3.0 MAJOR DRAINAGE SYSTEMS

The 1965 Master Plan Report for Storm Drainage Facilities ("1965 Master Plan") identified six primary subwatersheds within the Dade City study area. Each of these areas has its own drainage characteristics and potential problems, and for the most part each area is effectively isolated from the others due to local topographic conditions which are somewhat unique for Central Florida. Two of the subwatersheds, identified as Area V and Area VI, were excluded from consideration for potential stormwater improvements in the 1965 Master Plan, as at that time, very limited urban development was present in those areas.

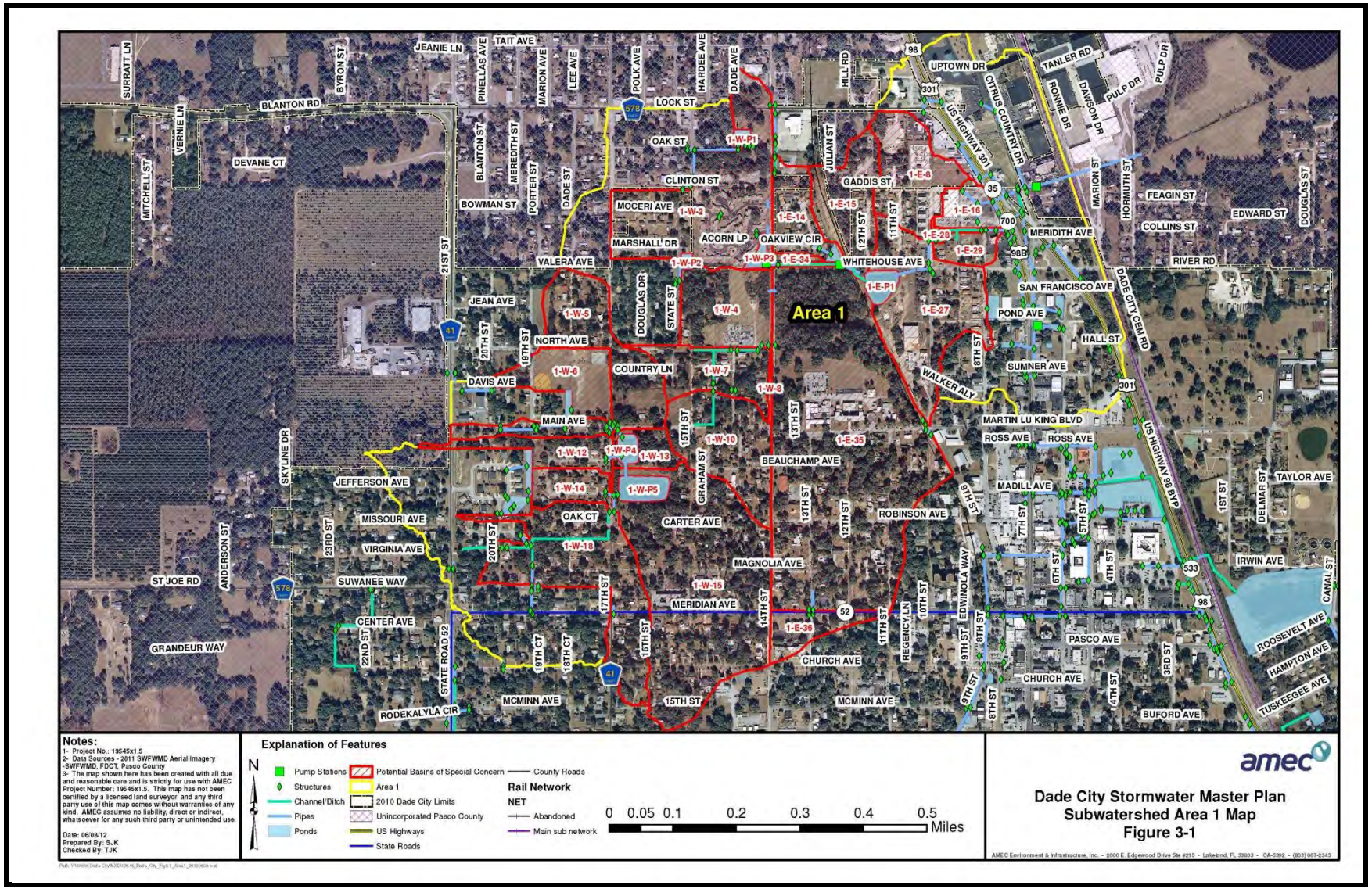
Most of Area V, located east of the CSX Transportation railroad right-of-way and roughly centered on River Road, to this date remains largely undeveloped, with significant portions of the subwatershed lying outside the limits of incorporated Dade City. With its location east of the CSX right-of-way, the primary causes of flooding concerns within this area are completely separate from those affecting the Dade City downtown area and locations adjacent to the downtown area. During development of the scope for this project, no drainage problem areas were identified by City staff in this area. For the reasons above, Area V is excluded from any study or consideration of future stormwater improvements in this report.

Area VI as identified in the 1965 Master Plan encompasses an area south of the downtown area and roughly centered on the old Seaboard Air Line Railroad right-of-way that was converted to a multiple-use recreational trail in 2007. The northern part of this area has seen significant development in the years since the 1965 Master Plan was prepared including primarily single-family residential neighborhoods of medium and low densities. The City has not received any reports of significant flooding problems in this area. Because of this, portions of Area VI that lie within the incorporated city limits have been included in this report, but grouped with Area III and Area IV as identified in the 1965 Master Plan.

Brief descriptions of the existing drainage systems in each of the four areas included for consideration in this report are summarized below.

3.1 Area 1 Subwatershed

Please refer to **Figure 3-1** below. Area 1 encompasses approximately 460 acres lying north and northwest of the Dade City downtown area. It is roughly bounded to the north by Lock Street (County Road 578), to the south by Meridian Avenue (State Road 52) and to the west by a sandy ridge located west of 21st Street (State Road 52). North of Martin Luther King Jr. Avenue, the area is roughly bounded to the east by US Highway 301 (though some portion of the privately-owned Dade City Industrial Park is included). South of Martin Luther King Jr. Avenue, the eastern boundary of Area 1 is formed by the multi-use recreational trail occupying the old Seaboard Air Line railroad right-of-way.


Area 1
Notes:
1- Project No.: 19545x1.5
2- Data Sources - 2011 SWFWMD Aerial Imagery -SWFWMD, FDOT, Pasco County
3- The map shown here has been created with all due and reasonable care and is strictly for use with AMEC Project Number: 19545x1.5. This map has not been certified by a licensed land surveyor, and any third party use of this map comes without warranties of any kind. AMEC assumes no liability, direct or indirect, whatsoever for any such third party or unintended use.
Date: 06/08/12
Prepared By: SJK
Checked By: TJK
Explanation of Features
Pump Stations
Structures
Channel/Ditch
Pipes
Ponds
Potential Basins of Special Concern
Area 1
2010 Dade City Limits
Unincorporated Pasco County
US Highways
State Roads
County Roads
Rail Network
NET
Abandoned
Main sub network
0 0.05 0.1 0.2 0.3 0.4 0.5 Miles
amec
Dade City Stormwater Master Plan
Subwatershed Area 1 Map
Figure 3-1
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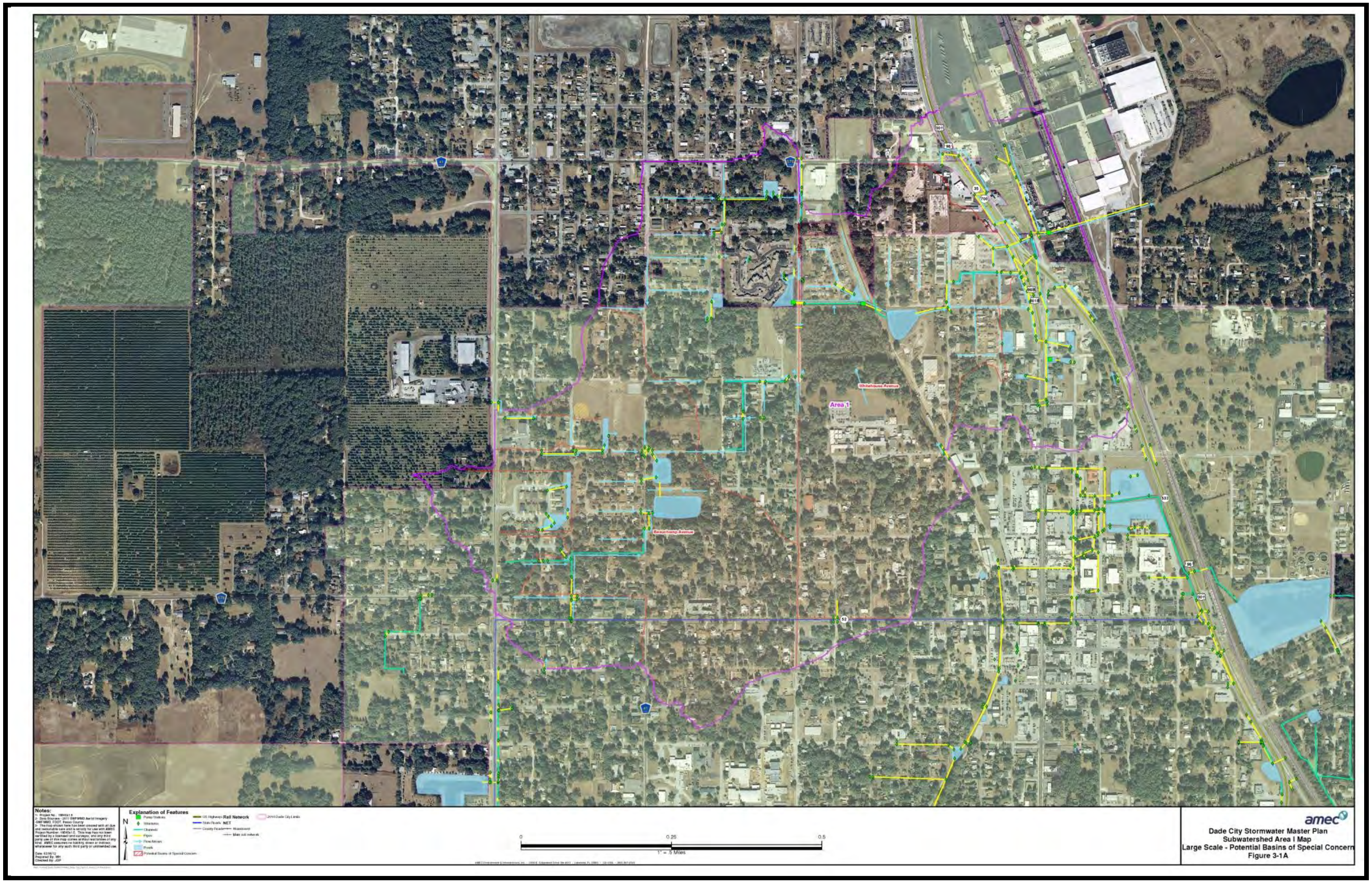

Notes:
Explanation of Features
N
Rail Network
NET
amec
Dade City Stormwater Master Plan
Subwatershed Area I Map
Large Scale - Potential Basins of Special Concern
Figure 3-1A

The natural flow pattern of stormwater runoff through the area is roughly west to east, eventually outfalling to the Withlacoochee River floodplain. The presence of lower ridges and high spots within the subwatershed serve to divide the area into several smaller localized basins which are effectively closed under all except for the most extreme storm events. As development has proceeded over the years, the available surface area of sandy, well-drained soils throughout the subwatershed has significantly decreased, resulting in increased volumes of stormwater runoff accumulating and ponding in the low areas, causing street flooding and localized flooding of privately-owned parcels during larger rainfall events.

The constructed storm water system within this subwatershed consists of several independent storm sewer and channel systems which serve the hydraulically isolated areas in the western part of the subwatershed, as well as a storm sewer system along US Highway 301 and the US Highway 301 Bypass (State Road 533) which is operated and maintained by the Florida Department of Transportation. These systems are briefly described below.

Area 1AWest of 17th Street

Please refer to **Figure 3-2** below. Stormwater runoff in this area flows east and north from the right-of-way of State Road 52 (Meridian Avenue) and County Road 41 (21st Street) through a series of inlets and pipes designed to convey it in a controlled manner down the rather steep hills. South of Missouri Avenue, runoff enters a shallow concrete-lined channel which runs north from Meridian Avenue. From here the ditch becomes earthen and then turns easterly and runs adjacent to several properties located on Oak Court. The channel then turns to the north and abruptly terminates just south of the intersection of Oak Court and 17th Street. The ditch has overflowed its banks several times as a result of high flows from intense rainfall events that have occurred in the 2012 rainy season. One property owner in the vicinity of Oak Court and 17th Street has reported yard flooding and water damage to part of the home in the past and it is assumed that blockage in the ditch may have caused stormwater to overtop the ditch banks at that location. Stormwater runoff from the end of this ditch must run overland over Oak Court to drain to the Beauchamp pond drainage collection system. This isolated lack of drainage conveyance can create safety concerns and potentially could be part of the reason the residence was previously flooded.

Between Missouri Avenue and Main Avenue, runoff flows easterly down gradient through a small subdivision (Highlands Bluff). This subdivision was constructed relatively recently, so it has several dry retention ponds which help to attenuate some of the runoff volume. Any runoff beyond the volume of this stormwater management system"s capacity is discharged and continues to flow easterly toward 17th Street.

Along Main Avenue, the City has recently constructed a storm sewer system which helps to convey water in a controlled manner down the hill toward 17th Street. Some of this water is captured and diverted to a narrow dry retention pond located next to a City-owned recreational park at the northwest corner of the intersection of Main Avenue and 17th Street. Excess runoff volume from this pond is discharged to the park by means of a concrete weir structure.

Once stormwater runoff originating in the locations noted above reaches 17th Street, it is conveyed by a series of pipe and inlet systems located at the major intersections to two ponds located on the northeast and southeast sides of the intersection of 17th Street and Beauchamp Avenue. Stormwater runoff from areas located to the north of the ponds also flows into the ponds. These ponds are connected by a 24" equalizer pipe running under Beauchamp Avenue and form the lowest point of this portion of the subwatershed. The ponds are isolated from the rest of the subwatershed by a low ridge to the east, and no positive outfall from the pond system exists. The location of these ponds in relation to low lying areas that could receive overflow from these ponds makes construction of stormwater outfall very expensive. A conceptual CIP to enlarge the ponds, eliminate through-traffic and retain the existing utilities and pedestrian access only down Beauchamp Avenue between 15th Street and 17th Street is included in Chapter 10 (Alternatives Analysis) of this report. Additionally, a CIP to improve the existing ditch located behind Oak Court is also included in Chapter 10.

Area 1B - 14th Street to 15th Street between Main Avenue and North Avenue

Please refer to **Figure 3-3** below. Stormwater runoff from this area, as well as from a somewhat higher region extending from Beauchamp Avenue south, is conveyed in a northward direction through a system of ditches and culverts to a 24" outfall pipe located near the intersection of North Avenue and 14th Street. From this point, it is joined by runoff conveyed by two concrete flumes located on the east and west sides of 14th Street to a wetland located north of the Tampa Electric Company (TECO) substation located in this area.

Stormwater runoff entering this wetland is conveyed to the east by a 24" pipe running under 14th Street, and discharges to a larger wetland on the east side of 14th Street that is located on property owned by the Pasco County School Board. This wetland is bounded to the south by higher elevation portions of the school board property, to the north by a large drainage ditch and to the east by a berm which separates it from a pond located south of the intersection of Whitehouse Avenue and 12th Street, on property owned by the City of Dade City. The berm is located along the old Seaboard Air Line Railroad right-of-way and was constructed as part of the grade for the railway. This pond will be discussed in greater detail later in this report and will be referred to as the "Whitehouse Pond."

Area 1C - Tommytown Area

Please refer to **Figure 3-4** below. The County recently constructed a stormwater management system along 15th Street between Clinton Street and Oak Street. This system conveys runoff from Clinton Street, 15th Street and Oak Street to a small retention pond located on the north side of Oak Street, approximately 200 feet west of 14th Street. All areas served by this system lie at relatively high elevations. Runoff in excess of the design volume for the pond is discharged to a roadside ditch on the north side of Oak Street and flows easterly toward 14th Street, where it is joined by runoff flowing through a pipe system from the north that captures stormwater runoff generated near the intersection of 14th Street and Lock Street. Runoff continues to the south along 14th Street, through a series of pipes and the roadside ditch that are in poor condition, until it reaches a large drainage ditch described below.

The large drainage ditch is a shallow earthen ditch of a 15± feet bottom width and which runs from the east side of 14th Street easterly to the west side of the Seaboard Air Line railroad right-of-way. All runoff in the ditch is discharged to the Whitehouse Pond by means of a Pasco County Housing Authority (PCHA) owned lift station via an 8" PVC stormwater force main. This lift station is located at the eastern end of the ditch.

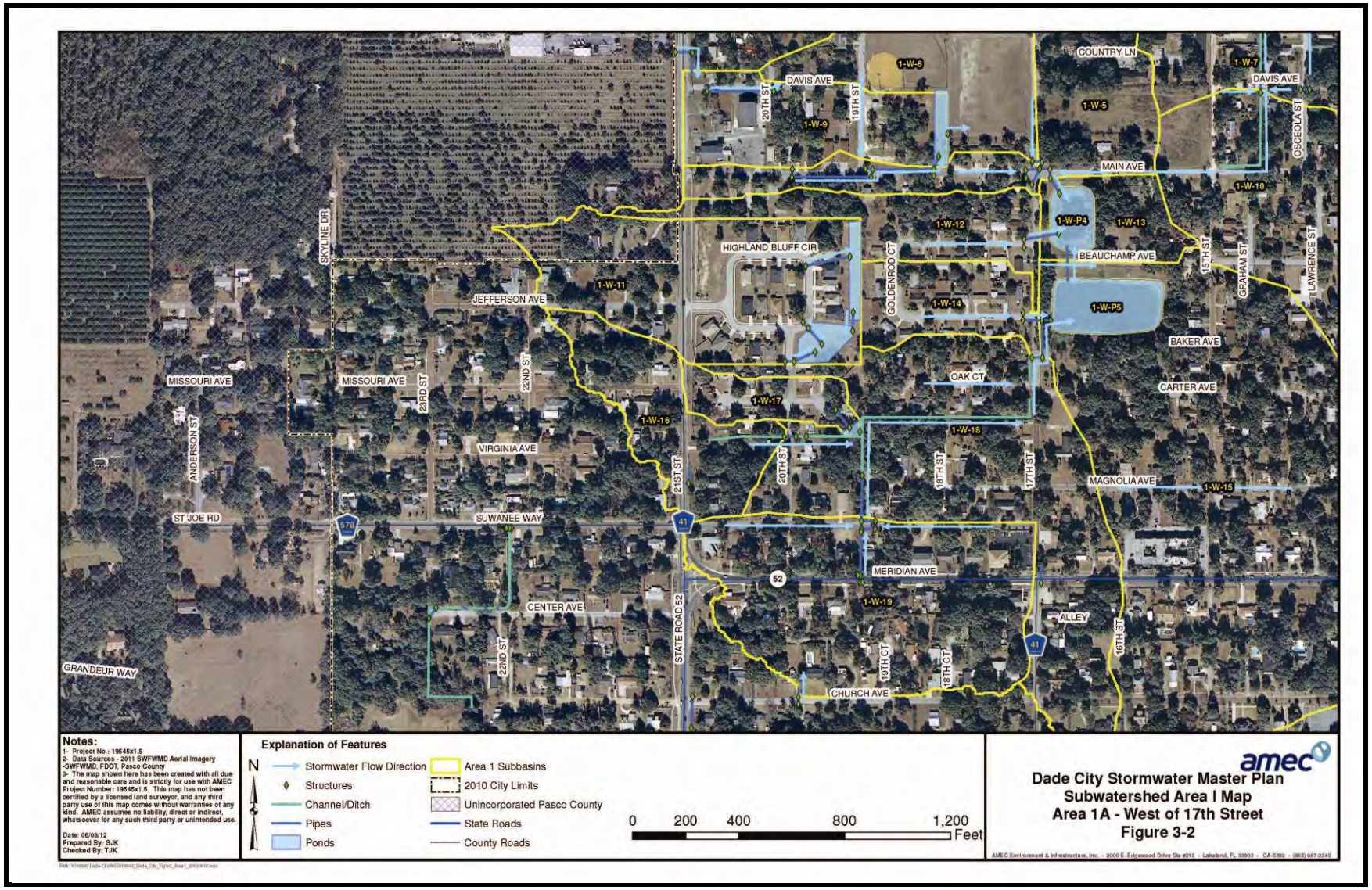
Additional stormwater runoff is discharged to the large ditch from the Dade Oaks Apartments housing complex located on Acorn Loop, owned by the PCHA. This development lies at a considerably lower elevation than the developments along Clinton Street and State Street, located to the north and west, respectfully. A small pipe and inlet system conveys runoff to a retention pond located at the southeast corner of the PCHA property, and water from this pond is discharged to the large drainage ditch to the east via a stormwater lift station operated by the PCHA. Both lift stations are manually operated, and no operating data was made available by the PCHA for this report.

Additional runoff contributions to large drainage ditch come from the neighborhood located to the north on Oakview Circle.

Area 1D - Whitehouse Avenue

Please refer to **Figure 3-5** below. The portion of Whitehouse Avenue between 10th Street and 12th Street includes the topographic low point for the entire subwatershed and has been subject to flooding problems for years. This area receives runoff not only from the Whitehouse Pond discharges but also from the storm sewer system for US Highway 301 (7th Street) between Pond Avenue and the Dade Village Shopping Center. As designed, runoff from 7th Street enters a shallow ditch running along the south side of the shopping center property and is then conveyed westerly and then southerly to the Whitehouse Pond by means of a small storm sewer system.

The low area noted above is connected to the outlet for the entire subwatershed by means of other portions of the US Highway 301 storm sewer system between Lock Street and the merge of the US Highway 301 Bypass and 7th Street. Stormwater modeling revealed a hydraulic "high point" that exists along the US Highway 301 right-of-way during significant storm events. This, along with the small size of the Whitehouse Pond and the relatively high amount of directly connected impervious area present in this portion of the watershed causes water to pond in the ditch and 10th Street area for long periods of time after storm events. This results in street and yard flooding and infrequent flooding of homes in the area.


COUNTRY LN
DAVIS AVE
MAIN AVE
BEAUCHAMP AVE
HIGHLAND BLUFF CIR
JEFFERSON AVE
MISSOURI AVE
OAK CT
BAKER AVE
CARTER AVE
MAGNOLIA AVE
VIRGINIA AVE
SUWANEE WAY
ST JOE RD
MERIDIAN AVE
CENTER AVE
ALLEY
CHURCH AVE
GRANDEUR WAY
SKYLINE DR
ANDERSON ST
20TH ST
19TH ST
22ND ST
23RD ST
21ST ST
18TH ST
17TH ST
16TH ST
15TH ST
OSCEOLA ST
GRAHAM ST
LAWRENCE ST
GOLDENROD CT
STATE ROAD 52
1-W-5
1-W-6
1-W-7
1-W-9
1-W-10
1-W-11
1-W-12
1-W-13
1-W-14
1-W-15
1-W-16
1-W-17
1-W-18
1-W-19
1-W-P4
1-W-P5
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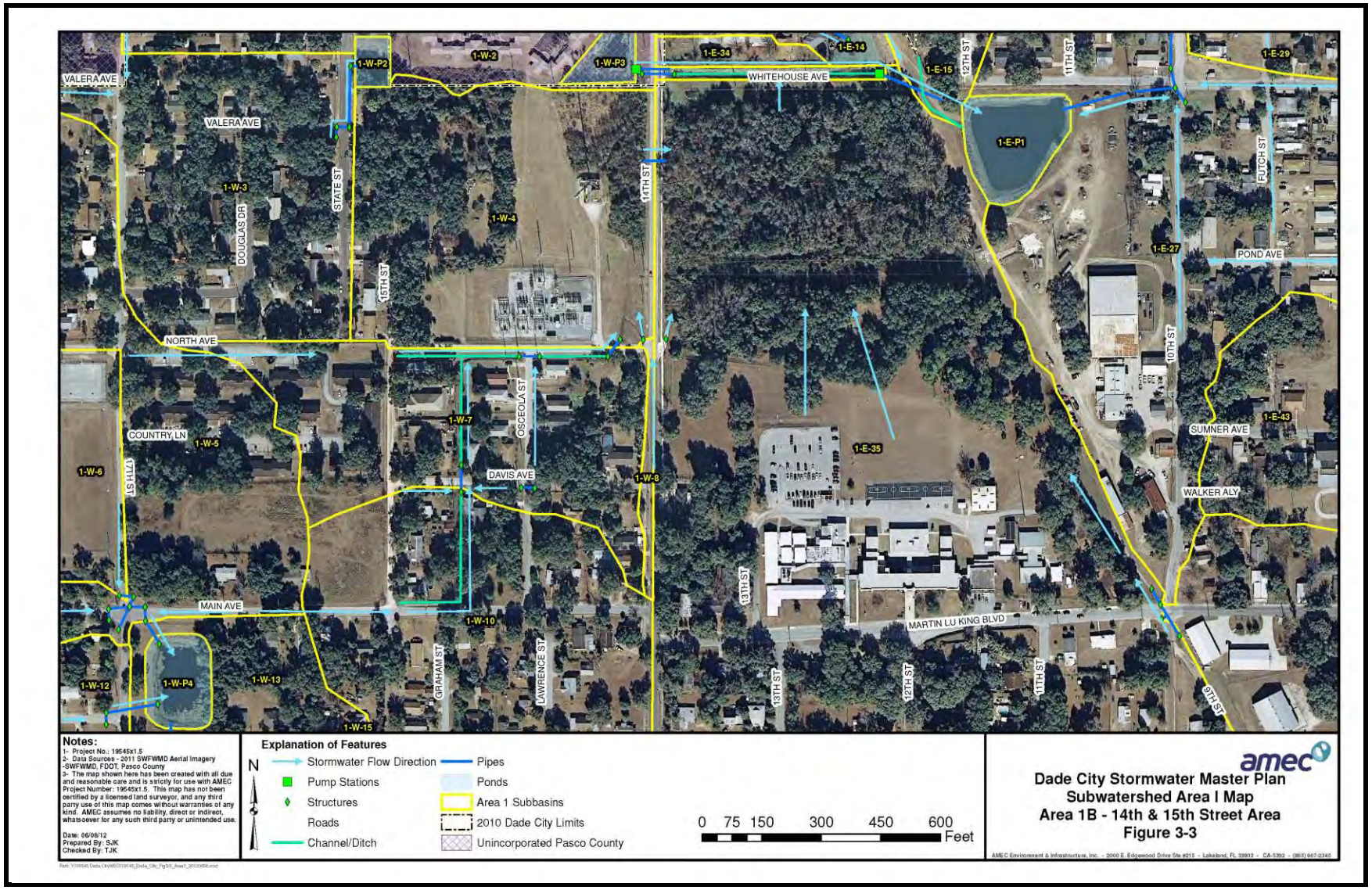
Prepared By: SJK
Checked By: TJK
Explanation of Features
N
Stormwater Flow Direction
Structures
Channel/Ditch
Pipes
Ponds
Area 1 Subbasins
2010 City Limits
Unincorporated Pasco County
State Roads
County Roads
0 200 400 800 1,200
Feet
amec
Dade City Stormwater Master Plan
Subwatershed Area I Map
Area 1A - West of 17th Street
Figure 3-2


VALERA AVE
1-W-P2
1-W-2
1-W-P3
1-E-34
1-E-14
WHITEHOUSE AVE
1-E-15
12TH ST
11TH ST
1-E-29
1-E-P1
FUTCH ST
1-W-3
STATE ST
DOUGLAS DR
14TH ST
1-W-4
15TH ST
1-E-27
POND AVE
NORTH AVE
10TH ST
OSCEOLA ST
1-W-7
COUNTRY LN
1-W-5
1-E-43
SUMNER AVE
1-W-6
16TH ST
DAVIS AVE
1-W-8
1-E-35
WALKER ALY
13TH ST
MAIN AVE
1-W-10
MARTIN LU KING BLVD
GRAHAM ST
LAWRENCE ST
1-W-12
1-W-P4
1-W-13
1-W-15
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Area 1 Subbasins
2010 Dade City Limits
Unincorporated Pasco County
0 75 150 300 450 600
Feet
amec
Dade City Stormwater Master Plan
Subwatershed Area I Map
Area 1B - 14th & 15th Street Area
Figure 3-3


HILLSBOROUGH AVE
MARION AVE
LEE AVE
POLK AVE
MANATEE AVE
HARDEE AVE
DADE AVE
HILLARD
LOCK ST
OAK ST
1-W-1
1-W-P1
15TH ST
HUTCHINSON ST
PORTER ST
MEREDITH ST
AUTUMN DR
CLINTON ST
17TH ST
JULIAN ST
CITRUS VILLAS LN
GADDIS ST
1-E-8
1-E-15
1-E-14
BOWMAN ST
MOCERI AVE
1-W-2
ACORN LP
14TH ST
12TH ST
DADE ST
1-W-3
MARSHALL DR
STATE ST
OAKVIEW CIR
1-W-P3
1-E-34
1-W-P2
WHITEHOUSE AVE
1-E-27
VALERA AVE
20TH ST
19TH ST
1-W-5
VALERA AVE
15TH ST
1-W-4
1-E-35
1-E-P1
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Unincorporated Pasco County
0 75 150 300 450 600
Feet
amec
Dade City Stormwater Master Plan
Subwatershed Area I Map
Area 1C - Tommytown Area
Figure 3-4
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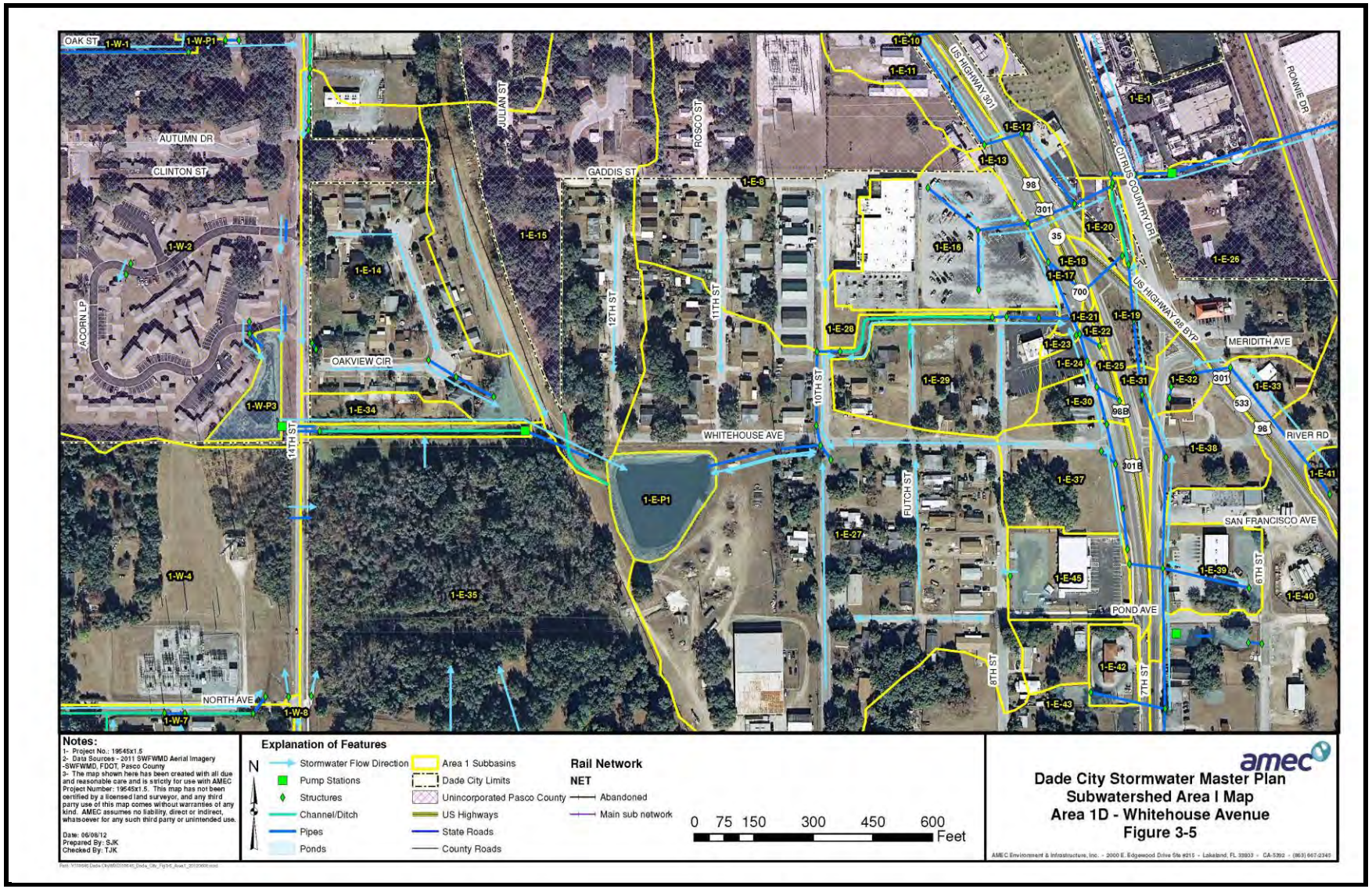
OAK ST
AUTUMN DR
CLINTON ST
ACORN LP
OAKVIEW CIR
JULIAN ST
ROSCO ST
GADDIS ST
12TH ST
11TH ST
10TH ST
14TH ST
WHITEHOUSE AVE
NORTH AVE
FUTCH ST
8TH ST
7TH ST
6TH ST
POND AVE
SAN FRANCISCO AVE
MERIDITH AVE
RIVER RD
RONNIE DR
CITRUS COUNTRY DR
US HIGHWAY 301
US HIGHWAY 98 BYP
1-W-1
1-W-P1
1-W-2
1-W-P3
1-W-4
1-W-6
1-W-7
1-E-1
1-E-8
1-E-10
1-E-11
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1-E-43
1-E-45
1-E-P1
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Rail Network
NET
Abandoned
Main sub network
N
0 75 150 300 450 600
Feet
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Dade City Stormwater Master Plan
Subwatershed Area I Map
Area 1D - Whitehouse Avenue
Figure 3-5
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Area 1E - US Highway 301/US Highway 301 Bypass Right-of-Way and Discharge Point

Please refer to **Figure 3-6**. The storm sewer system for US Highway 301 within the subwatershed connects the right-of-way for US Highway 301 and the US Highway 301 Bypass between Lock Street to the north and Martin Luther King Jr. Blvd. to the south with the discharge point for the entire subwatershed. Runoff from the north is conveyed through a series of pipes starting at the intersection with Lock Street that terminates at a 36" RCP discharging to a short roadside ditch on the west side of Citrus Country Drive (Old State Road 23). Runoff from the south enters this ditch by means of a 36" pipe and a 42" pipe which convey runoff from the right-of-way for 7th Street, as well as commercial properties adjacent to the right-of-way. An additional contribution is made from the US Highway 301 Bypass right-of-way to south of River Road.

The discharge point for subwatershed Area I is a stormwater lift station owned and operated by the Pasco Cogeneration Plant, at the south side of the Dade City Business Center. The lift station capacity is 11,000 gallons per minute (24.6 cubic feet per second) for the two existing pumps pumping at design head, and discharge to the Withlacoochee River floodplain system is to the east by means of a 30" pipe which runs under the CSX Transportation railroad right-of-way. This is the only current conveyance located under the railroad right-of-way in this area. Besides the contributions to runoff volume from the subwatershed, the lift station also receives runoff from the Business Center and Pasco Cogen Plant properties.

Given the size of the overall contributing portions of the subwatershed, as well as the amount of impervious surface present, this outfall is significantly undersized. During the majority of the modeled storm events, it is clearly evident that the lift station requires time to lower the flood water elevation to a level where positive discharge can occur from the 10th Street and Whitehouse Avenue area and relieve the flooding in that area.

3.2 Area 2 Subwatershed- Downtown Drainage Basin

Please refer to **Figure 3-7** below. Area 2 is approximately 199 acres in size, of which the majority includes the downtown area of Dade City. This subwatershed is roughly bounded by Martin Luther King Jr. Drive to the north, Howard Avenue to the south, and 11th Street to the west. . While the primary drainage divide for the subwatershed on the east is the CSX Transportation railroad right-of-way, the old wastewater treatment polishing pond located near the City-owned Irvin Park and the adjoining neighborhoods to the north and south are also included in this drainage basin. Virtually all stormwater runoff from the downtown area is routed to the pond "Irvin pond" before ultimately discharging to the Withlacoochee River floodplain to the east.

Because this subwatershed encompasses downtown Dade City, it has the most extensively developed stormwater infrastructure in the entire study area. Unfortunately, the system is undersized for the current level of development in the downtown area, and frequent flooding of streets and parking areas is experienced by downtown businesses and their customers even during "routine" rainfall events. During these storms, a significant amount of stormwater runoff flows overland in a generally northward and eastward direction toward the US Highway 301 Bypass, reaching depths and velocities of safety concern to pedestrians and motor vehicles as it flows down the City streets.

The downtown area lies at the foot of topographic ridges located to the south and west. Because of the significant topographic relief in the area, stormwater runoff flows can achieve high velocities as it makes its way downhill. Over the years, the downtown area has been almost completely covered with impervious surfaces from commercial and roadway development. This has significantly reduced any opportunity for stormwater runoff to infiltrate into the soil. Most of this development predates environmental resource permitting requirements adopted by SWFWMD in the 1980s, and as a result it lacks retention ponds or other measures which would serve to attenuate the increased volume and rate of stormwater runoff from the development process.

Please refer to **Figure 3-8** below. The main trunk for the downtown storm sewer system originates with several inlets connected by 15-inch pipes located at the intersection of Meridian Avenue and 7th Street. Parking lot drainage from businesses located west of this intersection is conveyed to the main system via overload flow along the roadway curb lines. The main storm sewer trunk continues eastward along Meridian Avenue to the intersection of 6th Street, where it turns to the north and continues northward until it reaches the intersection of 6th Street and Madill Avenue, increasing in size to 30 inches. Laterals join the main trunk at the following intersections, listed in order from south to north.

- Live Oak Avenue; one inlet connected by a 12-inch pipe.
- Pineapple Avenue; one 24" lateral conveying runoff eastward from the vicinity of Pineapple Avenue and 8th Street. One inlet connected by a 12" x 18" pipe that drains an empty lot at the intersection.
- Robinson Avenue; one parking lot drain inlet connected by a 15-inch pipe.
- Madill Avenue; one 30-inch lateral conveying runoff eastward from a series of inlets at the intersection of Madill Avenue and 7th Street. Two 14" x 23" pipes and one 15-inch pipe receiving runoff from small localized areas adjacent to 6th Street.

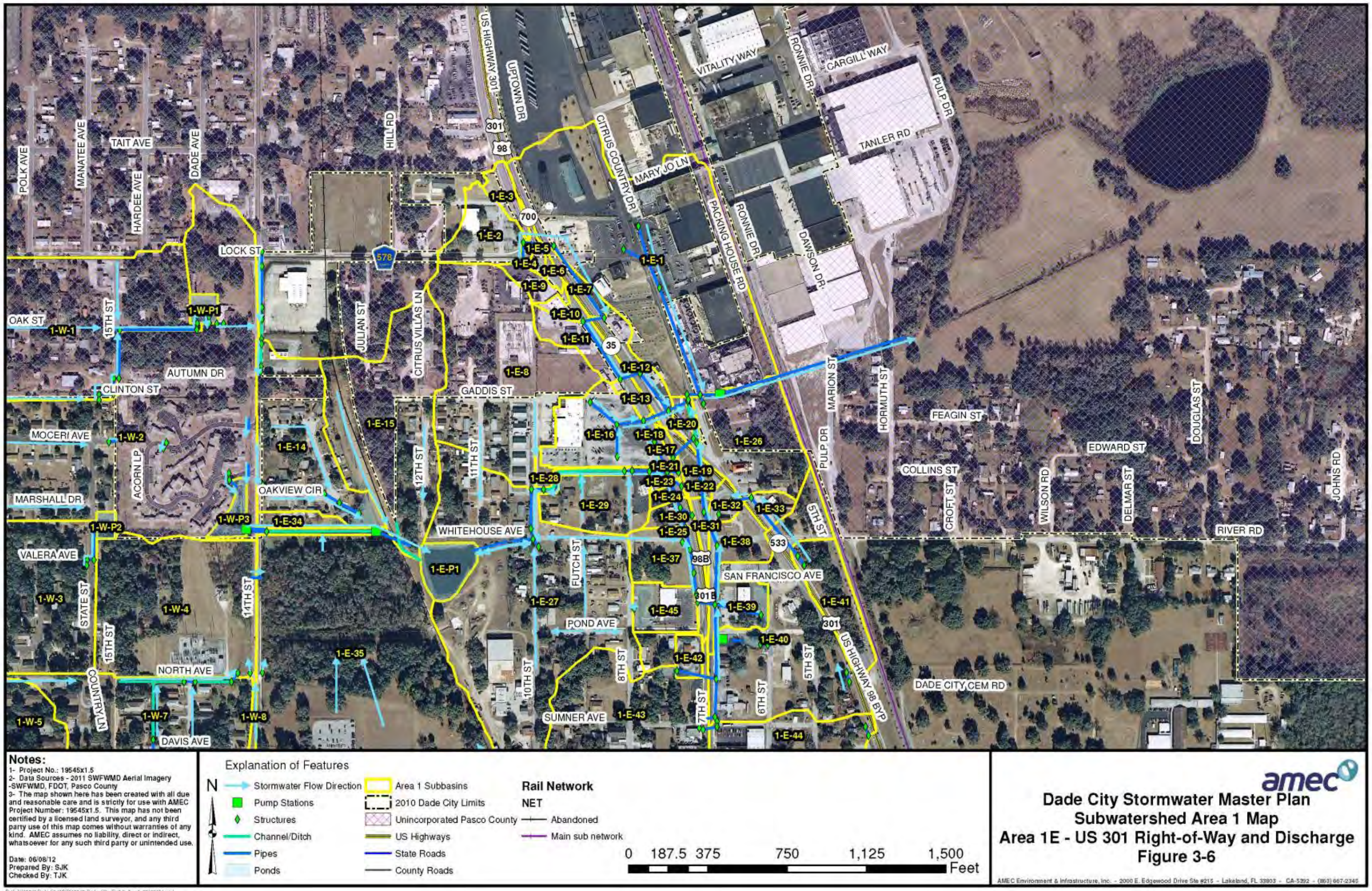
From the 6th Street – Madill Avenue intersection, the main trunk increases to 36 inches in size and turns eastward until it reaches 5th Street, crossing the East Pasco Government Center complex. This complex was constructed in the late 1990s time period and has a separate stormwater management system that ultimately discharges to the same receiving system as the downtown stormwater trunk line. This system is described in more detail below.

Once the main storm sewer trunk reaches the east side of 5th Street, it joins a 48" pipe which runs northward to a shallow ditch. This ditch conveys stormwater easterly toward the US Highway 301 Bypass right-of-way adjacent to a large low flood prone area located on the north side of the Pasco County Courthouse facility. This low area serves as a surge pond for large storm events.

Stormwater runoff from the main storm sewer trunk is joined by additional runoff from areas along 8th, 7th, 6th and 5th Streets north of Madill Avenue, which is conveyed through a series of manholes, inlets and pipes to the ditch. Other inlets and pipes convey runoff from 6th Street between Pineapple Avenue and Robinson Avenue, and 5th Street south of Live Oak Avenue, to the drainage ditch as well.

Once the drainage ditch connects to the US Highway 301 Bypass roadside ditch, it joins stormwater runoff from the highway and flows southward to a 48" concrete culvert that runs under the highway. This cross drain also receives runoff from the south, through the roadside ditch from the following locations.

- FDOT storm sewer system; the portion of the US Highway 301 Bypass right-of-way contributing runoff to this cross drain includes the area between Church Avenue and Meridian Avenue. The storm sewer terminates with a 36" pipe discharging to the roadside ditch just north of Meridian Avenue.
- Pasco County Courthouse; one 18-inch outfall and one 24-inch outfall convey parking and roadway runoff from the courthouse complex to the US Highway 301 Bypass roadside ditch.
- Intersection of Live Oak Avenue and 3rd Street; a small storm sewer system is connected by a 24" pipe discharging to a shallow ditch which runs easterly to the highway ditch.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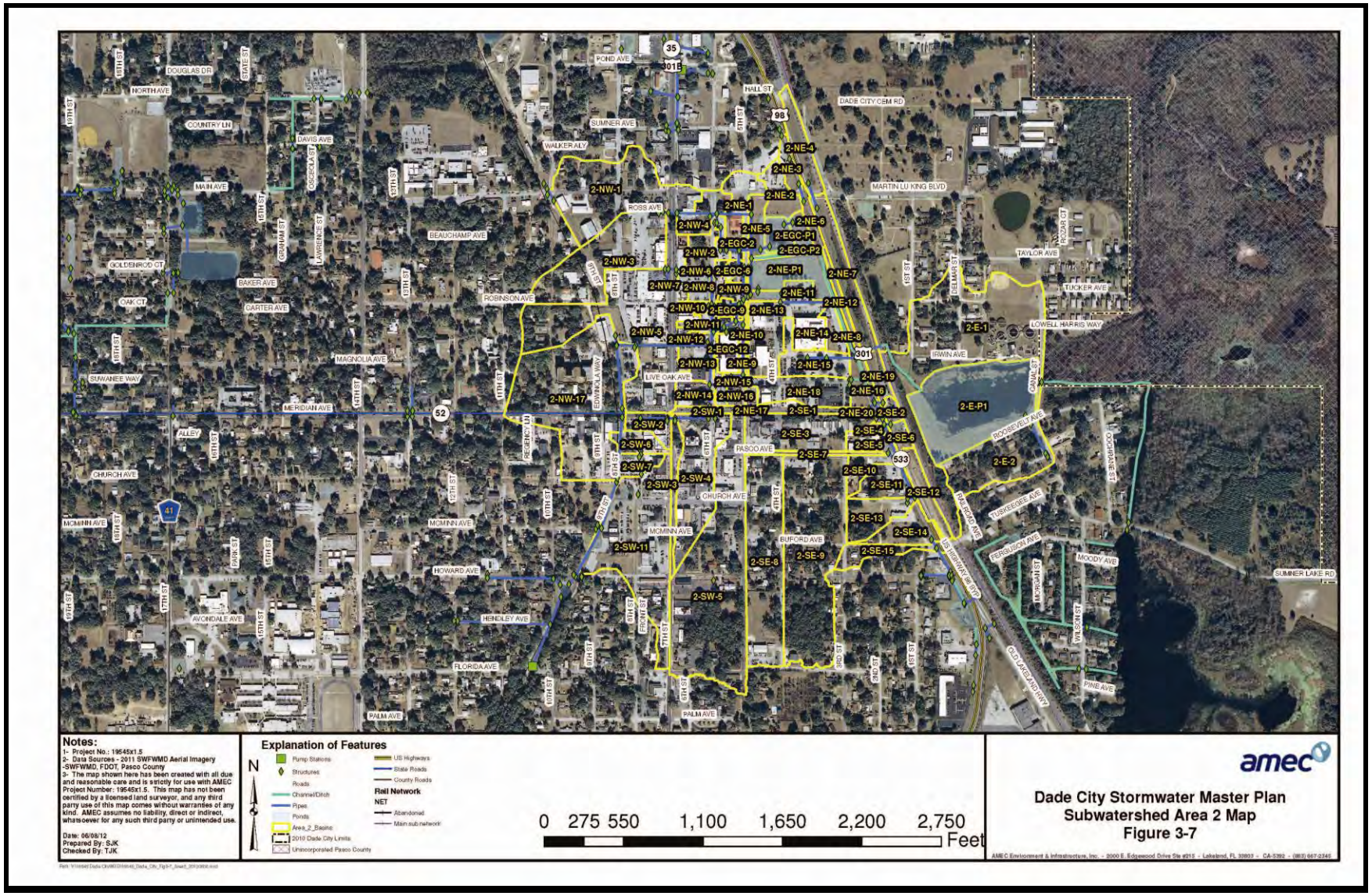
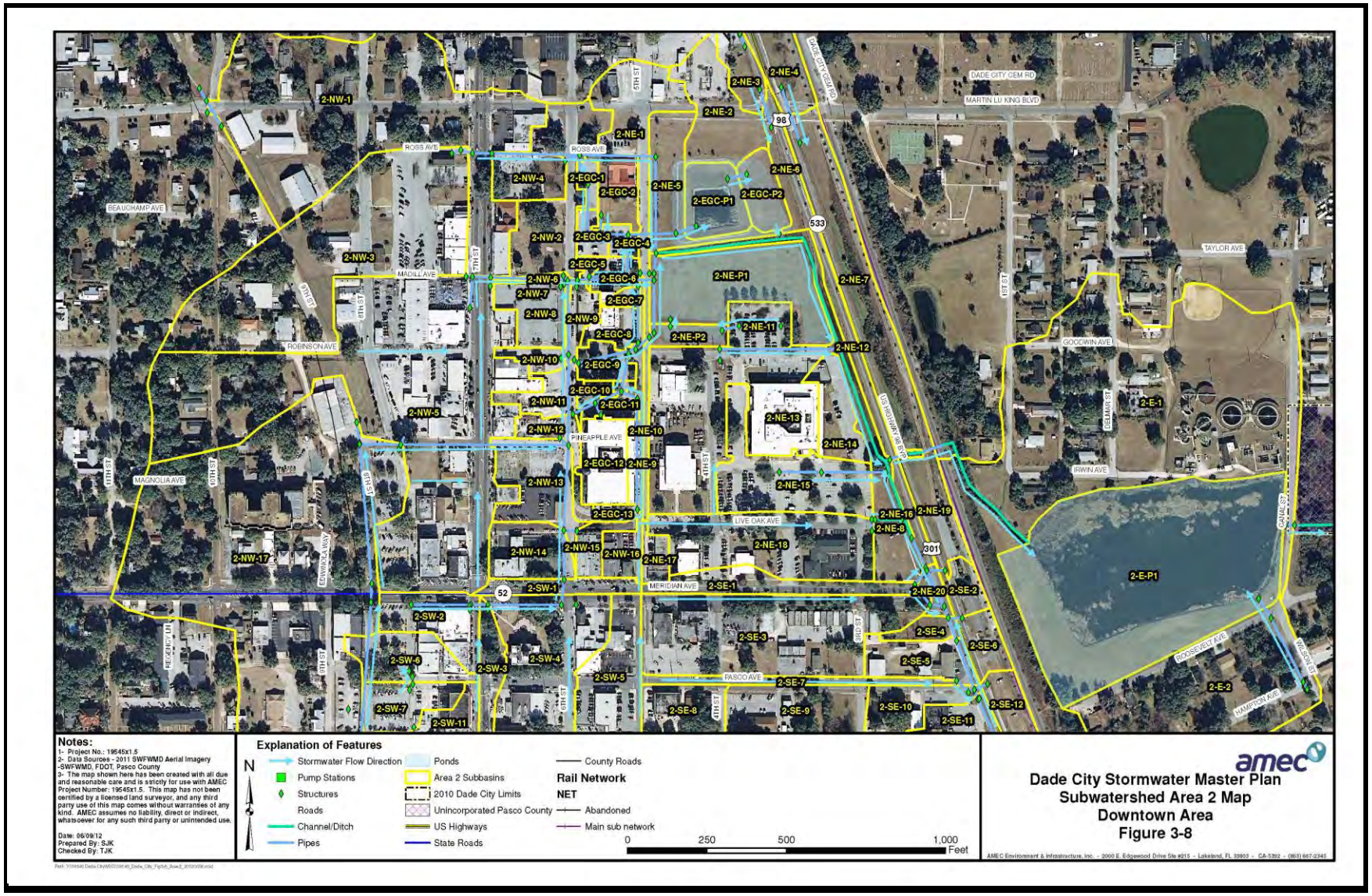
Ponds
Area 1 Subbasins
2010 Dade City Limits
Unincorporated Pasco County
US Highways
State Roads
County Roads
Rail Network
NET
Abandoned
Main sub network
0 187.5 375 750 1,125 1,500
Feet
amec
Dade City Stormwater Master Plan
Subwatershed Area 1 Map
Area 1E - US 301 Right-of-Way and Discharge
Figure 3-6


Notes:
1- Project No.: 19545x1.5
2- Data Sources - 2011 SWFWMD Aerial Imagery -SWFWMD, FDOT, Pasco County
3- The map shown here has been created with all due and reasonable care and is strictly for use with AMEC Project Number: 19545x1.5. This map has not been certified by a licensed land surveyor, and any third party use of this map comes without warranties of any kind. AMEC assumes no liability, direct or indirect, whatsoever for any such third party or unintended use.
Date: 06/08/12
Prepared By: SJK
Checked By: TJK
Explanation of Features
Pump Stations
Structures
Roads
Channel/Ditch
Pipes
Ponds
Area_2_Basins
2010 Dade City Limits
Unincorporated Pasco County
US Highways
State Roads
County Roads
Rail Network
NET
Abandoned
Main sub network
N
0 275 550 1,100 1,650 2,200 2,750
Feet
amec
Dade City Stormwater Master Plan
Subwatershed Area 2 Map
Figure 3-7
AMEC Environment & Infrastructure, Inc. - 2000 E. Edgewood Drive Ste #215 - Lakeland, FL 33803 - CA-5392 - (863) 667-2345


Notes:
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Date: 06/09/12
Prepared By: SJK
Checked By: TJK
Explanation of Features
Stormwater Flow Direction
Pump Stations
Structures
Roads
Channel/Ditch
Pipes
Ponds
Area 2 Subbasins
2010 Dade City Limits
Unincorporated Pasco County
US Highways
State Roads
County Roads
Rail Network
NET
Abandoned
Main sub network
0
250
500
1,000
Feet
amec
Dade City Stormwater Master Plan
Subwatershed Area 2 Map
Downtown Area
Figure 3-8
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Please refer to **Figure 3-9** below. The East Pasco Government Center was subject to SWFWMD environmental resource permitting rules and was required to construct a stormwater management system. Stormwater runoff from the site is collected in a series of pipes and inlets, and is conveyed to a retention pond located on the east side of 5th Street, immediately north of the main drainage ditch for the downtown area. From this retention pond, water is discharged through a concrete control structure to a separate holding cell to the east of the pond, and then to the drainage ditch by means of an earthen weir structure.

Stormwater flowing through the 48" cross drain under the US Highway 301 Bypass is conveyed through a short channel to another 48" cross drain under the CSX Transportation railroad embankment. Stormwater runoff is then conveyed toward the south through an open channel until it outfalls into Irvin pond. This pond was originally constructed to impound and polish treated effluent from the City"s wastewater treatment plant, but the plant no longer discharges to it. The pond is approximately 7 acres in size at the berm and has a bottom elevation of approximately 64 ft. NAVD. The seasonal high water table elevation for the pond has been estimated at 68.3 ft. NAVD.

Stormwater is discharged from the pond via a variable sized culvert under Canal Street where it flows easterly to a wetland system connected to the Withlacoochee River floodplain. The cross drain is in very poor condition.

3.3 Area 3 Subwatershed

Please refer to **Figure 3-10, Figure 3-11, Figure 3-12, Figure 3-13, and Figure 3-14** below. The Area 3 subwatershed identified in the 1965 Master Plan was not bounded to the south and east, so for this update a defined boundary was created by means of topographical analysis and review of the current incorporated limits of Dade City. The area considered for this study is approximately 1,540 acres in size, and is located southwest of the downtown area, roughly centered on State Road 52 south of Meridian Avenue. Much of the area remains undeveloped, though numerous permit applications have been filed with SWFWMD to authorize construction of new subdivisions. The majority of growth in the Dade City area is occurring within this subwatershed.

The area consists of high ridges and plateaus on sandy, well drained soils, and the City has experienced flooding problems in the vicinity of Howard Avenue near the crossing for the multipurpose recreational trail. Frequent street flooding to the extent that road closure is necessary is experienced in this portion of the subwatershed. This portion of the subwatershed is discussed in greater detail below, as alternatives to address this flooding are a priority to the City.

The City has not received flooding complaints for the remainder of this subwatershed. Much of the current development is new, and was therefore required to include stormwater management systems when applying for construction permits. Future projects will also require the incorporation of stormwater management systems that meet

the City"s more stringent Drainage Basin of Special Concern (DBSC) criteria. The majority of the Area 3 subwatershed is part of the Tank Lake DBSC, which is designated a closed basin and an area of special criteria and is discussed later in this report.

The general surface water runoff pattern through this area is from north to south, as runoff flows down the hills and is conveyed under the right-of-way for State Road 52, Old San Ann Road and Fort King Road (County Road 41) by means of box culvert structures. These culverts allow stormwater to enter wetlands and other low-lying areas, which convey it in a generally east-to-southeastward direction toward the Withlacoochee River floodplain system. Much of the area located west and north of State Road 52 and south of St. Joe Road (County Road 578) is located in a hydrologically closed basin draining to a large pond and low-lying area located northeast of the Abbey Glen subdivision.

The most significant City maintained feature in this area is a stormwater lift station located at the Florida Avenue crossing of the multi-purpose recreational trail. Runoff from this portion of the subwatershed is collected in a storm sewer trunk line that originates at Pasco Avenue and runs southward along the right-of-way for the multi-purpose trail. This trunk line is connected to another trunk line that travels north from Pasco Avenue, crosses Meridian Avenue (State Road 52) at 8th Street, and continues northward to Pineapple Avenue, where it is routed to the storm sewer system along 6th Street in the downtown area (Area 2). There are two curb inlets located near the intersection of Pasco Avenue and 8th Street: the inlet on the south side of Pasco Avenue contains the high points of the storm sewers running northward to Area 2 and southward to Area 3, and serves as the break between the two subwatersheds in this area.

The storm sewer within Area 3 is an 18" clay pipe at Pasco Avenue and traverses south, joining drainage laterals from Howard Avenue and Hendley Avenue, as well as inlets that connect at McMinn Avenue. The system terminates at the lift station on Florida Avenue as a 30" RCP. Please refer to **Figure 3-15** below for additional detail of the system.

Several years ago the City constructed improvements for the Howard Avenue system in an attempt to address the previously noted street flooding within a vertical low point along the Howard Avenue alignment, located 600 + feet west of the trail crossing. These improvements included replacing and upsizing piping and inlets on Howard Avenue, and the construction of a small surge pond at the southwest corner of the trail crossing at Howard Avenue. These improvements saw only limited success.

Stormwater runoff entering the wet well at the Florida Avenue lift station is pumped southward under Florida Avenue through a rectangular culvert, and discharges to a drainage ditch running along the east side of the multi-purpose trail. From this ditch, water continues to flow southward into a series of wetlands and low-lying areas, before turning eastward and ultimately discharging to the Withlacoochee River floodplain.

Other significant drainage structures in this area include a series of roadside ditches and culverts located on the east side of the State Road 52 right-of-way that extend from Church Avenue southward to a point approximately 450 feet south of Coleman Avenue. Stormwater runoff is conveyed and discharged into the wetland system that flows under Old San Ann Road. Another system of pipes, inlets and roadside ditches conveys stormwater southward along 17th Street from Colman Avenue to the wetland system near Dixie Avenue.

It is noted that discharge from the stormwater lift station located at the Florida Avenue crossing of the multi-purpose recreational trail is conveyed through Area 3 via the ditch that runs along the east side of the trail. The discharge is within the Tank Basin DBSC and is therefore subject to the DBSC criteria. Any drainage improvements that increase the capacity of the lift station and/or its immediate downstream conveyance have the potential to create localized flooding problems for property owners and residents near the trail.

3.4 Area 4 Subwatershed

Please refer to **Figure 3-16, Figure 3-17 and Figure 3-18** below. The final subwatershed evaluated for this study, Area 4 is approximately 230 acres in size and lies east of Area 3 and south of Area 2, centered roughly on the split of 7th Street and the US Highway 301 Bypass. The area to the northwest of the Bypass consists primarily of medium density residential neighborhoods constructed on relatively high ground, while the area southeast of the Bypass is more sparsely developed, situated on low-lying ground that slopes down toward the east.

The most significant drainage structures in this area are the pipes and inlets that make up the storm sewer system for US Highway 301 and the US Highway 301 Bypass. The storm sewer system begins at the intersection of US Highway 301 and Lake Drive, and several commercial developments adjacent to the right-of-way have outfalls into the system. Stormwater runoff is conveyed northward to a 42” pipe that discharges eastward to a large ditch hardened with concrete, which then conveys runoff eastward toward the Withlacoochee River floodplain. Additional runoff from 7th Street north of the split, and 5th Street at Hibiscus Park, is also routed to this 42” outfall by a series of pipes and inlets. Additionally, this outfall receives discharge from a City-owned pond located directly west of the US Highway 301 Bypass/7th Street split. The control structure for this pond is in poor condition.

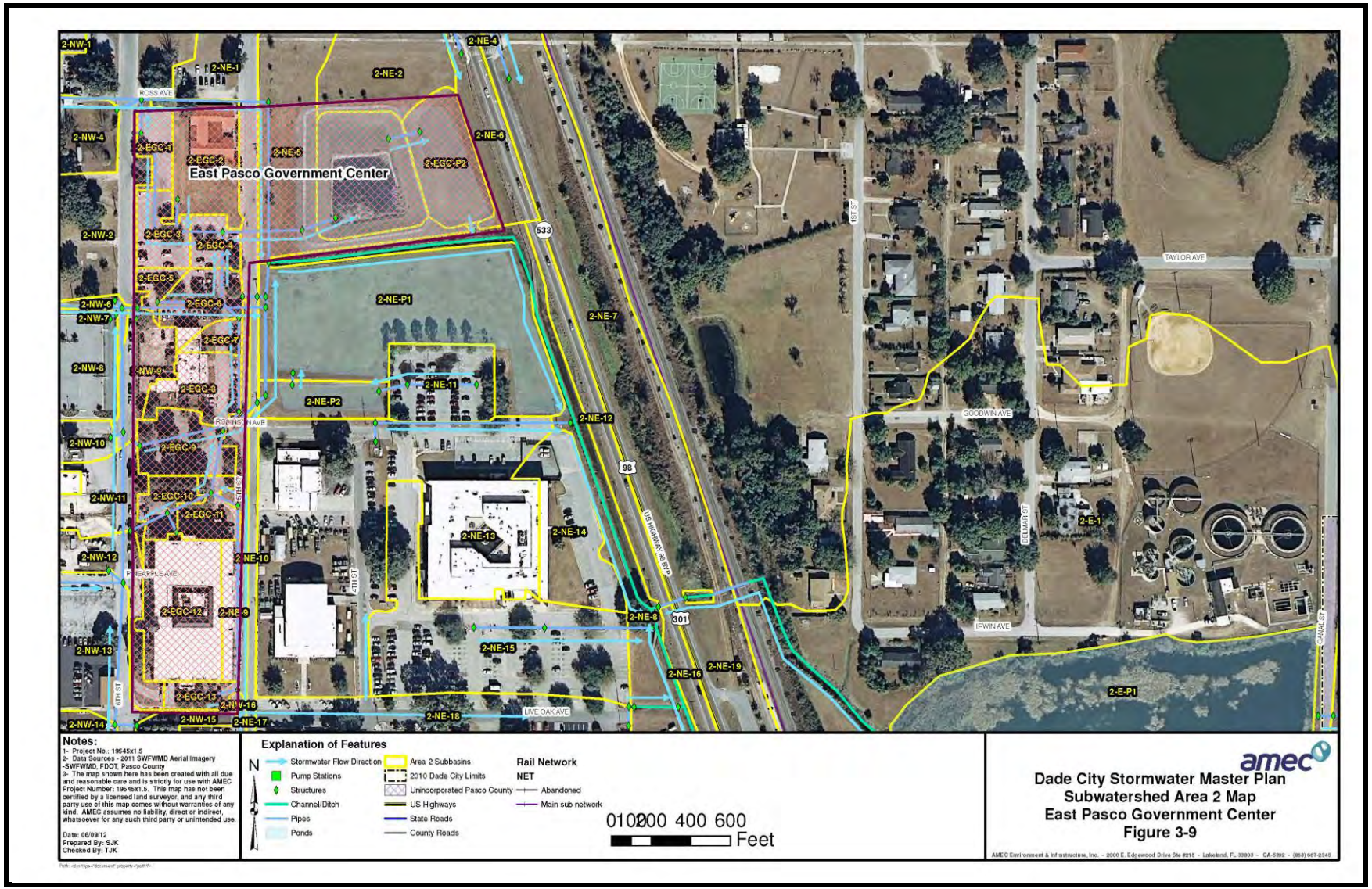
A smaller storm sewer system originating at the intersection of the US Highway 301 Bypass and Buford Avenue conveys runoff to a small borrow pit lying directly west of the Bypass approximately 200 feet south of the intersection with Howard Avenue. Some runoff is discharged under the Bypass roadway by means of a 36” cross drain, while other runoff continues south within the Bypass right-of-way through roadside ditches and driveway culverts until it reaches a 42” cross drain located approximately 530 feet south of the Coleman Avenue intersection.

Once stormwater runoff leaves the US Highway 301 Bypass right-of-way, it continues to flow eastward through a series of small sloughs and channels until it reaches the right-of-way of Old Lakeland Highway (County Road 35A), where it discharges to the adjacent CSX Transportation railroad right-of-way via a 48" pipe. En route to this outfall point, runoff is bypassed around a cattle ranch (Sid Larkin Property) by means of a high berm which isolates the wetlands on the Larkin property from the main stormwater conveyance system. The wetlands on the Larkin property were designated by SWFWMD under an environmental resource permit. Pasco County is currently proposing a project with the placement additional pipes under the CR 35A roadway. After flowing under the CSX railroad right-of-way, stormwater runoff is conveyed under Wilson Street by a metal pipe that is in exceptionally poor condition (this connection is proposed for upgrade as well) and discharges to the Boiler Lake system, which is part of the Withlacoochee River floodplain.

At the north end of Wilson Street there is a small neighborhood that is built around a series of shallow canals. These canals are connected to the Boiler Lake System by means of culvert crossings under Wilson Street. However, the inverts for the culverts are placed approximately 2 – 3 feet above the canal bottoms, and as a result the canals are filled with stagnant water almost year-round. These canals do not appear to serve any sort of drainage function, and were likely dug out for fill material to build the adjacent area up for development.

The only other drainage structures of note are a series of small pipes, inlets and channels located at the east ends of Dixie Avenue and Sunset Avenue, which serve to convey street runoff from these roads to the receiving system to the east.

The City has received no flooding complaints from residents or businesses in this subwatershed. However, during a field visit by AMEC staff, a City Public Works employee noted that during rainfall events, significant sheet flow coming down 5th Street adjacent to Hibiscus Park causes scour at 13529 5th Street. A possible cause of this scour is surface overflows from swales and inlets lying within the FDOT right-of-way that are in need of maintenance.


East Pasco Government Center
2-NW-1
2-NE-1
2-NE-2
2-NE-4
2-NW-4
2-EGC-1
2-EGC-2
2-NE-5
2-NE-6
2-EGC-P2
2-NW-2
2-EGC-3
2-EGC-4
2-EGC-5
2-NW-6
2-NW-7
2-EGC-6
2-EGC-7
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2-NW-9
2-EGC-8
2-NE-P1
2-NE-7
2-NE-11
2-NE-P2
2-NE-12
2-NW-10
2-EGC-9
2-EGC-10
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2-NE-13
2-NE-14
2-NW-12
2-NE-10
2-EGC-12
2-NE-9
2-NE-8
2-NW-13
2-NE-15
2-NE-16
2-NE-19
2-EGC-13
2-NW-16
2-NW-15
2-NE-17
2-NE-18
2-NW-14
2-E-1
2-E-P1
533
98
301
ROSS AVE
ROBINSON AVE
PINEAPPLE AVE
LIVE OAK AVE
TAYLOR AVE
GOODWIN AVE
IRWIN AVE
1ST ST
4TH ST
6TH ST
US HIGHWAY 98/301
CANAL ST
Notes:
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2- Data Sources - 2011 SWFWMD Aerial Imagery -SWFWMD, FDOT, Pasco County
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Date: 06/09/12
Prepared By: SJK
Checked By: TJK
Explanation of Features
Stormwater Flow Direction
Pump Stations
Structures
Channel/Ditch
Pipes
Ponds
Area 2 Subbasins
2010 Dade City Limits
Unincorporated Pasco County
US Highways
State Roads
County Roads
Rail Network
NET
Abandoned
Main sub network
N
0 100 200 400 600
Feet
amec
Dade City Stormwater Master Plan
Subwatershed Area 2 Map
East Pasco Government Center
Figure 3-9
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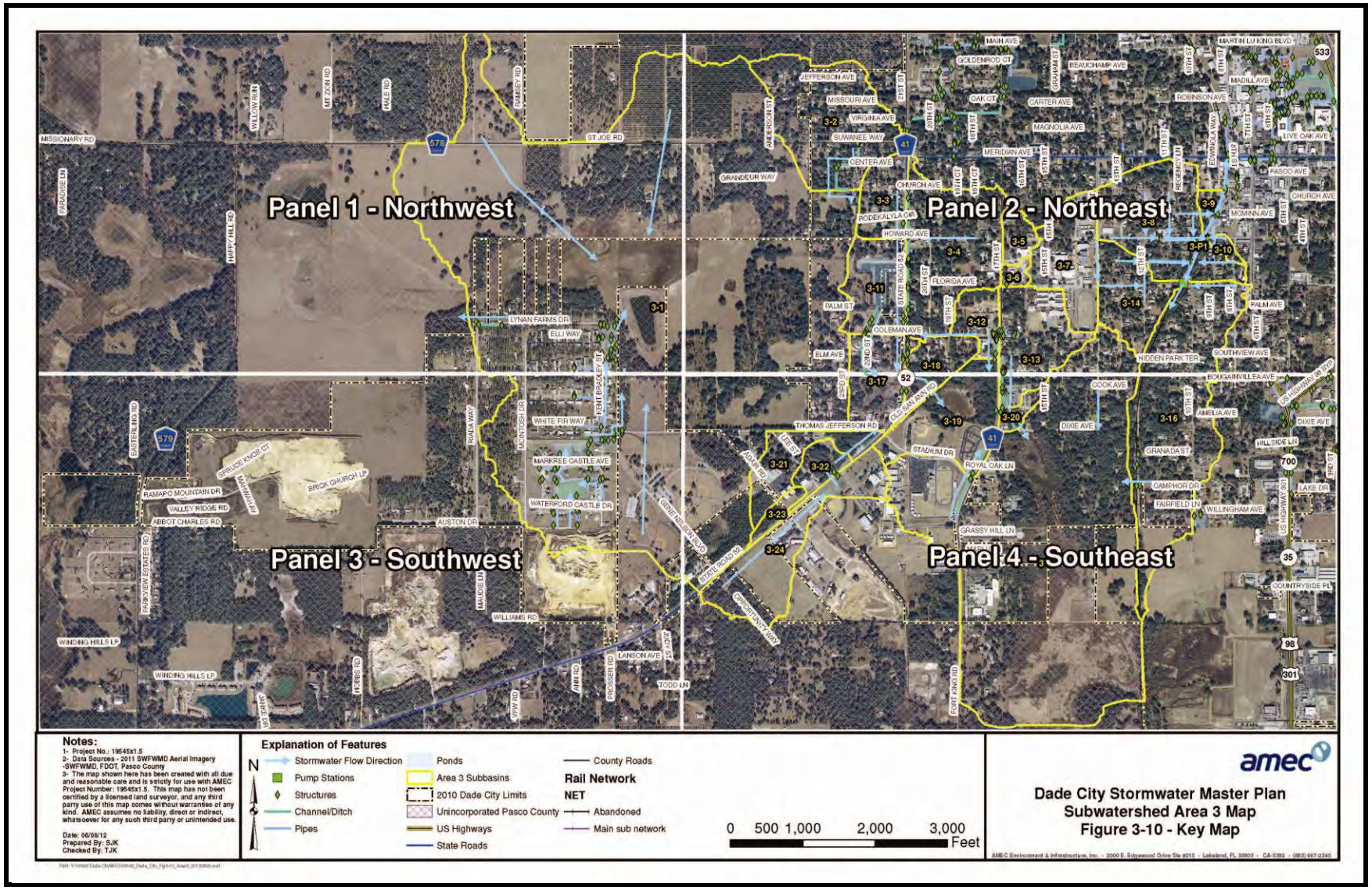
Panel 1 - Northwest
Panel 2 - Northeast
Panel 3 - Southwest
Panel 4 - Southeast
Notes:
1- Project No.: 19545x1.5
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Prepared By: SJK
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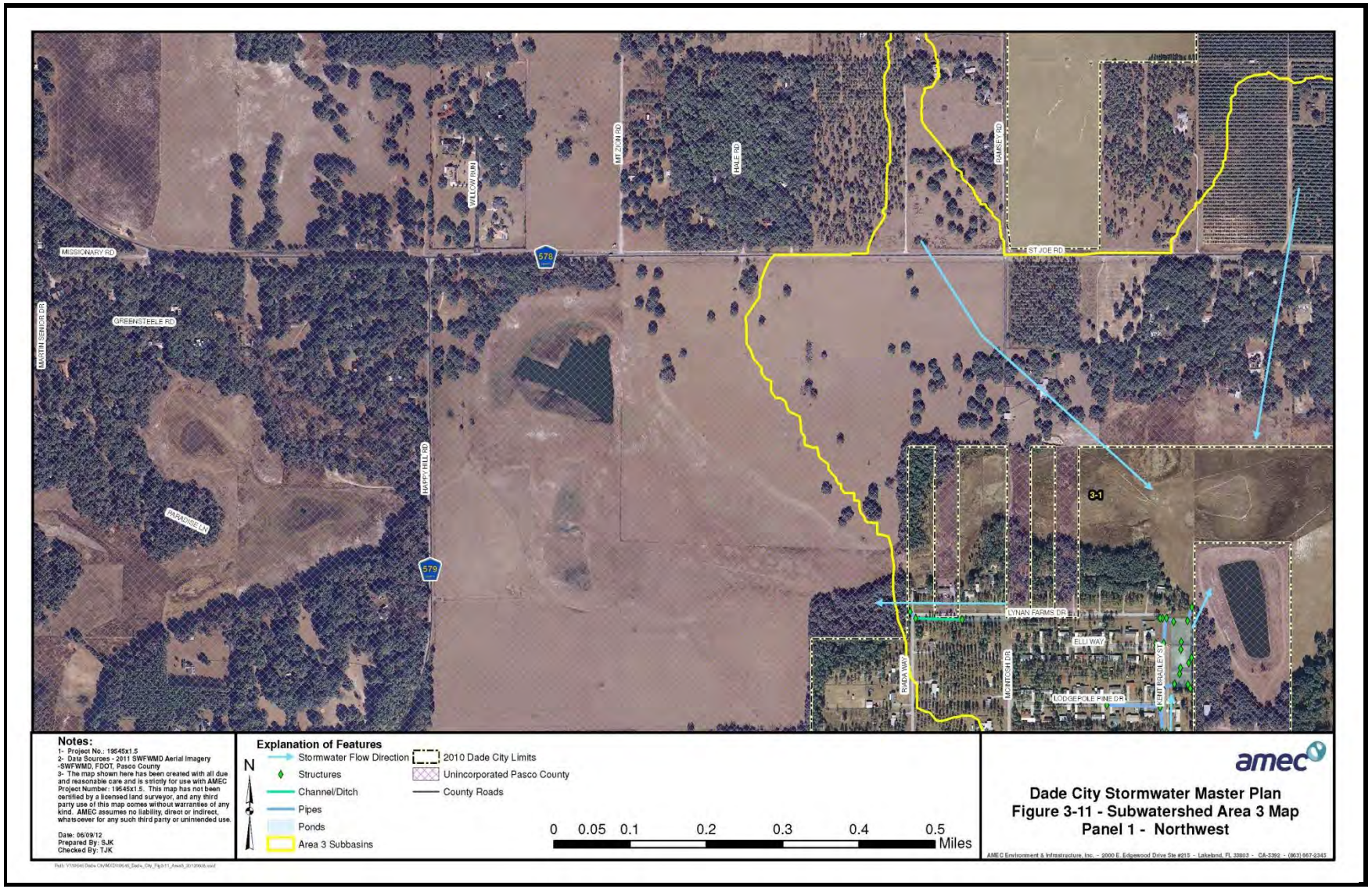
Explanation of Features
Stormwater Flow Direction
Pump Stations
Structures
Channel/Ditch
Pipes
Ponds
Area 3 Subbasins
2010 Dade City Limits
Unincorporated Pasco County
US Highways
State Roads
County Roads
Rail Network
NET
Abandoned
Main sub network
0 500 1,000 2,000 3,000
Feet
amec
Dade City Stormwater Master Plan
Subwatershed Area 3 Map
Figure 3-10 - Key Map


MISSIONARY RD
GREENSTEELE RD
MARTIN SENIOR DR
WILLOW RUN
MT ZION RD
HALE RD
RAMSEY RD
ST JOE RD
578
HAPPY HILL RD
BARNDEEN
579
3-1
LYNAN FARMS DR
ELLI WAY
MCINTOSH DR
LODGEPOLE PINE DR
KENT BRADLEY ST
Notes:
1- Project No.: 19545x1.5
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Checked By: TJK
Explanation of Features
Stormwater Flow Direction
Structures
Channel/Ditch
Pipes
Ponds
Area 3 Subbasins
2010 Dade City Limits
Unincorporated Pasco County
County Roads
N
0 0.05 0.1 0.2 0.3 0.4 0.5
Miles
amec
Dade City Stormwater Master Plan
Figure 3-11 - Subwatershed Area 3 Map
Panel 1 - Northwest
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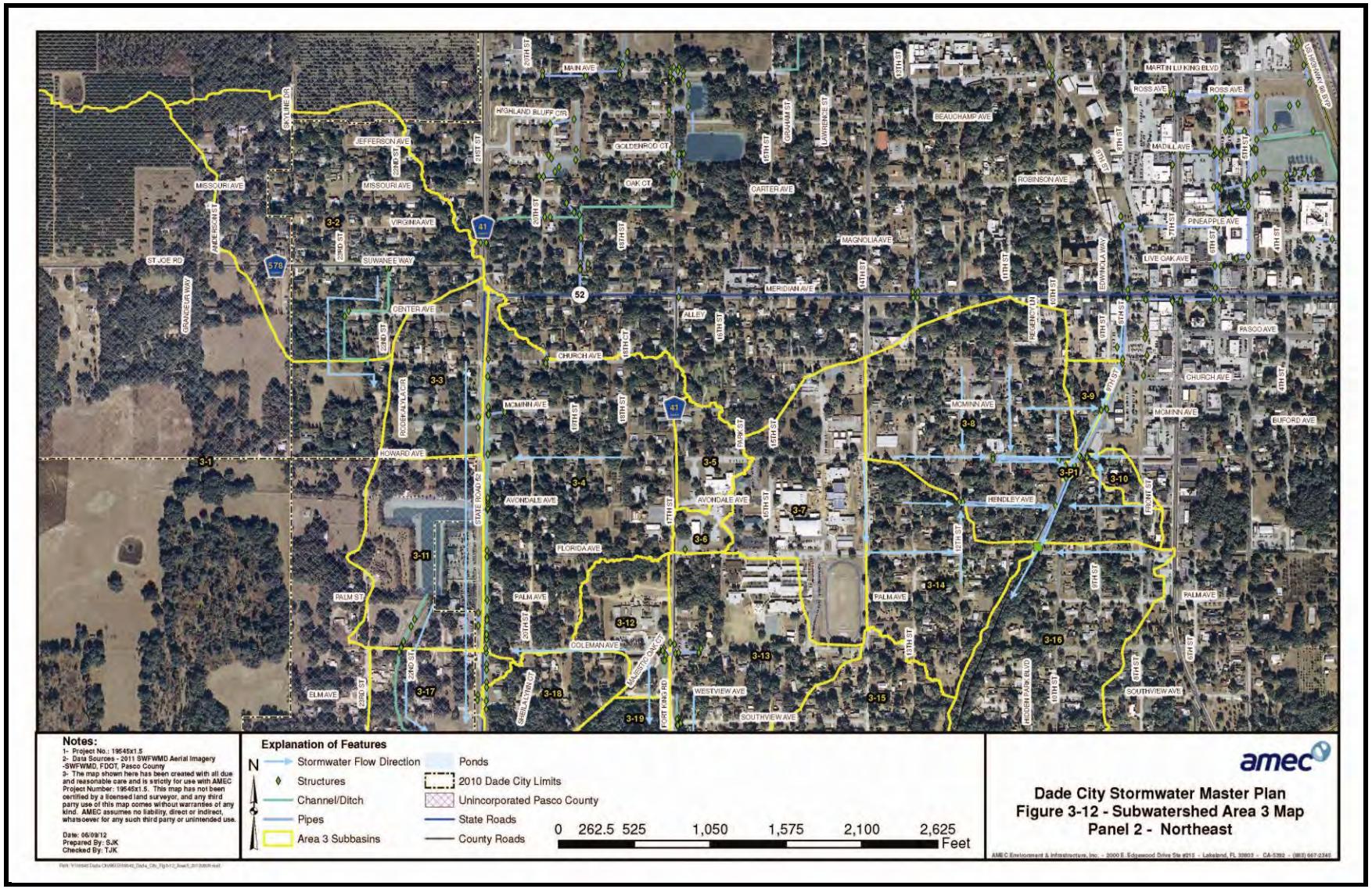
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Date: 06/09/12
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Explanation of Features
Stormwater Flow Direction
Structures
Channel/Ditch
Pipes
Area 3 Subbasins
Ponds
2010 Dade City Limits
Unincorporated Pasco County
State Roads
County Roads
0 262.5 525 1,050 1,575 2,100 2,625
Feet
N
amec
Dade City Stormwater Master Plan
Figure 3-12 - Subwatershed Area 3 Map
Panel 2 - Northeast
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Date: 06/09/12
Prepared By: SJK
Checked By: TJK

Explanation of Features

N

- Stormwater Flow Direction
- Structures
- Channel/Ditch
- Pipes
- Area 3 Subbasins
- Ponds
- 2010 Dade City Limits
- Unincorporated Pasco County
- State Roads
- County Roads

0 260 520 1,040 1,560 2,080 2,600 Feet

amec

Dade City Stormwater Master Plan
Figure 3-13 - Subwatershed Area 3 Map
Panel 3 - Southwest

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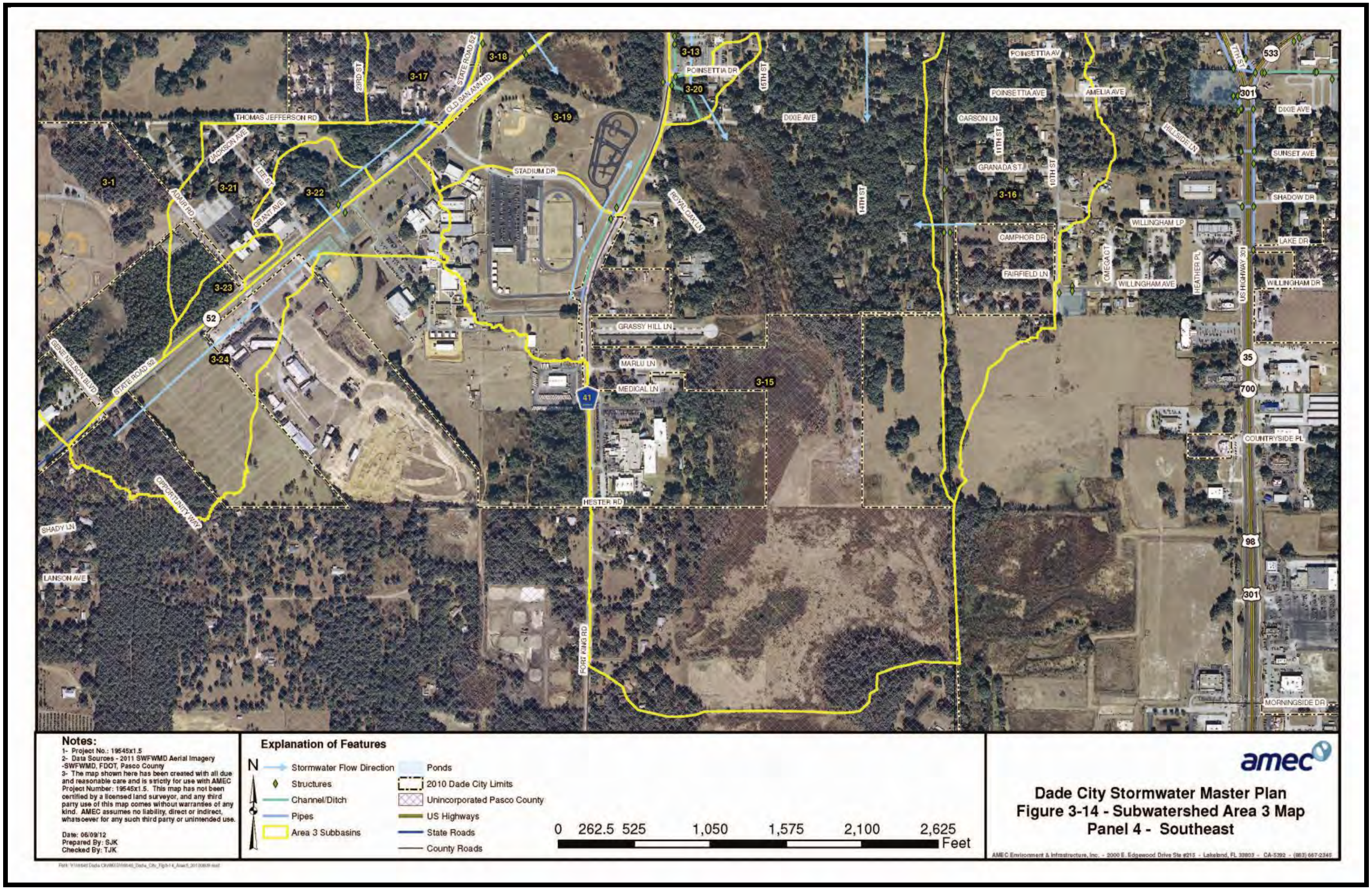
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STADIUM DR
POINSETTIA DR
DIXIE AVE
POINSETTIA AV
POINSETTIA AVE
AMELIA AVE
CARSON LN
GRANADA ST
CAMPHOR DR
FAIRFIELD LN
WILLINGHAM LP
WILLINGHAM AVE
WILLINGHAM DR
SUNSET AVE
SHADOW DR
LAKE DR
GRASSY HILL LN
MARLU LN
MEDICAL LN
HESTER RD
FORT KING RD
STATE ROAD 52
OLD SAN ANN RD
JACKSON AVE
ADAIR RD
GRANT AVE
LEE ST
ROYAL OAK LN
GENE NELSON BLVD
OPPORTUNITY WAY
SHADY LN
LANSON AVE
COUNTRYSIDE PL
MORNINGSIDE DR
US HIGHWAY 301
3-1
3-13
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533
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700
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Explanation of Features
N
Stormwater Flow Direction
Structures
Channel/Ditch
Pipes
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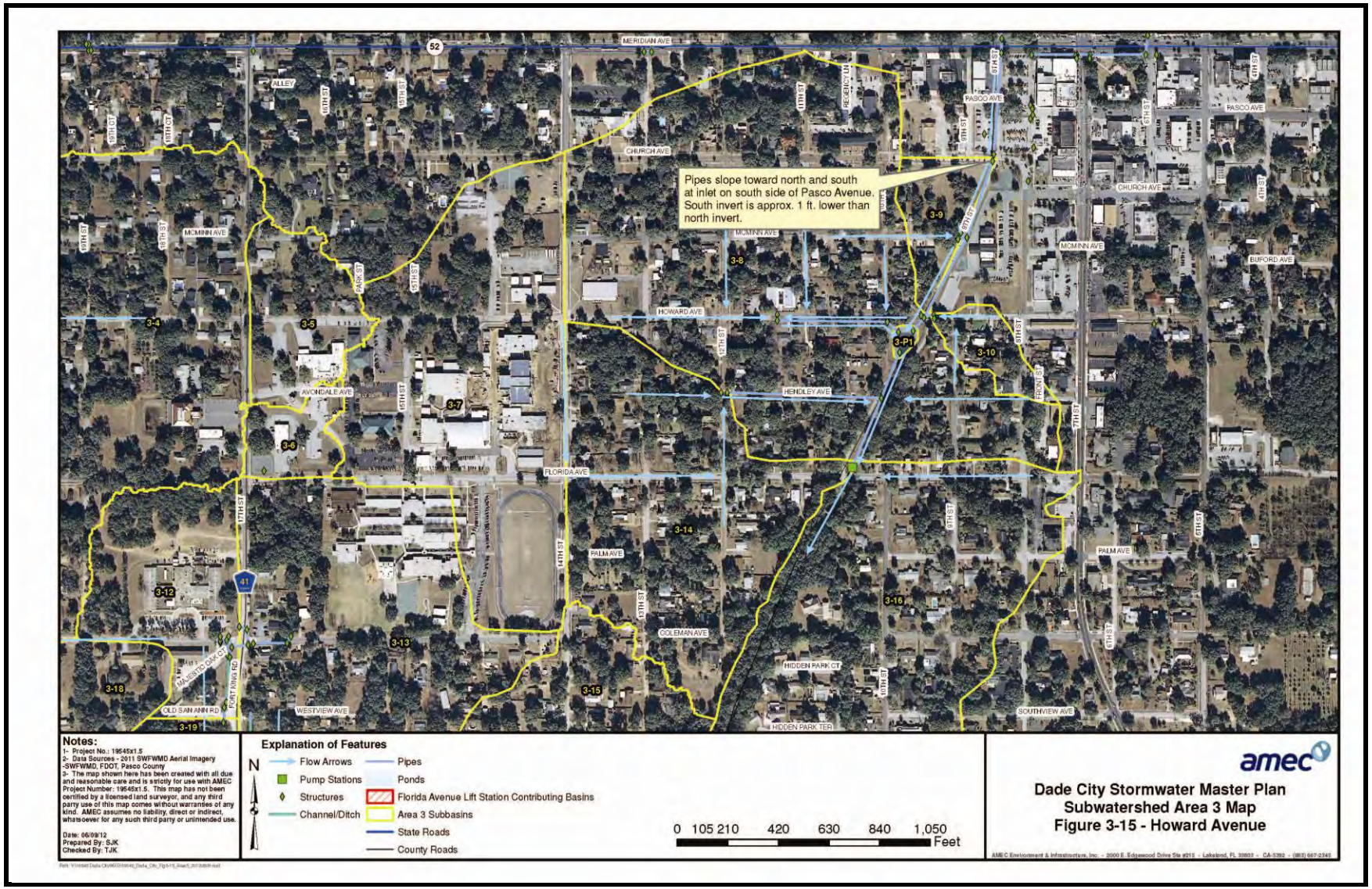
Ponds
2010 Dade City Limits
Unincorporated Pasco County
US Highways
State Roads
County Roads
0 262.5 525 1,050 1,575 2,100 2,625
Feet
amec
Dade City Stormwater Master Plan
Figure 3-14 - Subwatershed Area 3 Map
Panel 4 - Southeast


Pipes slope toward north and south at inlet on south side of Pasco Avenue. South invert is approx. 1 ft. lower than north invert.
MERIDIAN AVE
CHURCH AVE
PASCO AVE
MCMINN AVE
BUFORD AVE
HOWARD AVE
HENDLEY AVE
AVONDALE AVE
FLORIDA AVE
PALM AVE
COLEMAN AVE
HIDDEN PARK CT
HIDDEN PARK TER
WESTVIEW AVE
SOUTHVIEW AVE
OLD SAN ANN RD
3-4
3-5
3-6
3-7
3-8
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3-P1
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3-19
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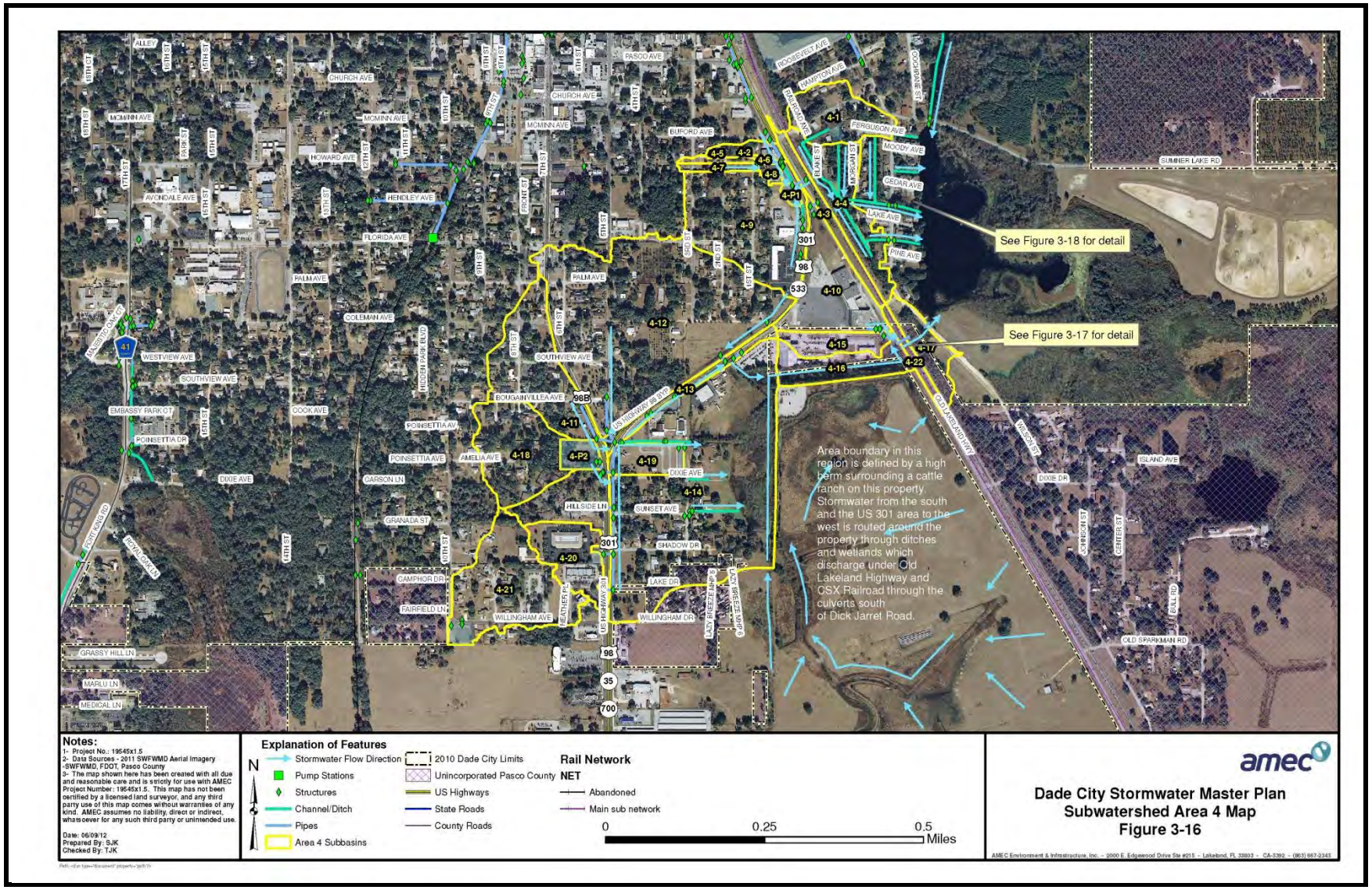
Explanation of Features
Flow Arrows
Pump Stations
Structures
Channel/Ditch
Pipes
Ponds
Florida Avenue Lift Station Contributing Basins
Area 3 Subbasins
State Roads
County Roads
N
0 105 210 420 630 840 1,050
Feet
amec
Dade City Stormwater Master Plan
Subwatershed Area 3 Map
Figure 3-15 - Howard Avenue


See Figure 3-18 for detail
See Figure 3-17 for detail
Area boundary in this region is defined by a high berm surrounding a cattle ranch on this property. Stormwater from the south and the US 301 area to the west is routed around the property through ditches and wetlands which discharge under Old Lakeland Highway and CSX Railroad through the culverts south of Dick Jarret Road.
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County Roads
Rail Network
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Abandoned
Main sub network
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0.5
Miles
amec
Dade City Stormwater Master Plan
Subwatershed Area 4 Map
Figure 3-16
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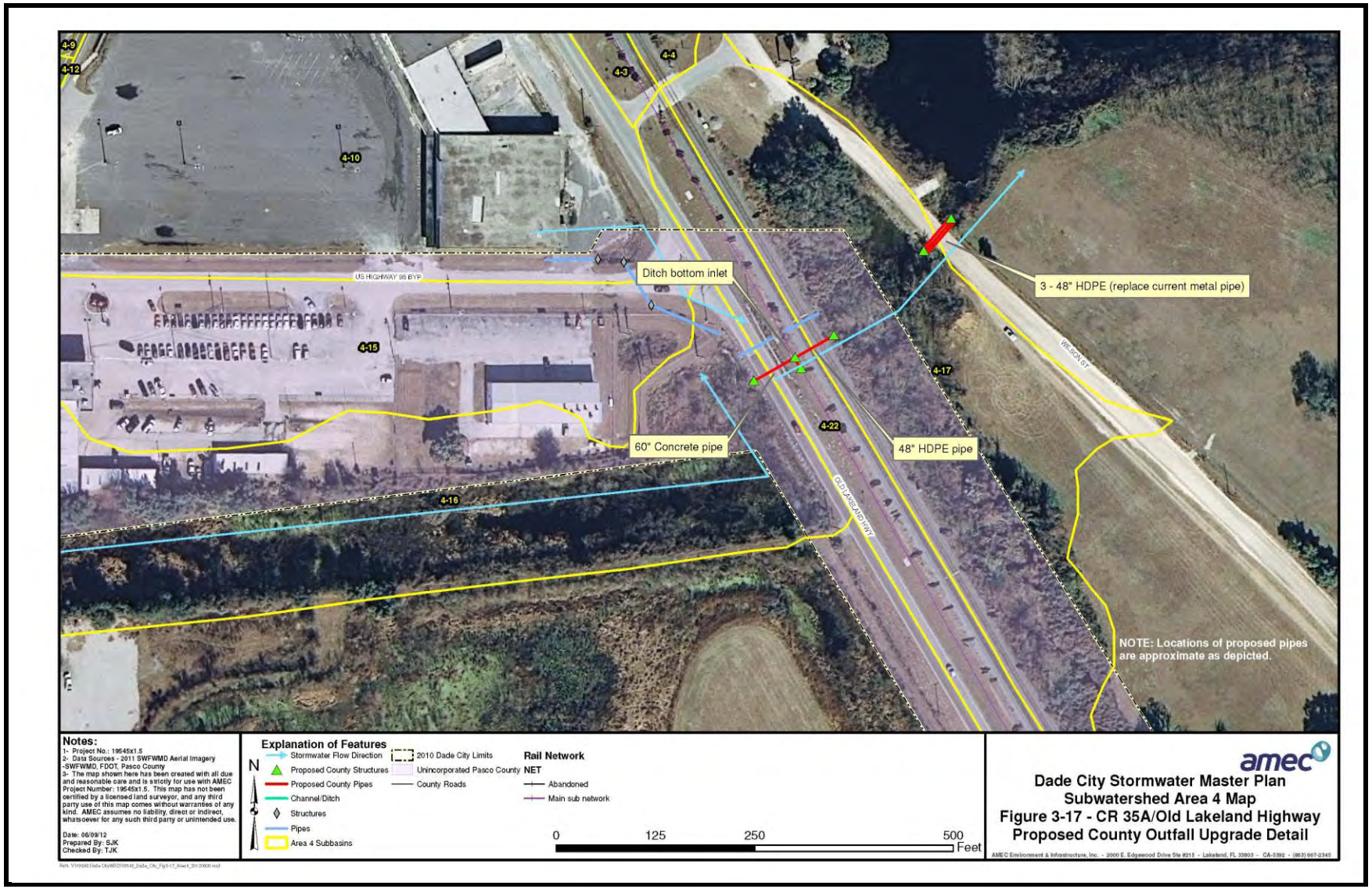
4-9
4-12
4-10
4-3
4-4
US HIGHWAY 98 BYP
Ditch bottom inlet
3 - 48" HDPE (replace current metal pipe)
4-15
4-17
WILSON ST
4-22
60" Concrete pipe
48" HDPE pipe
4-16
OLD LAKELAND HWY
NOTE: Locations of proposed pipes are approximate as depicted.
Notes:
1- Project No.: 19545x1.5
2- Data Sources - 2011 SWFWMD Aerial Imagery -SWFWMD; FDOT; Pasco County
3- The map shown here has been created with all due and reasonable care and is strictly for use with AMEC Project Number: 19545x1.5. This map has not been certified by a licensed land surveyor, and any third party use of this map comes without warranties of any kind. AMEC assumes no liability, direct or indirect, whatsoever for any such third party or unintended use.
Date: 06/09/12
Prepared By: SJK
Checked By: TJK
Explanation of Features
Stormwater Flow Direction
Proposed County Structures
Proposed County Pipes
Channel/Ditch
Structures
Pipes
Area 4 Subbasins
2010 Dade City Limits
Unincorporated Pasco County
County Roads
Rail Network
NET
Abandoned
Main sub network
N
0
125
250
500
Feet
amec
Dade City Stormwater Master Plan
Subwatershed Area 4 Map
Figure 3-17 - CR 35A/Old Lakeland Highway
Proposed County Outfall Upgrade Detail
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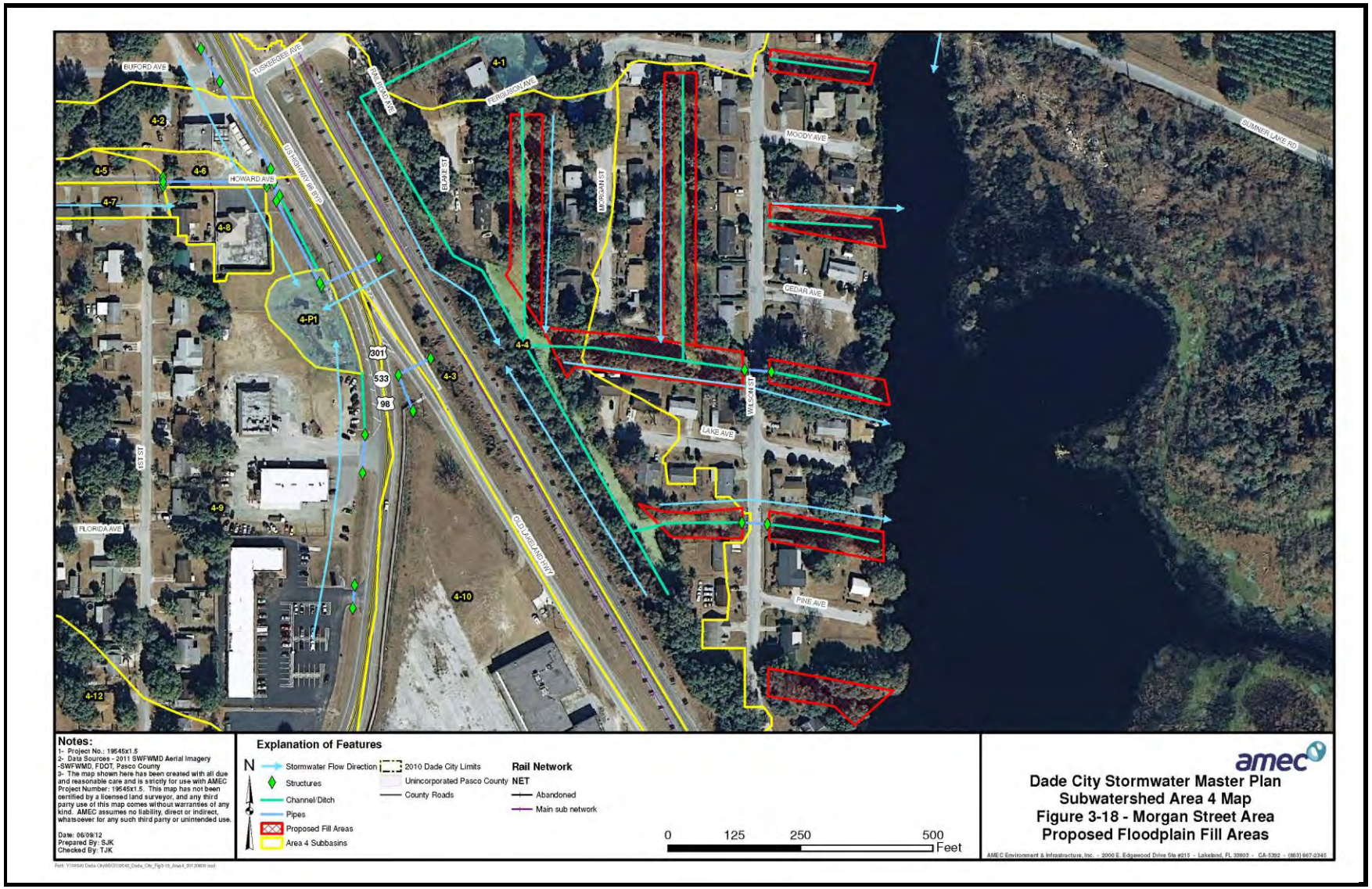
BURFORD AVE
TUSKEGEE AVE
RAILROAD AVE
FERGUSON AVE
HOWARD AVE
BLAKE ST
MORGAN ST
MOODY AVE
SUMNER LAKE RD
CEDAR AVE
WILSON ST
LAKE AVE
PINE AVE
1ST ST
FLORIDA AVE
CSX RAILROAD NW/7
US HIGHWAY 98/7
4-1
4-2
4-3
4-4
4-5
4-6
4-7
4-8
4-9
4-10
4-12
4-P1
301
533
98
Notes:
1- Project No.: 19545x1.5
2- Data Sources - 2011 SWFWMD Aerial Imagery -SWFWMD, FDOT, Pasco County
3- The map shown here has been created with all due and reasonable care and is strictly for use with AMEC Project Number: 19545x1.5. This map has not been certified by a licensed land surveyor, and any third party use of this map comes without warranties of any kind. AMEC assumes no liability, direct or indirect, whatsoever for any such third party or unintended use.
Date: 06/09/12
Prepared By: SJK
Checked By: TJK
Explanation of Features
N
Stormwater Flow Direction
Structures
Channel/Ditch
Pipes
Proposed Fill Areas
Area 4 Subbasins
2010 Dade City Limits
Unincorporated Pasco County
County Roads
Rail Network
NET
Abandoned
Main sub network
0
125
250
500
Feet
amec
Dade City Stormwater Master Plan
Subwatershed Area 4 Map
Figure 3-18 - Morgan Street Area
Proposed Floodplain Fill Areas
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