



REPORT OF FINDINGS FOR

Holley by the Sea DRAINAGE IMPROVEMENTS PROJECT

Prepared For:

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I. EXECUTIVE SUMMARY



I. EXECUTIVE SUMMARY

The Holley by the Sea Drainage Improvements Project was commissioned by Santa Rosa County in order to complete watershed studies, an alternatives and feasibility analysis, and development of design work needed to accomplish drainage improvements within the Holley by the Sea community.

The Holley by the Sea project area is largely residential in nature being comprised of the Holley by the Sea subdivision as well as numerous smaller subdivisions mostly along the northern and southern extents. The Holley by the Sea subdivision was platted and constructed when land development regulations for drainage were minimal. Roads were typically constructed low in elevation with road side swales. Residential development was slow to develop. Even as of the late 1990's homes within the area were infrequent. However over the last 10 – 15 years residential development has filled out the area such that developable land is largely built out.

The Holley by the Sea area is known to experience flooding with moderate to heavy rainfall and in some locations with minor rainfall. Some of the conditions causing this include flat topography and high groundwater table throughout. Much of the undeveloped area is classified as wetland, holding water for most or all of the year. Stormwater from these areas must drain through the project area during and after rainfall. This condition with the compounding flat topography causes roads to flood throughout the development, with some becoming impassable. There are also homes that report flooding in the heavier events.

In order to assess the drainage within Holley by the Sea, a hydraulic and hydrologic model was developed. The model relies on public information, resident responses, and topographic data. It represents the existing conditions within Holley by the Sea and allows evaluation of drainage

for various rainfall events. Results of the modeling fit well with the information known about the area drainage. For the 100-year storm event, flooding is shown throughout the area. In particular, the north-south roads carrying runoff from the wetlands to the outfall appear to have the greatest extent of flooding.

With information from the existing conditions model, conceptual improvements were developed to route stormwater more efficiently through the system in an attempt to reduce home, yard, and street flooding. -. These projects are intended to become the foundation of the drainage system, providing the most efficient drainage paths available. These will then need to be expanded with smaller projects to address local drainage issues.

Each of the conceptual projects were scored and given an estimated cost. The score is a simple comparison of effectiveness with higher numbers indicating greater benefit. This comparison is intended to provide a tool to aid in stormwater project programming.

A summary of the scored projects can be found on the adjacent page.

Descriptions of the projects are given later in this report. A sum of the concepts presented is approximately \$86M.

Holley by the Sea Drainage Improvement Program

Conceptual Improvement List

Project:	Cost:	Final Score
TKB 1: Basswood Drive Drainage Improvements	\$ 1,100,000	9
TKB 2: Glassport Street Drainage Improvements	\$ 325,000	3
TKB 3: Tom King Bayou East Branch Channel Restoration	\$ 6,700,000	17
TKB 4: Crescent Road Relief Pipeline	\$ 5,850,000	1
TKB 5: Freedom Ct South Channel Improvements	\$ 2,700,000	3
TKB 6: Freedom Ct North Channel Improvements	\$ 1,950,000	4
TKB 7: Tom King Bayou Middle Branch, North Channel Restoration	\$ 3,500,000	14
TKB 8: Tom King Bayou Middle Branch, South Channel Restoration	\$ 5,800,000	4
TKB 9: Tom King Bayou West Branch Channel Restoration	\$ 3,000,000	10
TKB 10: Sherwood Dr. Drainage Improvements	\$ 800,000	7
TKB 11: Camden Dr. Outfall Improvements	\$ 1,000,000	5
TKB 12: Federal Street Drainage Pipe	\$ 875,000	0
TKB 13: Citrus Dr. Drainage System Improvements	\$ 2,265,000	6
TKB 14: Broadmoor St. Outfall	\$ 2,300,000	2
TKB 15: Sunrise Drive Drainage Improvements	\$ 1,300,000	3
TKB 16: Sunrise Drive Entrance Improvements	\$ 530,000	1
TKB 17: Banyan Drive Drainage Area Improvements	\$ 490,000	5
EDN 1: West Ditch Improvements	\$ 800,000	3
EDN 2: Admiral St. N Drainage Improvements	\$ 650,000	2
EDN 3: Edgewood Dr. Drainage Improvements	\$ 630,000	1
EDN 4: Bluefish Rd Area Drainage System	\$ 1,650,000	2
EDN 5: East Bay Boulevard Culvert Upgrades	\$ 250,000	3
HDN 1: Brewster St. Outfall	\$ 1,800,000	3
HDN 2: Pepper Dr. Drainage System Improvements	\$ 1,100,000	2
WCE 1: Williams Creek East, South Channel Restoration	\$ 7,050,000	8
WCE 2: Williams Creek East, Northeast Channel Restoration	\$ 4,700,000	3
WCE 3: Williams Creek East, Northwest Channel Improvements	\$ 1,400,000	2
WCE 4: Leisure Street Drainage Improvements	\$ 9,765,000	1
WCW 1: Palmetto Drive Drainage System	\$ 1,835,000	10
WCW 2: Drainage System Improvements, Aurora St. to Resort St.	\$ 900,000	4
WCW 3: West Williams Creek Channel Restoration	\$ 1,150,000	12
WCW 4: Sandstone St. South Channel Improvements	\$ 260,000	2
NP1: Water Street Area Drainage Improvements	\$ 490,000	2
LE 1: Crittenden Drive Area Improvements	\$ 430,000	8

Conceptual Improvements
Holley by the Sea Drainage Study

Independent Improvements

Project:	Cost:	Final Score
TKB 3: Tom King Bayou East Branch Channel Restoration	\$ 6,700,000	17
TKB 7: Tom King Bayou Middle Branch, North Channel Restoration	\$ 3,500,000	14
TKB 9: Tom King Bayou West Branch Channel Restoration	\$ 3,000,000	10
TKB 13: Citrus Dr. Drainage System Improvements	\$ 2,265,000	6
TKB 16: Sunrise Drive Entrance Improvements	\$ 530,000	1
EDN 1: West Ditch Improvements	\$ 800,000	3
EDN 2: Admiral St. N Drainage Improvements	\$ 650,000	2
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Dependent Improvements, D1

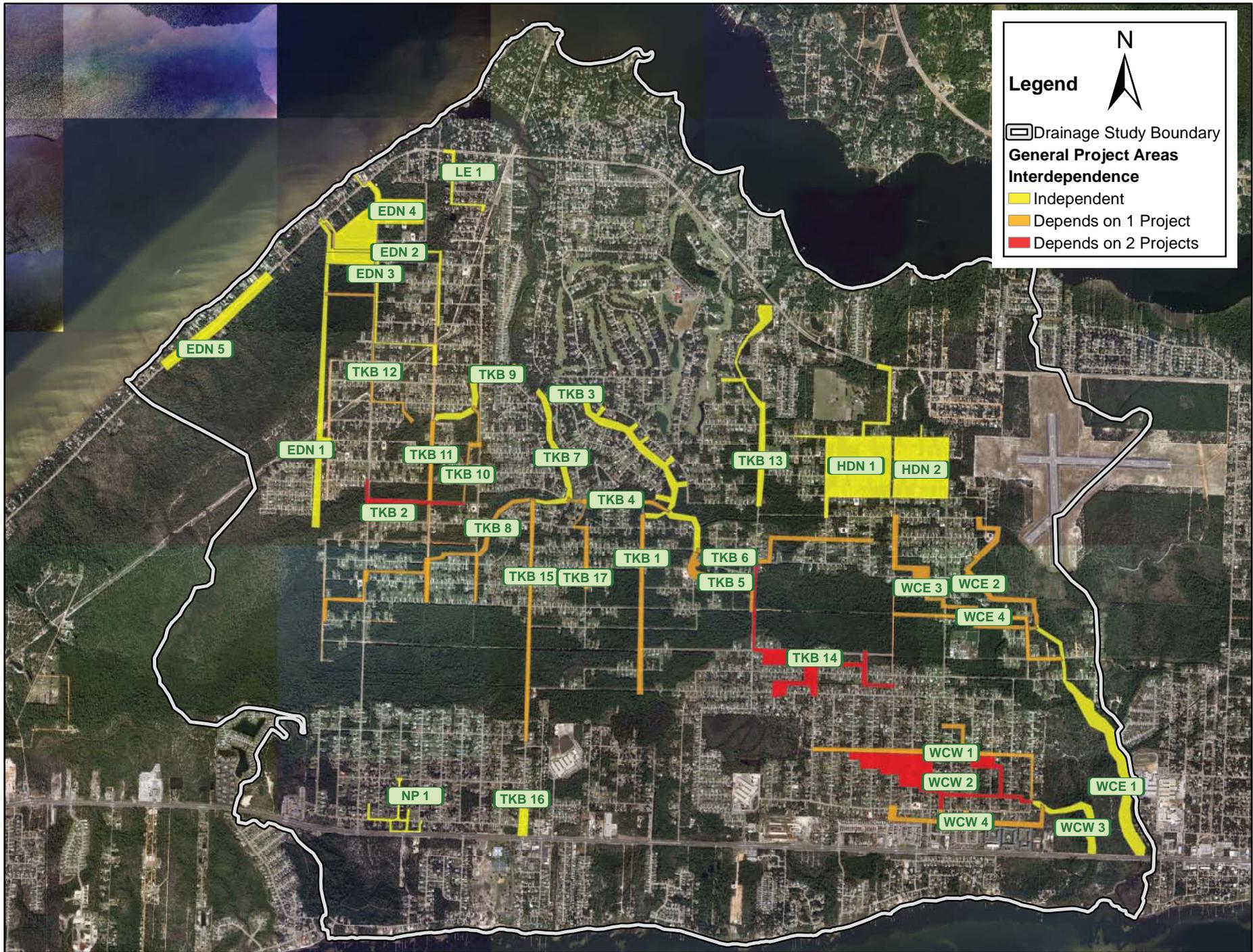
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WCW 1: Palmetto Drive Drainage System	\$ 1,835,000	10
WCW 4: Sandstone St. South Channel Improvements	\$ 260,000	2

Dependent upon one other improvement.

Dependent Improvements, D2

Project:	Cost:	Final Score
TKB 2: Glassport Street Drainage Improvements	\$ 325,000	3
TKB 4: Crescent Road Relief Pipeline	\$ 5,850,000	1
TKB 14: Broadmoor St. Outfall	\$ 2,300,000	2

Dependent upon two other improvements.



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II. INTRODUCTION



II. INTRODUCTION

Background and Purpose

On April 24, 2014, the Santa Rosa County Board of County Commissioners authorized Baskerville-Donovan, Inc. (BDI) to proceed with work on the Holley by the Sea Drainage Improvements Project, to accomplish watershed studies, an alternatives and feasibility analysis, and development of designs of drainage improvements within the Holley by the Sea community.

Scope of Services

The scope of services for this project was organized into three phases, as generally described below.

Phase I: Data Collection and Inspection

In general, the intent of the first phase was to collect all readily available information about existing drainage and stormwater management facilities at Holley by the Sea, and prepare that information for input into a hydraulic model. As part of that effort, stormwater facilities with conveyance equal to or greater than a 24" pipe were inventoried, and a Stormwater Inventory Map was developed.

As part of the data collection effort, a voluntary public engagement campaign was launched in late 2014 to acquire as much useful information regarding performance of the Holley by the Sea drainage system and stormwater management facilities as practical from residents of the community. The resident responses received were reviewed and taken into consideration in Phase II of the project.

Phase II: Watershed Modeling and Report

Using information obtained from the Phase I data collection effort, Phase II uses a 2-dimensional hydrologic and hydraulic model of the existing Primary Drainage System, which includes all inventoried pipes and associated structures, was developed using Inter Connected Pond Routing (ICPR) software, version 4. Synthetic storms corresponding to 3, 10, 25, and 100-year storm events with durations of 8 and 24 hours were routed through the hydraulic model, to identify possible causes of flooding. The results were analyzed to identify locations where the drainage system failed, due primarily to either structural flooding or stormwater overtopping roadways. Subsequently, several test runs were conducted to validate the model, and supplemental field data were obtained as needed to refine the model.

In the remainder of Phase II, major failure areas were identified, and conceptual improvement alternatives were developed and tested for each major failure area, with consideration of the relative impact of alternative concepts, including upstream and downstream effects as evaluated through model simulations for the selected storm events.

Phase III: Surveying and Design Services

After completion of Phases I and II, which culminate in the preparation of this report, Phase III of the project will include pre-design data collection (e.g., land survey, geotechnical, ecological), final design, and permitting efforts to develop construction drawings and secure permits as needed for high-priority projects identified by the County after completion of the first two phases.

III. BASIC OVERVIEW



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Project Location

The Holley by the Sea project study area is situated in the southernmost part of the 7,057 square mile Pensacola Bay watershed. As a convenient point of reference, the study area includes the intersection of US Highway 98 and Sunrise Drive, located at approximately latitude 30° 24' 08.15" N, longitude 86° 56' 08.97" W.

The area of interest for a drainage study is typically determined by a combination of factors including characteristics of the physical environment, and in some cases non-physical considerations such as property ownership or political boundaries.

For this project, the area of interest is bounded on the north by East Bay, on the south by Santa Rosa Sound, and on the east and west by areas of relatively high elevation, creating hydrologic divisions between the study area and adjacent upland areas. The resulting study area is approximately 8,100 acres (12.7 sq. mi.) in size.

Land Use

The project study area is predominantly residential in character. It was platted in the 1970's as a subdivision and remained largely undeveloped until the 2000's. Currently, approximately 80 to 90 percent of the developable land has been developed. Large areas of open space remain but these areas are mostly undevelopable wetlands.

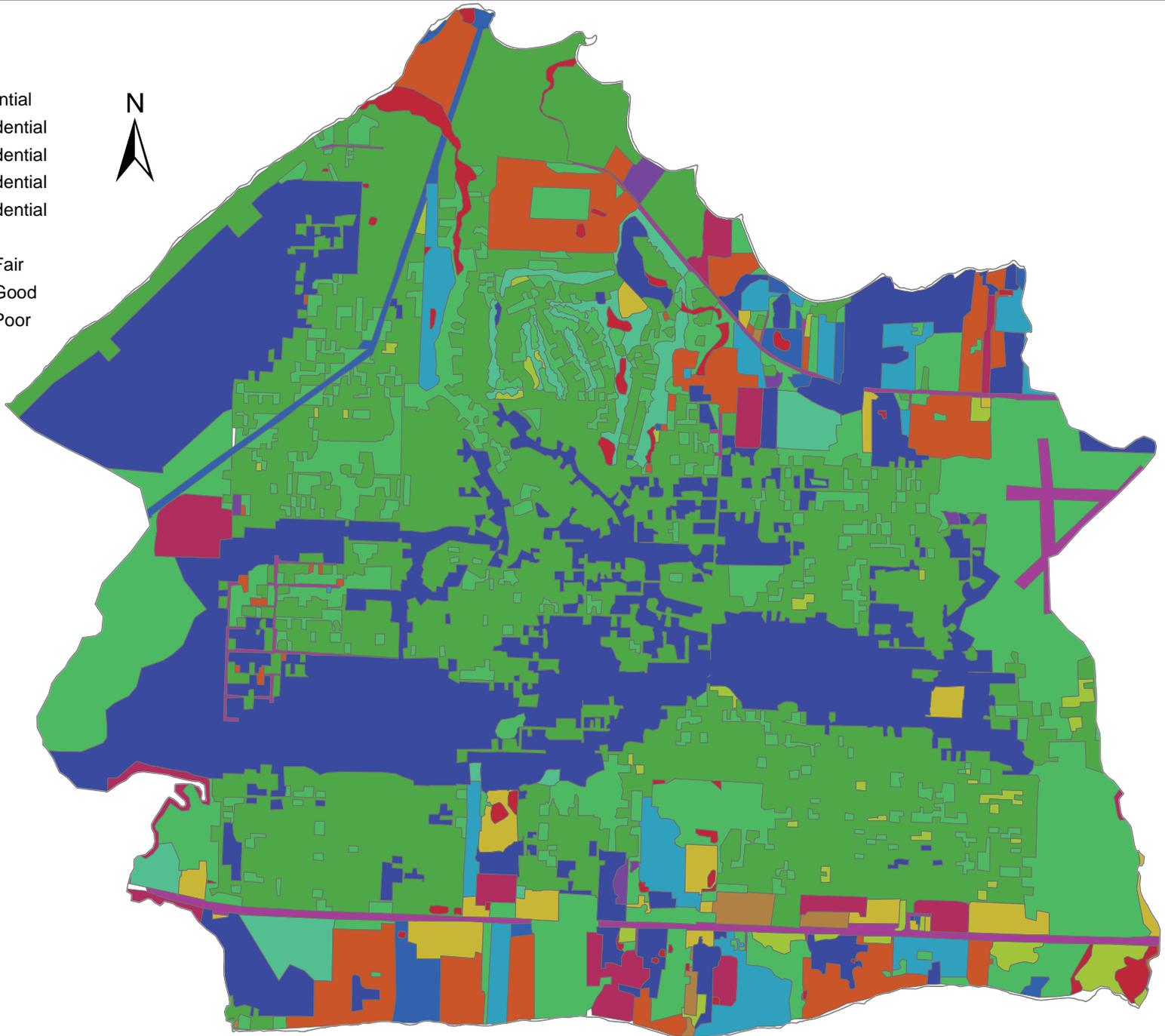
The northern part of the study area is traversed from east to west by County Road 399 (East Bay Boulevard), which roughly follows the shoreline of East Bay. Development along this portion of CR 399 is mostly residential. The southern part of the study area is traversed from east to west by US Highway 98 (Navarre Parkway). Development along this portion of US Highway 98 is primarily business/commercial. The study area is traversed from north to south by local roads including Edgewood Drive, Sunrise Drive/Valley Road/PGA Boulevard, and Citrus Drive/Alfred Boulevard/Lowe Road. Development along the north-south roads is primarily residential, with a few exceptions, notably wetlands interspersed throughout the study area, and a golf course along PGA Boulevard.

Other land uses within the study area include two schools that front US Highway 98 from the north side, the Holley Naval Outlying Field just south of East Bay Boulevard and the Holley-Navarre Water System wastewater treatment plant just east of Pepper Drive between Frankfort Street and Leisure Street.

Legend

Land Use

- 1 acre Residential
- 1/2 acre Residential
- 1/3 acre Residential
- 1/4 acre Residential
- 1/8 acre Residential
- Commercial
- Open Space Fair
- Open Space Good
- Open Space Poor
- Rural ROW
- Water
- Woods Fair
- Woods Good
- Woods Poor



Topography

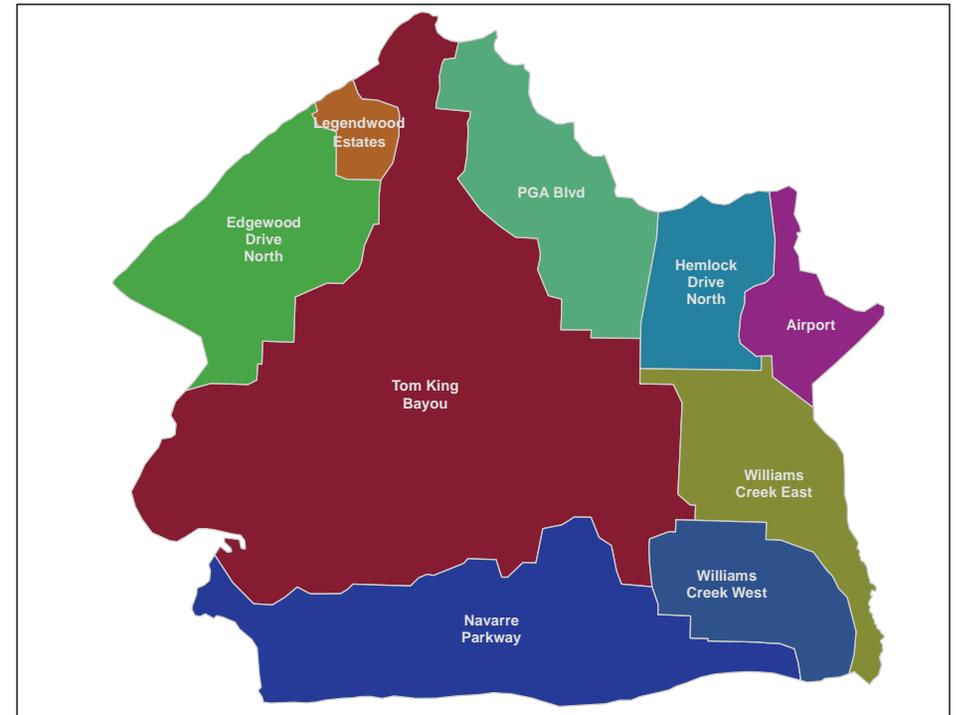
The study area is relatively flat, with grades typically less than 0.3% except in areas nearest to water bodies. Interior elevations vary from 0 ft (sea level) to highs in some locations reaching significantly in excess of 40 ft above sea level. A largely contiguous topographic high “ridge” extends roughly from east to west across the study area, with its highest elevations located just north of US-98. The interior of the study area also includes large wetlands systems that drain primarily to the north via Tom King Bayou, and to the south via Williams Creek.

The study area includes nine subbasins, six of which discharge into East Bay to the north, including the following:

- Edgewood Drive North
- Legendwood Estates
- Tom King Bayou
- PGA Boulevard
- Hemlock Drive North
- Airport

Three more subbasins discharge into Santa Rosa Sound to the south, including the following:

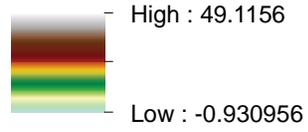
- Williams Creek East
- Williams Creek West
- Navarre Parkway



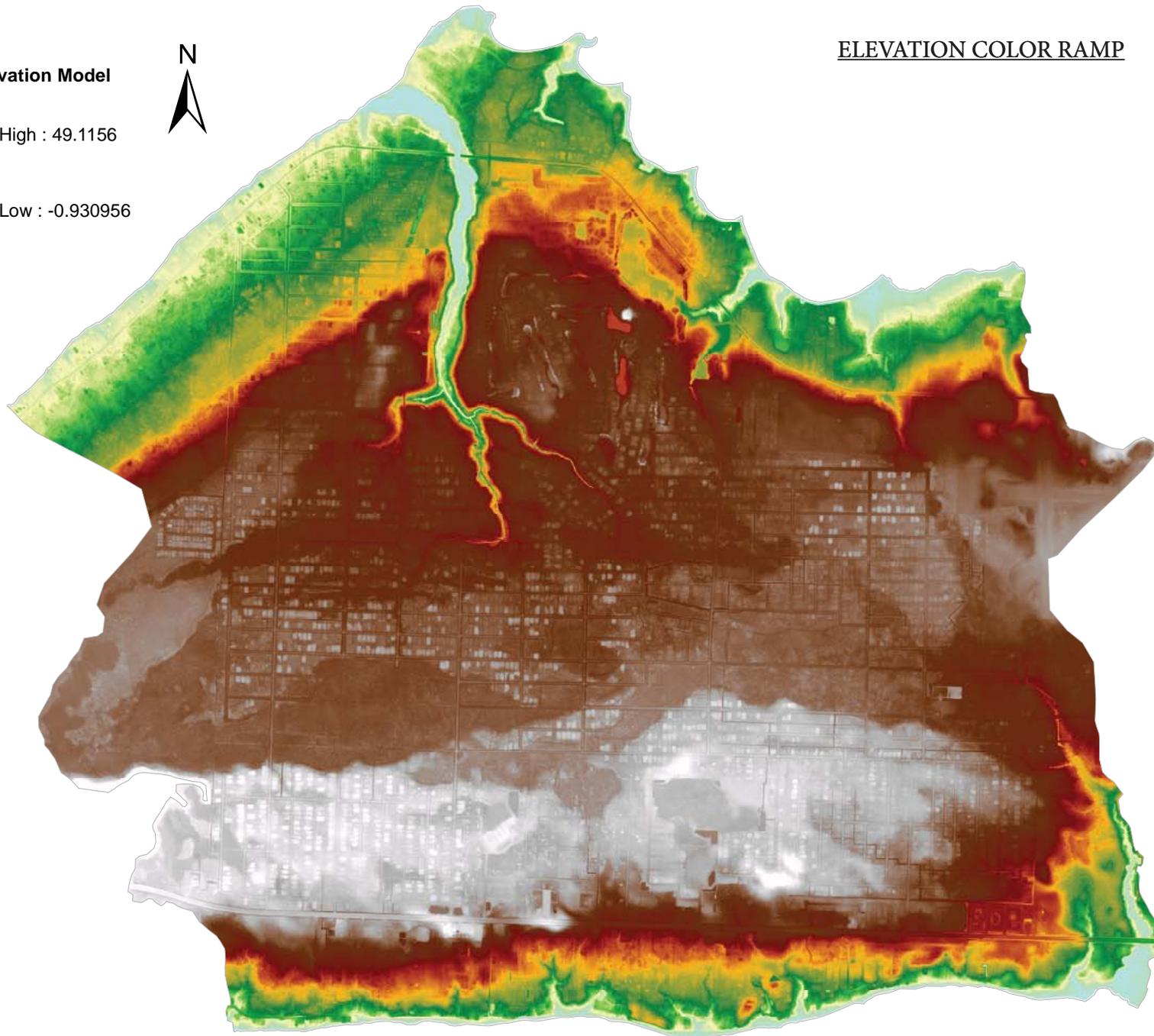
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Digital Elevation Model

Value



ELEVATION COLOR RAMP



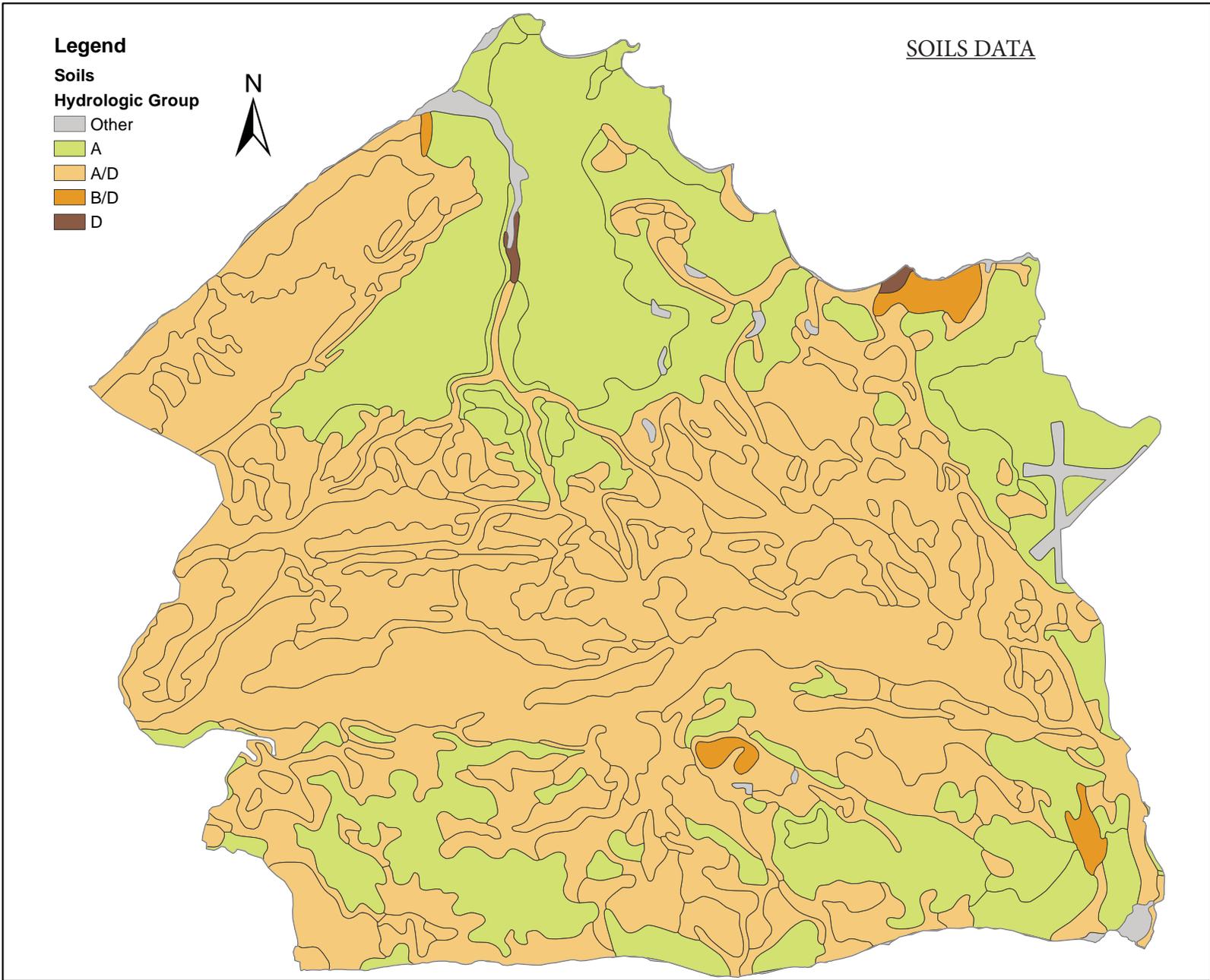
Soils

Data found for the study area in the United States Natural Resources Conservation Services (NRCS) Soil Survey database are sands and loamy sands. Most of the soils within the study area consist of the following:

- Lakeland sand (0 to 5% slopes)
- Leon sand (0 to 2% slopes)
- Ortega sand (0 to 5% slopes)
- Pactolus loamy sand (0 to 5% slopes)
- Pinkney loamy sand
- Rutledge loamy sand

All are represented in relatively comparable proportions. These soils are predominantly very permeable soils, but are poorly drained, mostly falling into hydrologic soil group (HSG) A/D, which is a dual classification.

The significance of the dual classification is that the first letter describes the soil's behavior in drained areas, and the second in undrained areas. The natural condition, however, is considered to be group D, which has a very slow infiltration rate (high runoff potential) when thoroughly wet. With the presence of a high ground water table and large areas of standing water in the study area, in heavy storm events most rainfall will become surface runoff.

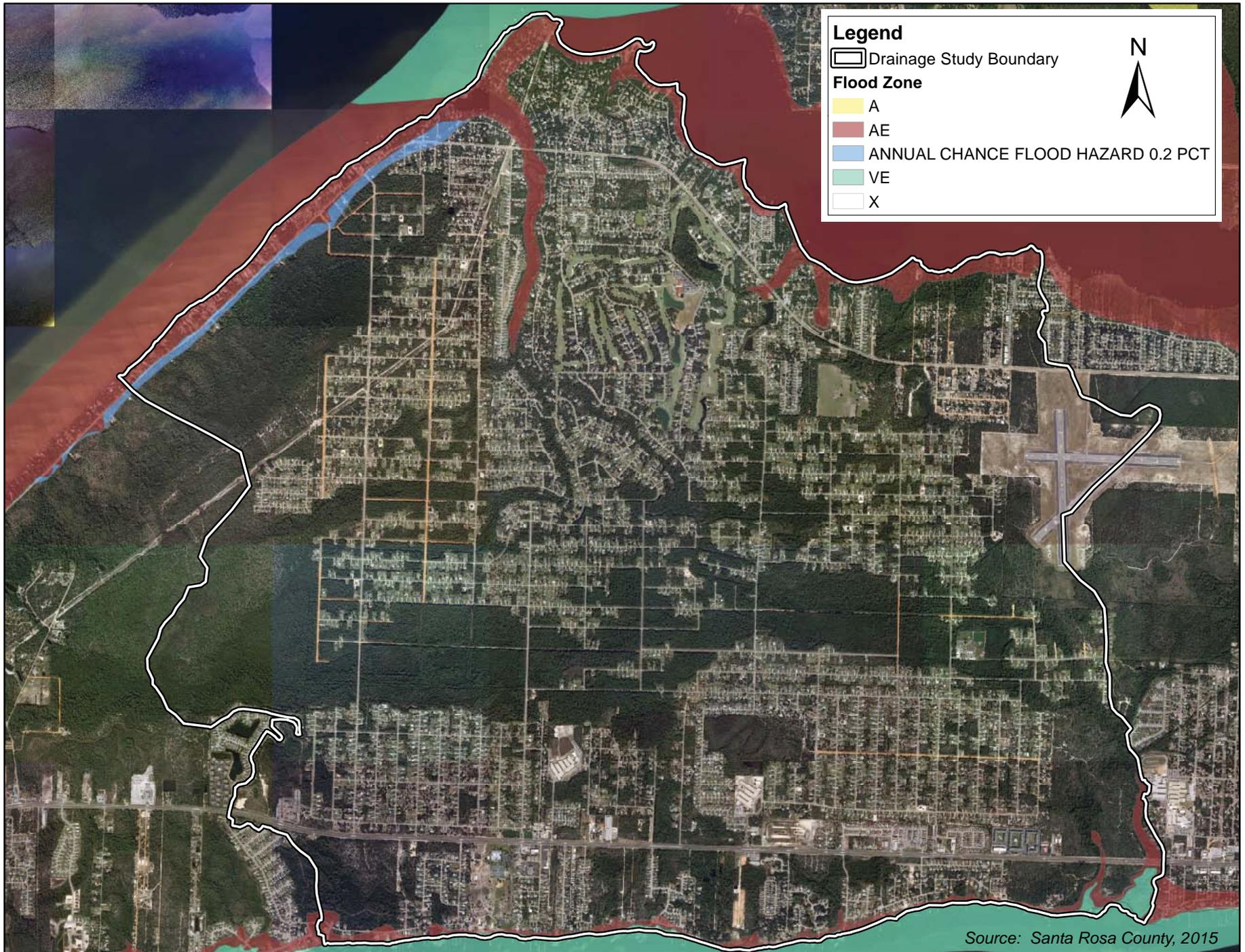


FEMA Flood Zone Information

Federal Emergency Management Agency (FEMA) flood zone data was reviewed for the study area using FEMA's online database resources, to identify areas that are predicted to flood under base (100-year) flood conditions. That information can be useful for identification of hazard mitigation opportunities, for planning purposes at project conceptual design level, and potentially for funding requests.

The significance of each zone depicted is explained on the FEMA Map Service Center website, and is summarized as follows:

- **Zone A:** Areas subject to inundation by the 1-percent-annual-chance flood event, which is also called the base flood or 100-year flood. Because detailed hydraulic analyses were performed to develop this map, no Base Flood Elevations (BFEs) or flood depths are shown.
- **Zone AE:** Areas subject to inundation by the base flood, as determined by detailed analytical methods. Within these zones, BFEs are shown.
- **Zone VE:** Areas along coasts subject to inundation by the base flood, with additional hazards due to storm-induced velocity wave action. BFEs derived from detailed hydraulic coastal analyses are shown within these zones.
- **Zone X (unshaded):** Minimal risk areas outside the 1-percent and .2-percent-annual-chance floodplains, higher than the 0.2-percent-annual-chance flood elevations. No BFEs or flood depths are shown within these zones.



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IV. METHODOLOGY



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The task of analyzing the Holley by the Sea drainage systems began with obtaining public information, much in the form of Geographical Information System (GIS) data sets. The data obtained includes information such as:

- Streets
- Parcels
- Contours
- USGS Soils Data
- Future Land Usage
- Wetland Inventory
- LIDAR

For items without data such as existing drainage improvements, survey work was performed to gain geometric and topographic data that would be included in the hydraulic modeling. Due to the size of the basin, a combination of GPS and traditional survey was performed to determine elevations of roadway drainage features. In some areas with more recent construction, data was taken from record drawings or permitted final construction plans.

In order for the drainage system to be evaluated, a hydrologic and hydraulic (H&H) stormwater model was created in ICPR Version 4 (Interconnected Channel and Pond Routing) produced by Streamline Technologies, Inc. The model consists of a network of one-dimensional nodes and links with integrated two-dimensional surface flow.

The Soil Conservation Service (SCS) method was used to determine runoff. The model computes drainage area, time of concentration, and curve numbers from data sets including land use, soils, and topography.

For routing of the stormwater model, FDOT documentation provided both rainfall distribution curves (synthetic storm events) and Intensity-Duration-Frequency curves. The 3, 25, and 100-year storm events were chosen for routing the existing conditions model. The routing was performed with the following assumptions:

- Water elevation in East Bay and Santa Rosa Sound was set to approximate high tide.
- Routing does not account for sequential storm events. Extreme conditions such as prolonged periods of rainfall will result in different peak flow rates and stages.
- Rainfall across the basin was held constant in relation to area.
- Roughness coefficients were set to reflect normal maintenance.

Calibration of the model had the benefit of only minimal, general information. Ideally a model should be calibrated with both stream and rain gauge data, however neither are available in this area. Calibration was completed using the best information available from observation and resident responses to the drainage questionnaire. Information was limited to occurrences and relative frequency of road and home flooding.

The results of the model's routing were then analyzed for system failure. Failure is generally defined by this study as road overtoppings and flooding of residences. The 100-year storm event, Santa Rosa County's design event, was used for evaluation.

V. EXISTING CONDITIONS



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Field Conditions

Typical of rural development, the existing drainage system within Holley by the Sea is composed mostly of open ditches and culverts. The original sections of the development do not appear to have any provision for stormwater retention or detention. Stormwater is routed to the nearest drainage feature where it flows to the bay to the north or Santa Rosa Sound to the south. The newer developments within the project area appear to include stormwater management facilities. These lie mostly north of East Bay Boulevard or south of US Highway 98.

One of the predominant characteristics of the drainage system is that many of the drainage features, in particular ditches and channels, have little access and have become heavily overgrown. These areas typically show a channel that carries low flow conditions. Outside of the low flow channel heavy and often woody vegetative growth has choked off much of the flow capacity. In addition, many times ditches have a constant water level consisting of groundwater.

Sedimentation is also a concern within the older sections of the area. Due to the flat topography in the area many ditches and pipes show signs of sediment buildup.

Public Outreach Information

During the early stages of the project, a drainage questionnaire was developed and residents were asked to respond. The questionnaire was sent out via the Santa Rosa County Public Information Office as well as several other means. From this effort BDI received approximately 160 responses. This accounts for a small percentage of the residents and business owners within the project limits. However, the responses were evenly spread throughout Holley by the Sea proper. Very few responses were received

from the newer areas within the project limits. A map indicating the type and location of responses has been provided.

From the responses, fourteen (14) residents described fifteen (15) structure floodings. Approximately half of these indicate floodings within the living spaces of homes. The other half include flooding of garages, patios, and out buildings such as sheds.

Yard floodings were indicated by nearly all of the responses from the questionnaires. Many of these responses also indicate that the yard flooding takes several days to drain off. A common complaint was that newer home construction fills in lots that then shed runoff on to neighboring lots. In several instances residents feel that this has compounded flooding within their own yard.

Street flooding was also noted by most of the residents that responded. Nearly every road within Holley by the Sea proper was described as having flooding somewhere along its length. This could appear to cover every portion of the roadways, however residents usually were not specific as to the location of the flooding. The floodings would most likely be in the vicinity of culvert crossings and shallow roadside swales.

Modeling Results

The existing conditions model was routed for various storm events from the 3-year being the smallest and the 100-year being the largest. Results of the 100-year event can be reviewed in the attached image. All of the events can be reviewed on large format maps supplied under separate cover.

Legend

Survey Responses

Level of Flooding

- No Flood
- Street
- Structure
- Yard
- Flooded Streets



As the results show (which can also be seen on the map), flooding within Holley by the Sea is extensive. It is important to note that much of the area showing flooding is undeveloped wetlands. These wetland areas fill up during rainfall and can cause runoff even long after the rain event has ceased.

Areas showing the worst flooding lie between the wetland system and Tom King Bayou. Most of the roads running north-south show flooding in this area as they form the primary drainage route from the wetlands to the outfall. Flooding on these roads backs water up on connecting roadways. Some of these roads include:

- Edgewood Drive
- Camden Drive
- Sherwood Drive
- Sunrise Drive
- Basswood Drive
- Citrus Drive
- Hemlock Drive

Many of the natural drainage paths seem to be operating inefficiently as well. At the extent of several of the larger natural drainage ways there appears to be large areas of flooding. This signifies high downstream flow depths which are inhibiting water from flowing to the outfall. Some of these areas include:

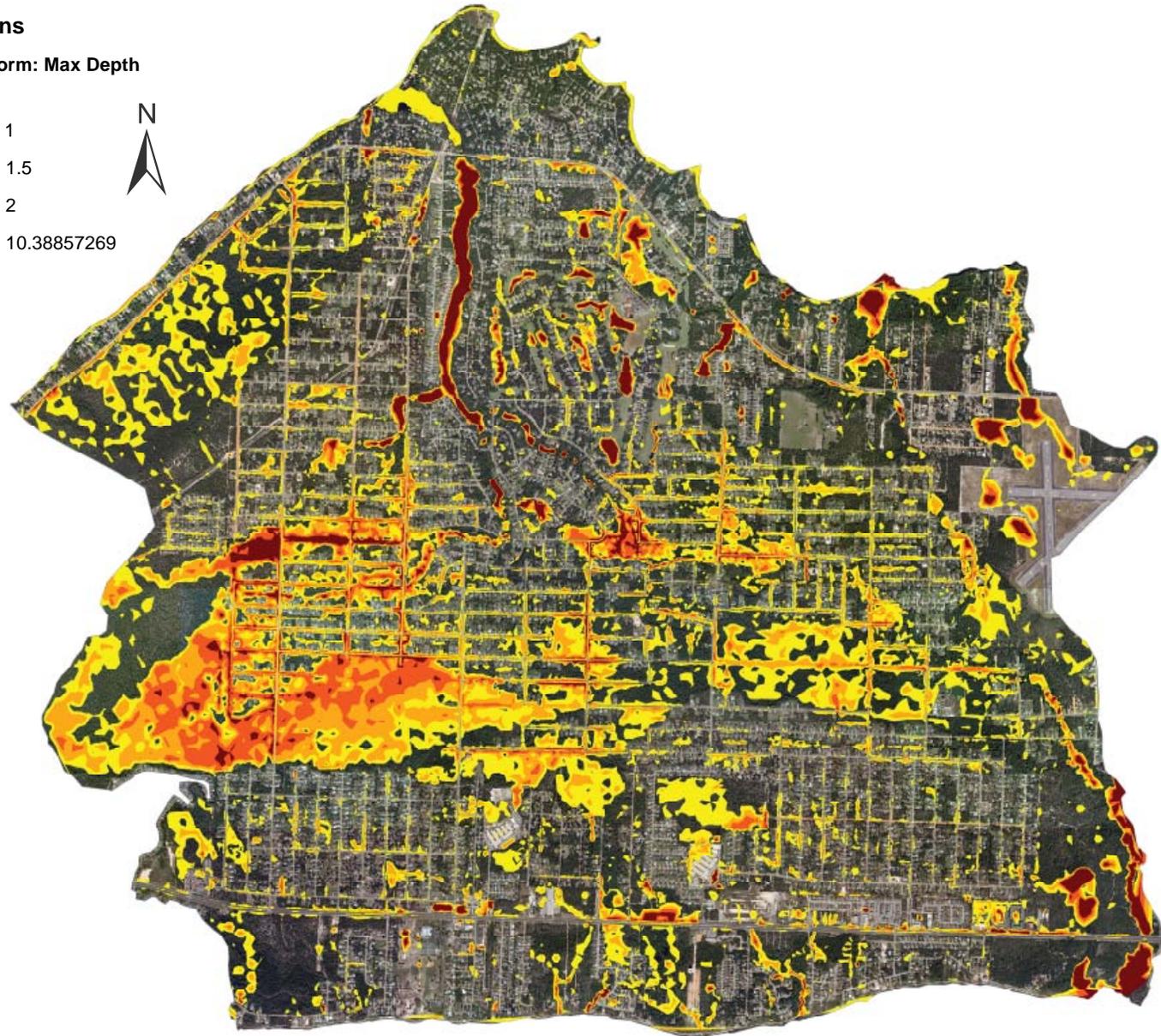
- West Branch of Tom King Bayou (vicinity of Redfield Street)
- East Branch of Tom King Bayou (South end of Basswood Drive)
- Williams Creek East (East end of Leisure Street)

The corridors of East Bay Boulevard and US Highway 98 generally indicate acceptable drainage facilities. This is largely due to their proximity to the ultimate outfall. Most of these have also been constructed more recently with provision for stormwater retention and detention.

Existing Conditions

100-Year, 24-Hour Storm: Max Depth

Depth (Feet)



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VI. CONCEPTUAL IMPROVEMENTS



VI. CONCEPTUAL IMPROVEMENTS

Suggesting improvements to the Holley by the Sea drainage system can be divided into two separate approaches:

- **Approach 1:** Suggest infrastructural improvements to improve flooding conditions. This is the more direct approach.
- **Approach 2:** Make recommendations concerning the policies of the county in regard to drainage infrastructure and land development.

Both approaches play a role in the effectiveness of drainage within the area and should be considered carefully.

Infrastructure Improvements

Projects for the improvement of drainage infrastructure typically include one of the following:

- Detain water to protect areas downstream
- Increase capacity of the existing drainage system
- Construct a new and separate outfall

Detaining water involves constructing ponds. The ponds serve as temporary outfalls where excess water is held and then slowly released over time in order not to overload the downstream drainage system. This approach requires large areas of undeveloped land and lower groundwater. Unfortunately, within Holley by the Sea, most of the buildable area is developed with residential construction. In addition, the groundwater table is often only feet below the ground surface.

Most of the larger tracts of undeveloped area are wetland some of which have already been placed in conservation.

Constructing a new outfall involves determining a different path to route stormwater. This typically requires buying property and/or acquiring easements.

Increasing the capacity of the existing stormwater system can take several forms. Within Holley by the Sea it most often will involve clearing and re-grading existing ditches. In addition, there will be many locations where the size of the existing infrastructure will be increased to facilitate better drainage.

Results of the improvements described within this section. They indicate that even with improvements there will remain areas within Holley by the Sea that experience flooding. Based upon the topography, groundwater hydrology and large wetlands it will not be possible to eliminate flooding within Holley by the Sea. In some locations the improvements will reduce flooding elevations only slightly. However, their impact will be in the duration of flooding, providing a clear path for stormwater so that it does not “pond” for extended periods of time.

A scoring system was developed in order to make comparisons between the effect or benefit of each concept. The scoring system takes in to account the number of flooding dwellings affected, number of overtopping streets affected, and the degree to which the project provides for future improvements. The scoring matrix is provided in the appendix for review.

On the following pages conceptual improvements to the Holley by the Sea drainage system have been listed and described. They have been organized by their subbasin and an overview of the concepts is shown for reference.

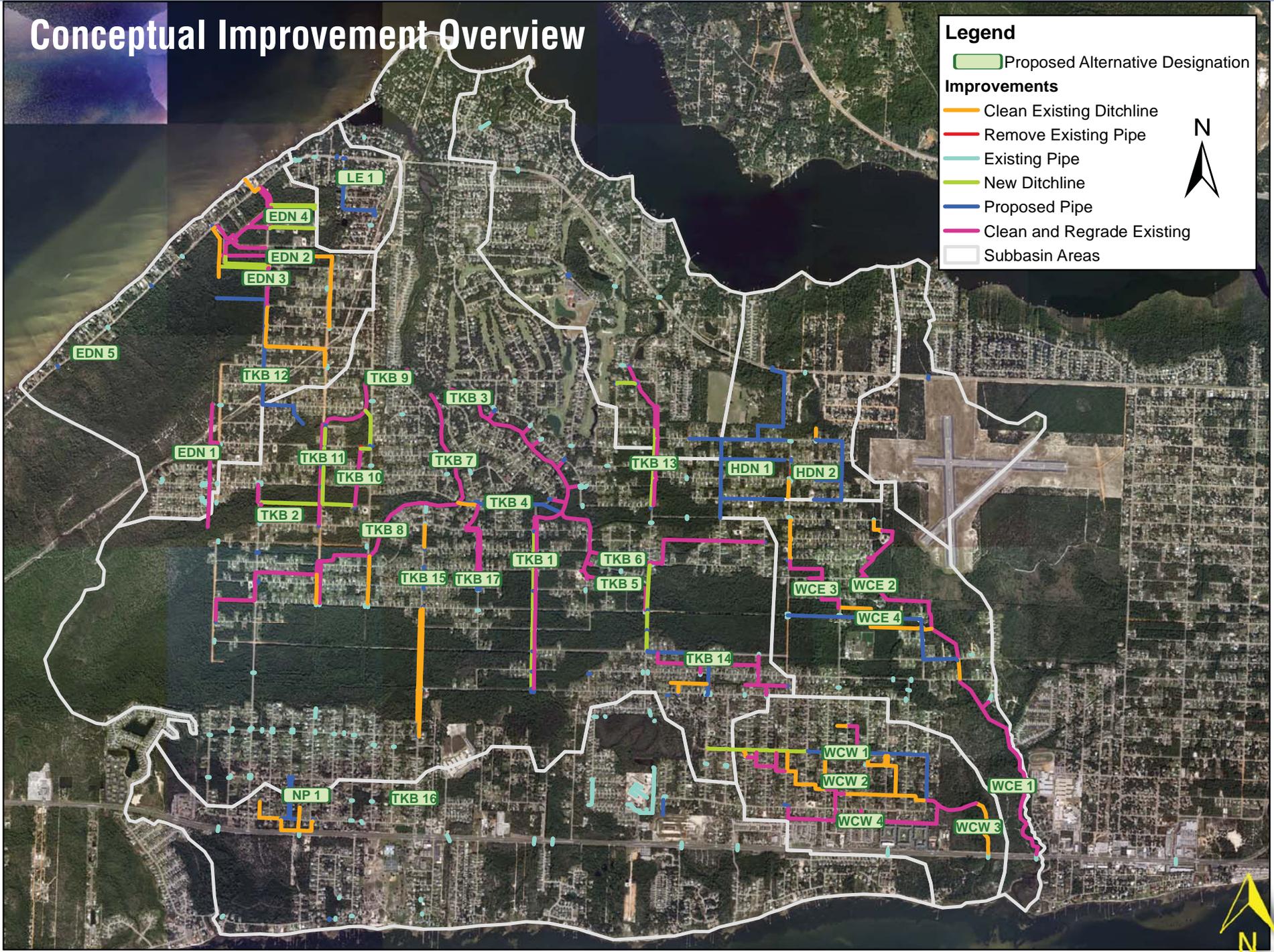
Policy Considerations

One of the items that will make the most immediate impact upon the flooding conditions within Holley by the Sea is a program of maintenance. Because of the nature of the area the existing drainage system needs more regular maintenance than many areas of the County. For instance, the flat grades within the area cause stormwater to move very slowly while draining. When only a small amount of sedimentation or vegetative growth occurs in the system, runoff slows even more.

This results in increased flow depths and lengthens the duration of flooding. Culvert pipes and drainage ditches need to be free of sedimentation and/or heavy plant growth in order to drain properly. In particular, the primary drainage paths should receive the most attention.

As stated earlier, there are areas of Holley by the Sea in which flooding will not be prevented. We suggest that these areas be carefully considered when future land development activities are submitted for County review and acceptance. Santa Rosa County currently requires detention of the 100 year storm event from new developments. It is understood that this requirement could be increased to full retention of the 100 -year event under certain circumstances. We would recommend that future development be restricted from discharging to the areas that show existing flooding within the area. Alternatively, the development could be entered into the existing conditions model to determine impact to the area. For residential construction, the same existing conditions model could be used to determine possible flow depths of adjacent drainage facilities in order to check against finished floor elevations.

Conceptual Improvement Overview



TOM KING BAYOU

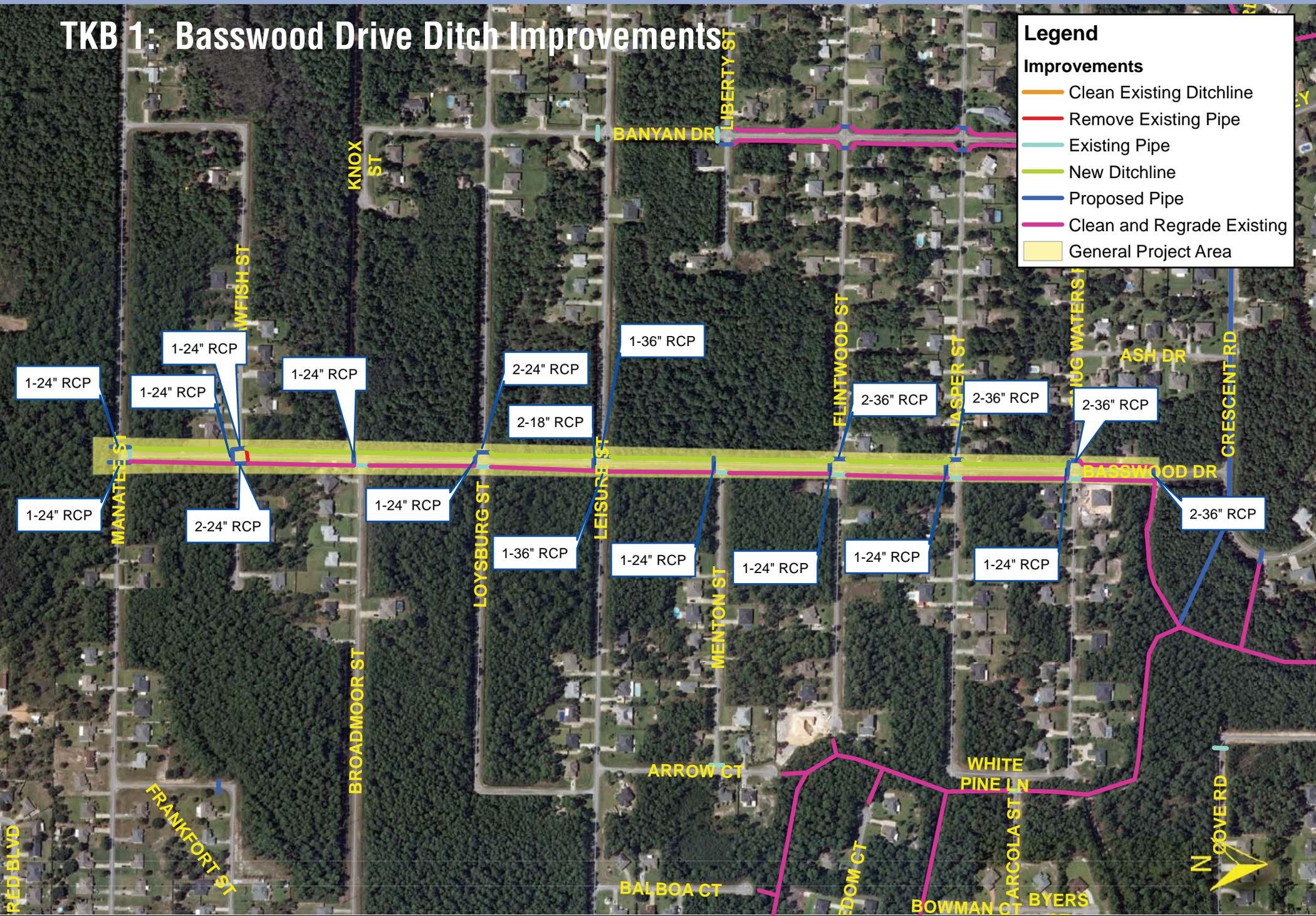
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TKB 17	Water Street Area Drainage Improvements

TKB 1: Basswood Drive Ditch Improvements

Legend

Improvements

- Clean Existing Ditchline
- Remove Existing Pipe
- Existing Pipe
- New Ditchline
- Proposed Pipe
- Clean and Regrade Existing
- General Project Area



TKB 1: Basswood Drive Drainage Improvements

Current Conditions

Basswood Drive runs north to south in the middle of Holley by the Sea. It is also a primary drainage path carrying stormwater runoff from Manatee Street and surrounding area and discharging to the East Branch of Tom King Bayou.

The road drainage consists of a roadside ditch on the east side with culverts making road crossings. Flooding in this area is well documented. It was mentioned by residents, predicted during modeling efforts and confirmed on the ground by BDI. During heavy rainfall and for considerable time afterwards, Basswood Drive and portions of side roads become impassable. These conditions can be attributed to several compounding factors: high downstream flooding depths, flat grades, and a long run to the discharge.

Conceptual Improvement Description

Improvements include re-grading the existing east roadside ditch. The ditch local highs and lows along its length that restrict flow. These should be corrected which will require replacing several culverts as shown in the aerial image provided.

In addition to re-grading the existing ditch, another conveyance path has been provided on the west side of the road. This will consist of roadside ditches and culverts and should effectively double the drainage capacity along Basswood Drive.

Currently the ditch is overgrown and should be cleaned at a minimum to facilitate drainage.

Results

The proposed improvements should contain stormwater within the ditches with one exception. The cross drain just south of Crescent Road on Basswood Drive still indicates that stormwater will overtop the road during the design storm, however the depth has been decreased considerably. This location is controlled by the downstream channel which cannot be improved beyond that proposed in TKB 3. This project should make Basswood Drive drivable throughout most of its length.

Dependence

This project may only be constructed after TKB 3: Tom King Bayou East Branch Channel Restoration. Constructing the project without providing downstream capacity might only add to the flooding conditions already noted. Needed maintenance of the existing ditch line can be accomplished independently.

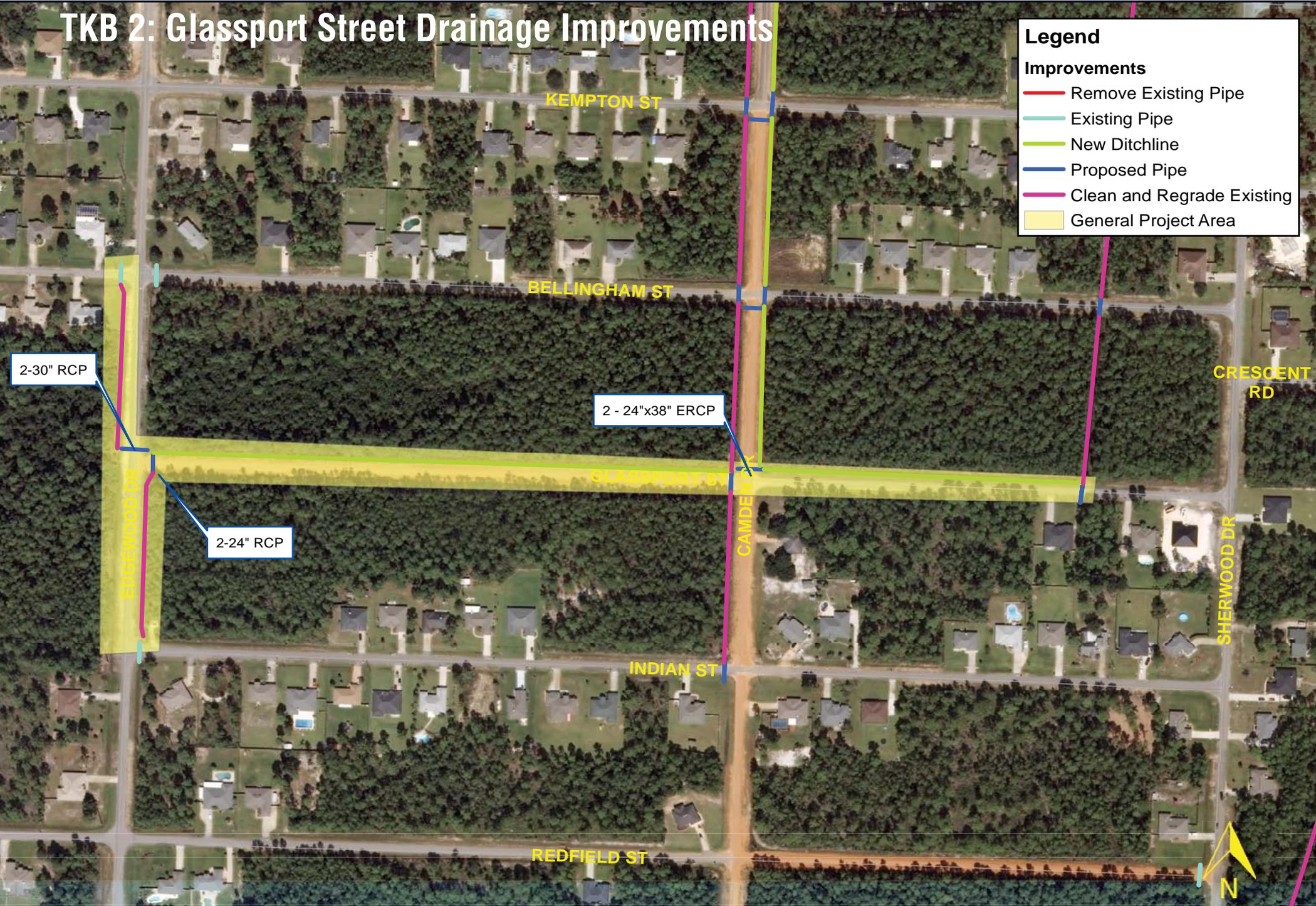
COST	SCORE
\$1.1M	9

TKB 2: Glassport Street Drainage Improvements

Legend

Improvements

- Remove Existing Pipe
- Existing Pipe
- New Ditchline
- Proposed Pipe
- Clean and Regrade Existing
- General Project Area



TKB 2: Glassport Street Drainage Improvements

Current Conditions

Glassport Street is an unpaved road which takes on off-site water from the wetlands to the west. The off-site water is conveyed to the east to an outfall line running north to the East Branch of Tom King Bayou. Flooding in this area was mentioned by residents in the questionnaires and predicted in the model.

Conceptual Improvement Description

Drainage Improvements include creating a main conveyance ditch on one or both sides of Glassport Street. Culvert upgrades will be necessary to facilitate the drainage as well. This will provide a clear and open drainage path from the western wetlands to the outfall lines that runs north close to Sherwood Drive and Camden Drive. The drainage improvements could be combined with a dirt road paving project which would aid in erosion control and protect downstream facilities from sediment build-up.

Results

This project should be performed after downstream improvements have been accomplished. Alone this project will provide little benefit and may only aggravate downstream conditions. With the necessary downstream improvements this project will lower flooding depths along Glassport Drive and the surrounding intersections considerably, removing the overtopping condition from Camden Drive.

Dependence

This project may only be constructed after downstream improvements have been made. Constructing the project without providing downstream capacity might only add to the flooding conditions already noted.

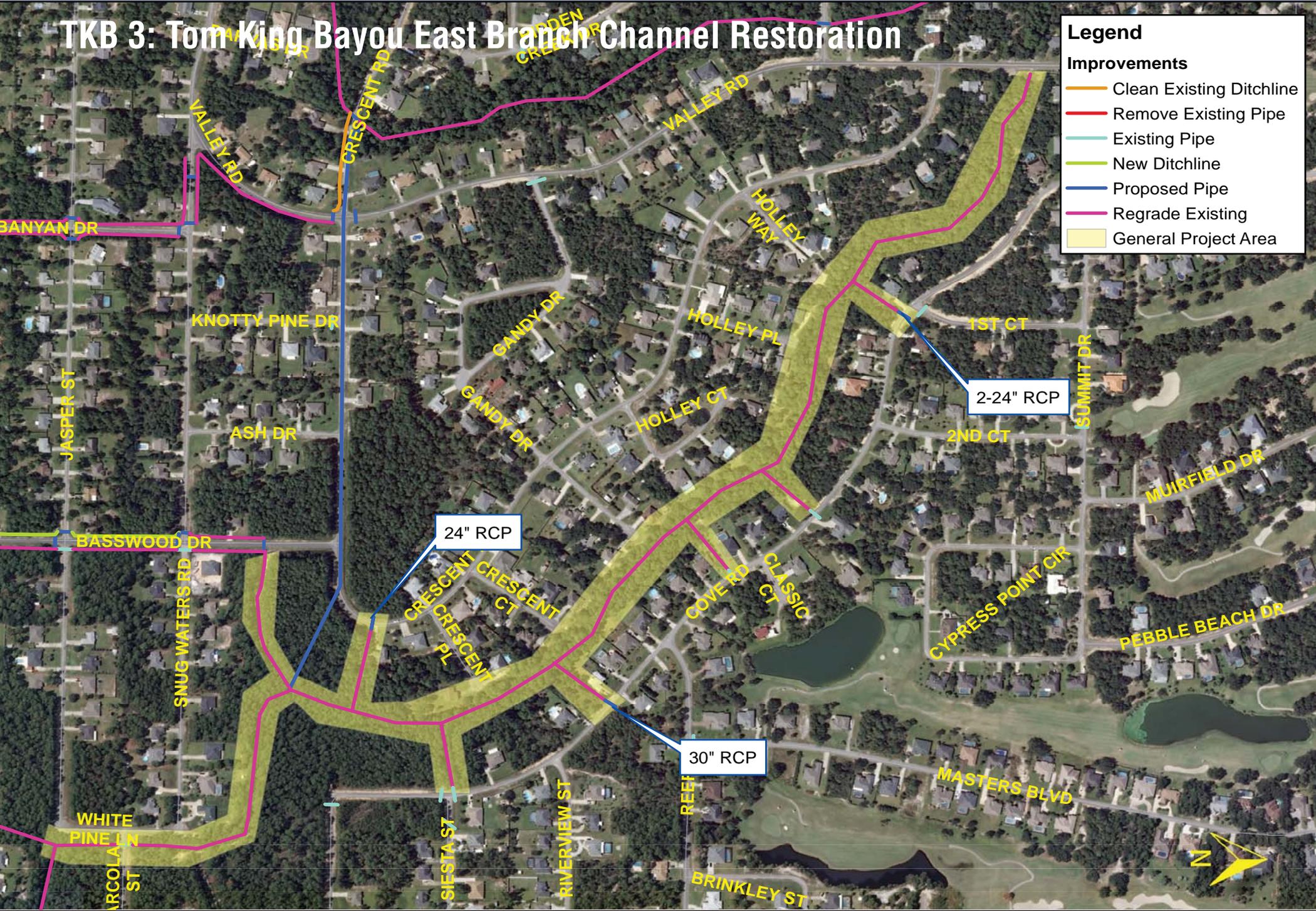
COST	SCORE
\$325,000	3

TKB 3: Tom King Bayou East Branch Channel Restoration

Legend

Improvements

- Clean Existing Ditchline
- Remove Existing Pipe
- Existing Pipe
- New Ditchline
- Proposed Pipe
- Regrade Existing
- General Project Area



TKB 3: Tom King Bayou East Branch Channel Restoration

Current Conditions

The East Branch of Tom King Bayou is a drainage way that runs from Valley Road (close to Summit Drive) to Basswood Drive. The channel serves as a stormwater outfall for a large area further to the south and east. During analysis the channel was found to be very flat with several local highs and lows. In addition, the channel and its floodplain appear to be heavily overgrown. Historic areal images indicate that this channel was once clear of heavy vegetation and open in nature. We expect that the heavy growth combined with the flat grades has caused sedimentation of the channel bottom, further aggravating the flooding condition.

Conceptual Improvement Description

The project consists of 6,900 linear feet of stream channel restoration from Valley Road (close to Summit Drive) to Basswood Drive. Plans are to re-grade the channel, clear overgrowth and provide armoring as necessary. Completion of the project should reduce flood depths in the channel which will protect properties along the channel as well as aid upstream drainage systems. It will also serve as the outfall for future drainage improvements that have been proposed upstream.

Results

Completion of the project should reduce flood depths in the channel which should protect properties along the channel as well as aid upstream drainage systems. The model indicates that depths at the upper reaches of the channel could be decreased by up to 10". However, this project will need to be permitted by the US Army Corps of Engineers and as such the exact

extent of the re-grading efforts will not be known until permitting efforts are begun.

Dependence

This project is independent of other improvements.

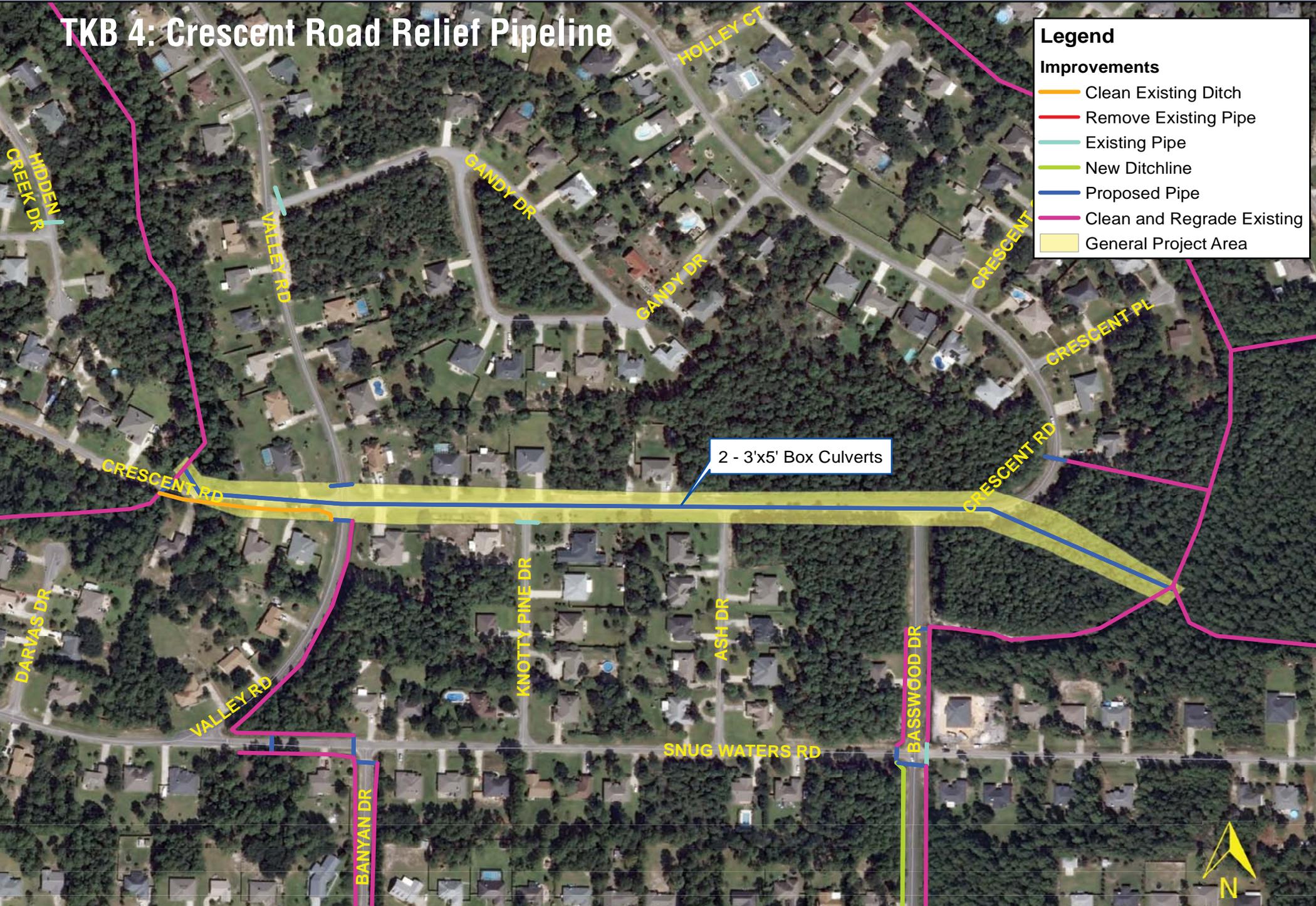
COST	SCORE
\$6.7M	17

TKB 4: Crescent Road Relief Pipeline

Legend

Improvements

- Clean Existing Ditch
- Remove Existing Pipe
- Existing Pipe
- New Ditchline
- Proposed Pipe
- Clean and Regrade Existing
- General Project Area



TKB 4: Crescent Road Relief Pipeline

Current Conditions

Flooding is shown throughout the upper reaches of the East Branch of Tom King Bayou. This project is a bypass pipeline that will take flow from the flooding area and route it to the Middle Branch (at Valley Drive) as shown in the aerial.

Conceptual Improvement Description

The work will consist of approx. 2000 LF of pipeline equivalent to a 2 barrel, 3'x5' box culvert. Due to the width of the pipeline an extensive amount of road rebuilding and repair will also be necessary.

Results

The model indicates that the relief pipeline could further reduce flooding depths in the East Branch of Tom King Bayou. However, this will add additional water to the Middle Branch of Tom King Bayou. Depths in the channel should increase only in the range of 1" – 2".

Dependence

This project may only be constructed after downstream improvements to the Middle Branch of Tom King Bayou (TKB 7) have been made. Constructing the project without providing additional capacity could increase flooding depths in the Middle Branch of Tom King Bayou.

In addition, because this project moves water from one drainage path to

another, extreme care should be taken in its design and analysis. For this reason, the impact of the project should be re-analyzed after the downstream improvements have been made using as-built information.

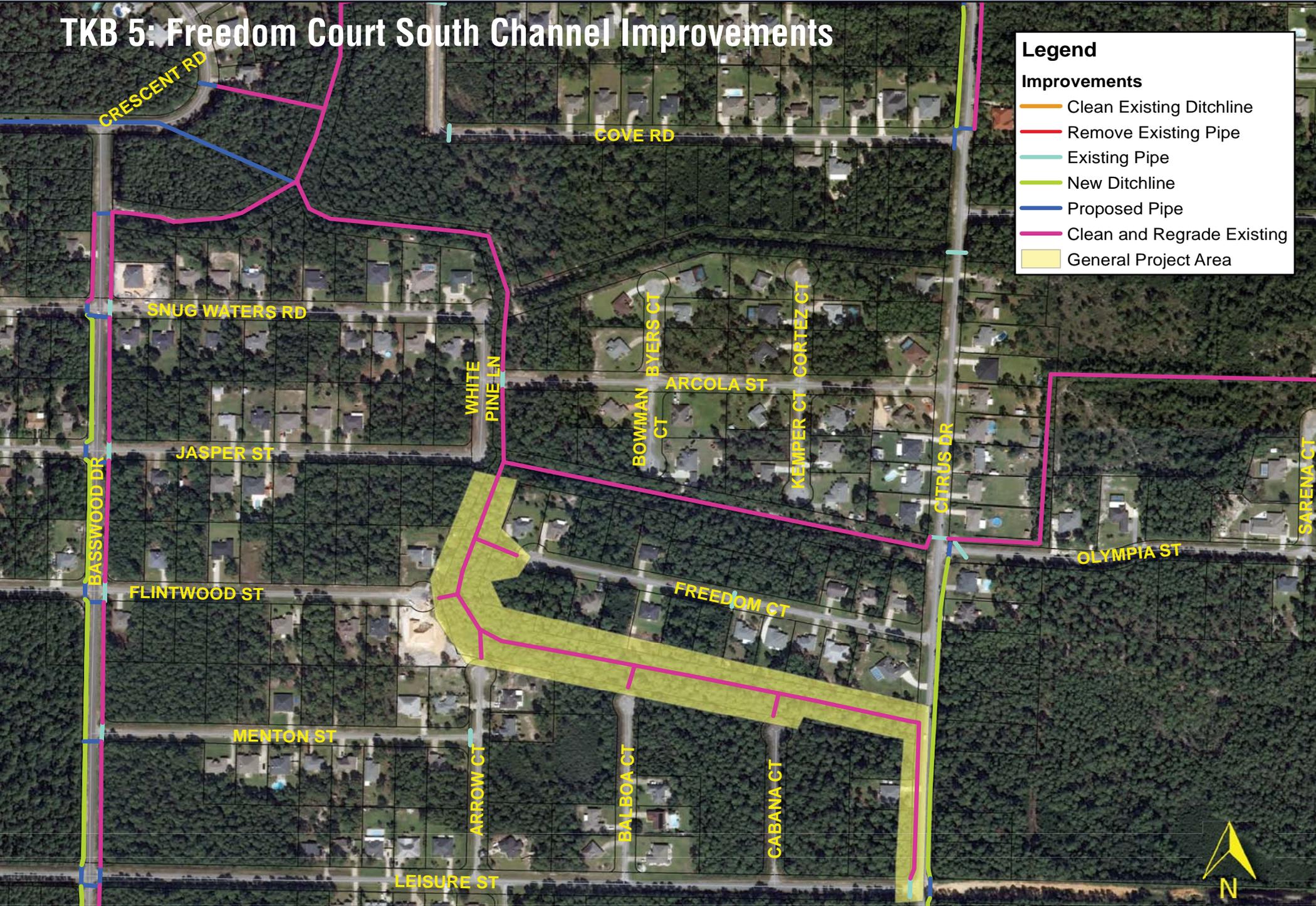
COST	SCORE
\$5.9M	1

TKB 5: Freedom Court South Channel Improvements

Legend

Improvements

- Clean Existing Ditchline
- Remove Existing Pipe
- Existing Pipe
- New Ditchline
- Proposed Pipe
- Clean and Regrade Existing
- General Project Area



TKB 5: Freedom Court South Channel Improvements

Current Conditions

Freedom Court lies between two primary drainage channels: one to the north and one to the south. These channels provide drainage for significant areas to the south and east, even extending to Manatee Drive. The project will provide drainage capacity in the south channel in order to aid upstream flooding conditions and future improvements.

Conceptual Improvement Description

Improvements include clearing and re-grading the existing channel which appears to be choked with vegetation through most of its length.

Results

The model indicates that the proposed improvements could reduce flow depths 6”.

Dependence

This project may only be constructed after downstream improvements have been made. Constructing the project without providing downstream capacity might only add to the flooding conditions already noted.

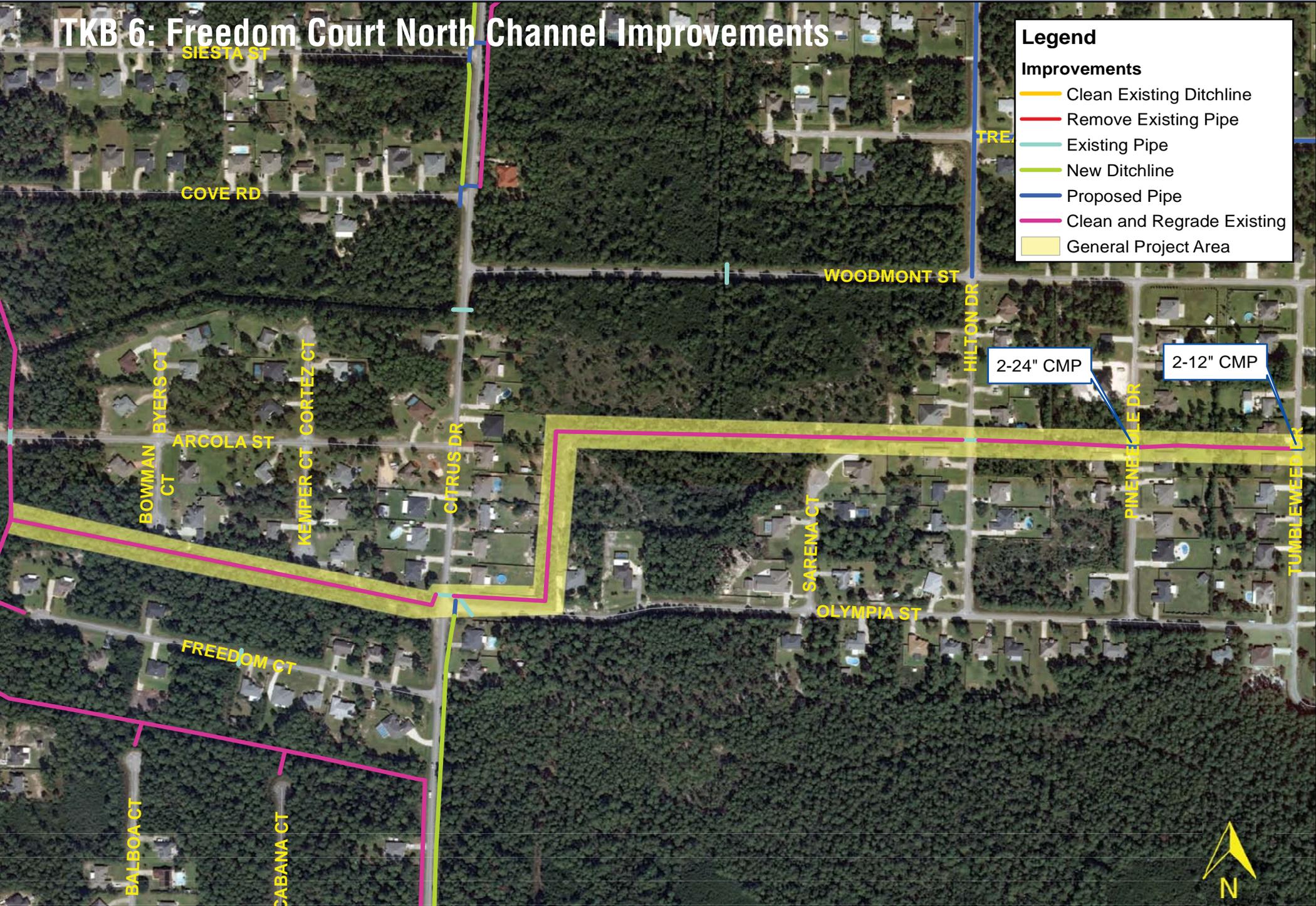
COST	SCORE
\$2.7M	3

ITKB 6: Freedom Court North Channel Improvements

Legend

Improvements

- Clean Existing Ditchline
- Remove Existing Pipe
- Existing Pipe
- New Ditchline
- Proposed Pipe
- Clean and Regrade Existing
- General Project Area



TKB 6: Freedom Court North Channel Improvements

Current Conditions

Freedom Court lies between two primary drainage channels: one to the north and one to the south. These channels provide drainage for significant areas to the south and east, even extending to Manatee Drive. The project will provide drainage capacity in the north channel in order to aid upstream conditions and future improvements.

Conceptual Improvement Description

Improvements will consist of channel improvements and culvert upgrades extending to Tumbleweed Drive to the east.

Results

The model results indicate that flow depths in the channel system are decreased only slightly, in the range of 3” – 4”.

Dependence

This project may only be constructed after downstream improvements have been made. Constructing the project without providing downstream capacity might only add to the flooding conditions already noted.

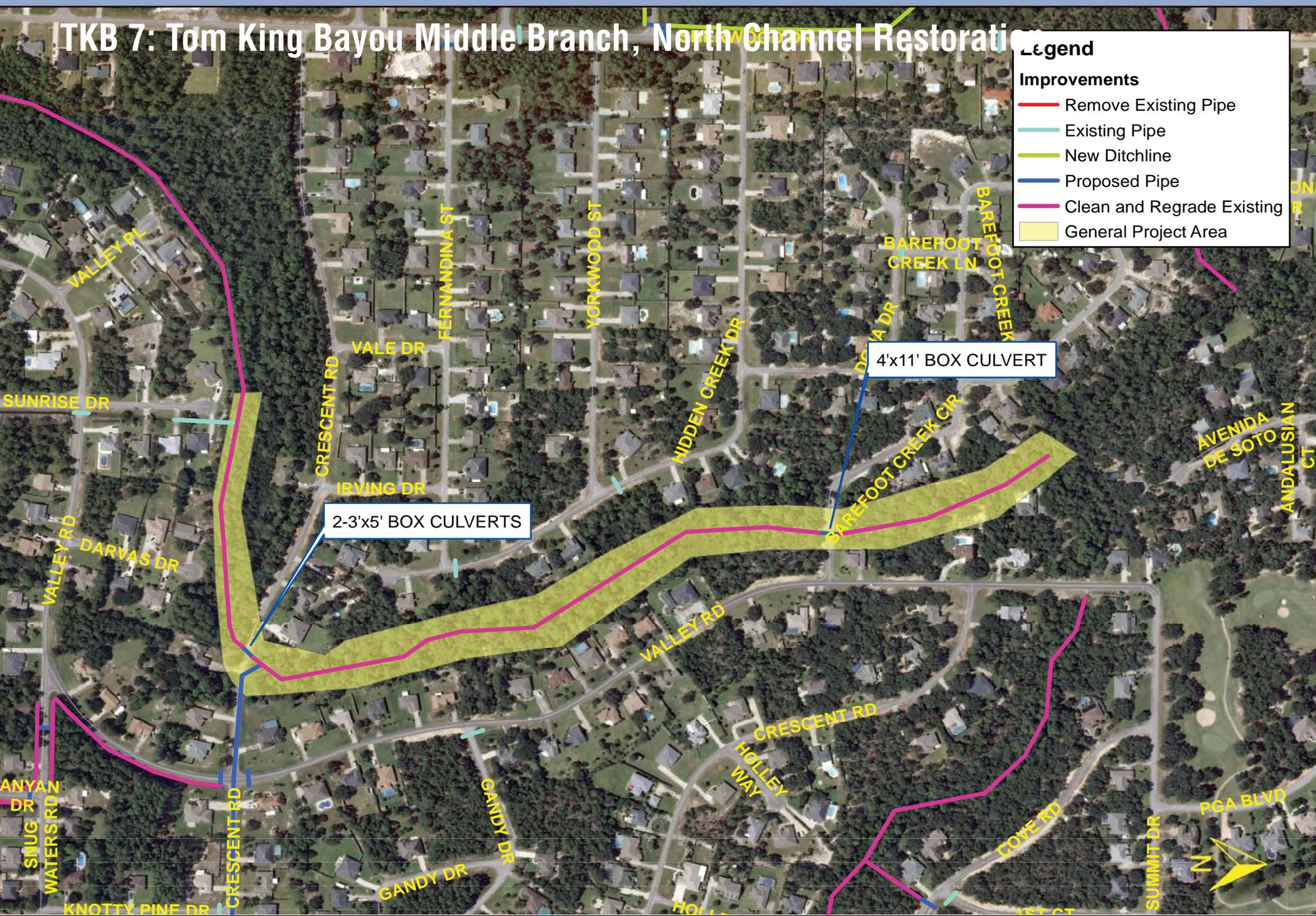
COST	SCORE
\$2.0M	4

TKB 7: Tom King Bayou Middle Branch, North Channel Restoration

Legend

Improvements

- Remove Existing Pipe
- Existing Pipe
- New Ditchline
- Proposed Pipe
- Clean and Regrade Existing
- General Project Area



TKB 7: Tom King Bayou Middle Branch, North Channel Restoration

Current Conditions

The north section of the Middle Branch of Tom King Bayou is a drainage channel that extends from northwest of Barefoot Creek Drive to Crescent Road. Flooding within this channel is not an immediate concern as it does not seem to impact any structures or overtop roadways. However, this channel serves as the outfall for several large areas of drainage to the south. For this reason a reduction in flow depths could aid upstream drainage which is needed.

Conceptual Improvement Description

The project consists of 2,600 linear feet of stream channel restoration throughout the channels length. Plans are to re-grade the channel, clear overgrowth and provide armoring as necessary. It will also serve as the outfall for future drainage improvements that have been proposed upstream. Work will also require replacement of the existing culvert at Barefoot Creek Circle.

Results

Completion of the project should reduce flood depths in the channel which will aid upstream drainage systems. The model indicates that depths at the upper reaches of the channel could be decreased by up to 9” and should protect Crescent Road from overtopping. However, this project will need to be permitted by the US Army Corps of Engineers and as such the exact extent of the re-grading efforts will not be known until permitting efforts are begun.

Dependence

This project is independent of other improvements.

COST	SCORE
\$3.5M	14

TKB 8: Tom King Bayou Middle Branch, South Channel Restoration

Current Conditions

The south section of the Middle Branch of Tom King Bayou is a drainage channel that extends from Crescent Road west to Sherwood Drive. Drainage ditches also extend from Sherwood Drive to the southwest along several roads ending at Longview Street. Drainage in this area collects and routes water from the southern wetlands to the outfall at the Middle Branch. Flooding is experienced throughout the area.

Conceptual Improvement Description

The project consists of 3,000 linear feet of stream channel restoration to the south section of the Middle Branch. Plans are to re-grade the channel, clear overgrowth and provide armoring as necessary. Completion of the project should reduce flood depths in the channel which will provide for upstream drainage systems. An additional 5,000 linear feet of ditch clearing and re-shaping with associated culvert upgrades will be necessary on the west side of Sherwood Drive, extending past Edgewood Drive.

Results

Model results of the project show a decrease in the flow depths in the channel from 10” – 12” which will also affect those systems discharging to the channel. Further upstream the effectiveness of the improvements decrease with reductions in flow depth being nearly zero on the far southwest corner of the project. This indicates that flow depths are primarily determined by slope of the flow path.

These improvements are still included because they will decrease the direction of flooding in this area. If desired these improvements can be eliminated or the project could be separated into two projects.

Dependence

This project may only be constructed after downstream improvements have been accomplished.

COST	SCORE
\$5.8M	4

TKB 9: Tom King Bayou West Branch Channel Restoration

Legend

Improvements

- Remove Existing Pipe
- Existing Pipe
- New Ditchline
- Proposed Pipe
- Clean and Regrade Existing
- General Project Area



1-4'x7' BOX CULVERT

TKB 9: Tom King Bayou West Branch Channel Restoration

Current Conditions

The West Branch of Tom King Bayou is a drainage channel that extends from east of Sherwood Drive to Camden Drive. Flooding within this channel is not an immediate concern as it does not seem to impact any structures or overtop roadways. However this channel serves as the outfall for several large areas of drainage to the south. For this reason a reduction in flow depths could aid upstream drainage which is needed.

Conceptual Improvement Description

The project consists of approximately 2,500 linear feet of stream channel restoration from east of Sherwood Drive to Camden Drive. Plans are to re-grade the channel, clear overgrowth and provide armoring as necessary.

Completion of the project should reduce flood depths in the channel which will aid upstream drainage systems. It will also serve as the outfall for future drainage improvements that have been proposed upstream.

Results

Model results indicate that flow depths in the channel could be reduced considerably which will serve to provide greater capacity to upstream improvements which discharge to this system.

Dependence

This project is independent of other improvements.

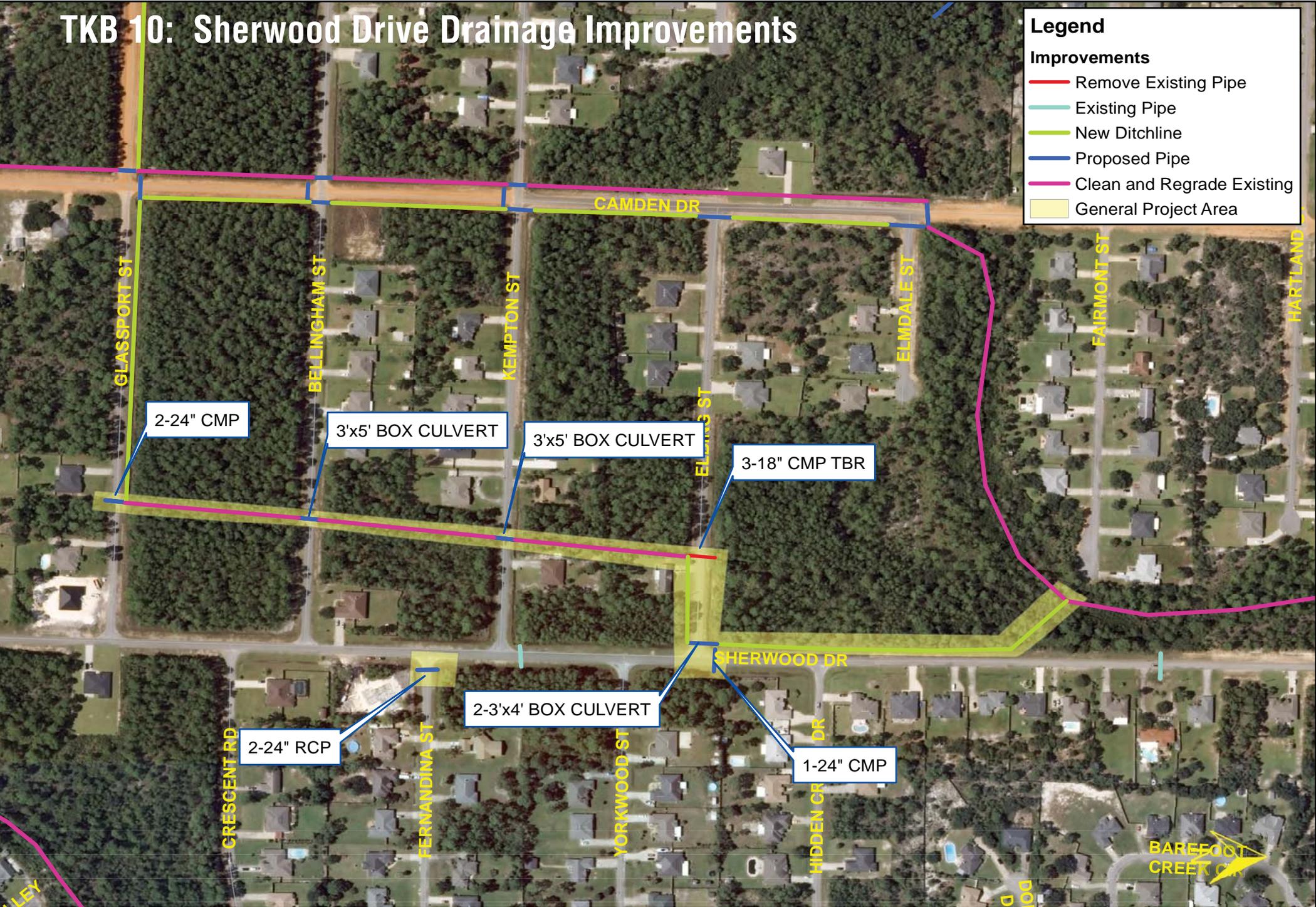
COST	SCORE
\$3.0M	10

TKB 10: Sherwood Drive Drainage Improvements

Legend

Improvements

- Remove Existing Pipe
- Existing Pipe
- New Ditchline
- Proposed Pipe
- Clean and Regrade Existing
- General Project Area



TKB 10: Sherwood Drive Drainage Improvements

Current Conditions

Sherwood Drive serves to convey stormwater from southern portions of the Tom King Bayou drainage area to the West Branch of Tom King Bayou. Some of the worst flooding in the drainage area occurs at the southern end of the road. This project has been proposed to provide greater capacity to this line of drainage.

Conceptual Improvement Description

The project will consist of improvements to the existing drainage paths including culvert replacement, stream channel restoration, and ditch improvements adding drainage capacity. This project should result in stormwater depth decreases along Sherwood Drive and in the area of Glassport Drive which serves as a path for stormwater from the wetlands west of Holley by the Sea.

Results

Results indicate that flow depths can be lowered along the entire extent of the proposed drainage path. In addition this could prevent road overtoppings at Bellingham and Glassport Streets.

Dependence

This project should not be constructed without first accomplishing downstream improvements. However, portions of other projects could be included in this scope to make the project independent of others.

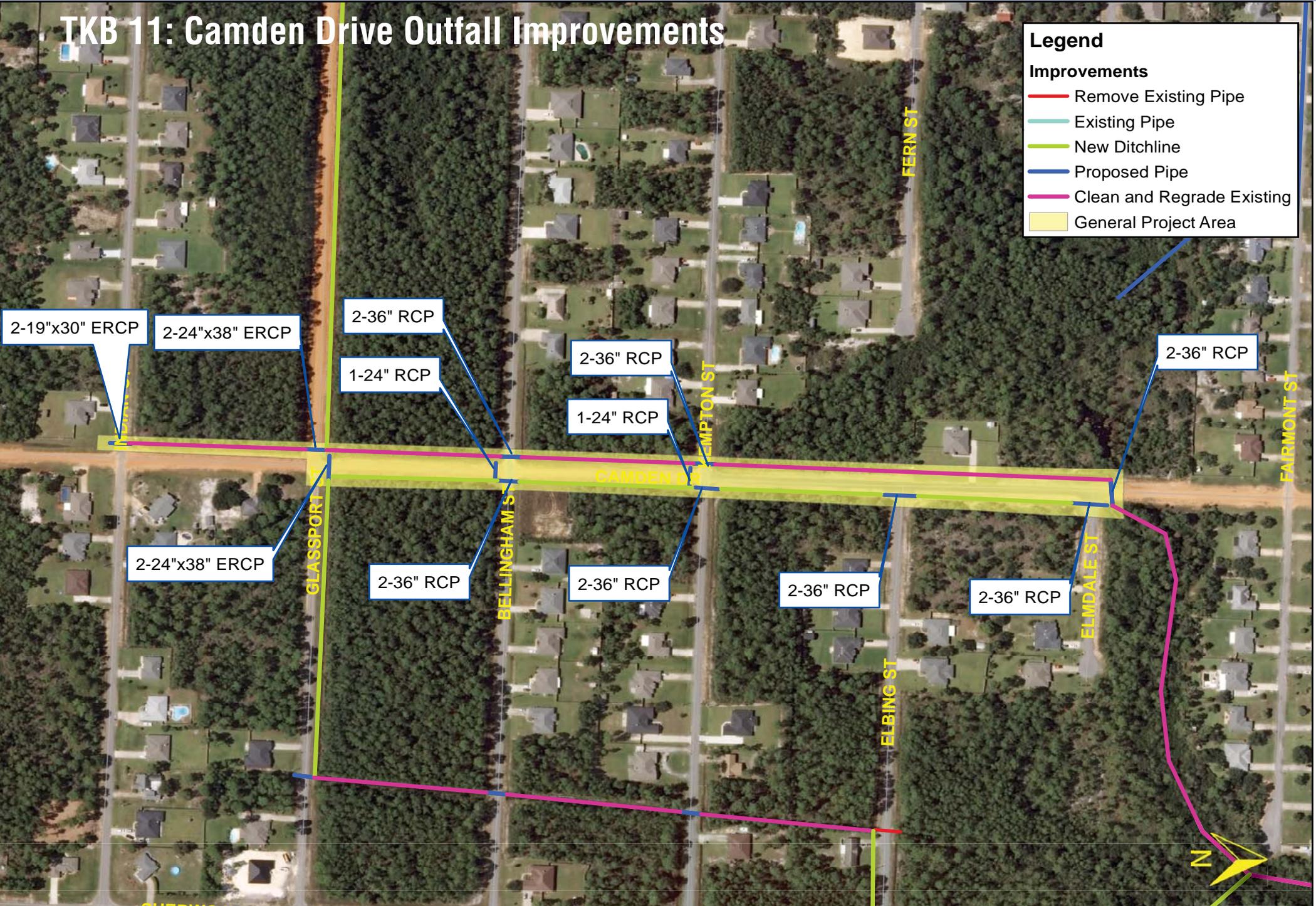
COST	SCORE
\$800,000	7

TKB 11: Camden Drive Outfall Improvements

Legend

Improvements

- Remove Existing Pipe
- Existing Pipe
- New Ditchline
- Proposed Pipe
- Clean and Regrade Existing
- General Project Area



TKB 11: Camden Drive Outfall Improvements

Current Conditions

Camden Drive serves to convey stormwater from southern portions of the Tom King Bayou drainage area to the West Branch of Tom King Bayou. Some of the worst flooding in the drainage area occurs at the southern end of the road. This project has been proposed to provide greater capacity to this line of drainage.

Conceptual Improvement Description

Work items will consist of improvements to the existing drainage system as well as adding additional ditching and culverts on the west side of the road to increase drainage capacity.

Results

The project will result in increased drainage along Camden Road which moves stormwater from the area surrounding Glassport Street to the west branch of Tom King Bayou. Modeling results indicate that flow depths can be lowered along the entire extent of the proposed drainage path. In addition this could prevent road overtoppings at Bellingham and Glassport Streets.

Dependence

This project should not be constructed without first accomplishing downstream improvements. However, portions of other projects could be included in this scope to make the project independent of others.

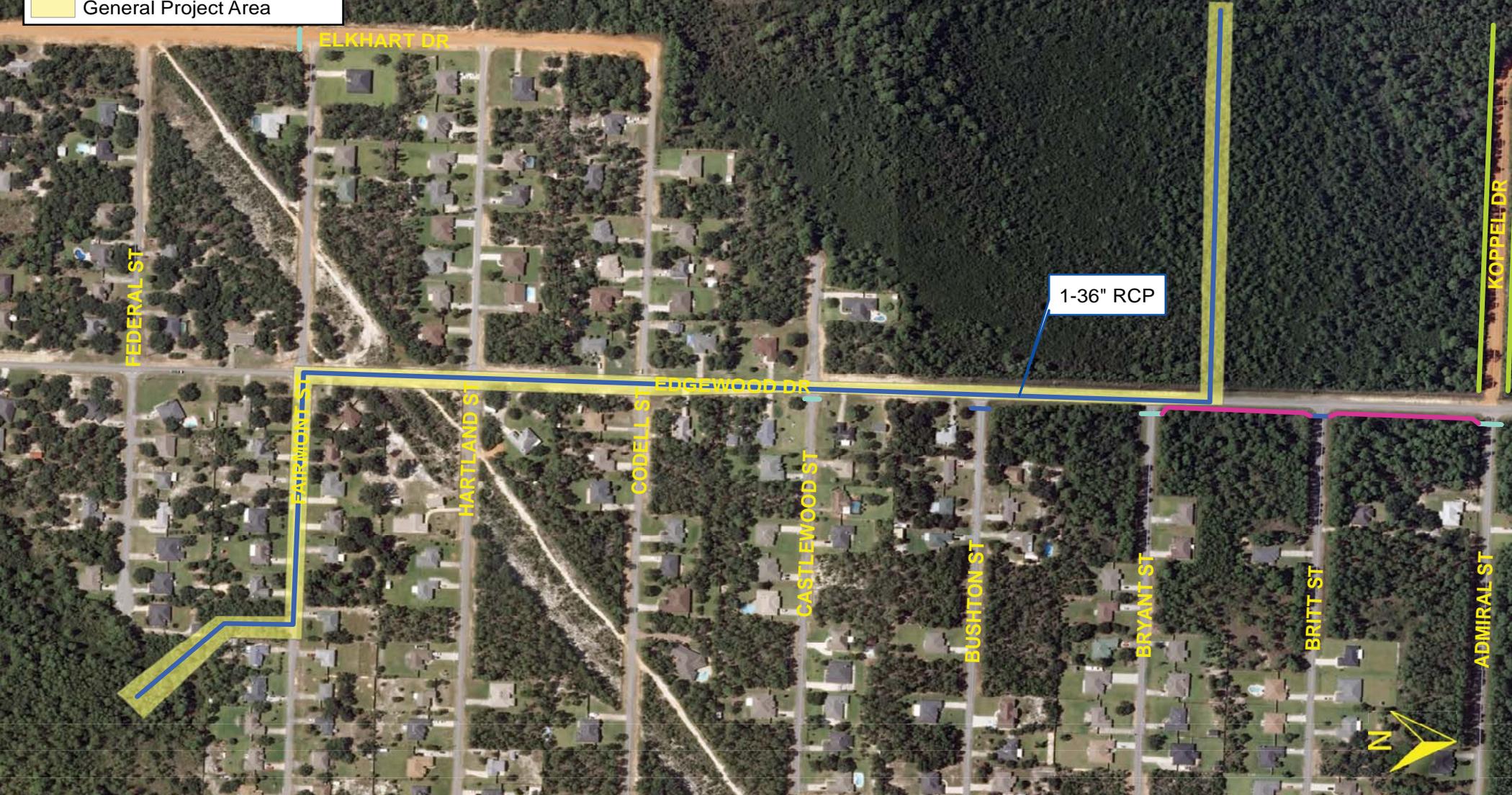
COST	SCORE
\$1.0M	5

TKP 10 - Federal Street Drainage Piper

Legend

Improvements

- Remove Existing Pipe
- Existing Pipe
- New Ditchline
- Proposed Pipe
- Clean and Regrade Existing
- General Project Area



TKB 12: Federal Street Drainage Pipe

Current Conditions

The area between Edgewood Drive and Camden Drive just east of Federal Street is an area that shows considerable flood depths affecting at least one street (Fern Street) and several yards directly.

Conceptual Improvement Description

The Federal Street drainage pipe begins just east of Federal Street and attempts to draw water off of the system and discharge to a drainage channel running north to south along the west side of Holley by the Sea. Along its path, the pipeline would be provided with inlets to pick up water in several local lows that collect stormwater.

Results

The modeling results indicate that the project could provide improvement in the area. Flood depths on the back of some lots could be lowered. The lowered flood depths however do not appear to improve conditions on Fern Street.

Dependence

This project can be constructed independently of other improvements, but could require easements and/or property agreements.

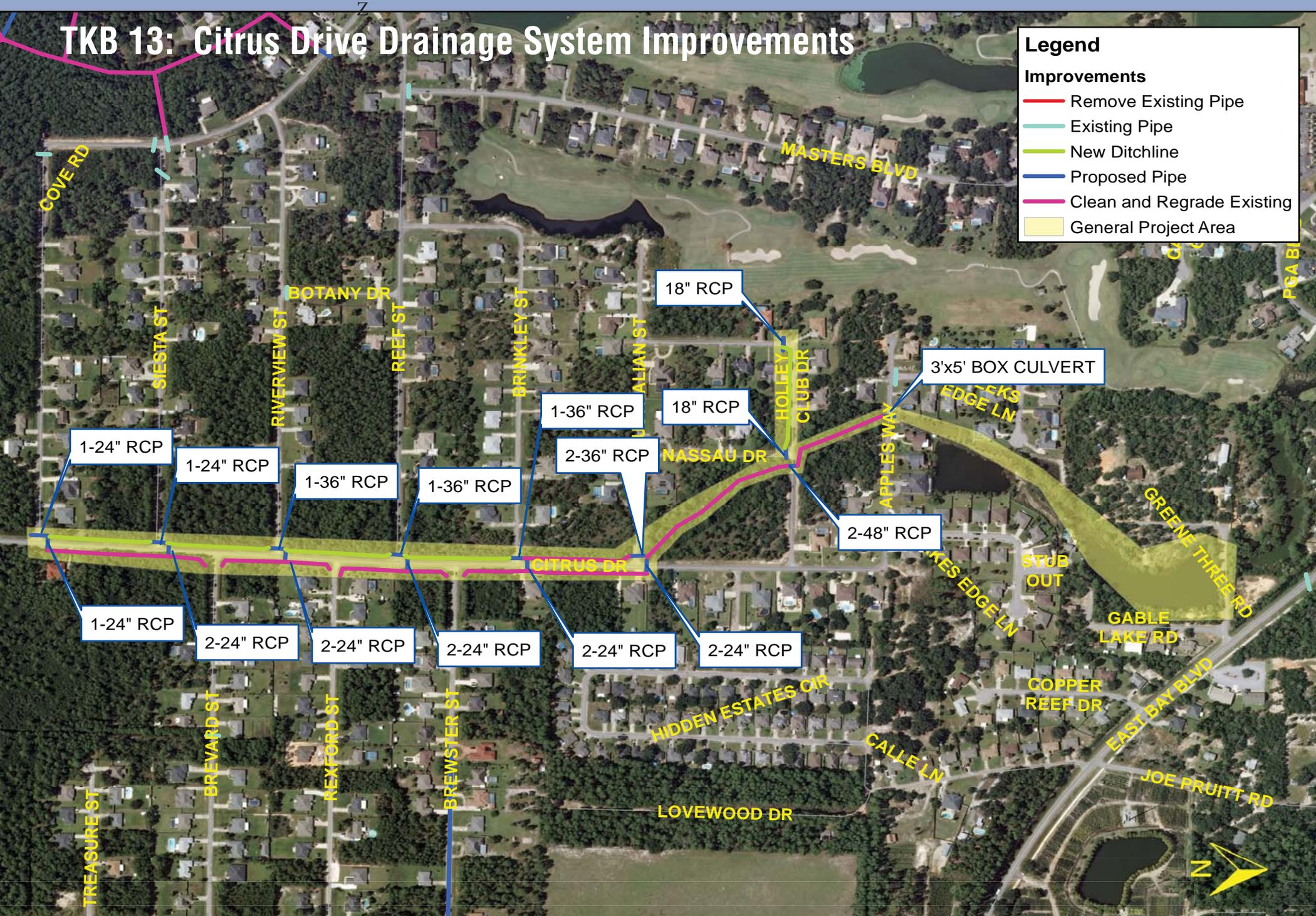
COST	SCORE
\$875,000	0

TKB 13: Citrus Drive Drainage System Improvements

Legend

Improvements

- Remove Existing Pipe
- Existing Pipe
- New Ditchline
- Proposed Pipe
- Clean and Regrade Existing
- General Project Area



TKB 13: Citrus Drive Drainage System Improvements

Current Conditions

Citrus Drive shows flooding along most of its north-south path during the 100yr-24hr storm event. At the north end of the road drainage facilities appear to be directed south. From historic documents it appears that provision was made for this drainage to be routed to the north. Some of this water could be directed again to the north to take water off of the Tom King Bayou East Branch system just to the south.

Conceptual Improvement Description

Improvements would include, ditch improvements and culvert upgrades as shown in the aerial. The project would end at Apples Way and discharge into a pond maintained by private property owners. This would require easements and/or maintenance agreements.

Results

The improvements should reduce drainage flow depths along Citrus Drive within this area. In addition this will remove water from the southern system which severely lacks capacity.

Dependence

This project can be constructed independently of other improvements, but could require easements and/or property agreements.

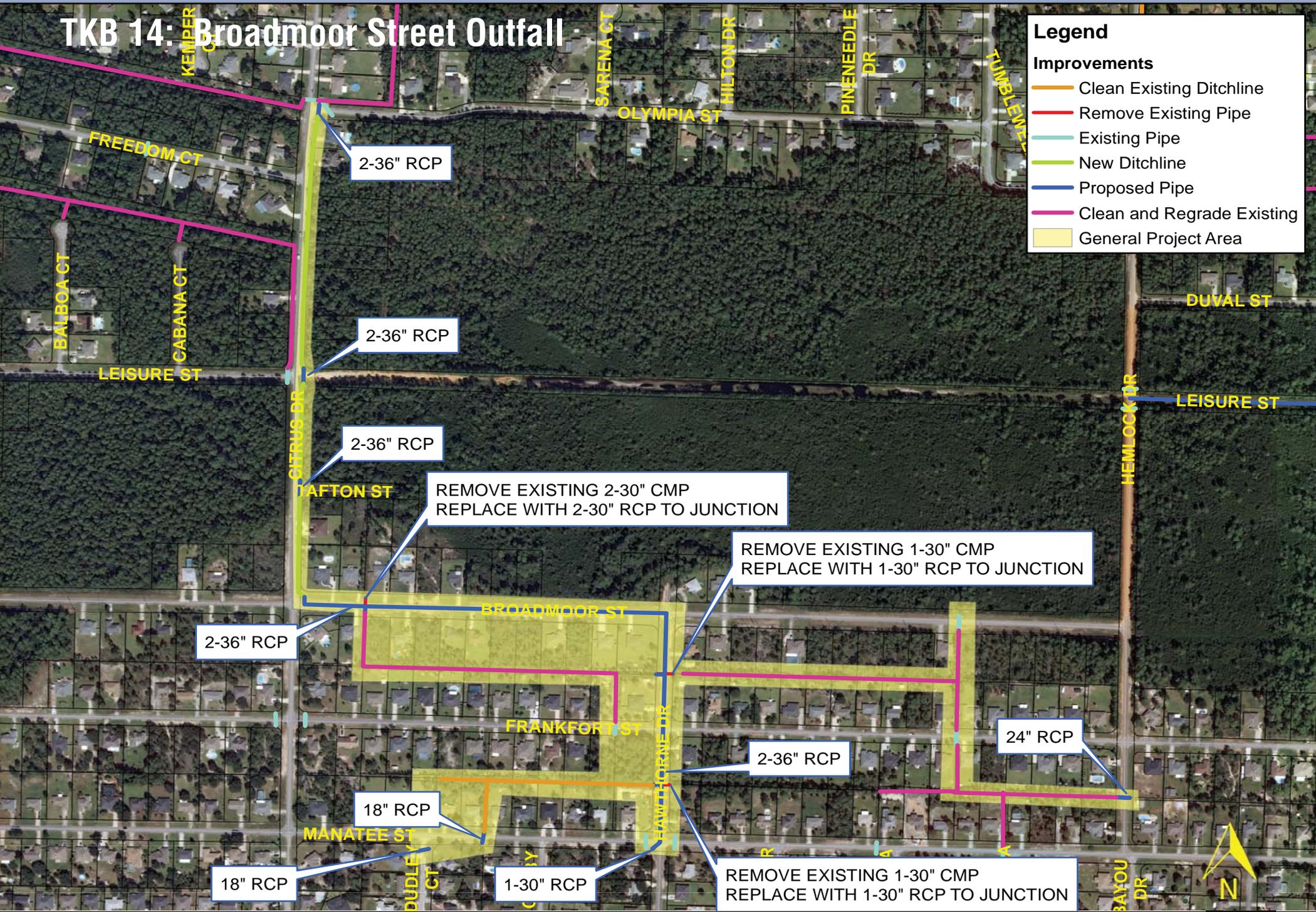
COST	SCORE
\$2.3M	6

TKB 14: Broadmoor Street Outfall

Legend

Improvements

- Clean Existing Ditchline
- Remove Existing Pipe
- Existing Pipe
- New Ditchline
- Proposed Pipe
- Clean and Regrade Existing
- General Project Area



TKB 14: Broadmoor Street Outfall

Current Conditions

The area bounded by Broadmoor Street, Manatee Street, Citrus Drive and Hemlock Drive is a large flat area which has little fall to its discharge point at the Freedom Drive ditch at Citrus Drive. Due to the flat grades in many ways it acts as a closed basin. Water builds up on streets and back yards and slowly drains to the north. In addition, a large wetland area lies just to the north, compounding the flooding.

Conceptual Improvement Description

The Broadmoor Street Outfall project consist of a new outfall line from the intersection of Manatee and Hawthorne to the discharge point on Citrus Drive (over 4,000 ft). The pipe will have collection points for stormwater along its path to pick up local drainage. Due to the nature of the area the pipe will be very flat, which will make careful maintenance necessary.

Results

The project will lower flood depths along its length. As with most of the improvements suggested in Holley by the Sea, these reductions will not be enough to eliminate flooding during large rainfall events. However, water should move out of the area more quickly after these rain events.

Dependence

This project should not be constructed without first accomplishing downstream improvements.

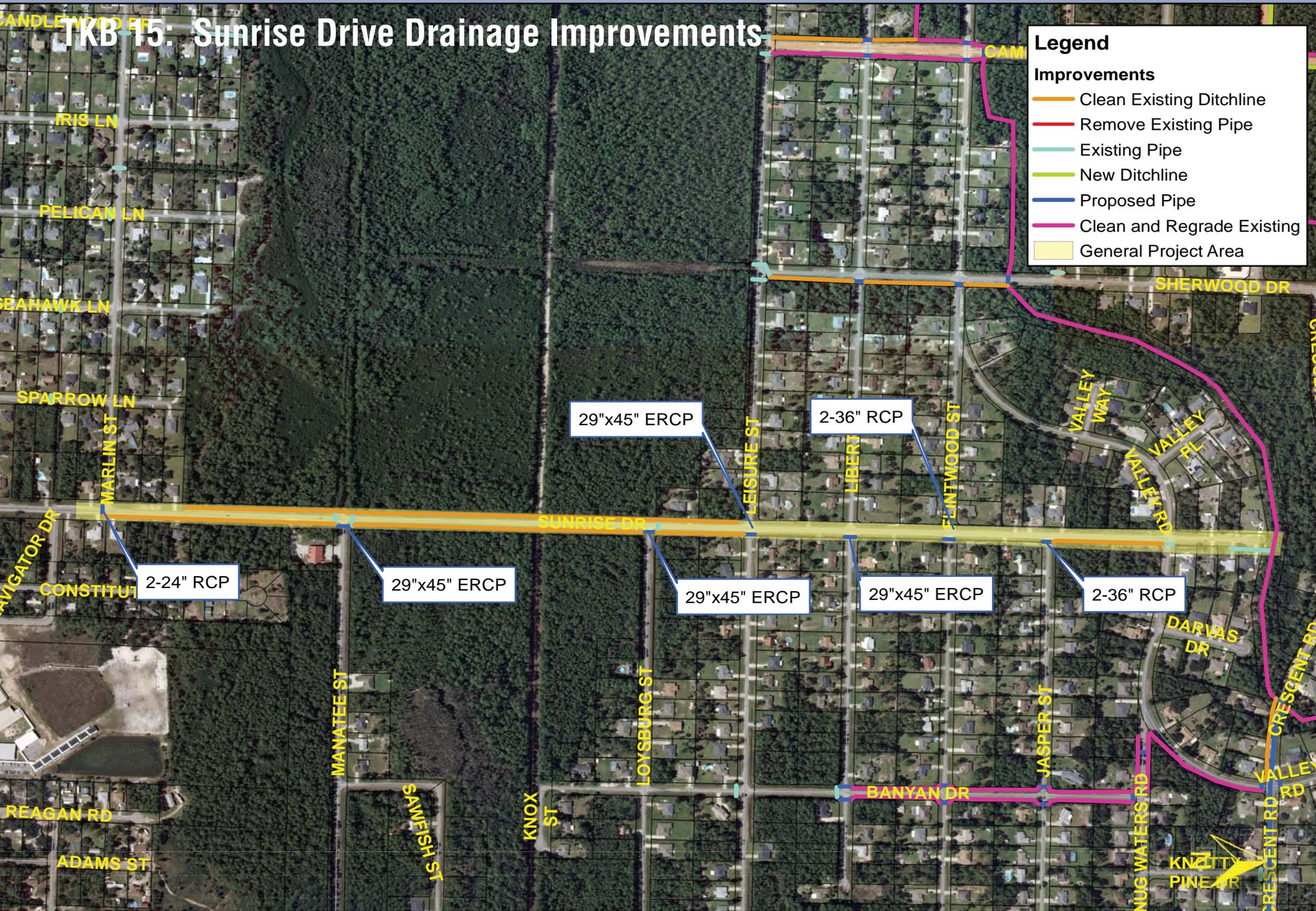
COST	SCORE
\$2.3M	2

TKB-15: Sunrise Drive Drainage Improvements

Legend

Improvements

- Clean Existing Ditchline
- Remove Existing Pipe
- Existing Pipe
- New Ditchline
- Proposed Pipe
- Clean and Regrade Existing
- General Project Area



TKB 15: Sunrise Drive Drainage Improvements

Current Conditions

Sunrise Drive encompasses the main entrance to Holley By the Sea and is a primary north-south road for the subdivision. Flooding has been noted along its path. Most of the flooding appears to be from overflowing road-side swales. The drainage system is in need of upgrades, particularly at its northern end to eliminate bottlenecks in the drainage path.

Conceptual Improvement Description

The project will provide culvert upgrades to eliminate the bottlenecks mentioned. In addition culverts will be increased along the length of the road to provide better north-south drainage to the outfall. Ditch re-grading may be necessary to facilitate the culvert upgrades.

Results

The project should lower flood depths along the road's length. These reductions may not be enough to eliminate flooding along the road's entire length. Most flooding reduction should occur at the northern end of the roadway. However, the entire roadway should experience better drainage with shorter durations of flooding conditions.

Dependence

This project should not be constructed without first accomplishing downstream improvements.

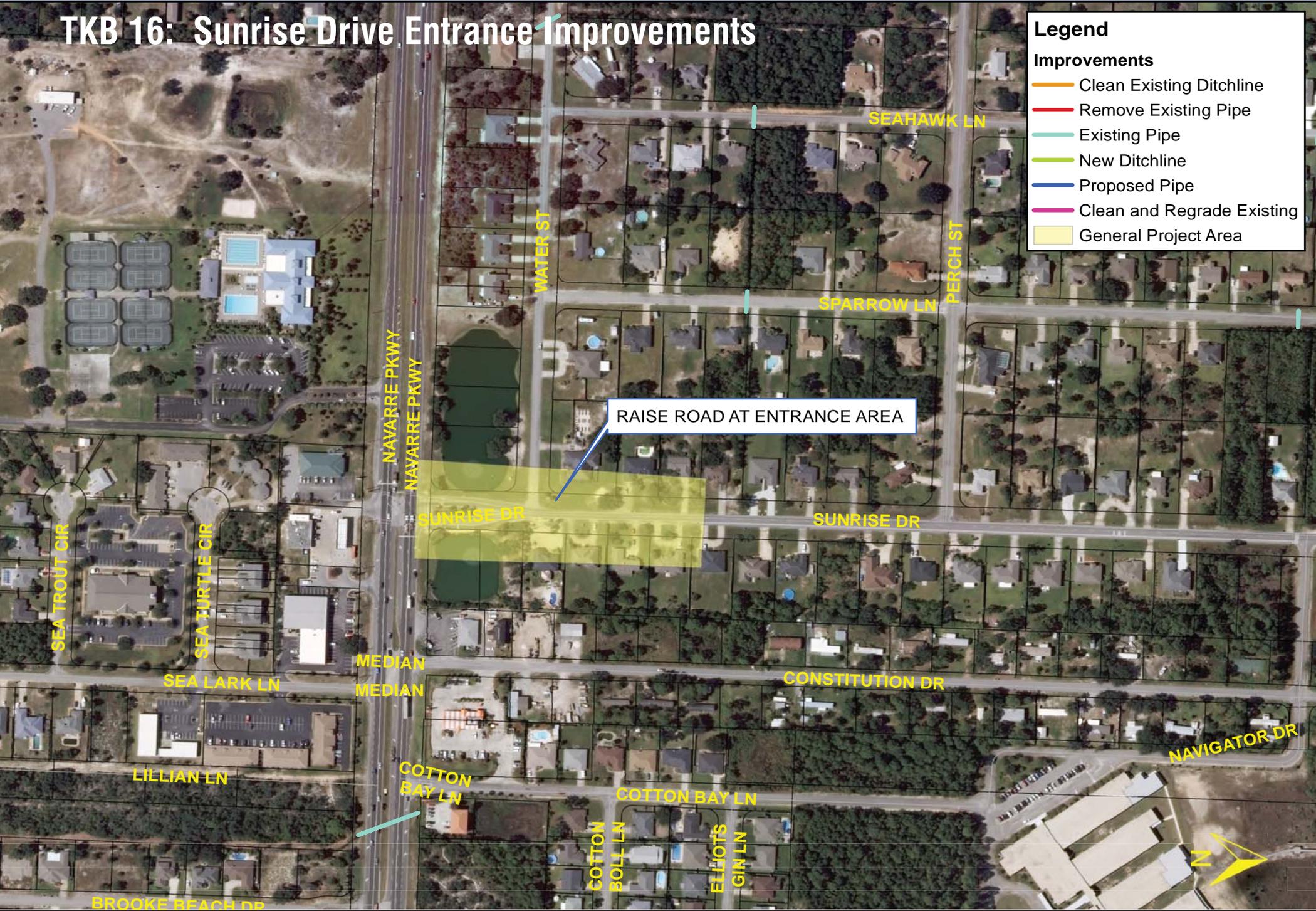
COST	SCORE
\$1.3M	3

TKB 16: Sunrise Drive Entrance Improvements

Legend

Improvements

- Clean Existing Ditchline
- Remove Existing Pipe
- Existing Pipe
- New Ditchline
- Proposed Pipe
- Clean and Regrade Existing
- General Project Area



TKB 16: Sunrise Drive Entrance Improvements

Current Conditions

Sunrise Drive is the main entrance to Holley By the Sea and is a primary north-south road for the subdivision. At the entrance there are two ponds, one on either side of the roadway, for aesthetic purposes. The ponds are kept at a constant water level with effluent from Holley Navarre WWTP. In addition, the ponds are used as irrigation water for the surrounding area. During moderate to heavy rainfall the level in the ponds rises to cover the road surface making the roadway impassable.

Conceptual Improvement Description

To make the roadway passable at the entrance from Hwy 98, the roadway will be rebuilt to raise its grade and provide connection between the ponds below. The Holley By The Sea sign should not require modification. Communication with FDOT will be necessary to coordinate work affecting their traffic light control.

Results

Raising the roadway should prevent roadway overtopping at the Holley by the Sea entrance area.

Dependence

This project can be constructed independently of other projects.

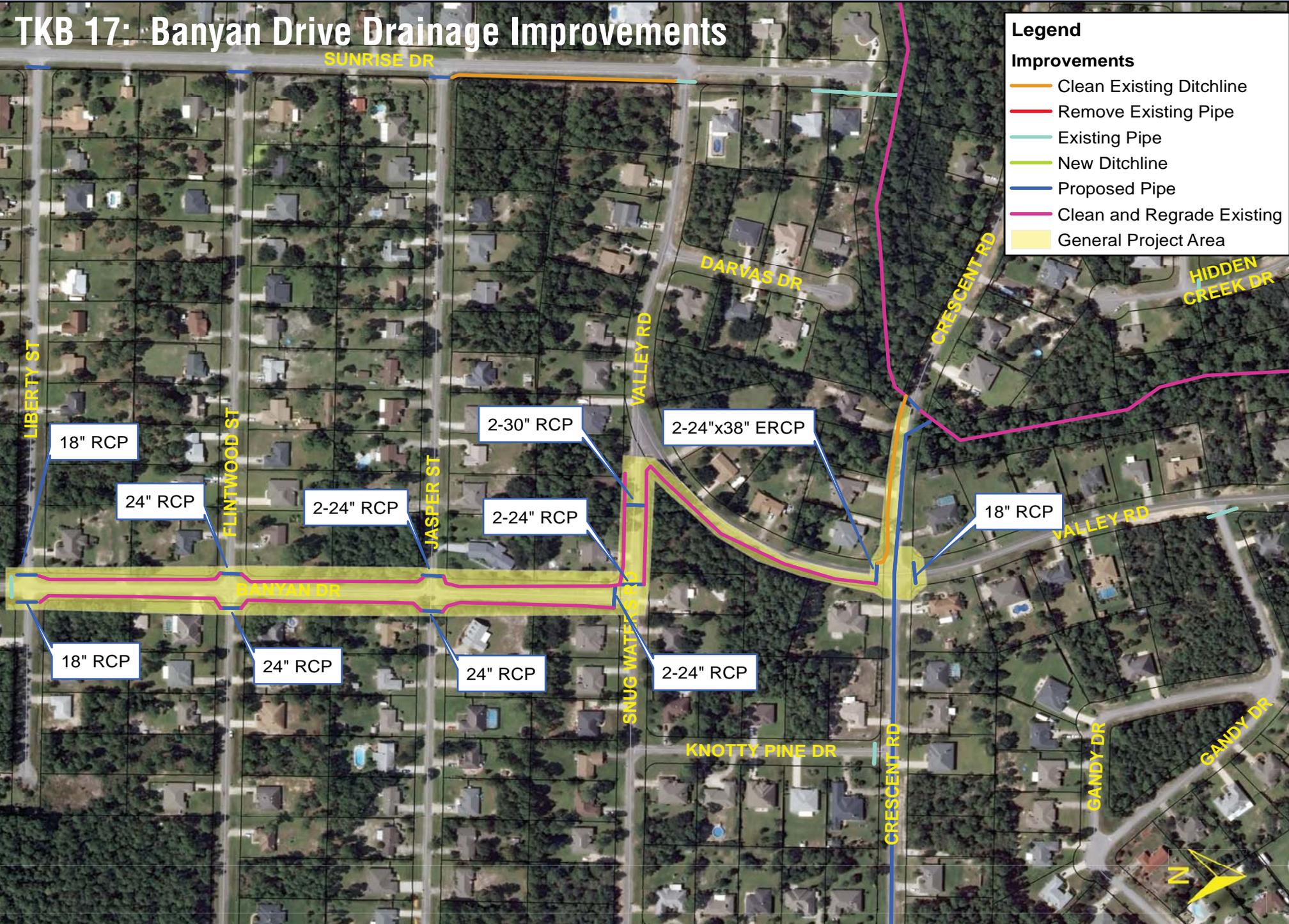
COST	SCORE
\$530,000	1

TKB 17: Banyan Drive Drainage Improvements

Legend

Improvements

- Clean Existing Ditchline
- Remove Existing Pipe
- Existing Pipe
- New Ditchline
- Proposed Pipe
- Clean and Regrade Existing
- General Project Area



TKB 17: Banyan Drive Drainage Improvements

Current Conditions

Banyan Drive is a north-south roadway that conveys stormwater runoff in the middle branch area of Tom King Bayou. Flooding has been noted along streets that drain to this main conveyance line. Existing drainage swales have become overgrown in some places, and existing culverts are causing bottlenecks in some areas.

Conceptual Improvement Description

The existing drainage swales should be cleaned and regraded to improve flow to Tom King Bayou. Most of the existing culverts will also need to be replaced either to increase capacity or due to regrading/lowering of the ditchline. Additionally, new culverts will be added on the southern portion of the conveyance system to connect and drain a previously isolated area.

Results

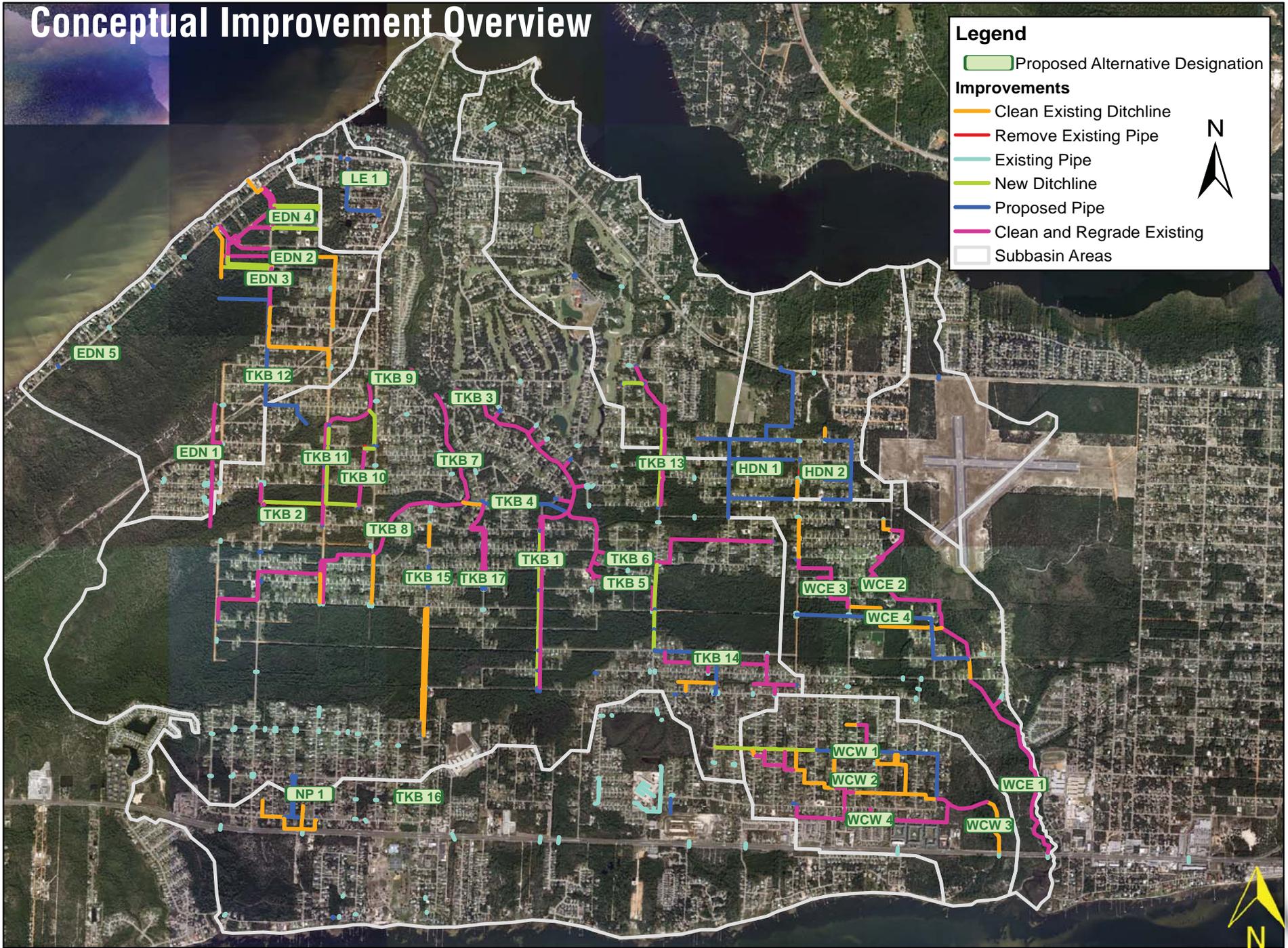
Improvements to this conveyance system should reduce roadway overtoppings in the immediate area.

Dependence

This project should not be constructed without first accomplishing downstream improvements.

COST	SCORE
\$490,000	5

Conceptual Improvement Overview



Legend

- Proposed Alternative Designation
- Improvements**
- Clean Existing Ditchline
- Remove Existing Pipe
- Existing Pipe
- New Ditchline
- Proposed Pipe
- Clean and Regrade Existing
- Subbasin Areas



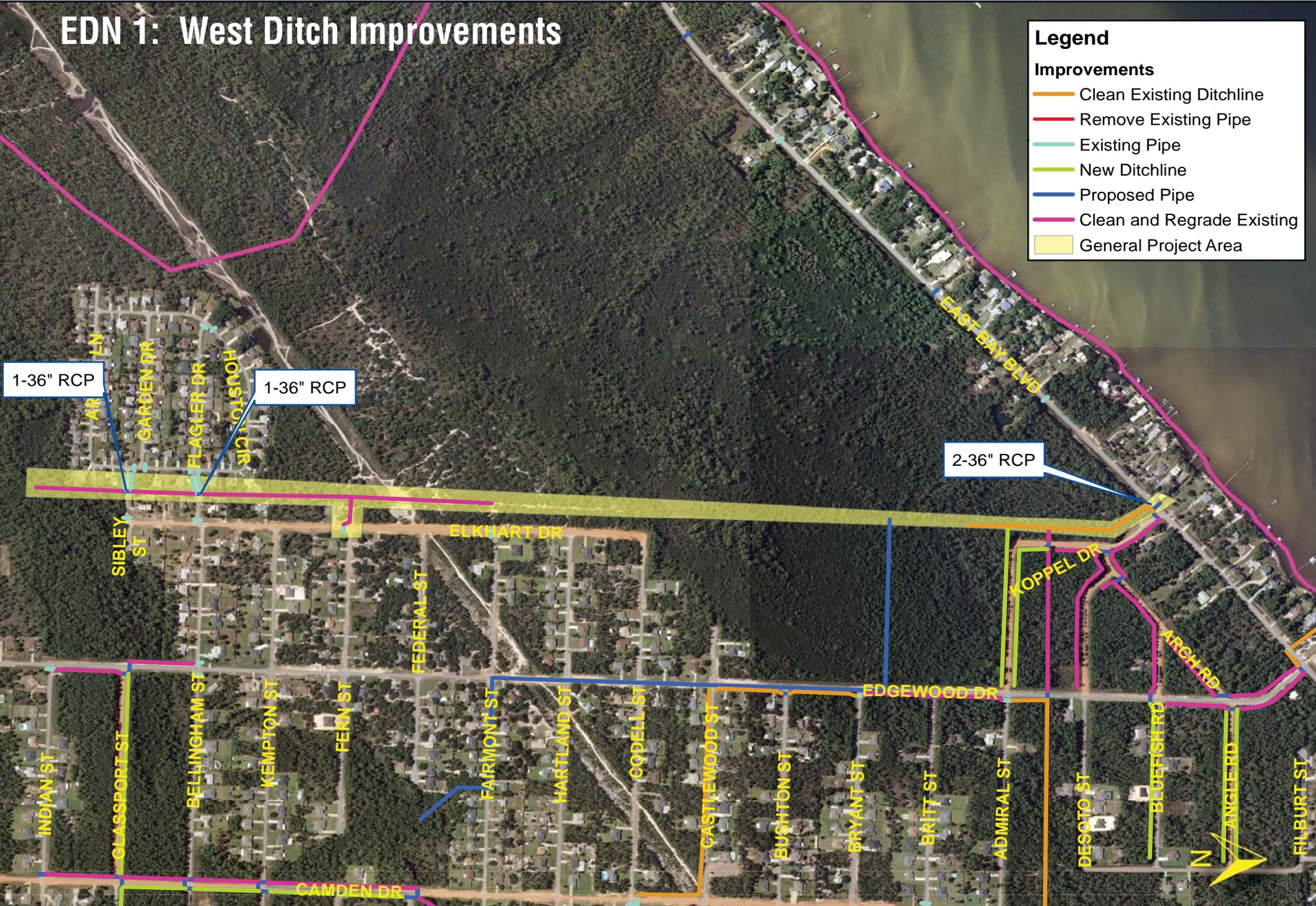
Edgewood Drive North	
EDN 1	West Ditch Improvements
EDN 2	Admiral Street North Drainage Improvements
EDN 3	Edgewood Drive Drainage Improvements
EDN 4	Bluefish Road Area Drainage System
EDN 5	East Bay Boulevard Culvert Upgrades

EDN 1: West Ditch Improvements

Legend

Improvements

- Clean Existing Ditchline
- Remove Existing Pipe
- Existing Pipe
- New Ditchline
- Proposed Pipe
- Clean and Regrade Existing
- General Project Area



EDN 1: West Ditch Improvements

Current Conditions

During the development of Holley by the Sea, a north-south drainage ditch was constructed on the west limit of the property. The ditch provides out-fall to areas close to the ditch along Elkhart Drive. It also provides relief for stormwater coming from the southern wetland. The ditch discharges to a low wetland area, but picks up on the north side of the wetland which routes it to the bay.

Conceptual Improvement Description

Improvements will include re-grading the ditch to provide more consistent slope and increase capacity. Specifically, slopes flatten around the power easement which forms a high point in the topography. Culvert upgrades will be necessary in order to draw additional water off of the southern wetland and route it to the north.

Results

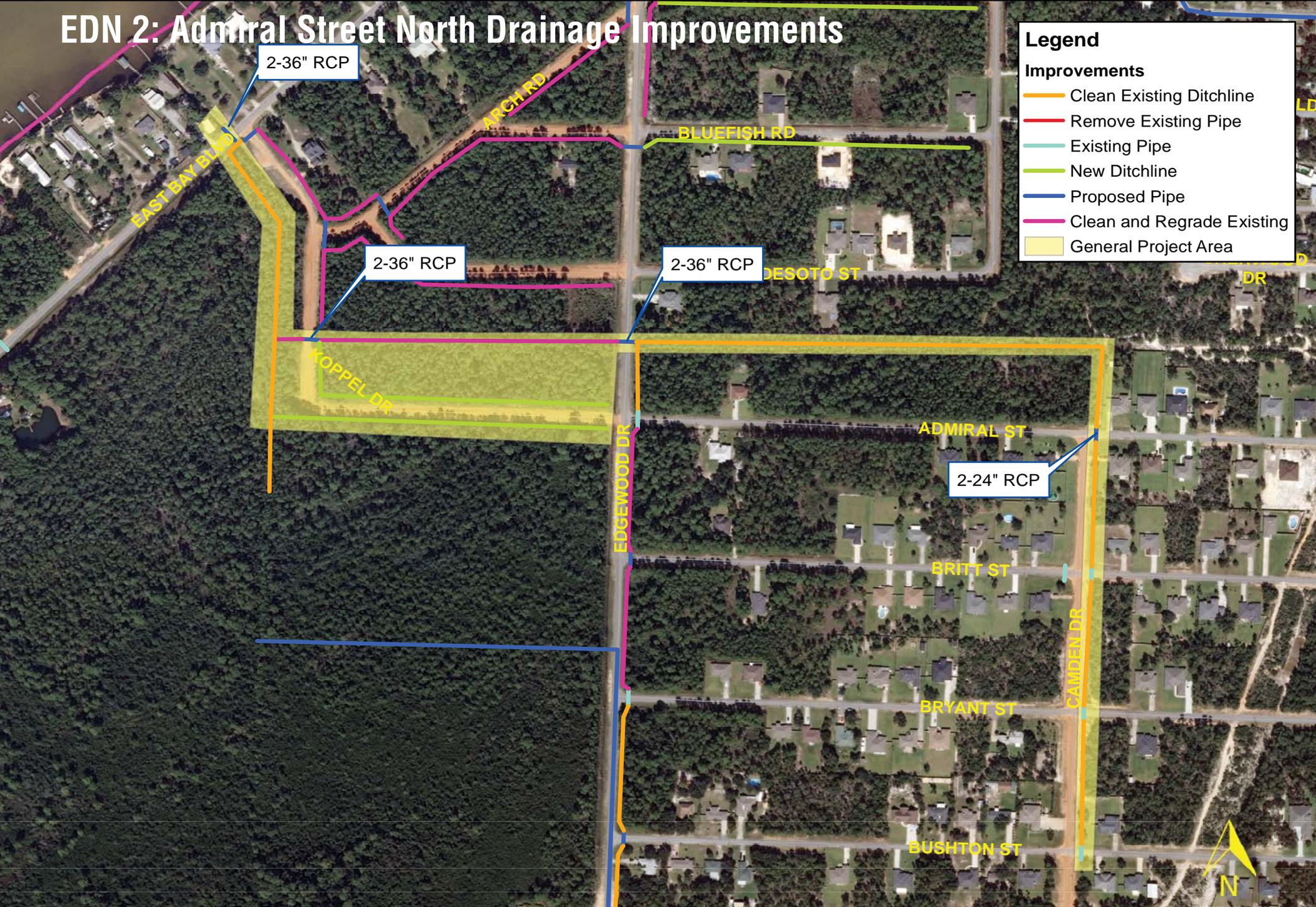
The model results indicate that flood depths in the southern wetland can be reduced. In addition, this should improve the performance of the drainage features discharging to this ditch. By drawings water off of the southern system for relief the water will be added to the northern system. The model indicates that the water depths in the north wetland could increase up to 4", however at the road culvert the increase is less than 2".

Dependence

This project is independent of other improvements.

COST	SCORE
\$800,000	3

EDN 2: Admiral Street North Drainage Improvements



EDN 2: Admiral Street North Drainage Improvements

Current Conditions

The Admiral Street North drainage ditch is a backlot ditch running between Admiral Street and Desoto Street. It receives drainage from those two blocks as well as stormwater runoff conveyed to it from Camden Drive and Edgewood Drive. The downstream portion of the channel has become overgrown contributing to roadway overtopping on Koppel Drive and upstream conveyance backups.

Conceptual Improvement Description

Improvements include cleaning and re-grading the downstream section of the ditch in order to increase flow into the West Ditch and outfall as well as providing better fall along the ditch line. General cleaning of the ditch length will also be performed as well as increasing the size of several culverts along the drainage path. A new ditch will be constructed along both sides of Koppel Drive to alleviate roadway overtopping.

Results

The project should lower flood depths and decrease roadway overtoppings. It could also provide some capacity for future projects and conveyance for future development. Water should also be able to move out of the area more quickly after rain events.

Dependence

This project is dependent on increasing the size of the culvert crossing at East Bay Boulevard and Koppel Drive, which is a part of the Bluefish Road Area Improvements (EDN 4). It may be constructed independently as long as the culvert improvement is added to this project.

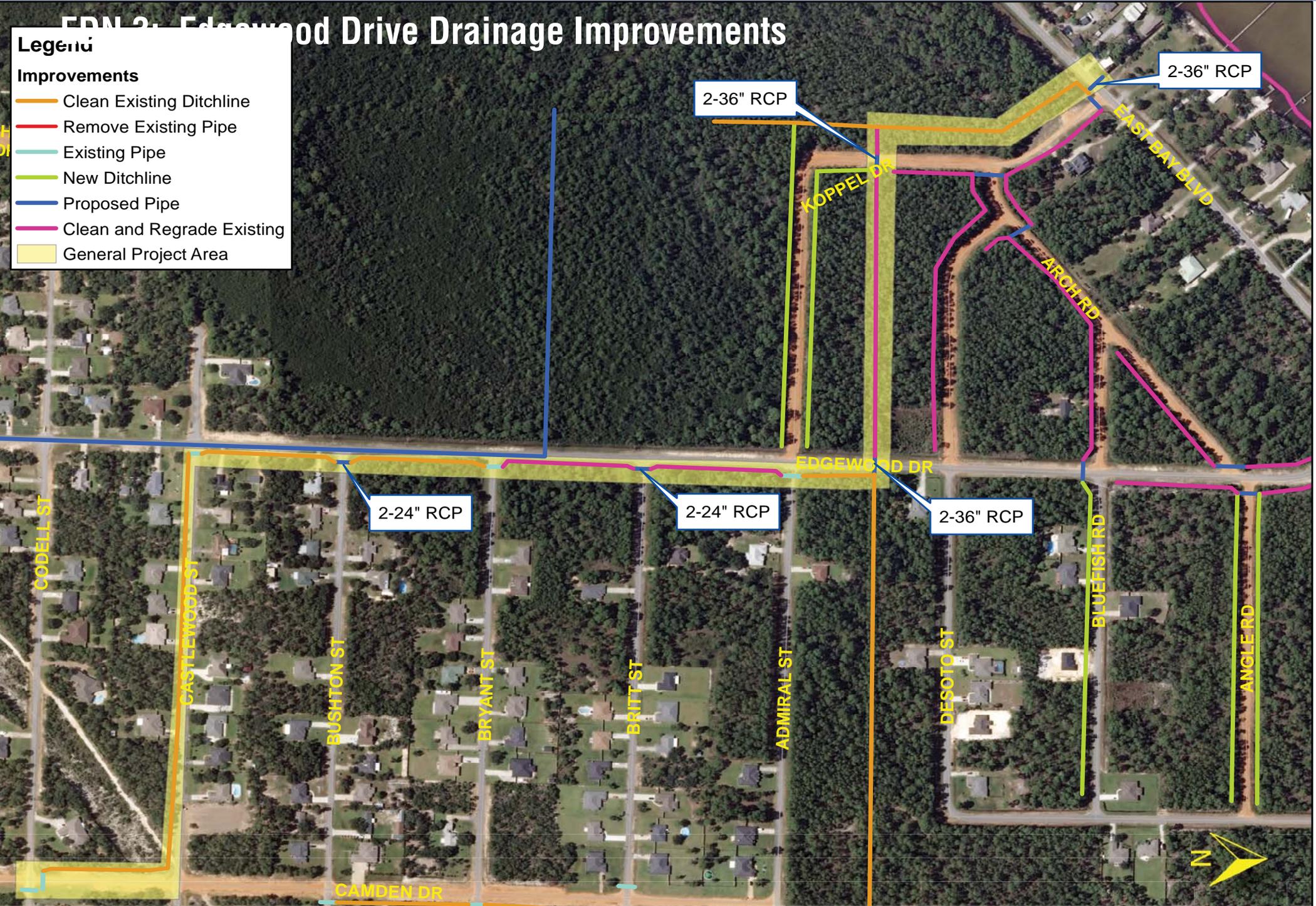
COST	SCORE
\$650,000	2

EDM 2: Edgewood Drive Drainage Improvements

Legend

Improvements

- Clean Existing Ditchline
- Remove Existing Pipe
- Existing Pipe
- New Ditchline
- Proposed Pipe
- Clean and Regrade Existing
- General Project Area



EDN 3: Edgewood Drive Drainage Improvements

Current Conditions

The area around Edgewood Drive naturally drains north and is collected by a back lot ditch north of Admiral Street. Flooding has been noted along Edgewood Drive as well as some of the surrounding blocks. The area is fairly low and flat, and some of the ditch conveyance systems have become overgrown.

Conceptual Improvement Description

Improvements include cleaning most of the existing ditch line as well as re-grading the portion between Bryant Street and Britt Street to facilitate better drainage to the Admiral Street North ditch. Some culverts along the run will also be increased in size.

Results

The implementation of these alternatives should decrease upstream runoff depths and instances of roadway overtopping along Edgewood Drive. It should also decrease the length of time water remains in the area after the storm ends.

Dependence

This project should not be constructed without first accomplishing downstream improvements.

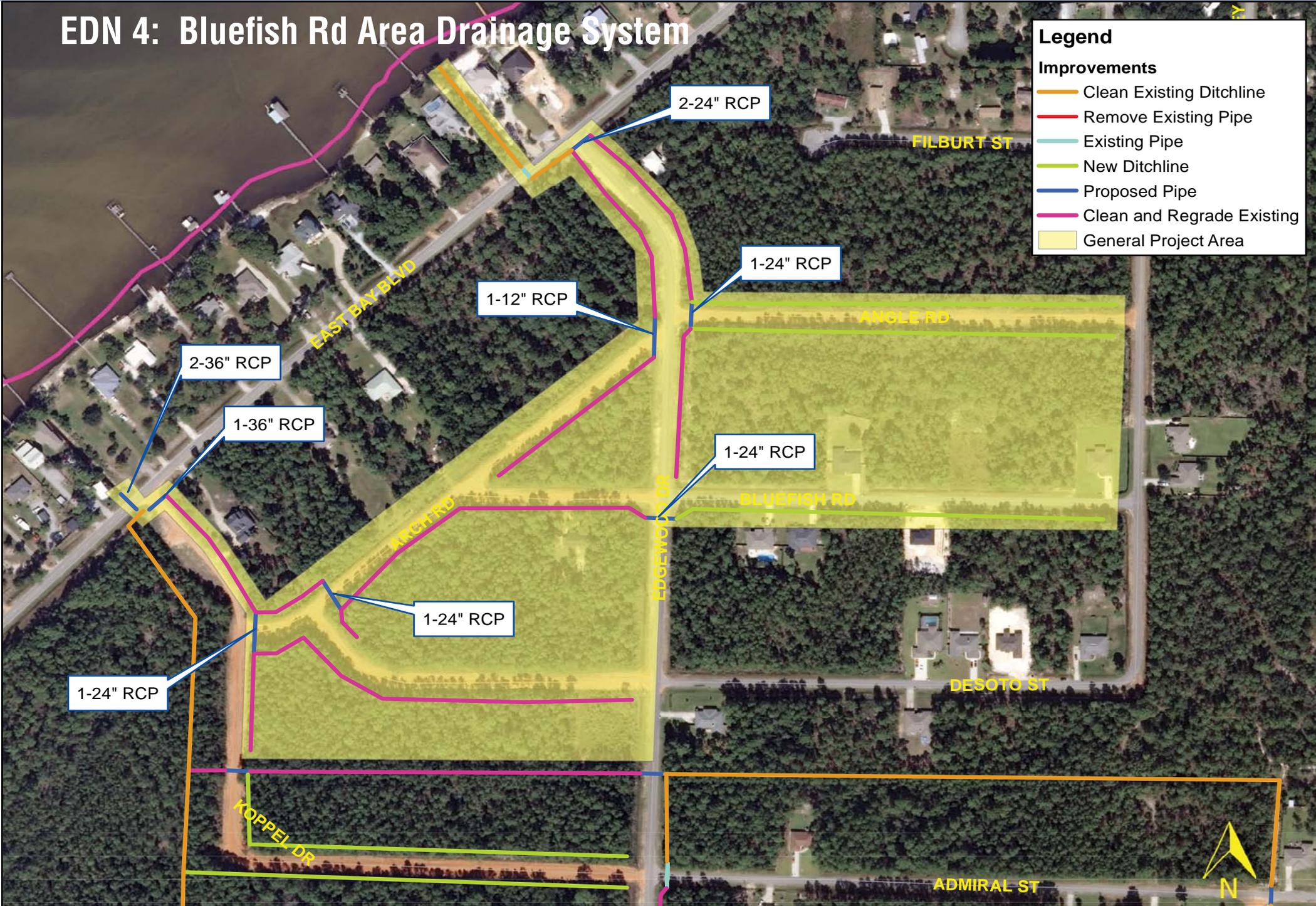
COST	SCORE
\$630,000	1

EDN 4: Bluefish Rd Area Drainage System

Legend

Improvements

- Clean Existing Ditchline
- Remove Existing Pipe
- Existing Pipe
- New Ditchline
- Proposed Pipe
- Clean and Regrade Existing
- General Project Area



EDN 4: Bluefish Rd Area Drainage System

Current Conditions

The area around Bluefish Road currently has little to no conveyance system in place. Existing ditches are overgrown, and some blocks lack culvert crossings.

As a result, much of the area experiences flooding of roads and yards. Most of the area is currently undeveloped, but flooding will likely increase as more homes are constructed.

Conceptual Improvement Description

This project involves cleaning and lowering much of the existing ditchline, as well as adding new culvert crossings and ditches to surrounding blocks. Some of the existing culverts will also be increased in size, including one under East Bay Boulevard.

Results

The proposed drainage system should decrease the number of roadway over topplings in the area and lower the surrounding flood stages. Some areas may still experience flooding, especially the back of some lots, but the model indicates that the duration will be decreased.

Dependence

This project can be constructed independently of other projects.

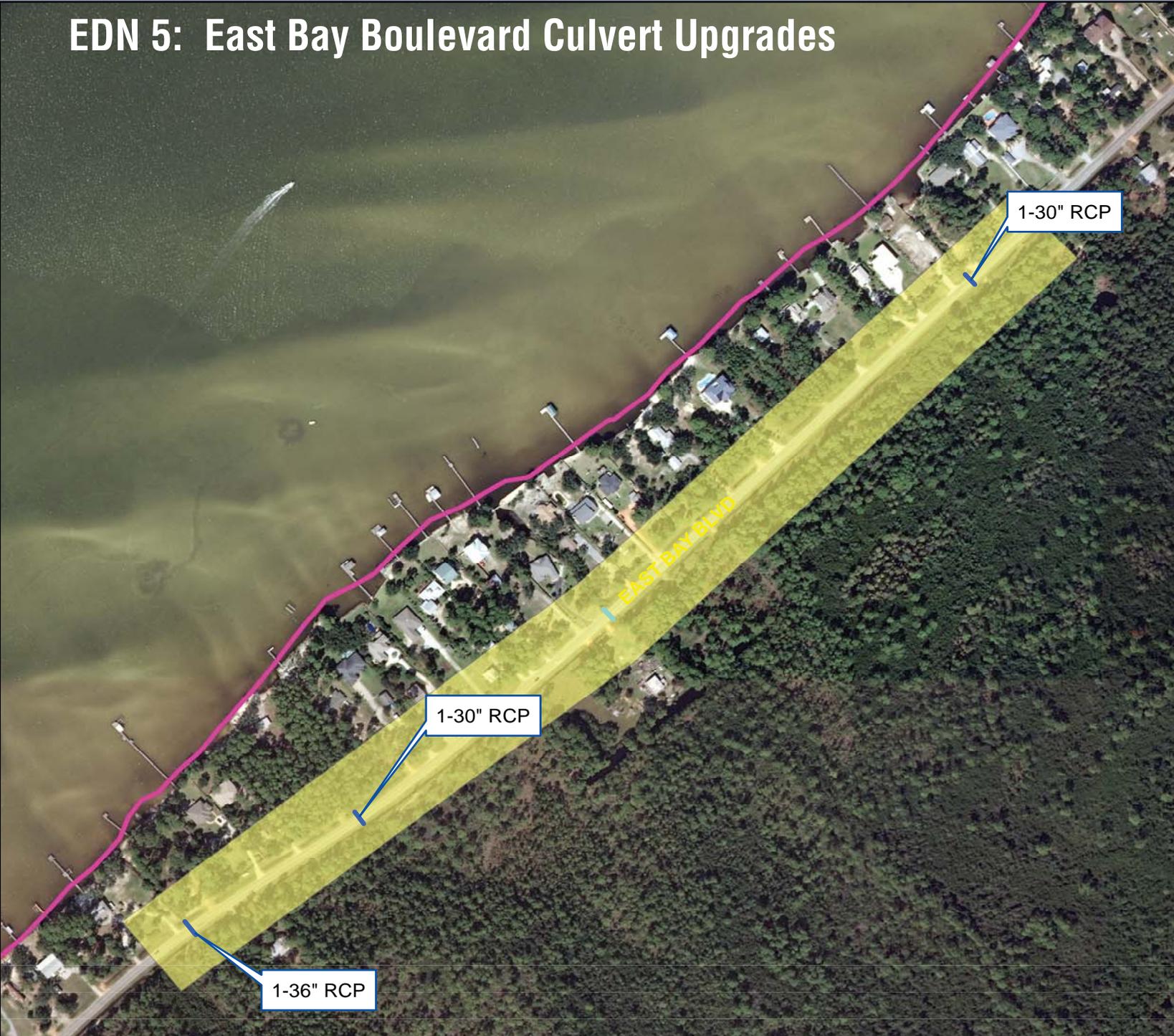
COST	SCORE
\$1.7M	2

EDN 5: East Bay Boulevard Culvert Upgrades

Legend

Improvements

- Clean Existing Ditchline
- Remove Existing Pipe
- Existing Pipe
- New Ditchline
- Proposed Pipe
- Clean and Regrade Existing
- General Project Area



EDN 5: East Bay Boulevard Culvert Upgrades

Current Conditions

This portion of East Bay Boulevard naturally drains west, into East Bay. The wetland area to the east also naturally drains this direction, and must cross East Bay Boulevard to reach an outfall. Some portions of East Bay Boulevard have experienced roadway overtopping.

Conceptual Improvement Description

The sizes of some of the culverts under East Bay Boulevard should be increased to better convey runoff to the outfalls in the East Bay.

Results

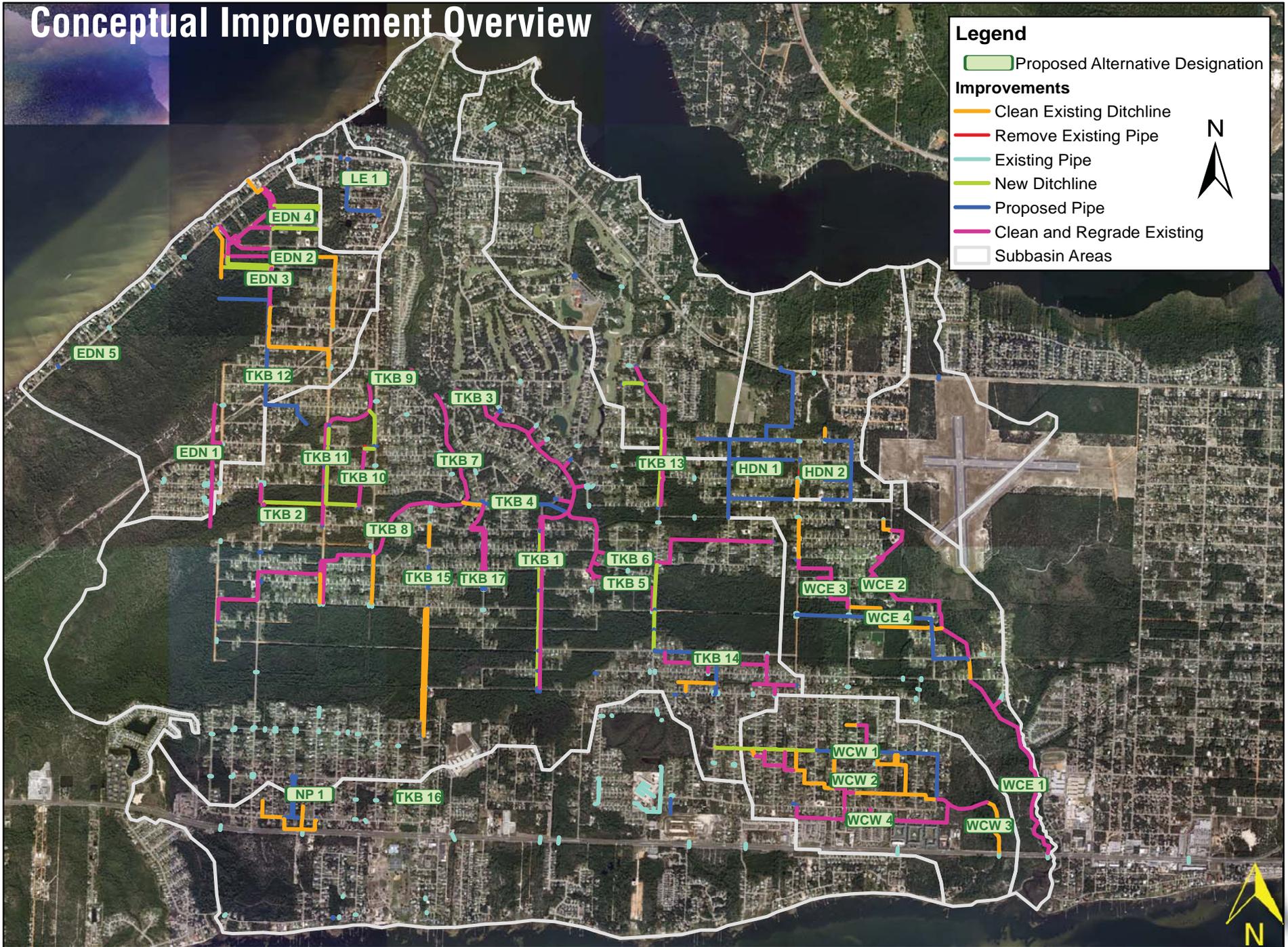
Increasing the capacity of the culverts indicated should prevent runoff from flooding the road during a large storm event. This project should also decrease the duration of any flooding on the east side of the road.

Dependence

This project may be constructed independently of other projects.

COST	SCORE
\$250,000	3

Conceptual Improvement Overview



Legend

- Proposed Alternative Designation
- Improvements**
- Clean Existing Ditchline
- Remove Existing Pipe
- Existing Pipe
- New Ditchline
- Proposed Pipe
- Clean and Regrade Existing
- Subbasin Areas



Hemlock Drive North	
HDN 1	Brewster Street Outfall
HDN 2	Pepper Drive Drainage System Improvements

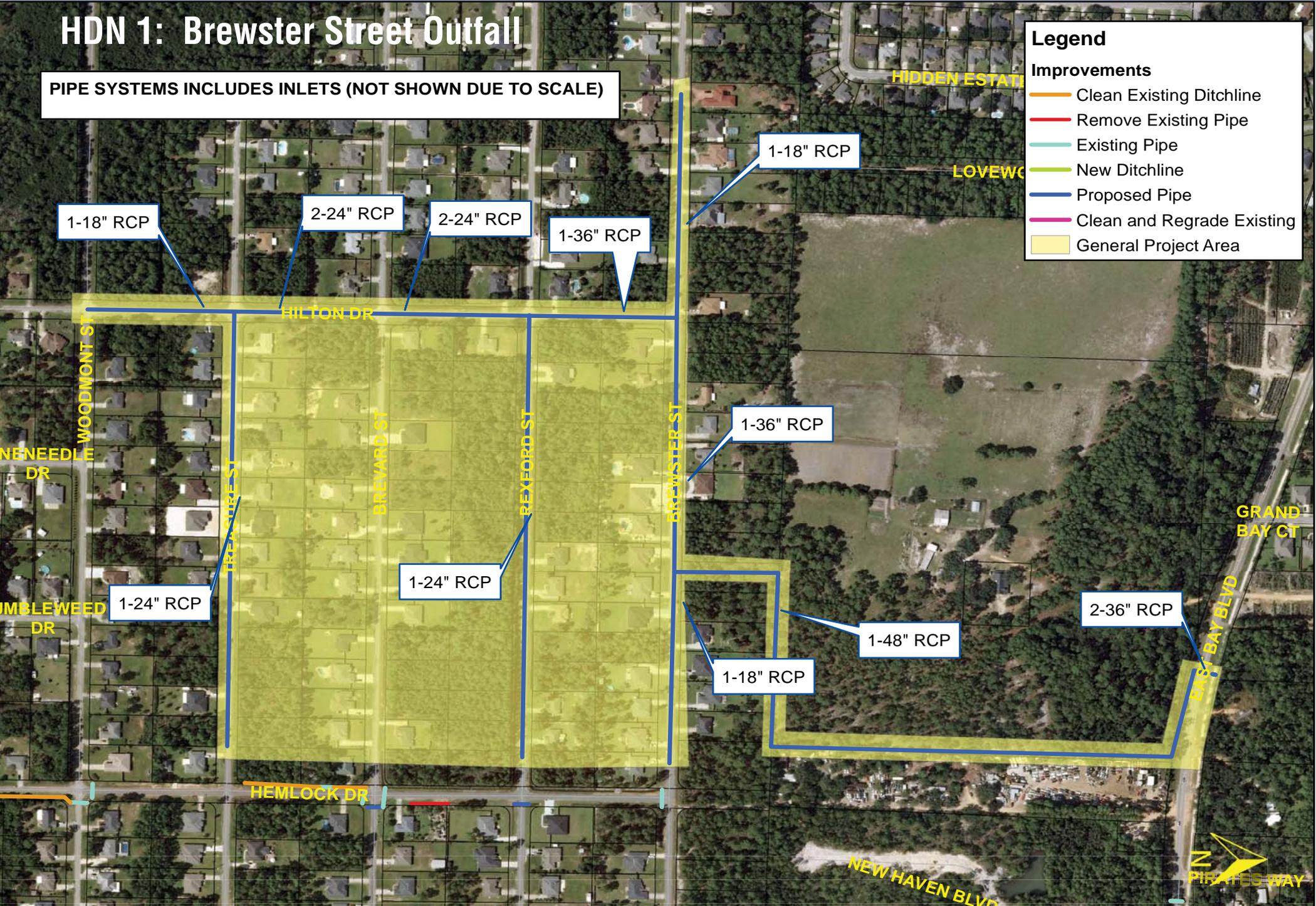
HDN 1: Brewster Street Outfall

PIPE SYSTEMS INCLUDES INLETS (NOT SHOWN DUE TO SCALE)

Legend

Improvements

- Clean Existing Ditchline
- Remove Existing Pipe
- Existing Pipe
- New Ditchline
- Proposed Pipe
- Clean and Regrade Existing
- General Project Area



HDN 1: Brewster Street Outfall

Current Conditions

The existing ditch systems for the area around Brewster Street and Hilton Drive convey runoff on the east side of the road to a creek outfall north-east of Hemlock Drive, and runoff from the west side of Hilton Drive to a system that eventually feeds into Tom King Bayou. The area is also very flat. The area around Brewster Street and Hilton Drive have reported street and yard flooding.

Conceptual Improvement Description

Improvements include installation of collection and conveyance pipes along Hilton Drive, Treasure Street, Rexford Street, and Brewster Street, which will connect to a new outfall pipe that will run under East Bay Boulevard.

Results

The proposed collection system should prevent most roadway overtopping in the area, as well as decreasing yard flooding.

Dependence

This project is not dependent on any other projects. However, it does require property acquisition for the new outfall pipe.

COST	SCORE
\$1.8M*	3

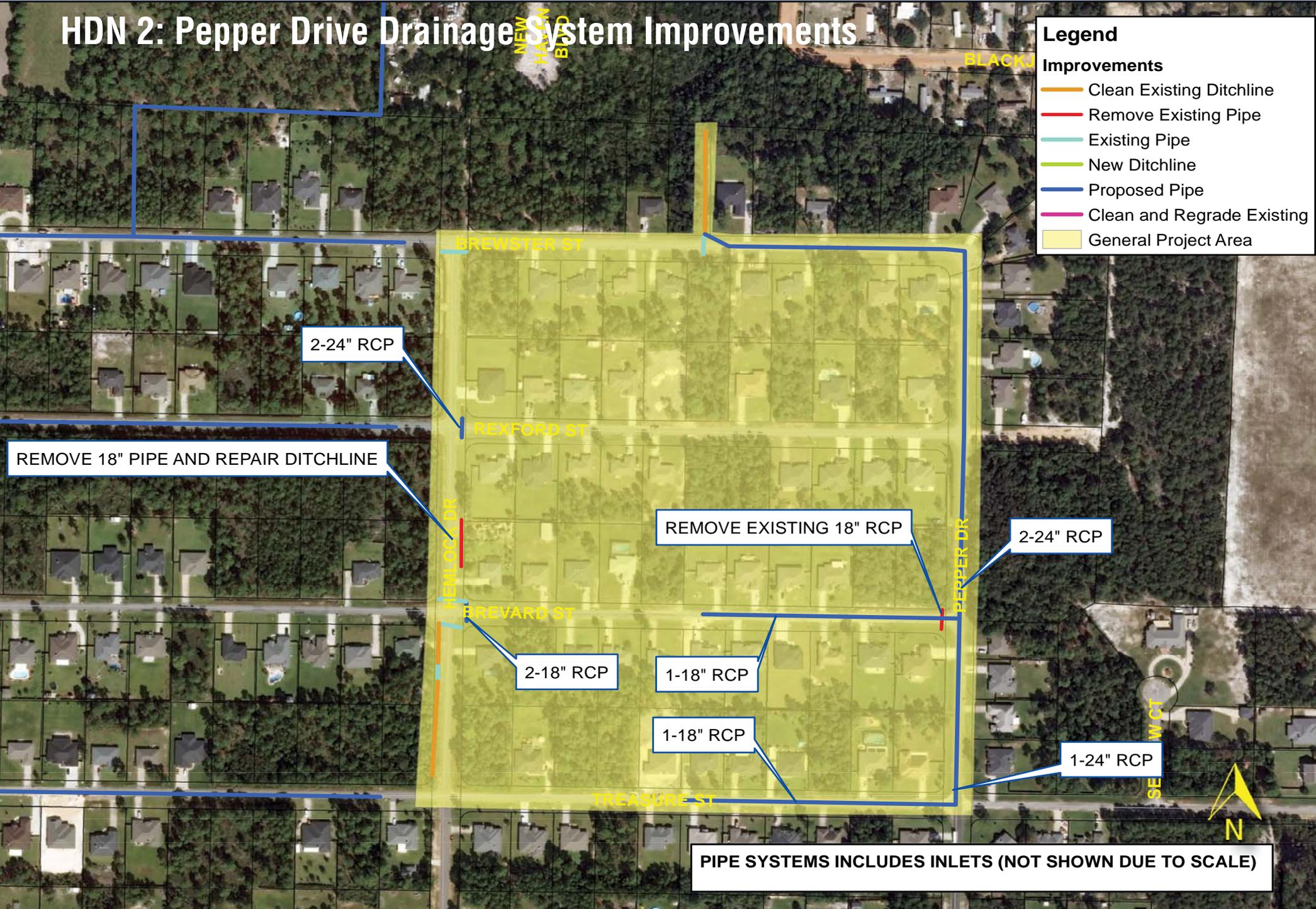
*NOTE: Property acquisition not included in cost.

HDN 2: Pepper Drive Drainage System Improvements

Legend

Improvements

-  Clean Existing Ditchline
-  Remove Existing Pipe
-  Existing Pipe
-  New Ditchline
-  Proposed Pipe
-  Clean and Regrade Existing
-  General Project Area



HDN 2: Pepper Drive Drainage System Improvements

Current Conditions

Pepper Drive is in the northeast portion of Holley by the Sea. Roadway overtopping and yard flooding have been reported in this area. The areas around Pepper Drive and Hemlock Drive naturally drain toward a creek northeast of Hemlock Drive. The main conveyance pipes in this area are also along Hemlock Drive. Recently, an exfiltration pipe system has been installed along parts of the Pepper Drive area.

Conceptual Improvement Description

Improvements include installation of a collection and conveyance system of pipes along Pepper Drive and some of the side streets. Additionally, some of the culverts along Hemlock Drive will be replaced to increase flow capacity. One existing pipe will be removed, as the model indicates it is undersized and causing water to build up upstream.

Results

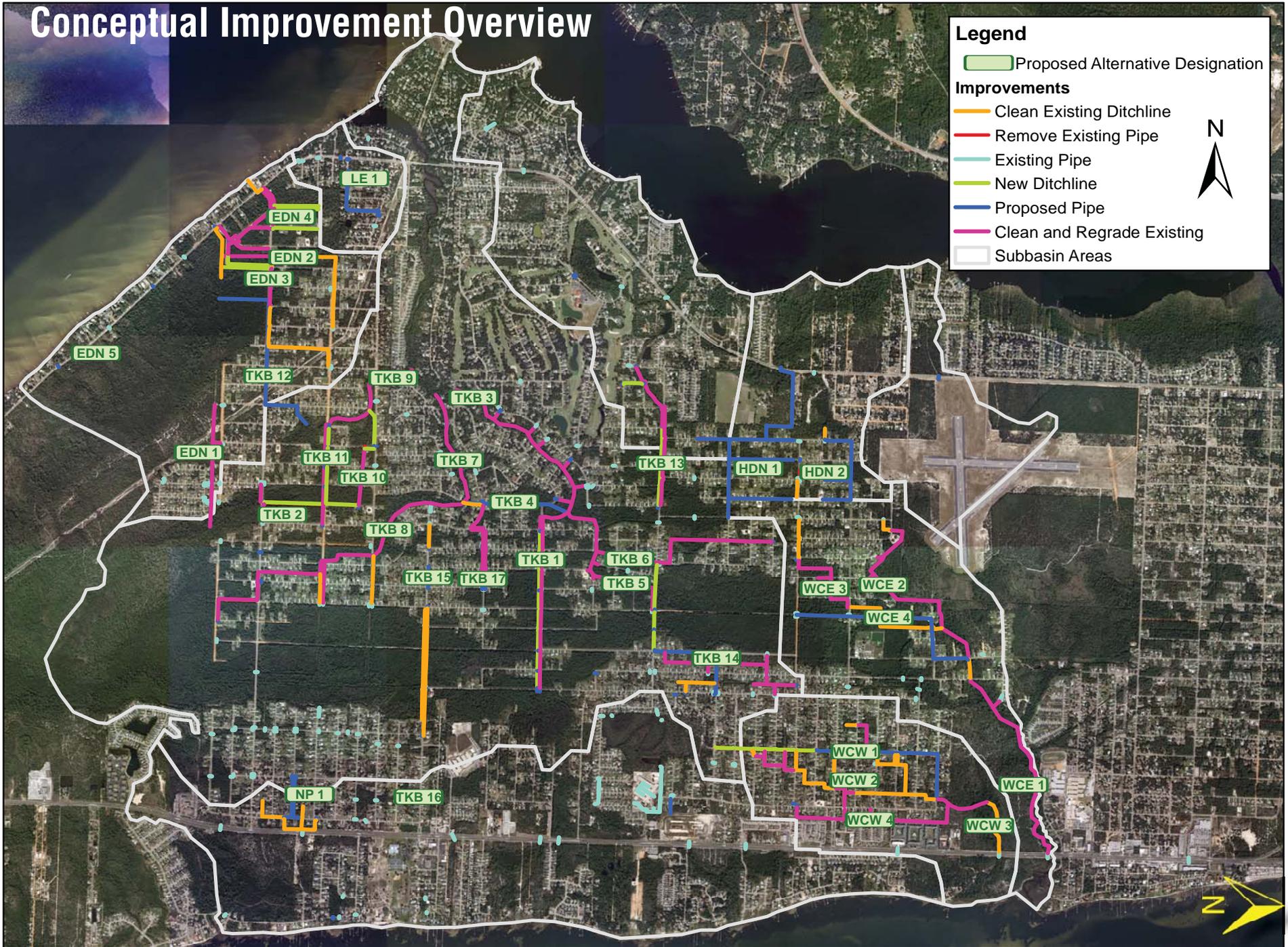
The addition of the collection system and increasing the culvert sizes appears to decrease area roadway overtopping. There may still be some flooding of yards, but the duration of flooding should decrease.

Dependence

This project is independent of other projects.

COST	SCORE
\$1.1M	2

Conceptual Improvement Overview



Williams Creek East	
WCE 1	Williams Creek East, South Channel Restoration
WCE 2	Williams Creek East, Northeast Channel Restoration
WCE 3	Williams Creek East, Northwest Channel Improvements
WCE 4	Leisure Street Drainage Improvement

WCE 1: Williams Creek East, South Channel Restoration

Legend

Improvements

- Clean Existing Ditchline
- Remove Existing Pipe
- Existing Pipe
- New Ditchline
- Proposed Pipe
- Clean and Regrade Existing
- General Project Area



WCE 1: Williams Creek East, South Channel Restoration

Current Conditions

Williams Creek provides a drainage outfall for several hundred acres of property both inside and outside of Holley by the Sea. Within the project limits, Williams Creek East drains the area along the eastern boundary and south of the airfield.

Conceptual Improvement Description

The project consists of approximately 5,000 linear feet of stream channel restoration from US Highway 98 to Frankfort Street. Plans are to re-grade the channel, clear overgrowth and provide armoring as necessary. Completion of the project should reduce flood depths in the channel to aid upstream drainage systems. It will also serve as the outfall for future drainage improvements that have been proposed upstream.

This project may require property considerations as the channel is not within right-of-way or existing easements.

Results

Completion of the project should reduce flood depths in the channel considerably. This improvement will make provision for projects further upstream that will more directly affect flooding within Holley by the Sea. It should be noted that this project will need to be permitted by the US Army Corps of Engineers and as such the exact extent of the re-grading efforts will not be known until permitting efforts are begun.

Dependence

This project is independent of other improvements.

COST	SCORE
\$7.1M*	8

*NOTE: Property acquisition not included in cost.

WCE 2: Williams Creek East, Northeast Channel Restoration

Legend

Improvements

- Clean Existing Ditchline
- Remove Existing Pipe
- Existing Pipe
- New Ditchline
- Proposed Pipe
- Clean and Regrade Existing
- General Project Area



WCE 2: Williams Creek East, Northeast Channel Restoration

Current Conditions

Williams Creek provides a drainage outfall for several hundred acres of property both inside and outside of Holley by the Sea. Within the project limits Williams Creek East drains the area along the eastern boundary and south of the airfield.

Conceptual Improvement Description

The project consists of stream channel restoration from Frankfort Street northwest to Parkridge Drive. Plans are to re-grade the channel, clear overgrowth and provide armoring as necessary. Completion of the project should reduce flood depths in the channel which will protect several properties along the channel as well as aid upstream drainage systems. It will also serve as the outfall for future drainage improvements that have been proposed upstream.

This project may require property considerations as the channel is not within right-of-way or existing easements.

Results

Completion of the project should reduce flood depths in the channel considerably, with road crossings at the upper reaches no longer overtopping (Parkridge Drive and Woodmont Street). It should be noted that this project will need to be permitted by the US Army Corps of Engineers and as such the exact extent of the re-grading efforts will not be known until permitting efforts are begun.

This project should also be reconsidered once downstream improvements have been made. The model will need to be updated to reflect as-built information downstream.

Dependence

This project should not be constructed without first accomplishing downstream improvements.

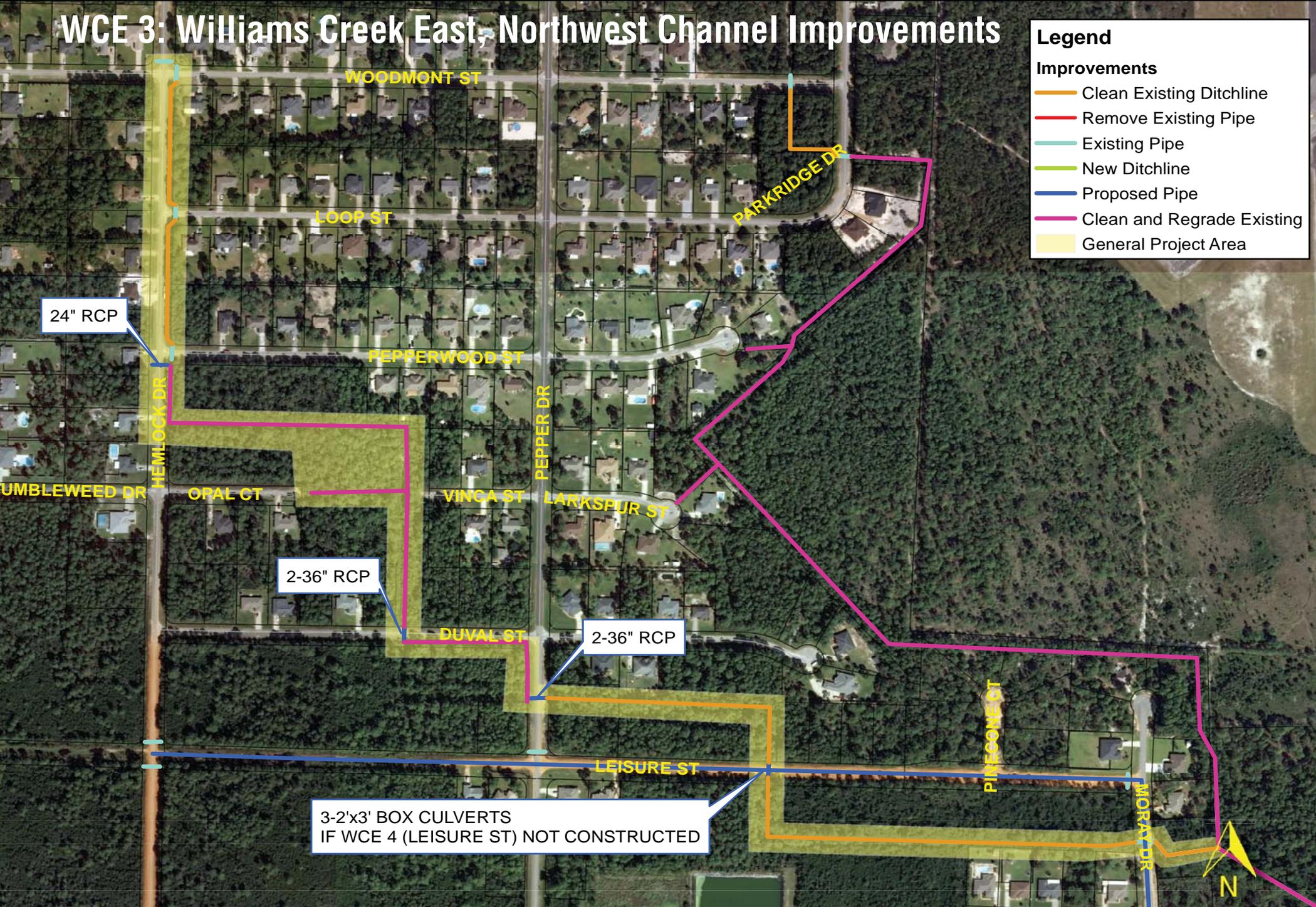
COST	SCORE
\$4.7M	3

WCE 3: Williams Creek East, Northwest Channel Improvements

Legend

Improvements

- Clean Existing Ditchline
- Remove Existing Pipe
- Existing Pipe
- New Ditchline
- Proposed Pipe
- Clean and Regrade Existing
- General Project Area



3-2'x3' BOX CULVERTS
IF WCE 4 (LEISURE ST) NOT CONSTRUCTED

WCE 3: Williams Creek East, Northwest Channel Improvements

Current Conditions

Williams Creek provides a drainage outfall for several hundred acres of property both inside and outside of Holley by the Sea. Within the project limits Williams Creek East drains the area along the eastern boundary and south of the airfield. The northwest section described here takes a stepped route to end at Hemlock Drive just south of Pepperwood Street.

Conceptual Improvement Description

The project consists of several thousand feet of stream channel restoration and ditch improvements. Plans are to re-grade the channel, clear overgrowth and provide armoring as necessary. Completion of the project should reduce flood depths in the channel which will protect several properties along the channel as well as aid upstream drainage systems. It will also serve as the outfall for future drainage improvements that have been proposed upstream. The southern portion of this project will change if the Leisure Street project is built. However, in this report, it is assumed that it must stand alone.

Results

By itself this project will reduce flow depths only a few inches as indicated by the model. However, along with the Leisure Street improvements, reduction in flow depths will be larger due to the stormwater being taken off of the downstream system.

Dependence

This project should not be constructed without first accomplishing downstream improvements.

COST	SCORE
\$1.4M	2

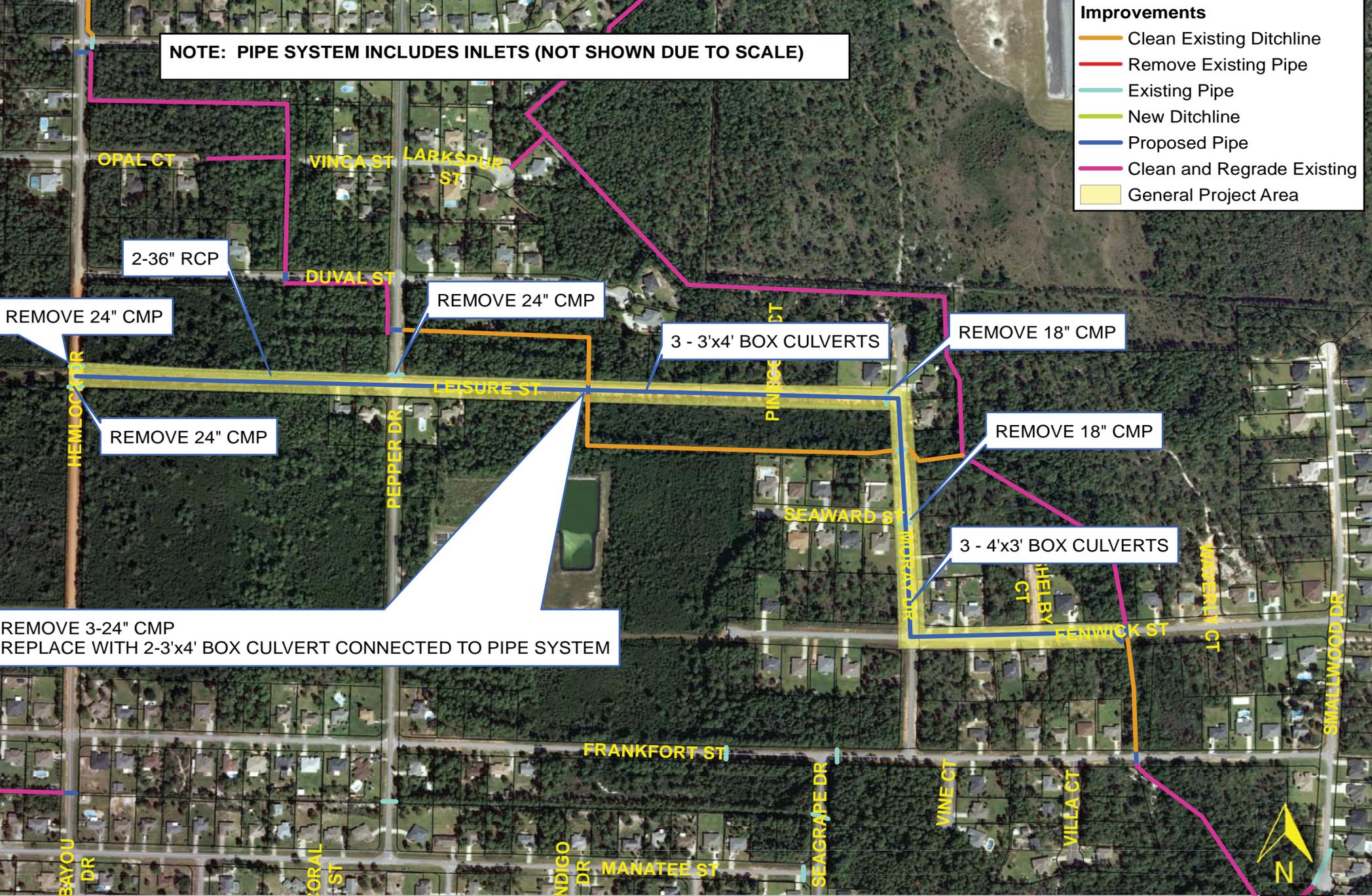
WCE 4: Leisure Street Drainage Improvement

NOTE: PIPE SYSTEM INCLUDES INLETS (NOT SHOWN DUE TO SCALE)

Legend

Improvements

- Clean Existing Ditchline
- Remove Existing Pipe
- Existing Pipe
- New Ditchline
- Proposed Pipe
- Clean and Regrade Existing
- General Project Area



WCE 4: Leisure Street Drainage Improvement

Current Conditions

Leisure Street runs east-west across Holley by the Sea and is unimproved on the eastern end. It runs through several areas of wetland. This project is included to take excess stormwater off of the wetland system to the west. Although not necessary for drainage improvements, paving the road should be considered if this project is built.

Conceptual Improvement Description

Improvements include a pipeline that extends from Williams Creek to Leisure Street and over to Hemlock Drive. The pipeline consists of a three barrel 3'x4' box culvert due to cover restrictions. In addition, collection will be provided along its length to take water off of the roadway and surrounding areas.

Results

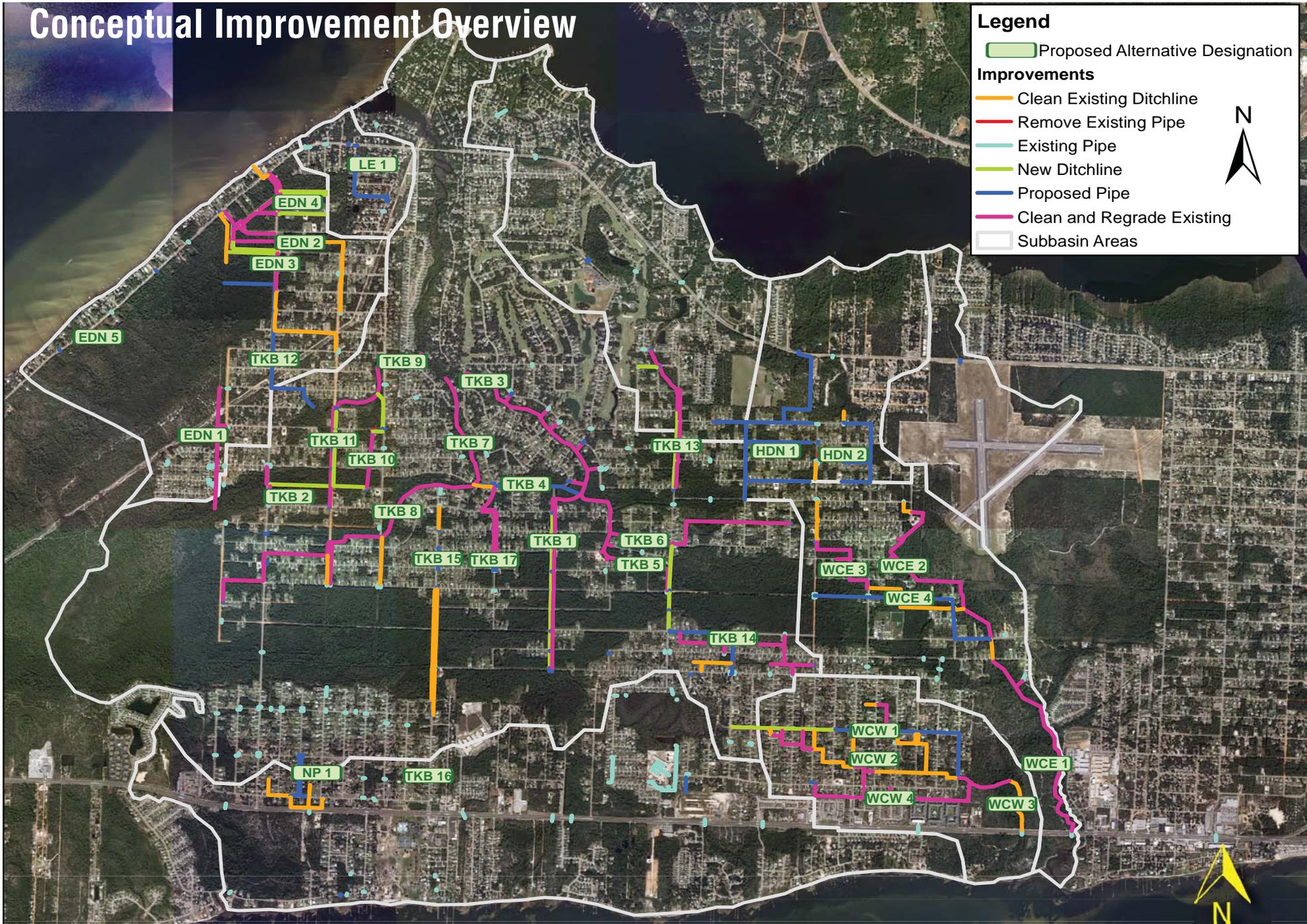
The model indicates that improvement should be seen along Leisure St such that the roadway will be passable. In addition improvements are also indicated in areas further north, since this project effectively takes water off of the Williams Creek system in which the Northwest Channel Improvements are located. It doesn't seem to reduce levels in the western wetland to any real extent. For this reason, it may be advisable to shorten the scope of the project so that it covers the areas with residences.

Dependence

This project should not be constructed without first accomplishing downstream improvements. However, portions of other projects could be added to the project scope to make it independent of other improvements.

COST	SCORE
\$9.8M	1

Conceptual Improvement Overview



Williams Creek West	
WCW 1	Palmetto Drive Drainage System
WCW 2	Drainage System Improvements, Aurora Street to Resort Street
WCW 3	Williams Creek Channel Restoration
WCW 4	Sandstone Street South Channel Improvements

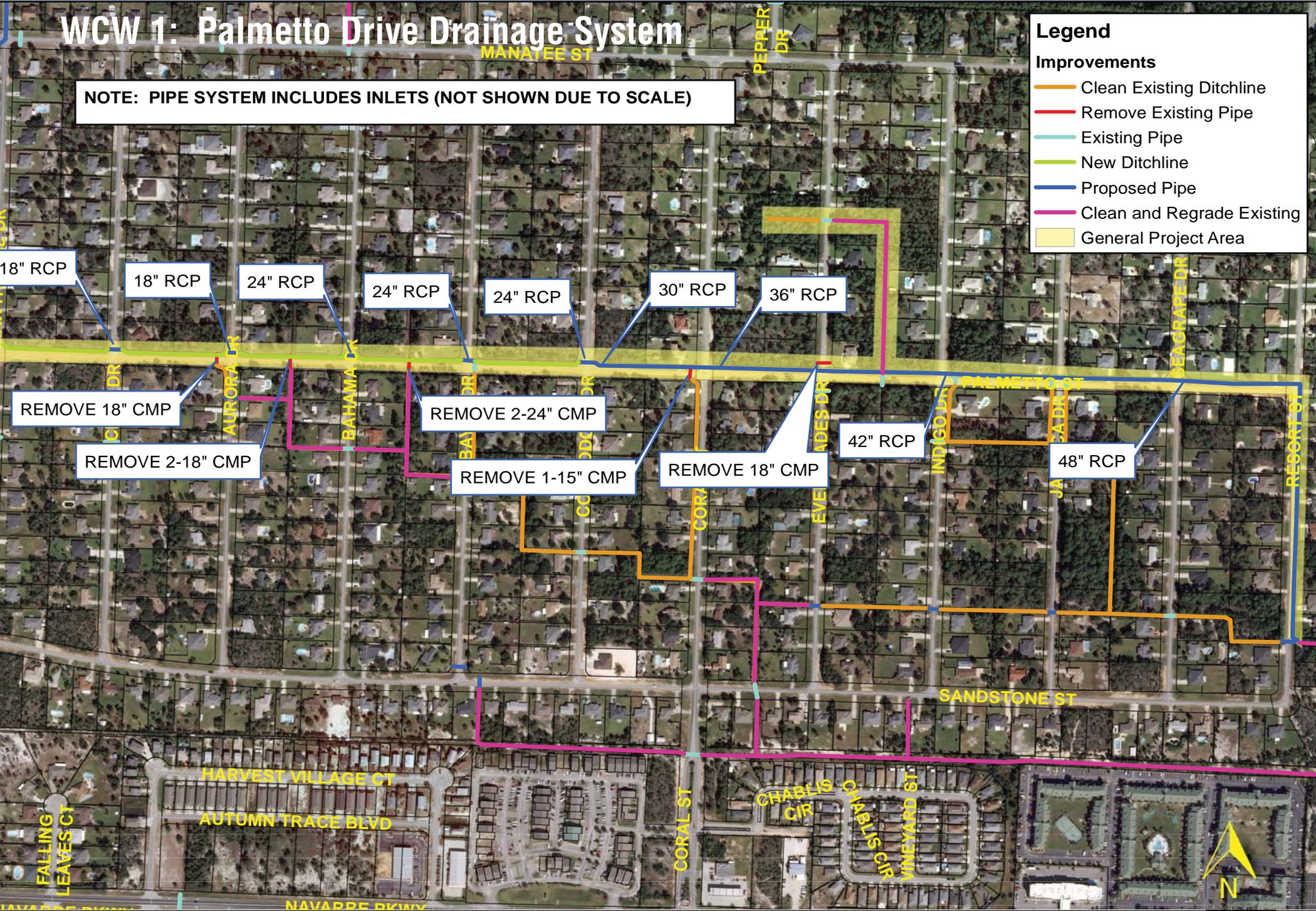
WCW 1: Palmetto Drive Drainage System

NOTE: PIPE SYSTEM INCLUDES INLETS (NOT SHOWN DUE TO SCALE)

Legend

Improvements

- Clean Existing Ditchline
- Remove Existing Pipe
- Existing Pipe
- New Ditchline
- Proposed Pipe
- Clean and Regrade Existing
- General Project Area



WCW 1: Palmetto Drive Drainage System

Current Conditions

The area of Holley by the Sea along Palmetto Street (particularly to the south) has been the topic of much flooding concern. Much of the area drains south to a ditch and culvert system that runs to the east to Williams Creek west portion. This ditch runs mostly along property lines, between homes and behind lots. Several residents responded during the public outreach describing the flooding. There several that mentioned yard and street flooding occur. Three residents described having home flooding and one other home is known to have flooded in the area. This project is intended to take water off of the system routing it around the troubled areas. Unfortunately, most of the floodings appear to be due to low structure elevations. In these conditions it will not be possible to ensure protection against flooding.

Conceptual Improvement Description

The project consists of a collection system that runs east along Palmetto Street where it turns south and runs to the existing culvert for discharge. It will take water flow from the north off of the existing system and routing it directly to the outfall at Williams Creek West. The system is a combination of roadside ditch and below grade pipe. Due to the existing topography the system will have minimal slopes making careful maintenance necessary.

Results

The model indicates that flow depths in the channel can be lowered between 4” – 6”. This decrease should help with yard flooding but as noted above protection cannot be ensured for the homes that flood along this length due to their low elevations.

Dependence

This project should not be constructed without first accomplishing downstream improvements. It is possible that the project could be accomplished independently. However, this will require changes to the design.

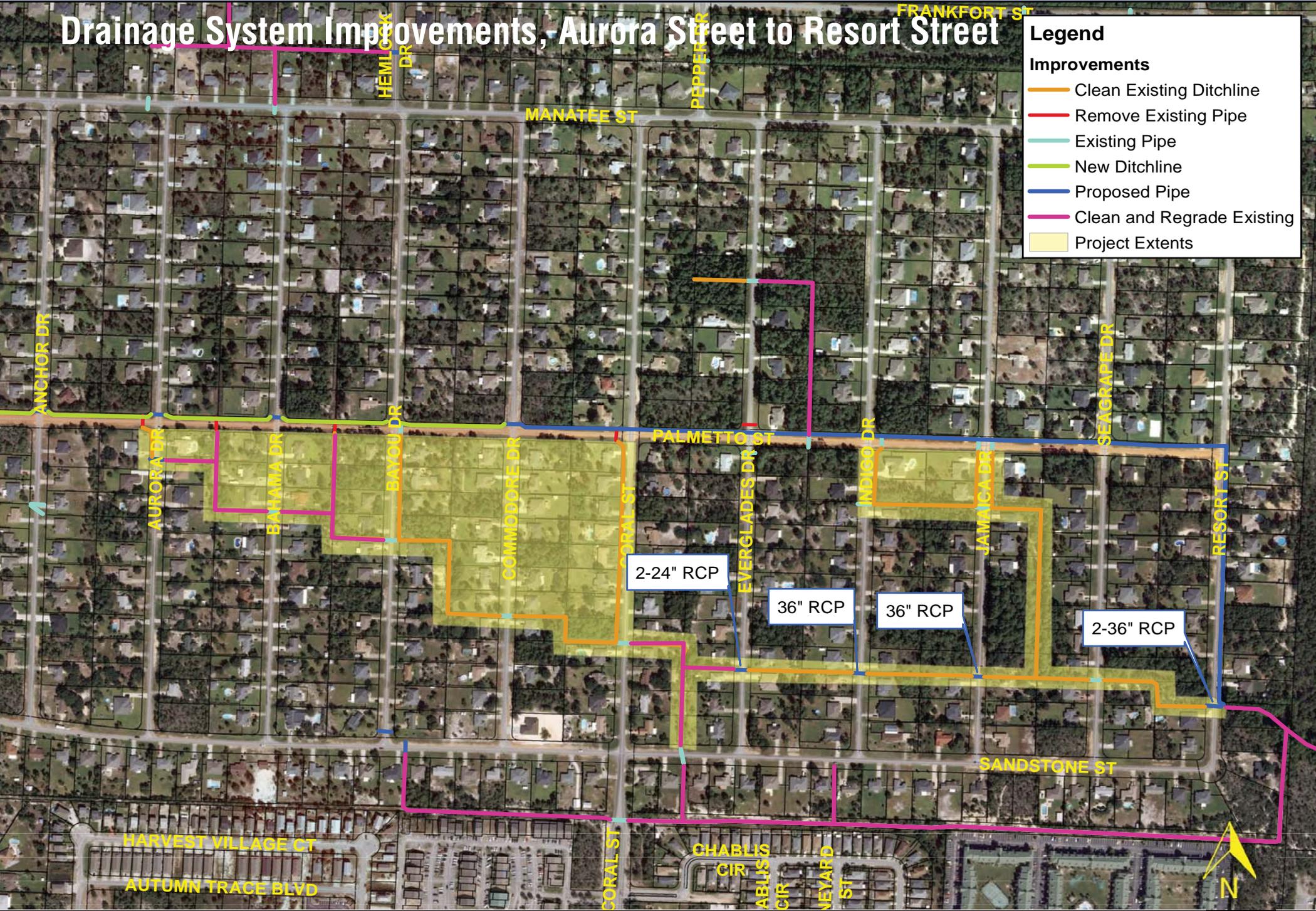
COST	SCORE
\$1.8M	10

Drainage System Improvements, Aurora Street to Resort Street

Legend

Improvements

- Clean Existing Ditchline
- Remove Existing Pipe
- Existing Pipe
- New Ditchline
- Proposed Pipe
- Clean and Regrade Existing
- Project Extents



WCW 2: Drainage System Improvements, Aurora Street to Resort Street

Current Conditions

The area of Holley by the Sea along Palmetto Street (particularly to the south) has been the topic of much flooding concern. Much of the area drains south to a ditch and culvert system that runs to the east to Williams Creek west portion. This ditch runs mostly along property lines, between homes and behind lots. Several residents responded during the public outreach describing the flooding. There several that mentioned yard and street flooding occur. Three (3) residents described having home flooding and one other home is known to have flooded in the area. This project is intended to take water off of the system routing it around the troubled areas. Unfortunately, most of the floodings appear to be due to low structure elevations. In these conditions it will not be possible to ensure protection against flooding.

This project is intended to increase capacity in the existing ditch and culvert system in order to reduce yard flooding and avoid road overtoppings. It has been assumed to take place after the Palmetto Drainage System has been constructed.

Conceptual Improvement Description

Improvements include culvert upgrades as well as clearing the ditch along the existing system. In many places the ditch runs along a back property line, making fence removal and replacement necessary in many locations.

Results

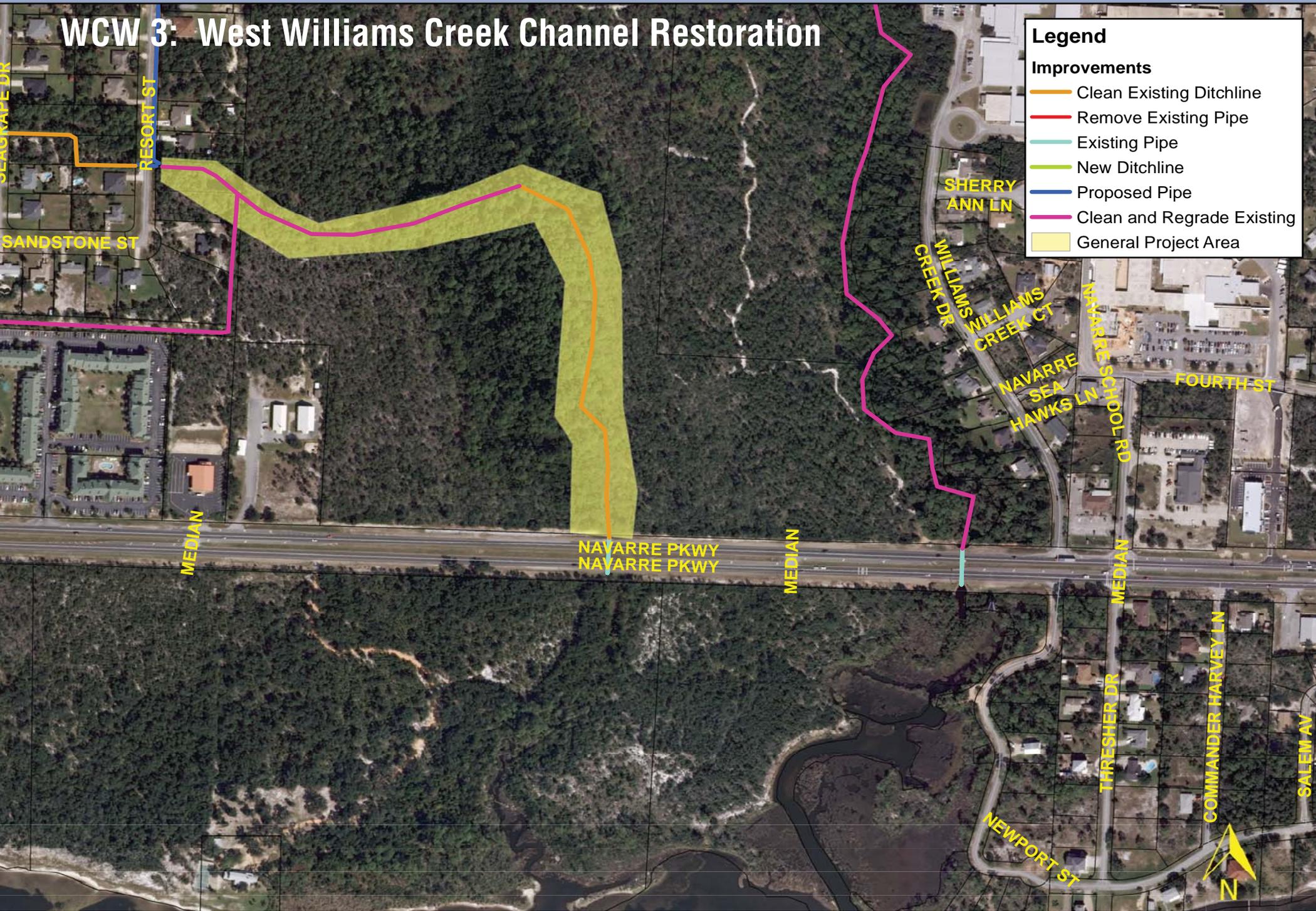
The model indicates that flow depths along the ditch system can be lowered and several road overtoppings eliminated. In addition this should provide a clear path to quickly move water out of the system after rain events, reducing the duration of flooding.

Dependence

This project should not be constructed without first accomplishing downstream improvements as well as the Palmetto St. Drainage Improvements.

COST	SCORE
\$900,000	4

WCW 3: West Williams Creek Channel Restoration



Legend

Improvements

- Clean Existing Ditchline
- Remove Existing Pipe
- Existing Pipe
- New Ditchline
- Proposed Pipe
- Clean and Regrade Existing
- General Project Area

WCW 3: West Williams Creek Channel Restoration

Current Conditions

The area of Holley by the Sea along Palmetto Street (particularly to the south) has been the topic of much flooding concern. Much of the area drains south to a ditch and culvert system that runs to the east to Williams Creek west portion. The outfall to Williams Creek West appears to hold water just east of Resort Street. This is likely caused by high downstream grades.

Conceptual Improvement Description

The project consists of several hundred feet of stream channel restoration from Resort Street to the east. Plans are to re-grade the channel, clear overgrowth and provide armoring as necessary. Further to the east, it is suggested (and included here) that the channel's flood plain be cleared of its heavy overgrowth.

Completion of the project should reduce the flow depth in the channel which should provide a better condition to future upstream drainage improvements.

Results

The model indicates that these improvements could reduce the water surface elevation by 5".

Dependence

This project is independent of other improvements.

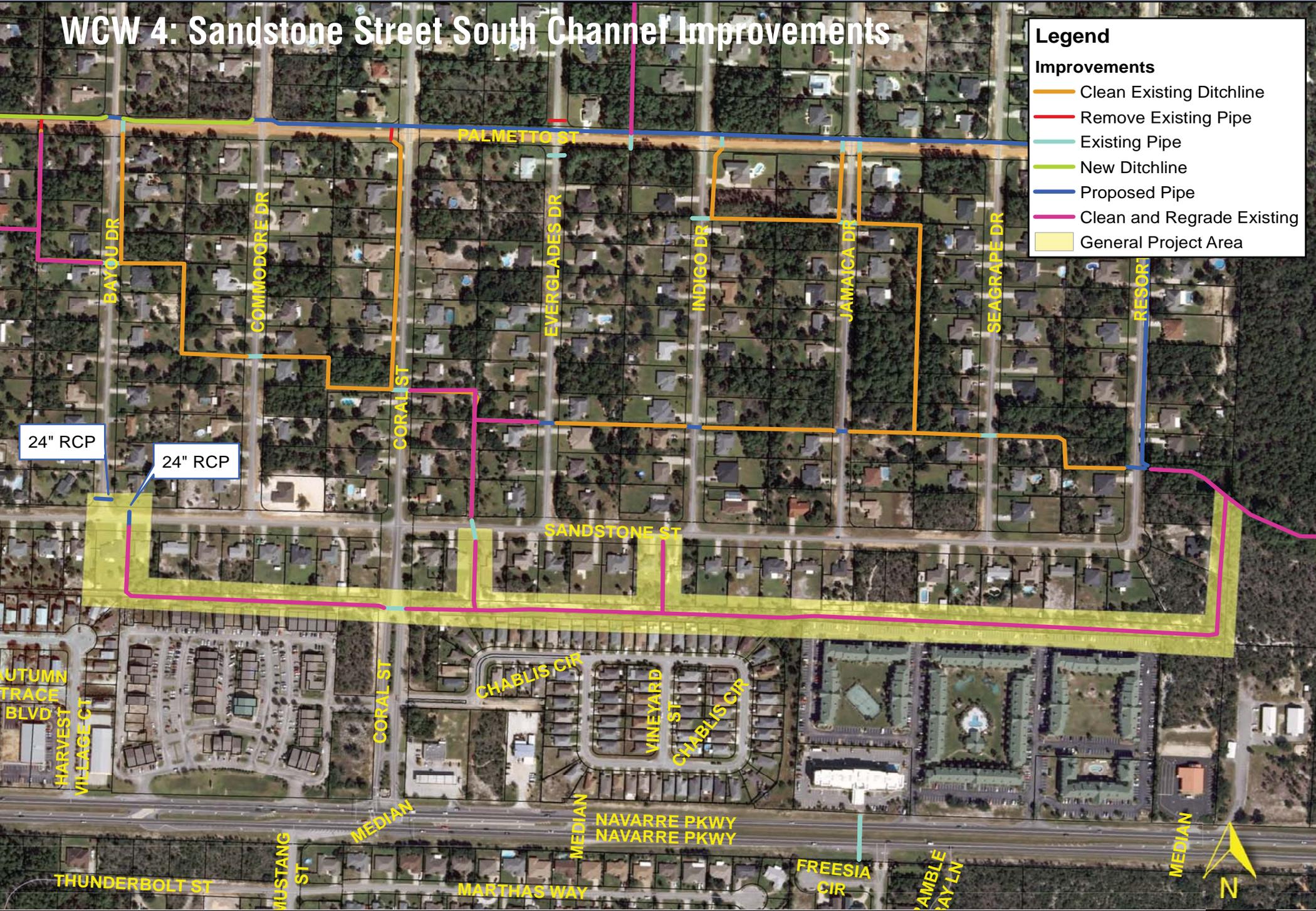
COST	SCORE
\$1.2M	12

WCW 4: Sandstone Street South Channel Improvements

Legend

Improvements

- Clean Existing Ditchline
- Remove Existing Pipe
- Existing Pipe
- New Ditchline
- Proposed Pipe
- Clean and Regrade Existing
- General Project Area



WCW 4: Sandstone Street South Channel Improvements

Current Conditions

On the southern limit of Holley by the Sea and running parallel to Sandstone Street there is a large, sandy ditch that provides outfall to some of the areas mentioned in WCW 1. The ditch runs to the east and eventually discharges to Williams Creek West. On the eastern end there appears to be grades that cause water to pond before discharging. Some ponding in this ditch system may be useful to allow water to infiltrate, however the ponding elevation should be carefully determined to protect surrounding properties.

Conceptual Improvement Description

Improvements consist of culvert upgrades and some regrading of the ditch on the east side in order to facilitate better discharge to Williams Creek West.

Results

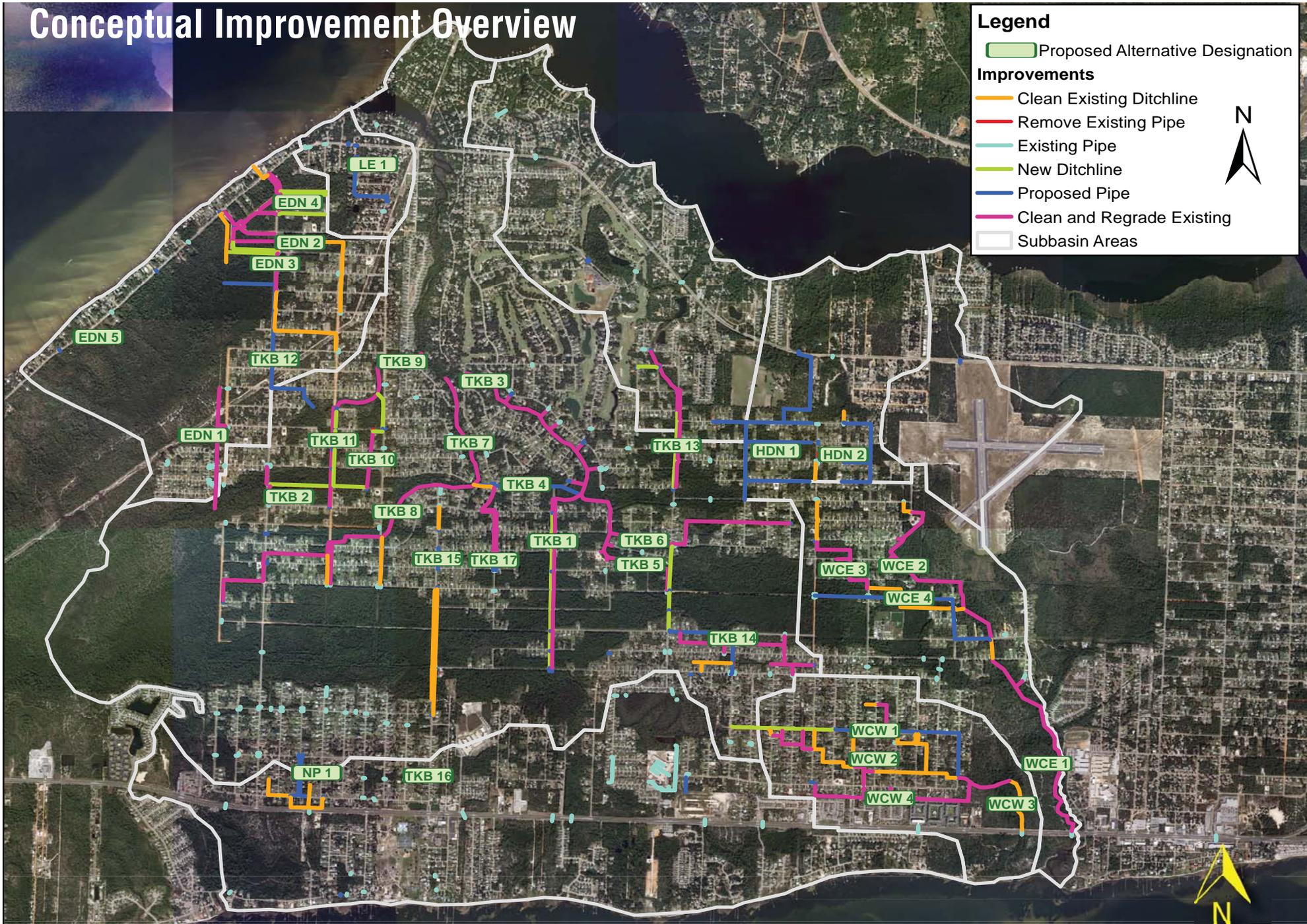
The model indicates that the proposed improvements avoid overtoppings at the culvert replacements, Bayou Drive and Sandstone Street. Flow depths should be reduced on the east end also as water moves toward Williams Creek West.

Dependence

This project should not be constructed without first accomplishing downstream improvements.

COST	SCORE
\$260,000	2

Conceptual Improvement Overview



Navarre Parkway

NP 1

Water Street Area Drainage Improvements

NP 1: Water Street Area Drainage Improvements

Legend

Improvements

- Clean Existing Ditchline
- Remove Existing Pipe
- Existing Pipe
- New Ditchline
- Proposed Pipe
- Clean and Regrade Existing
- General Project Area



NP 1: Water Street Area Drainage Improvements

Current Conditions

The southwestern portion of Holley by the Sea predominantly drains south to the Santa Rosa Sound by way of culverts that cross Navarre Parkway (Highway 98). Flooding has been reported along Water Street, Flamingo Lane, and other surrounding streets in the neighborhood. Most of the area's runoff is conveyed through roadside drainage swales that are very shallow. The deeper swales (near the Navarre Parkway crossing) seem to have become overgrown, restricting flow.

Conceptual Improvement Description

Improvements consist of culvert upgrades and some cleaning of area ditches to facilitate better discharge to the Navarre Parkway crossing. Additionally, a collection system will be installed along Flamingo Drive to improve drainage and to better connect the Perch Street culvert crossing to the outfall.

Results

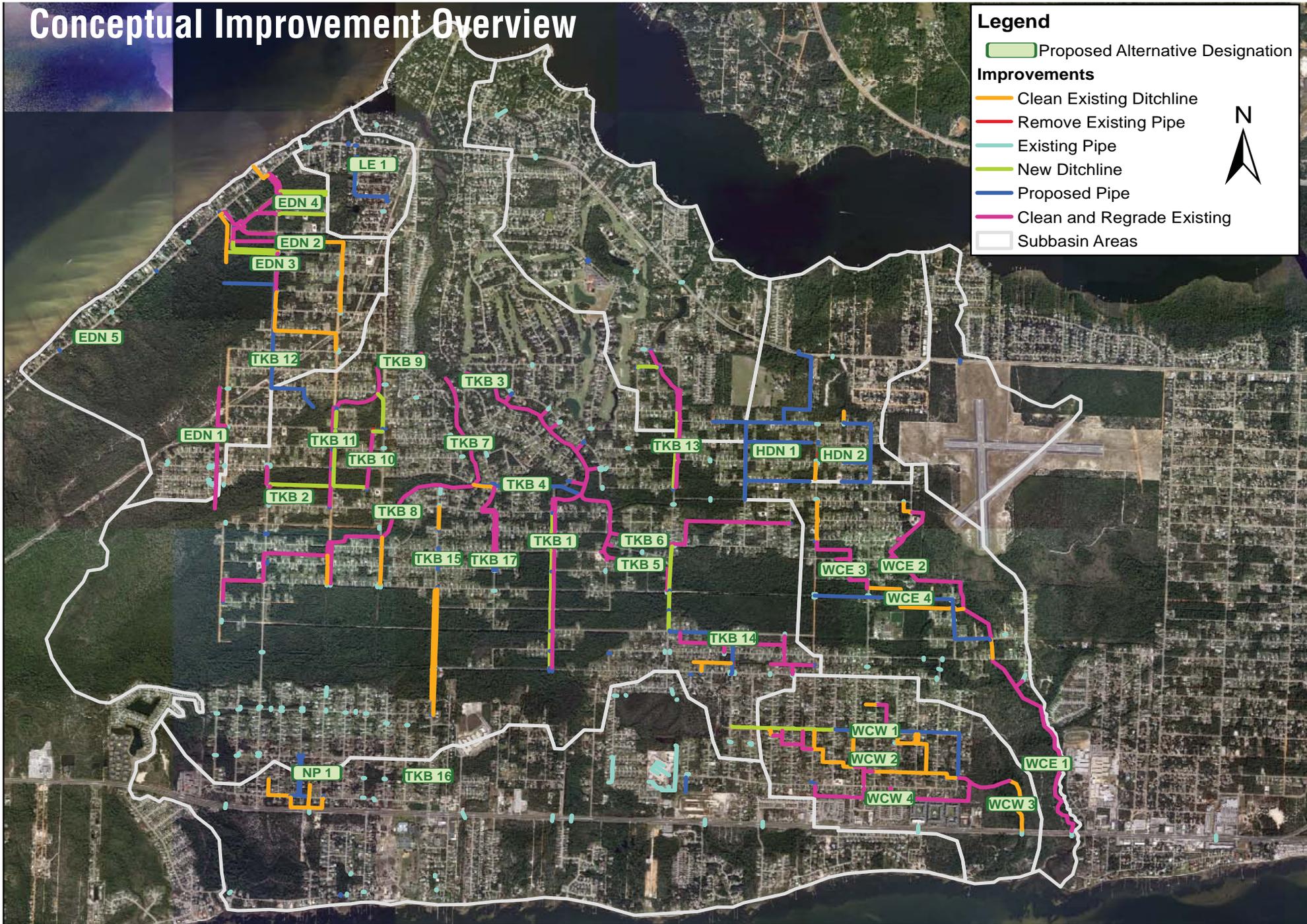
The model indicates that the proposed improvements should prevent overtoppings at the culvert replacements, as well as on Perch Street and Flamingo Lane.

Dependence

This project is independent of other improvements.

COST	SCORE
\$490,000	2

Conceptual Improvement Overview



Legendwood Estates

LE 1

Crittenden Drive Area Drainage Improvements

LE 1: Crittenden Drive Area Drainage Improvements



Legend

Improvements

- Clean Existing Ditchline
- Remove Existing Pipe
- Existing Pipe
- New Ditchline
- Proposed Pipe
- Clean and Regrade Existing
- General Project Area

36" RCP

29"x45" ERCP

24"x38" ERCP

30" RCP

30" RCP

CONNECT EXISTING 15" CMP TO JUNCTION

24" RCP

LE 1: Crittenden Drive Area Drainage Improvements

Current Conditions

The Legendwood Estates area has a main drainage system of culverts that runs north along Crittenden Drive, as well as a few wet ponds throughout the area. Roadway and home flooding has been reported in the area. It appears that some of the roadside swales have become overgrown and some of the ponds may have accumulated sediment or debris, reducing their storage capacity.

Conceptual Improvement Description

Improvements consist of culvert upgrades and some cleaning of area ditches to facilitate better drainage to and across the East Bay Boulevard crossing. Additionally, a relief pipe system will be installed along Crittenden Drive from Ferris Drive to Valerie Lane to collect and discharge runoff previously routed to the Donald Drive area pond.

Results

The model indicates that the proposed improvements should decrease flood stages in the upstream portion of the drainage system significantly, therefore decreasing the risk of home flooding in the area. Additionally, these improvements should reduce roadway overtoppings in the immediate area.

Dependence

This project is independent of other improvements.

COST	SCORE
\$430,000	8

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VII. PROGRAMMING



VII. PROGRAMMING

With the extent of the Holley by the Sea area and the number of improvement projects described it is important that a tool be developed to set priorities and plan necessary funds. This involves a system of comparing the effect or benefit of the projects. For the Holley by the Sea area a scoring matrix was developed that considers flooding dwellings affected, overtopping streets affected, and the degree to which it provides for subsequent improvements. Other factors can and should be considered, such as funding and property acquisition. However these scorings provide a simple comparison of each project's benefit in order to begin planning.

Estimated costs and scores have been developed for each conceptual improvement. Costs reflect total estimated project costs. Construction and design estimates are included in the total. A summary of this information is shown on the adjacent page. In addition, a copy of the scoring matrix can be reviewed in the attachments and shows the development of each score.

Many of the conceptual improvements are affected by downstream projects. This requires that many of the projects be accomplished in a specific sequence. Also included with the scorings shown are those projects that must be accomplished first. This should provide a system for planning funds.

Several of the lowest ranking projects may prove too expensive for the benefit they provide. Excluding these projects the sum of all of the conceptual improvements is approximately \$64M.

Funding sources that have been suggested for Holley by the Sea include State Water Project funding and environmental funding programs through the Florida Department of Environmental Protection (FDEP). Santa Rosa County has also been effective in using the Hazard Mitigation Grant Program (HMGP) although this requires prior damage before seeking funding. Some of these programs could be used, but these alone will not provide the level of funding shown to be needed. Other funding sources will need to be developed.

Conceptual Improvements

Holley by the Sea Drainage Study

Independent Improvements

Project:	Cost:	Final Score
TKB 3: Tom King Bayou East Branch Channel Restoration	\$ 6,700,000	17
TKB 7: Tom King Bayou Middle Branch, North Channel Restoration	\$ 3,500,000	14
TKB 9: Tom King Bayou West Branch Channel Restoration	\$ 3,000,000	10
TKB 13: Citrus Dr. Drainage System Improvements	\$ 2,265,000	6
TKB 16: Sunrise Drive Entrance Improvements	\$ 530,000	1
EDN 1: West Ditch Improvements	\$ 800,000	3
EDN 2: Admiral St. N Drainage Improvements	\$ 650,000	2
EDN 3: Edgewood Dr. Drainage Improvements	\$ 630,000	1
EDN 4: Bluefish Rd Area Drainage System	\$ 1,650,000	2
EDN 5: East Bay Boulevard Culvert Upgrades	\$ 250,000	3
HDN 1: Brewster St. Outfall	\$ 1,800,000	3
HDN 2: Pepper Dr. Drainage System Improvements	\$ 1,100,000	2
WCE 1: Williams Creek East, South Channel Restoration	\$ 7,050,000	8
WCW 2: Drainage System Improvements, Aurora St. to Resort St.	\$ 900,000	4
WCW 3: West Williams Creek Channel Restoration	\$ 1,150,000	12
NP1: Water Street Area Drainage Improvements	\$ 490,000	2
LE 1: Crittenden Drive Area Improvements	\$ 430,000	8

Dependent Improvements, D1

Project:	Cost:	Final Score
TKB 1: Basswood Drive Drainage Improvements	\$ 1,100,000	9
TKB 5: Freedom Ct South Channel Improvements	\$ 2,700,000	3
TKB 6: Freedom Ct North Channel Improvements	\$ 1,950,000	4
TKB 8: Tom King Bayou Middle Branch, South Channel Restoration	\$ 5,800,000	4
TKB 10: Sherwood Dr. Drainage Improvements	\$ 800,000	7
TKB 11: Camden Dr. Outfall Improvements	\$ 1,000,000	5
TKB 12: Federal Street Drainage Pipe	\$ 875,000	0
TKB 15: Sunrise Drive Drainage Improvements	\$ 1,300,000	3
TKB 17: Banyan Drive Drainage Area Improvements	\$ 490,000	5
WCE 2: Williams Creek East, Northeast Channel Restoration	\$ 4,700,000	3
WCE 3: Williams Creek East, Northwest Channel Improvements	\$ 1,400,000	2
WCE 4: Leisure Street Drainage Improvement:	\$ 9,765,000	1
WCW 1: Palmetto Drive Drainage System	\$ 1,835,000	10
WCW 4: Sandstone St. South Channel Improvements	\$ 260,000	2

Dependent upon one other improvement.

Dependent Improvements, D2

Project:	Cost:	Final Score
TKB 2: Glassport Street Drainage Improvements	\$ 325,000	3
TKB 4: Crescent Road Relief Pipeline	\$ 5,850,000	1
TKB 14: Broadmoor St. Outfall	\$ 2,300,000	2

Dependent upon two other improvements.

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APPENDIX



Holley by the Sea Drainage Improvement Program
Scoring Matrix

Project:	Cost:	Flooding Homes Affected	Flooding Streets Affected	Individual Score ¹	Future Improvement Score ²	Final Score ³
		3x	1x			
TKB 1: Basswood Drive Drainage Improvements	\$ 1,100,000	0	9	9	0	9
TKB 2: Glassport Street Drainage Improvements	\$ 325,000	0	3	3	0	3
TKB 3: Tom King Bayou East Branch Channel Restoration	\$ 6,700,000	1	0	3	14	17
TKB 4: Crescent Road Relief Pipeline	\$ 5,850,000	0	1	1	0	1
TKB 5: Freedom Ct South Channel Improvements	\$ 2,700,000	0	1	1	2	3
TKB 6: Freedom Ct North Channel Improvements	\$ 1,950,000	0	2	2	2	4
TKB 7: Tom King Bayou Middle Branch, North Channel Restoration	\$ 3,500,000	0	1	1	13	14
TKB 8: Tom King Bayou Middle Branch, South Channel Restoration	\$ 5,800,000	0	4	4	0	4
TKB 9: Tom King Bayou West Branch Channel Restoration	\$ 3,000,000	0	1	1	9	10
TKB 10: Sherwood Dr. Drainage Improvements	\$ 800,000	0	4	4	3	7
TKB 11: Camden Dr. Outfall Improvements	\$ 1,000,000	0	2	2	3	5
TKB 12: Federal Street Drainage Pipe	\$ 875,000	0	0	0	0	0
TKB 13: Citrus Dr. Drainage System Improvements	\$ 2,265,000	1	3	6	0	6
TKB 14: Broadmoor St. Outfall	\$ 2,300,000	0	2	2	0	2
TKB 15: Sunrise Drive Drainage Improvements	\$ 1,300,000	0	3	3	0	3
TKB 16: Sunrise Drive Entrance Improvements	\$ 530,000	0	1	1	0	1
TKB 17: Banyan Drive Drainage Area Improvements	\$ 490,000	0	5	5	0	5
EDN 1: West Ditch Improvements	\$ 800,000	0	3	3	0	3
EDN 2: Admiral St. N Drainage Improvements	\$ 650,000	0	2	2	0	2
EDN 3: Edgewood Dr. Drainage Improvements	\$ 630,000	0	1	1	0	1
EDN 4: Bluefish Rd Area Drainage System	\$ 1,650,000	0	2	2	0	2
EDN 5: East Bay Boulevard Culvert Upgrades	\$ 250,000	0	3	3	0	3
HDN 1: Brewster St. Outfall	\$ 1,800,000	0	3	3	0	3
HDN 2: Pepper Dr. Drainage System Improvements	\$ 1,100,000	0	2	2	0	2
WCE 1: Williams Creek East, South Channel Restoration	\$ 7,050,000	0	2	2	6	8
WCE 2: Williams Creek East, Northeast Channel Restoration	\$ 4,700,000	0	3	3	0	3
WCE 3: Williams Creek East, Northwest Channel Improvements	\$ 1,400,000	0	2	2	0	2
WCE 4: Leisure Street Drainage Improvement:	\$ 9,765,000	0	1	1	0	1
WCW 1: Palmetto Drive Drainage System	\$ 1,835,000	2	0	6	4	10
WCW 2: Drainage System Improvements, Aurora St. to Resort St.	\$ 900,000	0	4	4	0	4
WCW 3: West Williams Creek Channel Restoration	\$ 1,150,000	0	0	0	12	12
WCW 4: Sandstone St. South Channel Improvements	\$ 260,000	0	2	2	0	2
NP1: Water Street Area Drainage Improvements	\$ 490,000	0	2	2	0	2
LE 1: Crittenden Drive Area Improvements	\$ 430,000	1	5	8	0	8

1. Sum of score incurred by this project alone.
2. Sum of individual scores of all subsequent projects.
3. Sum of Individual Score and Score for future projects.

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REPORT OF FINDINGS
for
Holley by the Sea DRAINAGE IMPROVEMENTS PROJECT

