

North Port Big Slough Flood Reduction Study



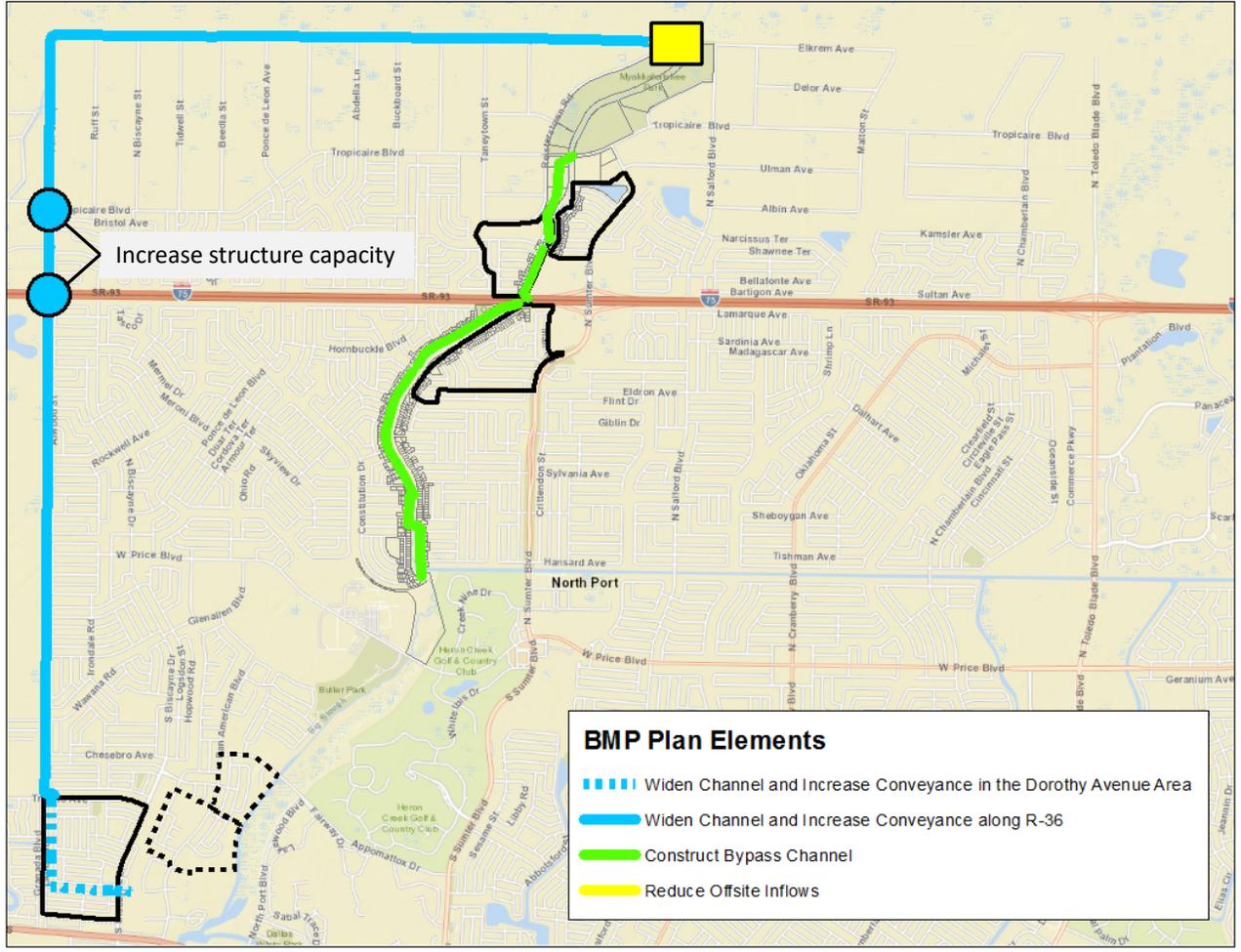
City of North Port
Commission Workshop

March 4, 2019

North Port Big Slough Flood Reduction Study

Recommended Plan – Plan Components

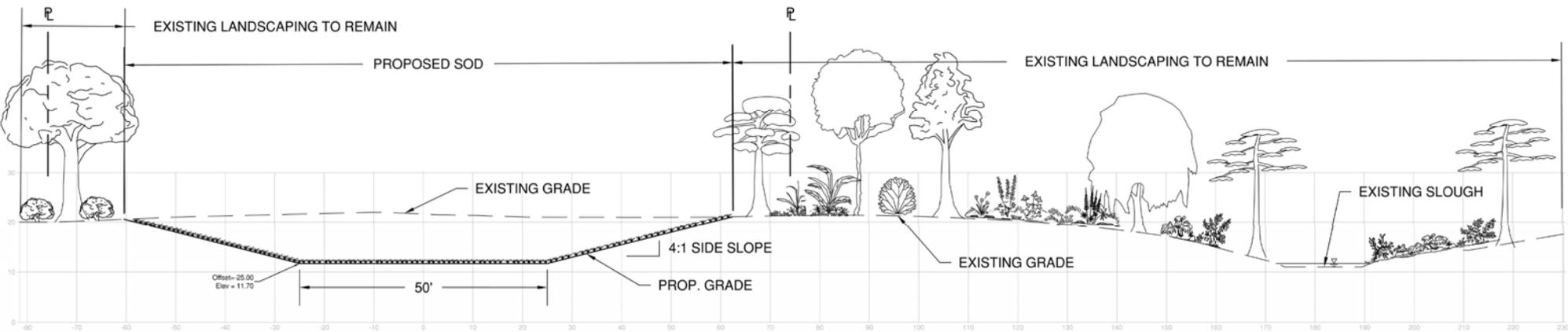
Project Components	105B
Existing Condition*	X
Dorothy (Single Box Culvert)	-
Dorothy (Triple Box Culvert)	X
R-36 Improvements	X
Bypass (flowway, n = 0.040)	X
Bypass (wetland, n = 0.150)	-
Reduce Northern Inflows	X
Other Planned Improvements	-



* Existing Condition model updated from 2012 version

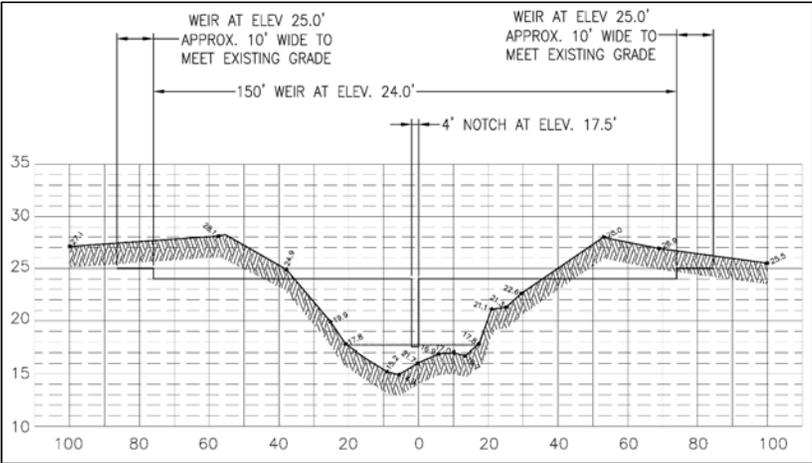
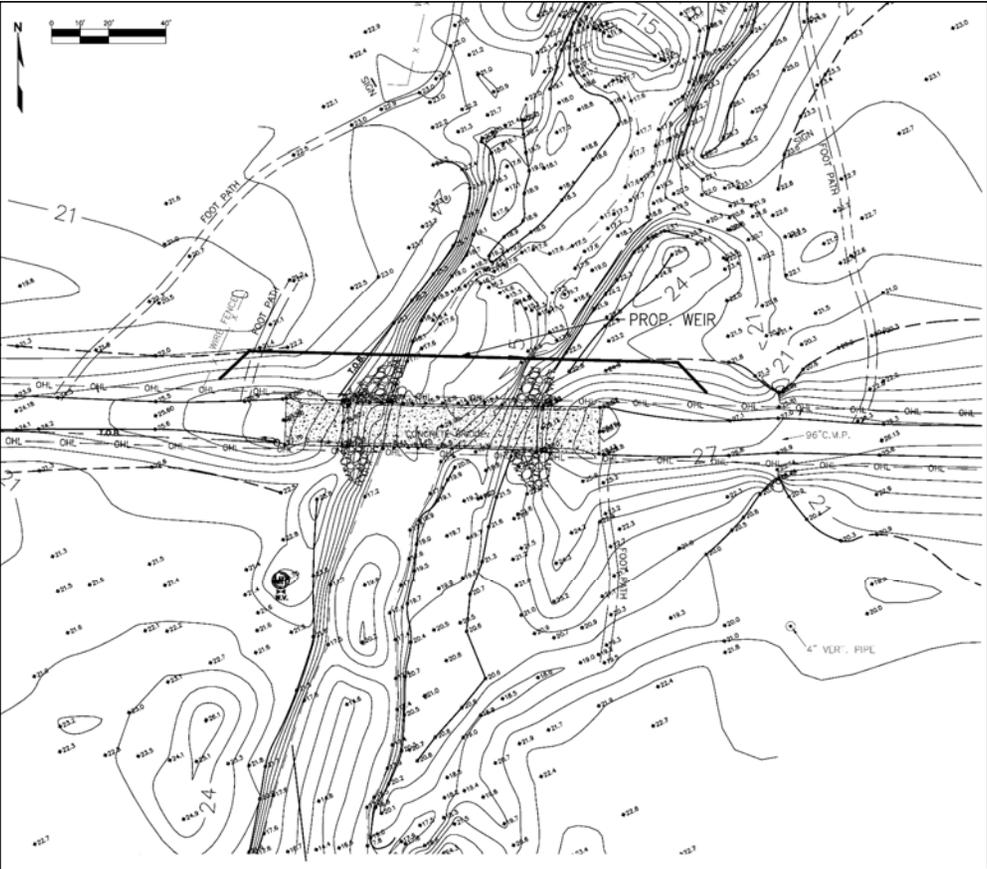
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Local/Regional Improvements (e.g., Bypass Construction)



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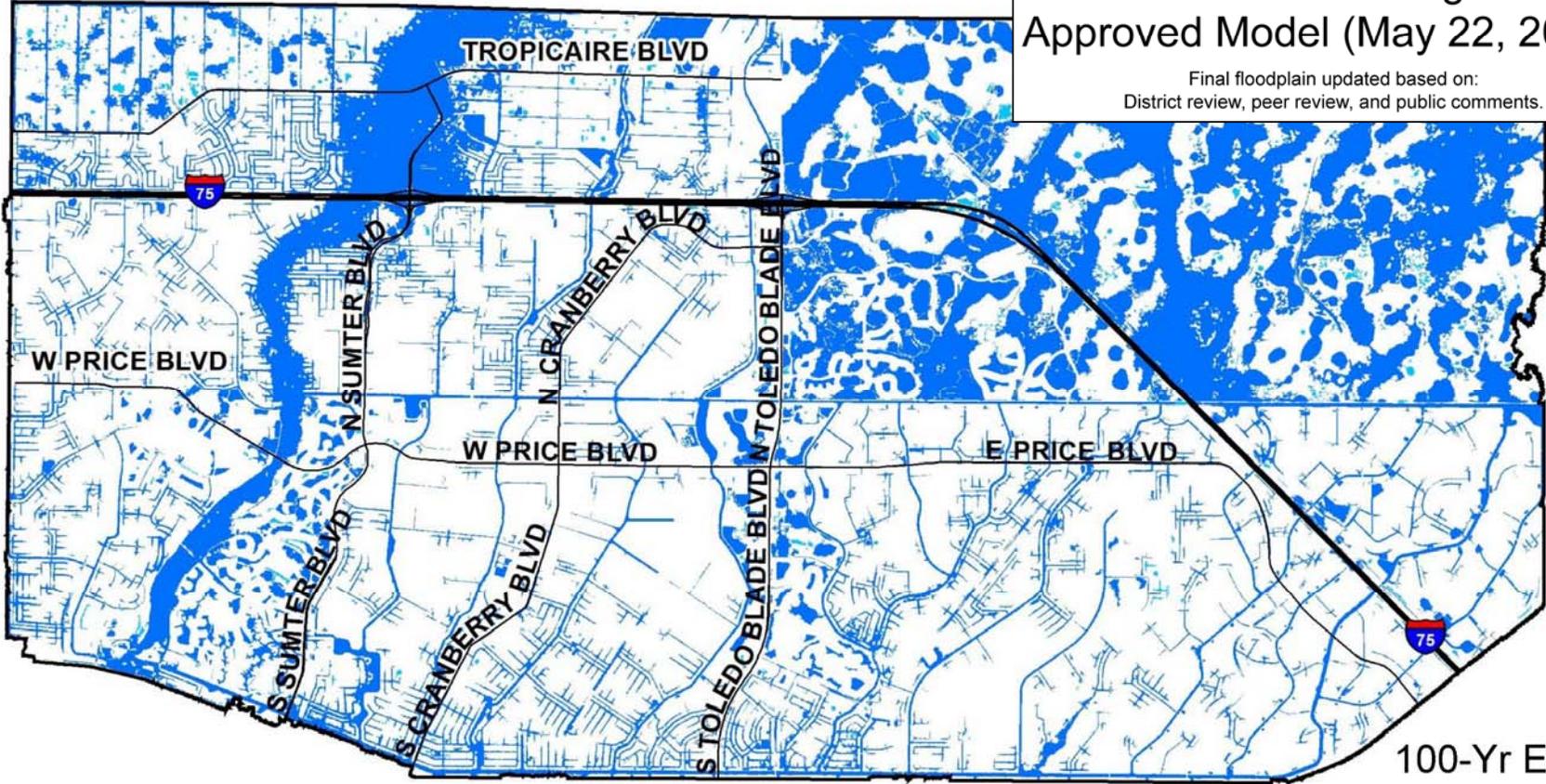
Regional Improvements (e.g., Reduce Offsite Inflows at FPL Easement North of City)



North Port Big Slough Flood Reduction Study

Project Plan – Using City of North Port’s Existing Available Model

SWFWMD Governing Board
Approved Model (May 22, 2012)
Final floodplain updated based on:
District review, peer review, and public comments.



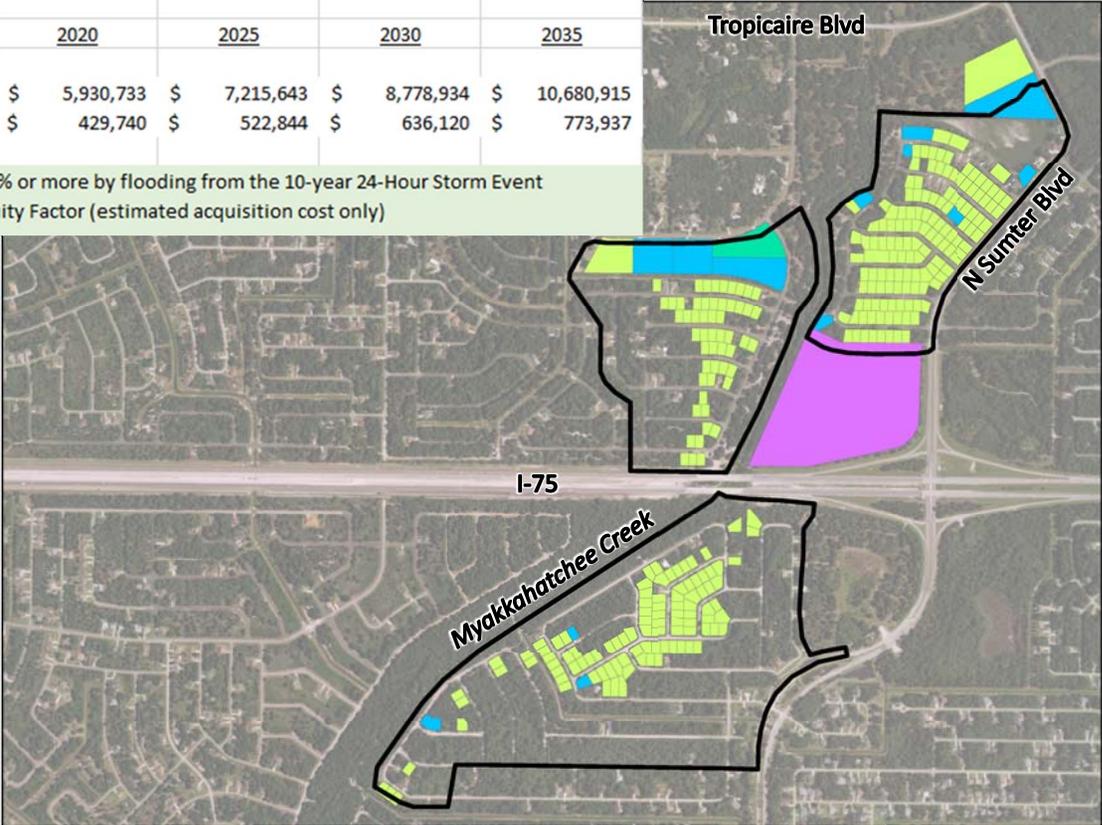
100-Yr Event

North Port Big Slough Flood Reduction Study

Project Alternative: Acquisition Costs

	Preliminary Estimate of Acquisition Cost (Based on Sarasota County Property Appraiser 2017, projected at 4% inflation)				
	2017	2020	2025	2030	2035
Estimated Property Value*	\$ 5,272,400	\$ 5,930,733	\$ 7,215,643	\$ 8,778,934	\$ 10,680,915
Estimated Annualized Cost**	\$ 382,037	\$ 429,740	\$ 522,844	\$ 636,120	\$ 773,937

* Combined "Just Value" of properties inundated 50% or more by flooding from the 10-year 24-Hour Storm Event
 ** Cost annualized over 50 years at 7%, 13.8 PV Annuity Factor (estimated acquisition cost only)



North Port Big Slough Flood Reduction Study

Engineer’s Opinion of Probable Cost

	Engineer's Estimate of Probable Construction Cost (Based on RS Means 2017, with costs projected at 4% inflation)				
	<u>2017</u>	<u>2020</u>	<u>2025</u>	<u>2030</u>	<u>2035</u>
Dorothy (Triple Box Culvert)	\$ 5,628,495	\$ 6,331,291	\$ 7,702,984	\$ 9,371,858	\$ 11,402,298
R-36 Improvements	\$ 15,379,020	\$ 17,299,306	\$ 21,047,251	\$ 25,607,199	\$ 31,155,073
Bypass (flowway, n = 0.040)	\$ 17,121,876	\$ 19,259,782	\$ 23,432,470	\$ 28,509,182	\$ 34,685,779
Reduce Northern Inflows	\$ 2,575,105	\$ 2,896,643	\$ 3,524,209	\$ 4,287,739	\$ 5,216,690
Estimated Combined Cost	\$ 40,704,496	\$ 45,787,022	\$ 55,706,913	\$ 67,775,978	\$ 82,459,840
Estimated Annualized Cost*	\$ 2,949,442	\$ 3,317,721	\$ 4,036,515	\$ 4,911,037	\$ 5,975,028

** Combined construction cost annualized over 50 years at 7%, 13.8 PV Annuity Factor (capital cost only, excludes O&M)*

RS Means Heavy Construction Costs, adjusted to Ft Myers/Sarasota County area, for engineering design, permitting and construction with 30% contingency.

North Port Big Slough Flood Reduction Study

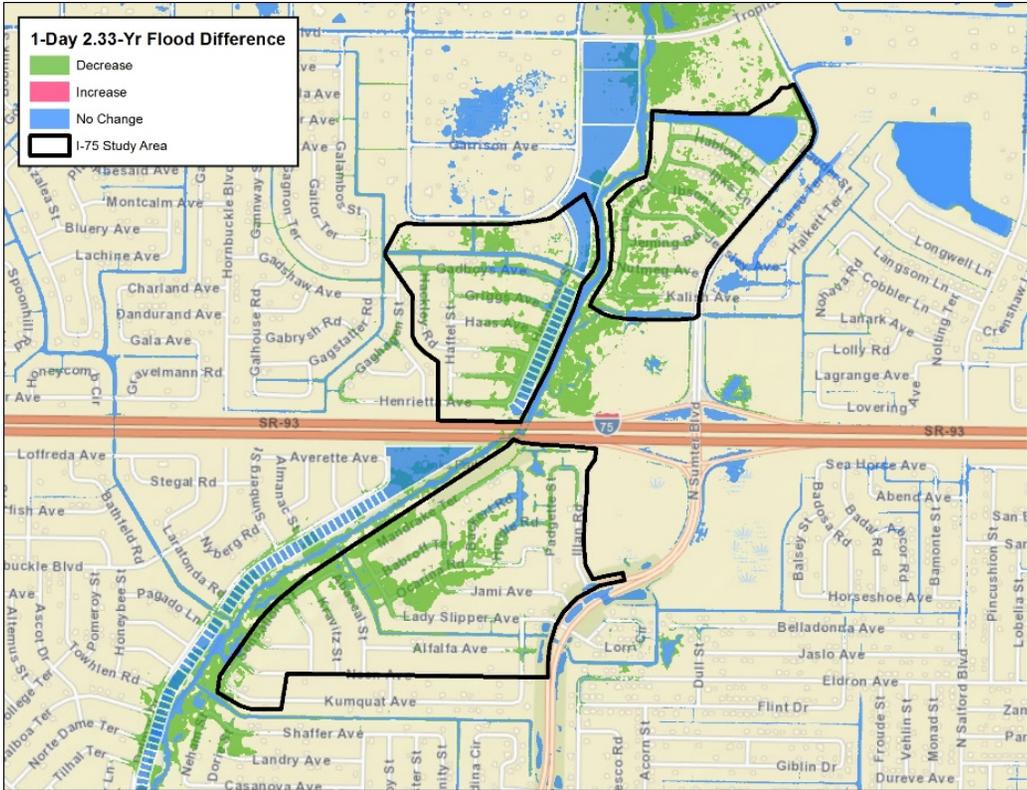
Flood Area Reduction and Project Benefits

	Flood Reduction (acres)	Road Flood Reduction (miles)	Parcels Reduction (centroid)
2.33-year	244	7.8	234
5-year	359	12.9	405
10-year	460	18.3	538
25-year	495	20.7	542
50-year	518	21.1	562
100-year	557	24.5	558

Expected annual benefits were based on simulation results (reduction in predicted flood inundation) for storm events with probability of recurrence from 2.33 to 100-years.

BCR is the project’s annualized Benefit to Cost Ratio:

- Plan annualized benefit = \$1,977,742 with BCR = 0.67
- Ph.1 annualized benefit = \$1,842,132 with BCR = 1.38



Future enhancements (e.g., cost reduction, greater inflow restriction, diversion to Deer Prairie) may increase flood reduction performance and BCR of Full Plan.

North Port Big Slough Flood Reduction Study

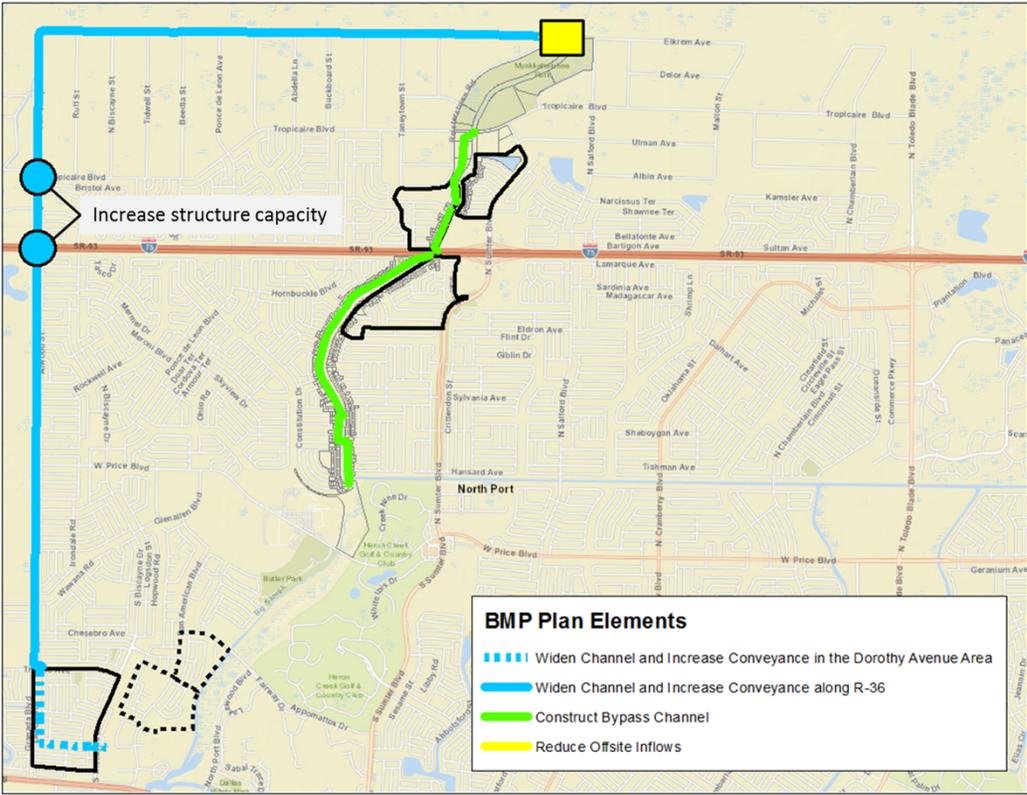
Recommendation: Apply for SWERP Conceptual Approval (Full Plan and Phase I Implementation with CFI Funding Request)

Full Plan

Project Components		105B
Existing Condition*		x
Dorothy (Single Box Culvert)		-
Dorothy (Triple Box Culvert)		x
R-36 Improvements		x
Bypass (flowway, n = 0.040)		x
Bypass (wetland, n = 0.150)		-
Reduce Northern Inflows		x
Other Planned Improvements		-
Estimated Combined Cost		\$ 40,704,496
Estimated Annualized Cost		\$ 2,949,442
Road Flood Reduction (miles)	2.33-year	7.8
	5-year	12.9
	10-year	18.3
	25-year	20.7
	50-year	21.1
Parcels Reduction (touch)	2.33-year	863
	5-year	1138
	10-year	1161
	25-year	1161
	50-year	1207
Parcels Reduction (centroid)	2.33-year	234
	5-year	405
	10-year	538
	25-year	542
	50-year	562
100-year	558	
Estimated Annualized Benefit		\$ 1,977,742
Est. Benefit/Cost Ratio (BCR)		0.67

Phase I

Project Components		106
Existing Condition*		x
Dorothy (Single Box Culvert)		x
Dorothy (Triple Box Culvert)		-
R-36 Improvements		-
Bypass (flowway, n = 0.040)		x
Bypass (wetland, n = 0.150)		-
Reduce Northern Inflows		-
Other Planned Improvements		-
Estimated Combined Cost		\$ 18,420,876
Estimated Annualized Cost		\$ 1,334,774
Road Flood Reduction (miles)	2.33-year	7.5
	5-year	10.8
	10-year	14.8
	25-year	15.9
	50-year	16.7
Parcels Reduction (touch)	2.33-year	811
	5-year	968
	10-year	996
	25-year	984
	50-year	1012
Parcels Reduction (centroid)	2.33-year	230
	5-year	398
	10-year	505
	25-year	503
	50-year	480
100-year	482	
Estimated Annualized Benefit		\$ 1,842,132
Est. Benefit/Cost Ratio (BCR)		1.38



North Port Big Slough Flood Reduction Study

Checklist:

Surface conditions:

- site topography – need future site-specific survey
- wetlands – need future delineation of wetland boundaries to evaluate impacts and mitigation
- wildlife – need future study
- historical/archaeological – need future study
- minimum flows and levels – need future study
- water quality – need future study

Subsurface conditions:

- geological – need site-specific soils information
- geotechnical – need to support engineering design of proposed features
- hydrogeological – need to support final configuration of proposed improvements

Other:

- Offsite Conditions and Impacts (additional modeling and agency coordination required)
 - ability to restrict inflows and store stormwater for attenuation north of City
 - ability to increase outflow to Deer Prairie Slough

Performance:

- Pre/Post Peak Stage – preliminary, to be updated with each Individual permit application
- Pre/Post Volume – not currently required, open basin discharges to tidal waters

North Port Big Slough Flood Reduction Study

Related Documents: Stormwater Management Plan Report, Conceptual Drawings, and Checklist & Considerations



City of North Port
 Professional Engineering Services for the
 Big Slough Flood Reduction Study
 Agreement #2016-48
 Department of Public Works
STORMWATER MANAGEMENT PLAN

 February 2019
 DeLoach Engineering Science, PLLC
 1845 Ivanhoe Road | Orlando, FL 32804
 DeLoach Engineering Science
 water resources and civil engineering

CONCEPTUAL DRAWINGS
 FOR THE
BIG SLOUGH FLOOD REDUCTION STUDY

 PREPARED FOR
 THE CITY OF NORTH PORT
 PREPARED BY
 DeLoach Engineering Science
 PROJECT NO. 16-00000-00
 JANUARY 2019
 CONCEPTUAL PLAN - NOT FOR CONSTRUCTION
 CITY OF NORTH PORT
 BIG SLOUGH
 FLOOD REDUCTION STUDY
 PLAN AND PROFILE
 CONCEPTUAL PLAN - NOT FOR CONSTRUCTION
 CITY OF NORTH PORT
 BIG SLOUGH
 FLOOD REDUCTION STUDY
 R36 CROSS SECTIONS

DELOACH  SWMP & SWRP CHECKLIST AND CONSIDERATIONS
**Checklist and Considerations Regarding City of North Port
 (Big Slough Stormwater Management Plan) and
 Application for a Stormwater Management Resource Permit (SWMRP)**
 The City of North Port intends to apply for a Subsurface Environmental Resource Permit (SWERP) from the
 South Florida Water Management District, pending "Conceptual Approval" of the permit. Completed
 items from the stormwater management plan (SWMP) items that the District's conceptual approval
 of the proposed drainage improvements will allow the City to determine and implement the work, meet
 a permit condition to maintain with the large size and expected cost of the SWMRP, while maintaining
 a high level of compliance with the large size and expected cost of the SWMRP.

DELOACH  SWMP & SWRP CHECKLIST AND CONSIDERATIONS
CHECKLIST OF ITEMS TO BE ADDRESSED IN FUTURE PERMIT APPLICATION SUBMITTALS

Surface conditions:
 site topography – need future site-specific survey
 wetlands – need future delineation of wetland boundaries to evaluate impacts and mitigation
 wildlife – need future study
 historical/archaeological – need future study
 minimum flows and levels – need future study
 water quality – need future study

Subsurface conditions:
 geological – need site-specific soils information
 geotechnical – need to support engineering design of proposed features
 hydrogeological – need to support final configuration of proposed improvements

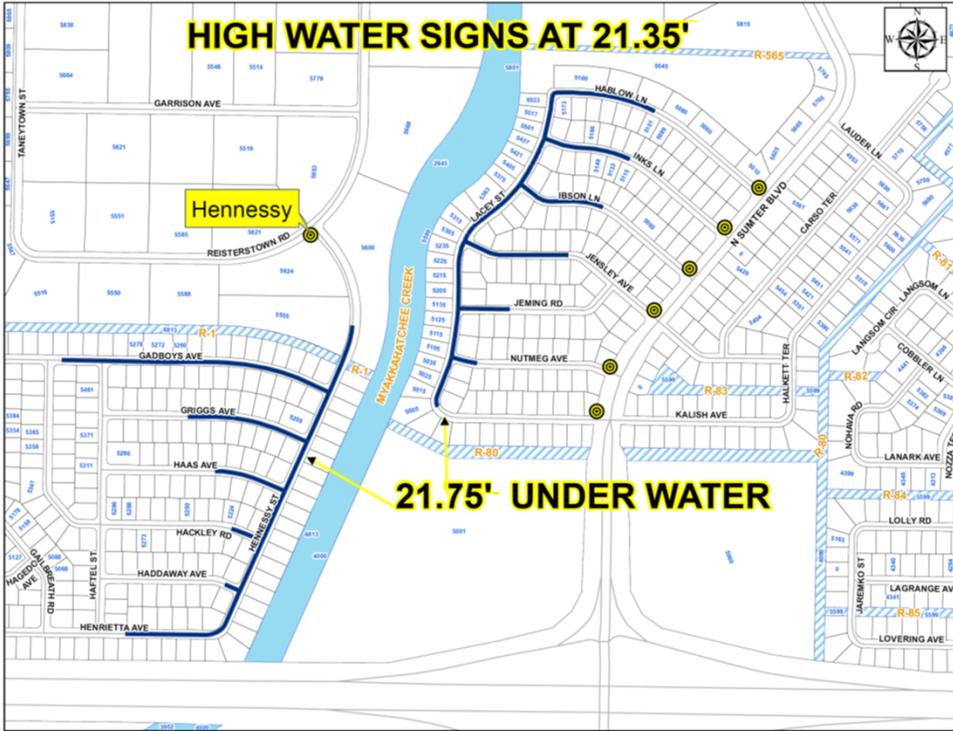
Other:
 Offsite Conditions and Impacts (additional modeling and agency coordination required)
 ability to restrict inflows and store stormwater for attenuation north of City
 ability to increase outflow to Deer Prairie Slough

Performance:
 Pre/Post Peak Stage – preliminary, to be updated with each individual permit application
 Pre/Post Volume – not currently required, open basin discharges to tidal waters

City of North Port - Big Slough Flood Reduction Study 6

Flooding Before Creek Clearing Project

(Tropicaire Blvd USGS Gage At 21.35' And At 21.75')

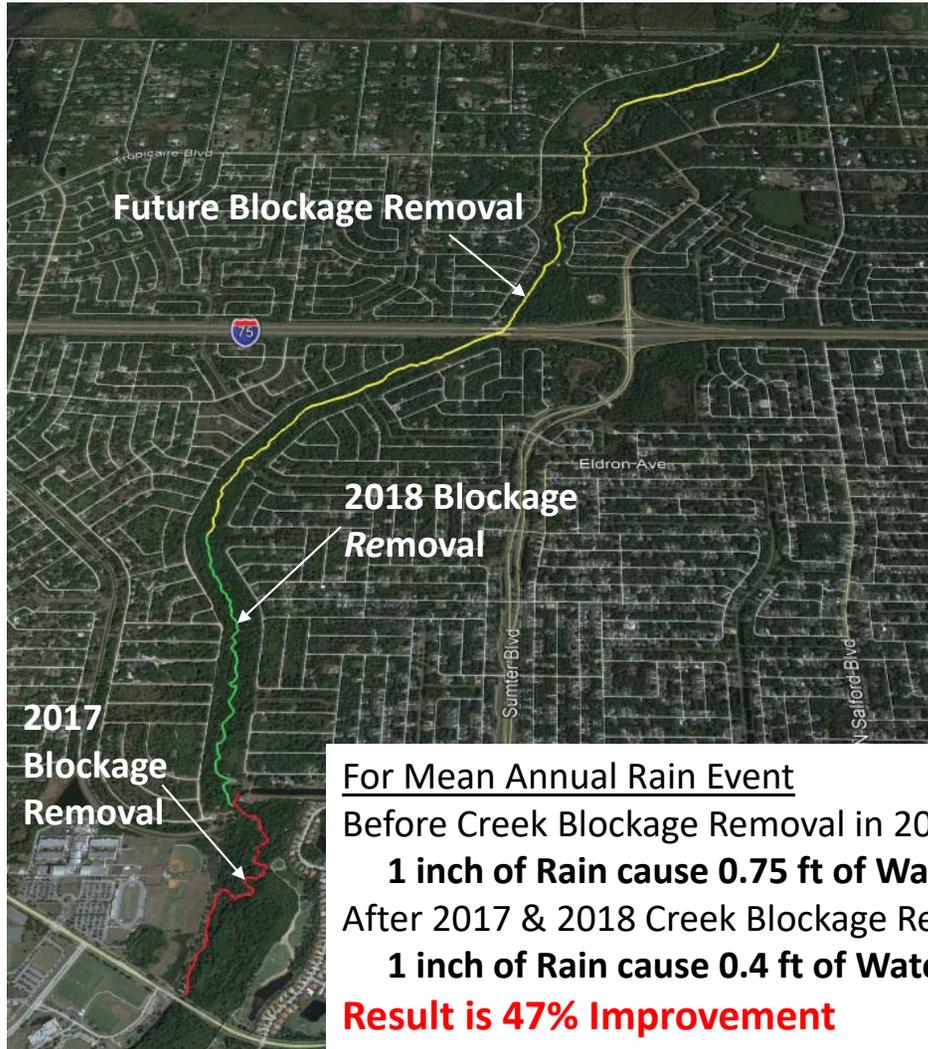


Street Flooding Near Myakkahatchee Creek
North of I-75



Street Flooding Near Myakkahatchee Creek
South of I-75

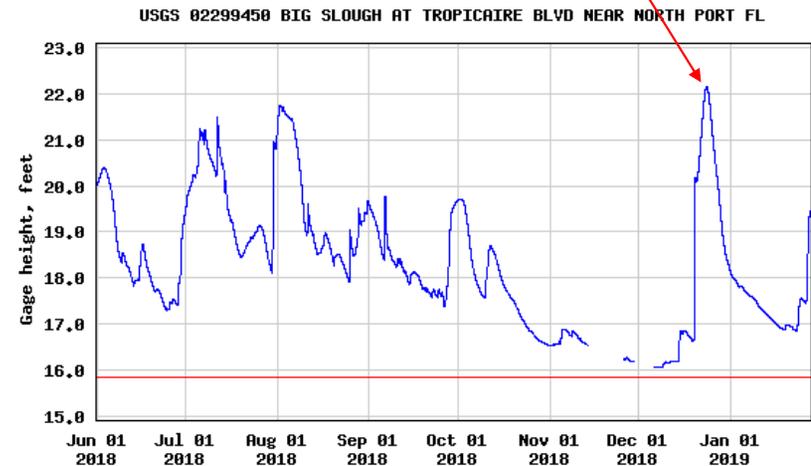
After 2017 - 2018 Creek Blockage Removal



**No street flooding after
 2017 - 2018 project
 Tropicaire Blvd USGS gage at 22.15'**

Gage height, feet

Most recent instantaneous value: 19.45 01-28-2019 12:00 EST



Cost of Myakkahatchee Creek Blockage Removal

Year	Area of Creek	Miles of Creek Blockage Removed	Activity	Cost
2017	Price Blvd to Snover Waterway	0.76	Actual PW Staff time and Equipment	\$77,845
2018	Snover Waterway to R-88	0.97	Actual PW Staff time and Equipment	\$42,156
Total		1.73		\$120,001
Future	Price Blvd to North City Boundary		Cultural and Archeological Survey	Est \$80,000
Future	Price Blvd to North City Boundary		Wildlife and Wetland Survey	Est \$100,000
Future	R-88 to North City Boundary	3.19	Estimated PW Staff time and Equipment	Est \$50,000
Add'l Cost				\$230,000

Staff Recommendation

- 1. Submit Conceptual Environmental Resource Permit Application to SWFWMD for Recommended Plan**
- 2. Debris/Vegetation Blockage removal project**
 - a. Conduct wildlife, wetland, cultural and archeological surveys along the Myakkahatchee Creek corridor
 - b. Define creek access and obtain SWFWMD approval
 - c. Continue removal of blockages along rest of the Myakkahatchee Creek
 - d. Maintain creek access to continue annual inspection and maintenance efforts to keep creek clear of blockages
 - e. Continue removing debris/vegetation blockage in other existing City conveyance systems
- 3. Evaluate localized drainage improvements in the Dorothy area upstream of the R-ditches**
 1. Retain consultant to survey area
 2. Replaced inverted driveways and design improvements to the drainage conveyance system.
 3. Pursue grant funding
- 4. Flooded Property Acquisition (based on property inundated 50% or more by flooding from the 10-year 24-hour Storm event)**
 - a. Research available grant funding
- 5. Continue reaching out to the SWFWMD and Sarasota County on the Inflow Reduction Option**

Time Line

Time Period	Activity	Entity
April 2019	Submit Conceptual ERP to SWFWMD	DES Consultant
May to December, 2019	Respond to two requests for additional information (RAI) with SWFWMD	DES Consultant
FY 2019 to 2020	Conduct wildlife, wetland and archeological surveys along the Myakkahatchee Creek corridor	Retain Consultant
FY2020 to 2024	Clear blockages in the Myakkahatchee Creek	Public Works Operations
FY 2020 to 2022	Evaluate, design and permit localized drainage improvements in Dorothy area upstream of the R-ditches	Retain Consultant
FY 2023 to 2025	Construct improvements in Dorothy area	Retain Contractor
FY 2020 to Future	Pursue Flooded Property Acquisition	City Staff
FY 2025 to Future	Evaluate whether additional flood reduction is still needed - implement DES recommended plan	Public Works