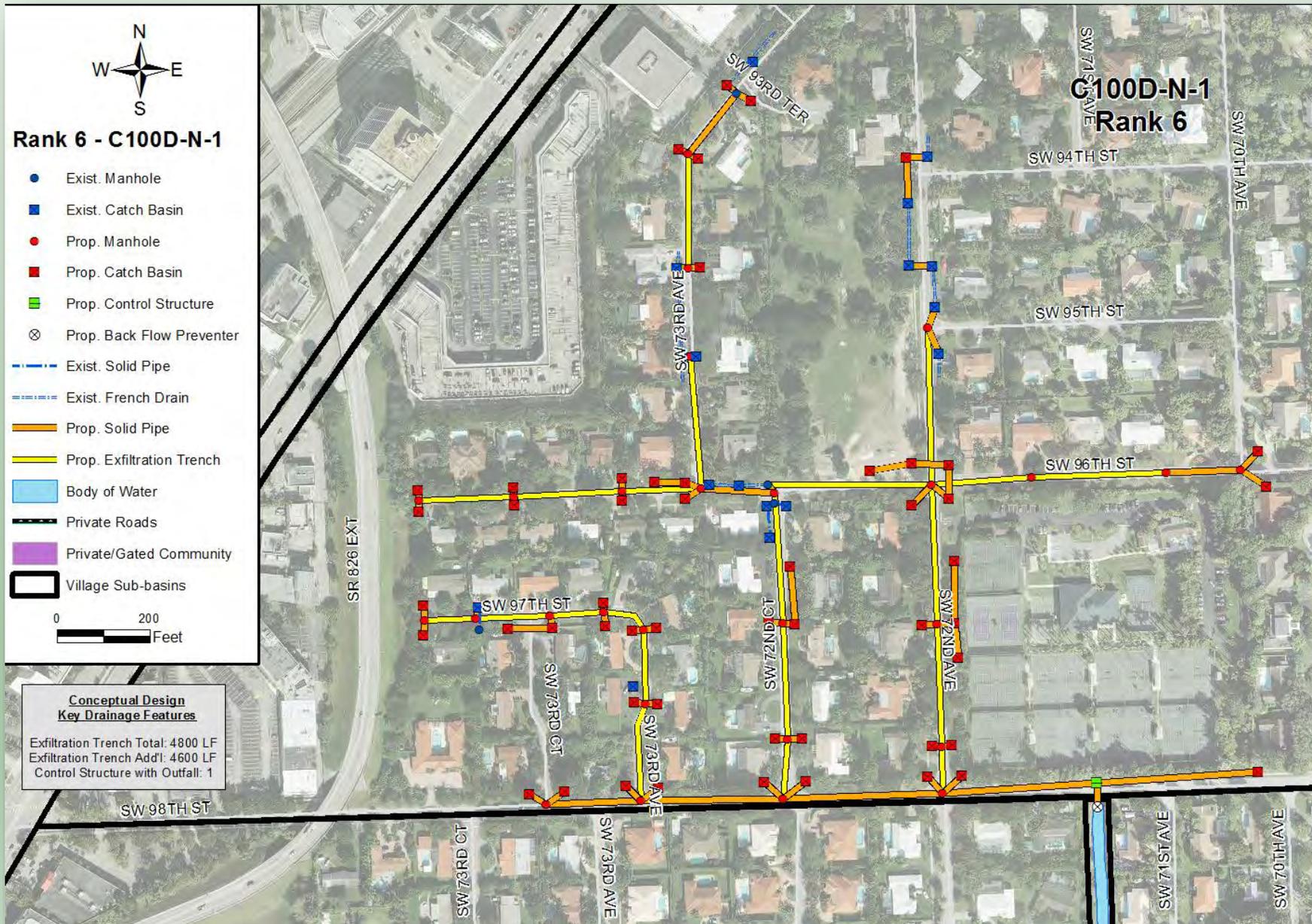


Conceptual Projects Village Wide

CONCEPTUAL PROJECT DEVELOPMENT AND RANKING (CONT.): PHASE II

Rank 6 Site Proposed Improvements

FPSS Score Before Projects 239.2 , FPSS After Projects 30



CONCEPTUAL PROJECT DEVELOPMENT AND RANKING (CONT.): PHASE II



**Rank 6: 100-year Flood Map
without Project
FPSS = 239**

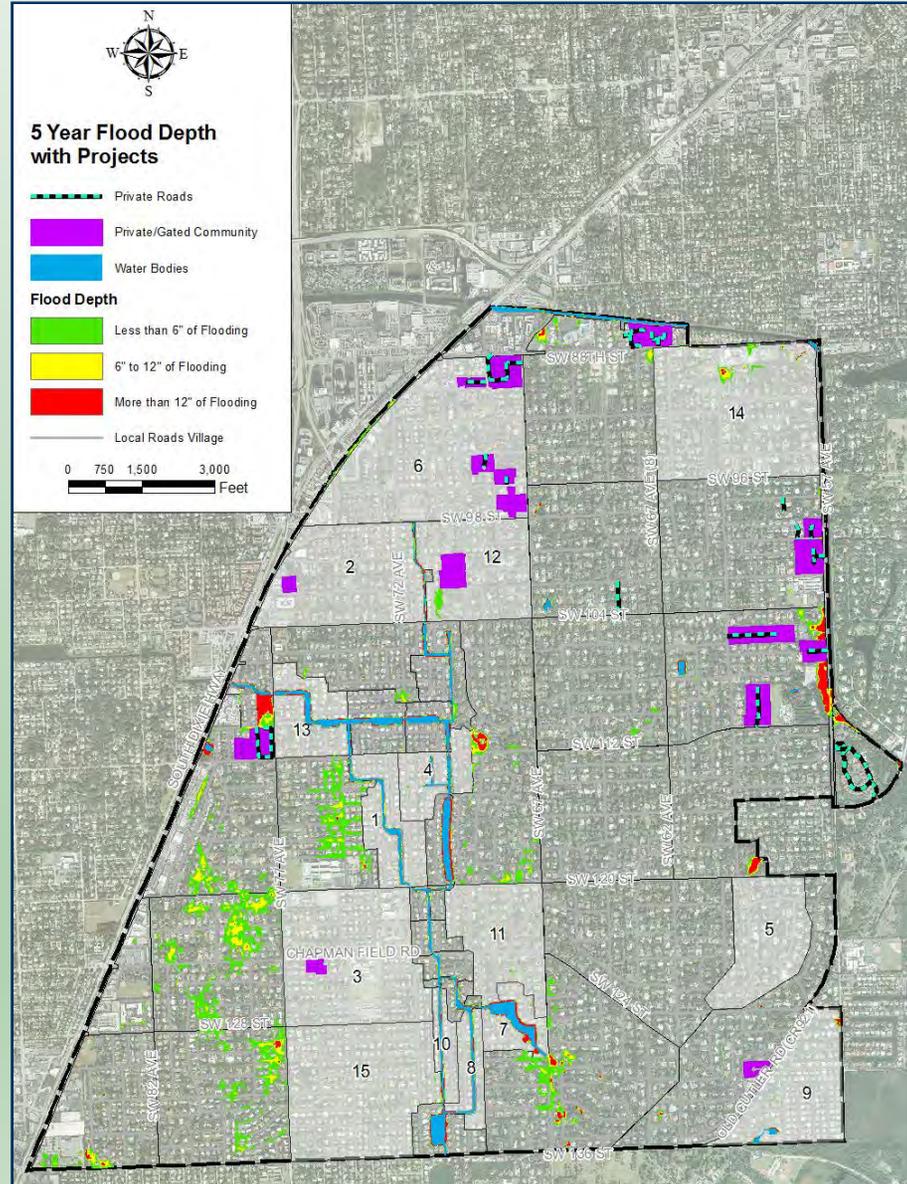
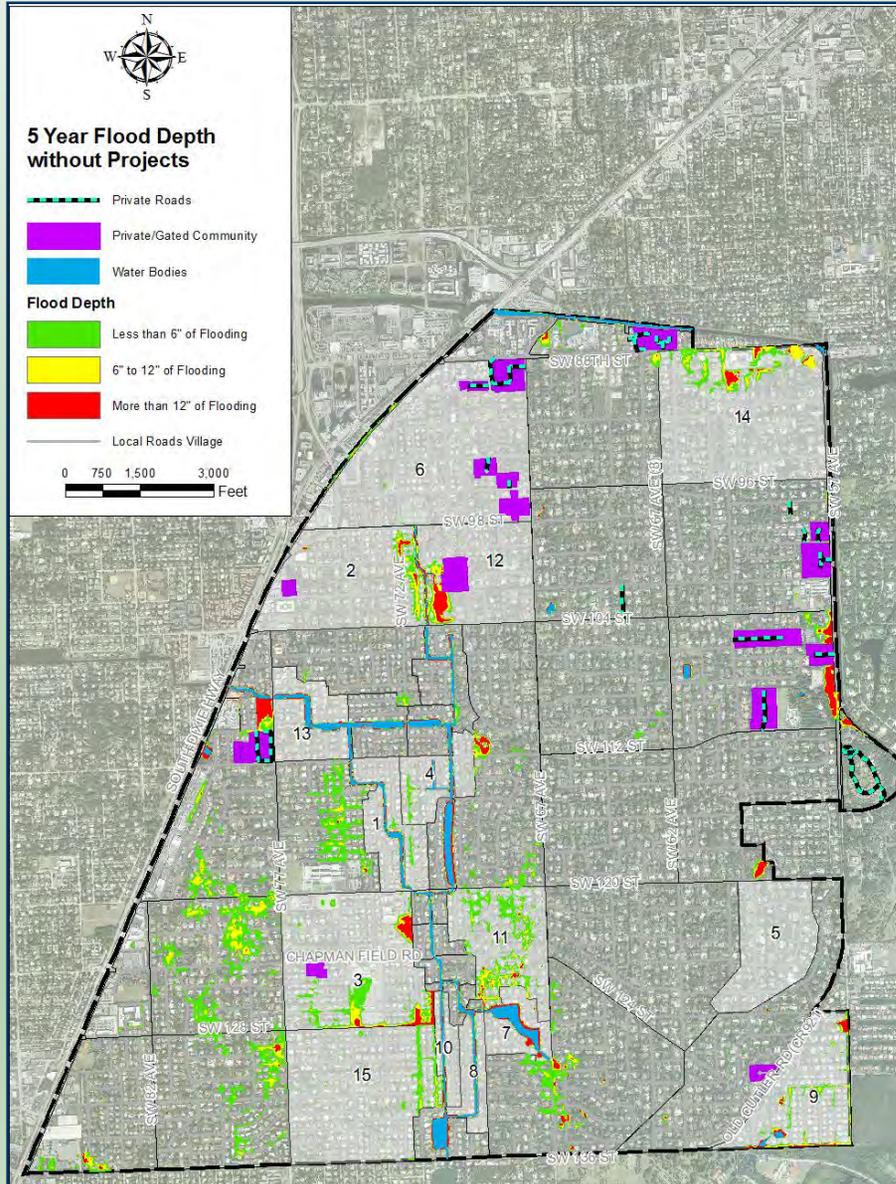


**Rank 6: 100-year Flood Map
with Project
FPSS = 30**

CONCEPTUAL PROJECT DEVELOPMENT AND RANKING (CONT.): PHASE II

5-year Flood Map without Projects

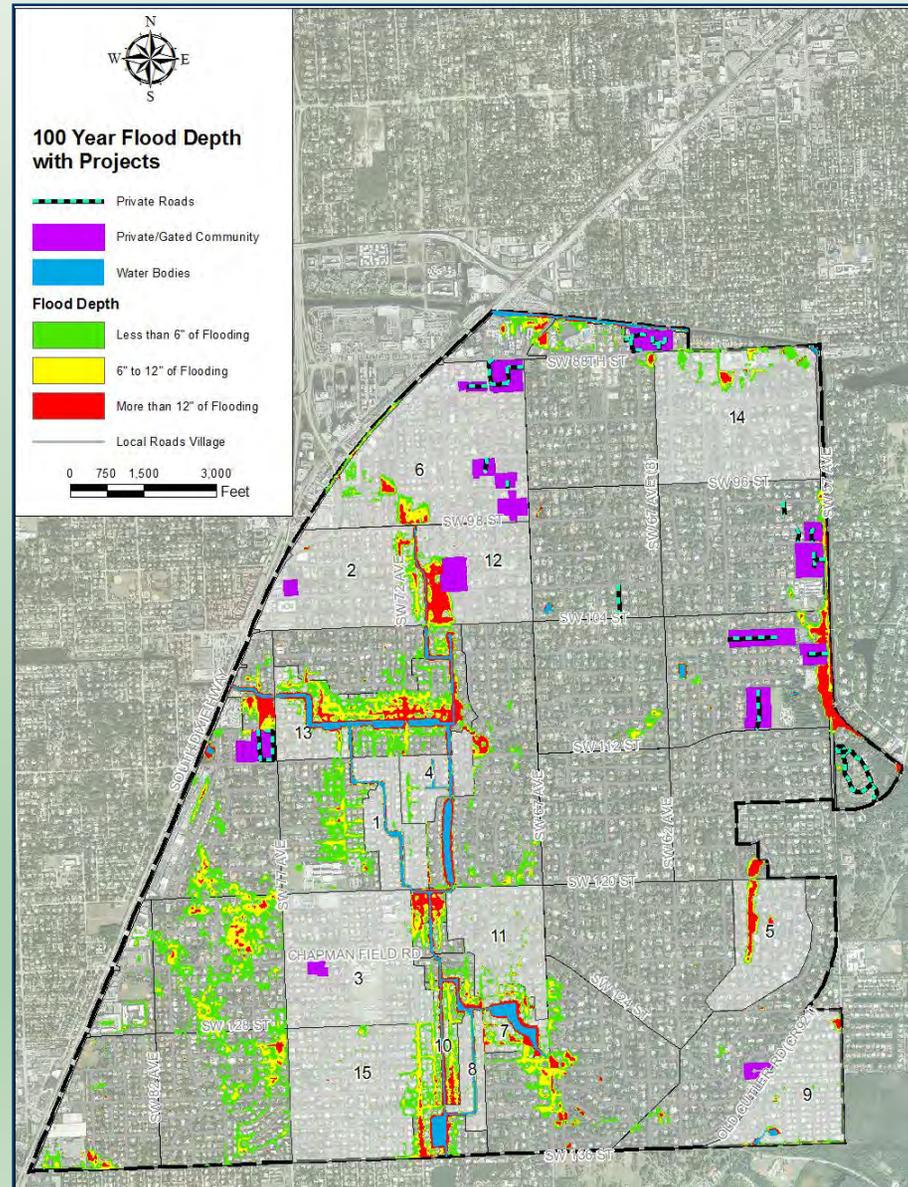
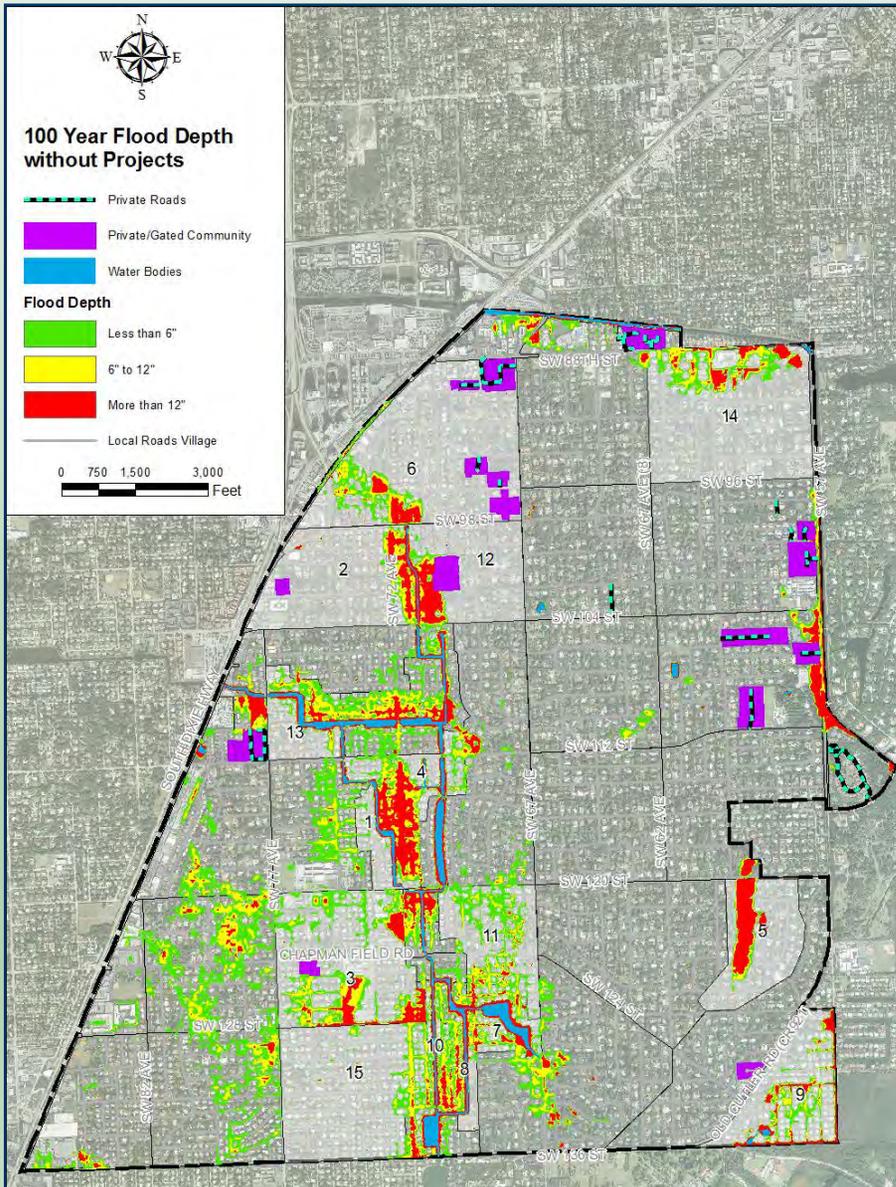
5-year Flood Map with Projects



CONCEPTUAL PROJECT DEVELOPMENT AND RANKING (CONT.): PHASE II

100-year Flood Map without Projects

100-year Flood Map with Projects



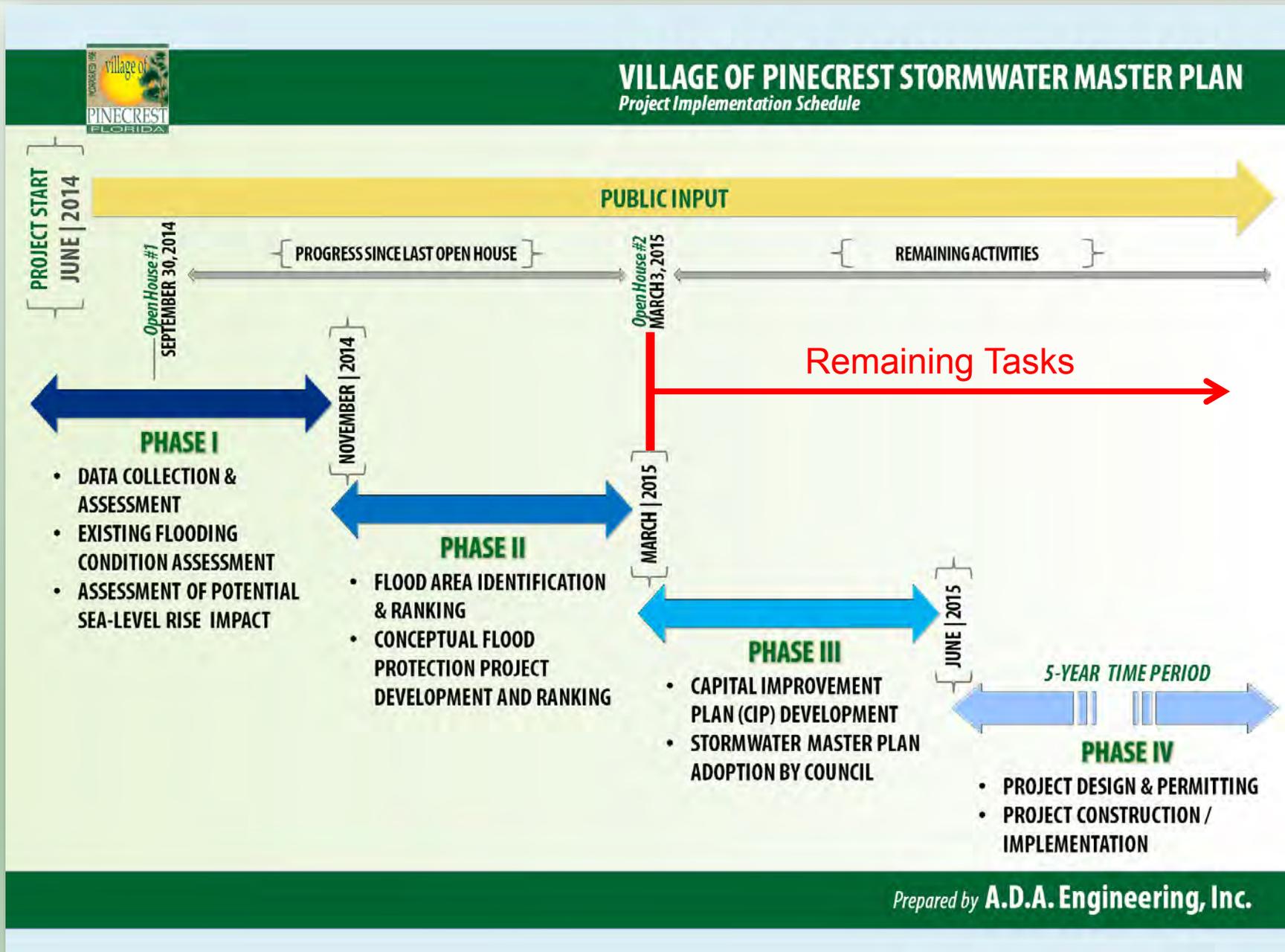
CONCEPTUAL PROJECT DEVELOPMENT AND RANKING (CONT.): PHASE II

FLOOD RANK	SUB-BASIN NAME	FPSS SCORE w/o IMPROVEMENTS	FPSS SCORE WITH IMPROVEMENTS	FPSS SCORE REDUCTION	COST ESTIMATE PER SUB-BASIN
1	U29-S	467.1	0.8	466.3	\$ 2,489,026.00
2	C100DN-1W	334.2	121.6	212.6	\$ 2,647,968.00
3	C100A-W3N	294.3	0.1	294.2	\$ 3,563,820.00
4	U35-S	286.7	1.2	285.5	\$ 1,044,751.00
5	PNL&RGL	265.7	109.6	156.1	\$ 2,361,101.00
6	C100D-N-1	239.2	30	209.2	\$ 2,465,120.00
7	C100A-E-2	202.4	152.7	49.7	\$ 1,150,958.00
8	C100A-5	198.4	1	197.4	\$ 1,779,038.00
9	B-Bay-SE	160.1	15.8	144.3	\$ 4,644,125.00
10	U32-S	159.3	129.4	29.9	\$ 627,709.00
11	C100A-E-1	157.7	15.1	142.6	\$ 3,565,564.00
12	C100DN-1E	153.9	131.8	22.1	\$ 2,823,005.00
13	U28-E	151.4	131.6	19.8	\$ 2,426,848.00
14	C2-S-9NE	142.8	35.3	107.5	\$ 3,196,833.00
15	C100A-W3S	131.4	122	9.4	\$ 3,926,657.00

➤ **Projects ranked based on cost effectiveness:**

Cost Effectiveness = Project Cost (\$) / Reduction in FPSS score

PINECREST STORMWATER MASTER PLAN DEVELOPMENT



Prepared by **A.D.A. Engineering, Inc.**