POWER DISTRICT

Prepared For:

Gainesville Community Redevelopment Agency

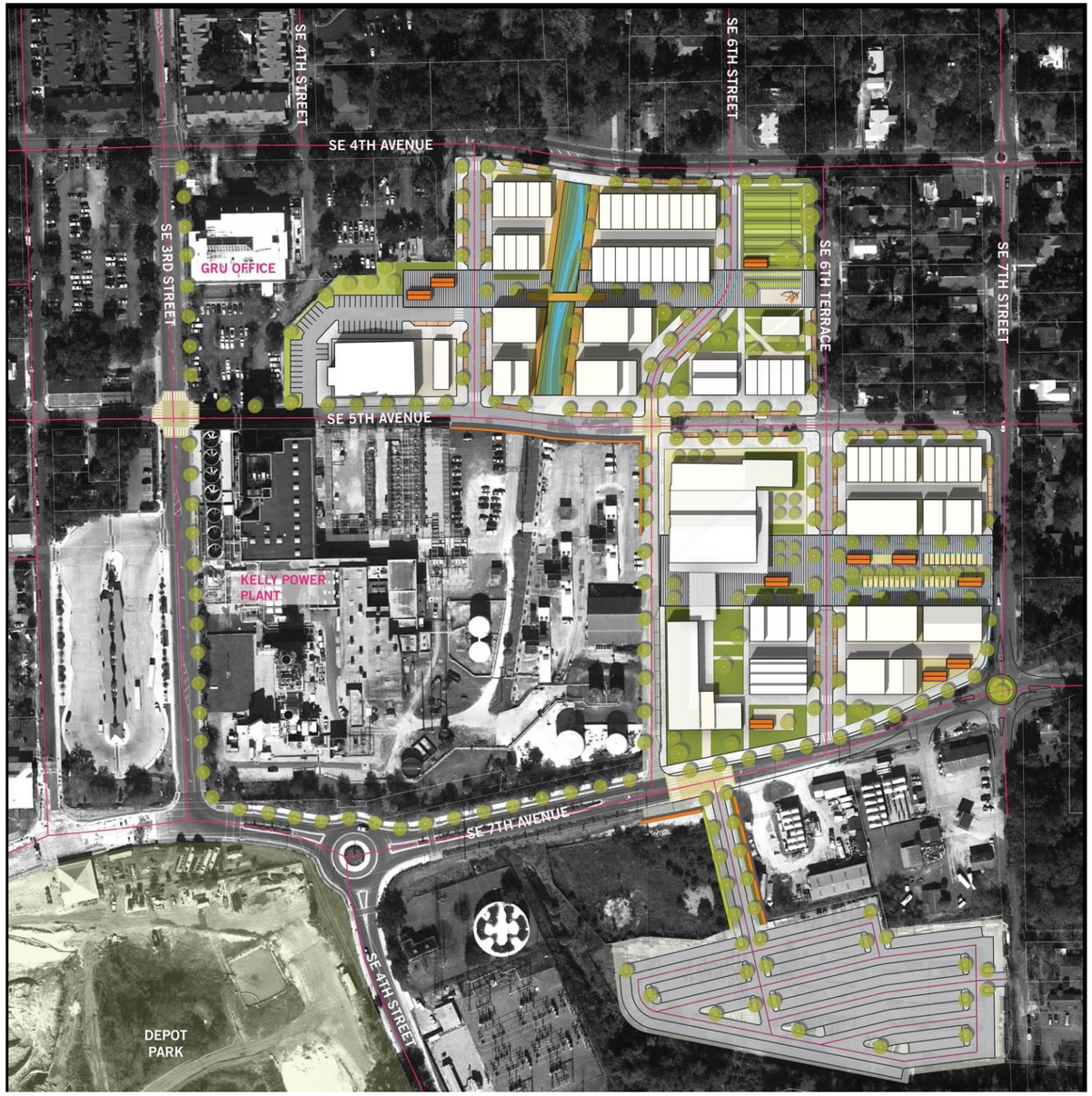
Prepared By:

JONES EDMUNDS

In Cooperation with:

CITY OF GAINESVILLE 1869 STATE OF FLORIDA

GRU



GAINESVILLE COMMUNITY REDEVELOPMENT AGENCY
SWEETWATER BRANCH DAYLIGHTING FEASIBILITY ANALYSIS

Gainesville Community Redevelopment Agency | October 2015

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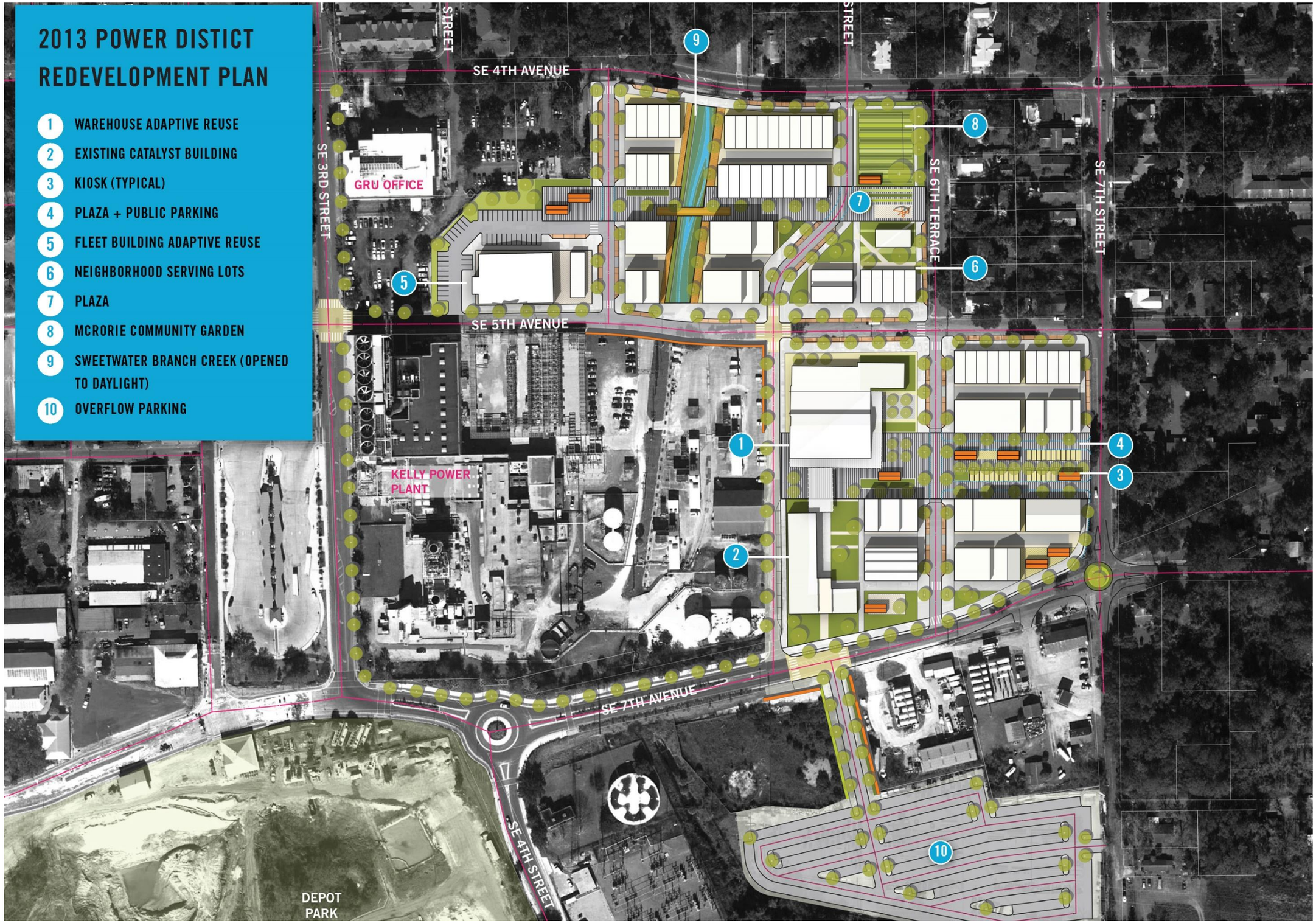


EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

The *Sweetwater Branch Daylighting Feasibility Analysis* assesses and documents the existing infrastructure, regulations, constraints, opportunities, and required work associated with the concept of daylighting the creek. Currently, the Sweetwater Branch Creek is underground within a 9-foot x 7-foot concrete box culvert, through the Power District Redevelopment Area. Daylighting refers to the concept of removing the existing box culvert and exposing the creek to air and light. It was determined through the process of this study and investigation, that it is achievable and feasible to daylight the Sweetwater Branch Creek between SE 4th Avenue and SE 5th Avenue within the central area of the Power District.

The Power District is approximately a 17-acre area bounded by SE 4th Avenue on the north, SE 3rd Street on the west, SE 7th Street on the east, and Depot Avenue on the south. The Daylighting Study Area (DSA) runs through the middle of the Power District, between SE 4th Avenue and SE 5th Avenue. The Power District is adjacent to and east of the Gainesville Regional Utilities (GRU) JR Kelly Power Station on property owned by GRU. Recently, GRU relocated some operations from their Downtown campus to the Eastside Operations Center, thus vacating several buildings and parcels on the site. The Power District provides a unique opportunity to rebuild an important portion of Gainesville's urban fabric while encouraging new economic investment, supporting neighborhoods, and serving as a destination for the greater community.

The consulting firm Perkins and Will completed the *Power District Redevelopment Plan* for the Community Redevelopment Agency (CRA) in December 2013. This document was subsequently adopted by the City Of Gainesville Commission, serving as the CRA board. Jones Edmunds & Associates, Inc. used Perkins and Will's conceptual building footprints and street layouts as the background for the figures presented in this report. The CRA, acting on behalf of the City of Gainesville (CoG) and GRU, is the agency coordinating the implementation of the *Power District Redevelopment Plan* by facilitating the development of approximately 17 acres of properties and buildings previously occupied by GRU operations. The *Power District Redevelopment Plan* is flexible, and the building location, size, and height as well as the secondary street layout may change to encourage development.

The *Power District Sweetwater Branch Creek Daylighting Feasibility Analysis* addresses the *Power District Redevelopment Plan* Elements 9 and 14 (Sweetwater Branch Creek daylighting feasibility study). A companion report, *Power District Utility Infrastructure Analysis,* addresses *Power District Redevelopment Plan* Elements 9 (stormwater treatment/mitigation assessment) and 11 (development demand and infrastructure capacity assessment).

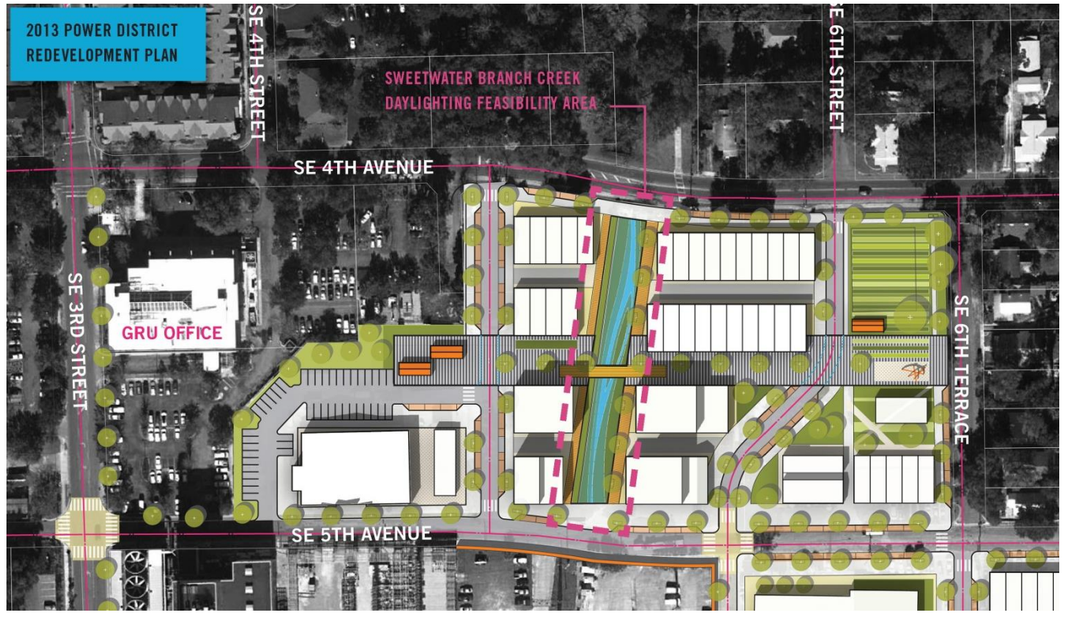
This report investigates the need to preserve and maintain the overall development potential of the Power District, while considering the opportunities and constraints associated with various Sweetwater Branch Creek Daylighting alternatives. It was determined through the process of this study and investigation, that it is achievable and feasible to daylight the Sweetwater Branch Creek between SE 4th Avenue and SE 5th Avenue within the central area of the Power District.

The goals of the *Sweetwater Branch Creek Daylighting Feasibility Study* are:

- Investigate the potential to daylight Sweetwater Branch Creek based on various economic and ecological considerations.
- Assemble a working group of technical stakeholders to actively participate in the redevelopment of the Power District.
- Evaluate the existing conditions. Collect, inventory, and synthesize existing data, codes, policies, and programs. Identify the redevelopment conflicts, challenges, and opportunities concerning the existing site conditions and the proposed Power District project area redevelopment plan and the maximum potential build-out.
- Provide a list of suggested projects, which includes financial implications, to coordinate short-term and long-term planning.
- Determine a conceptual, achievable Sweetwater Branch Creek (SWBC) cross-section if daylighting the Sweetwater Branch Creek is pursued.

This report will be used as a guide to help facilitate a coordinated and sequenced redevelopment strategy between multiple stakeholder entities related to specific tasks necessary to prepare the Power District for redevelopment investment.

Limits of Sweetwater Branch Creek Daylighting Feasibility Study



SUGGESTED PROJECTS (RANDOM ORDER)

The following projects are suggested in the *Power District Infrastructure Analysis* and facilitate daylighting Sweetwater Branch. The Power District Infrastructure Analysis assesses and documents the existing infrastructure and identifies deficiencies, conflicts, planned projects, redevelopment constraints, and suggested improvements based on the *2013 Power District Redevelopment Plan*. The purpose of this study is to assist in the positioning of the Power District as a viable and appealing redevelopment area by identifying and removing potential barriers to private investment. As a result of the previous use of the site as a regional utility supplier, many existing utilities traverse parcels that would otherwise be suitable for development. This report synthesizes a significant amount of data into a single and comprehensive document which outlines the necessary actions required to fully capture the vision of the Power District. These projects will need to be evaluated and prioritized based on a forthcoming comprehensive investment strategy.

1. Relocate the existing 12-inch water main that runs north-south, east of SWBC. Three relocation options were developed: (1) along the conceptual extension of SE 6th Street between SE 4th Avenue and SE 5th Avenue, (2) along SE 7th Street, and (3) along a new utility corridor adjacent and east of the SWBC. The preferred option is (1), which GRU has estimated to cost $100,000 to $150,000.

2. Relocate the existing 15-inch vitrified clay pipe (VCP) sanitary sewer line that runs north-south, east of SWBC. Three relocation options were developed: (1) along the conceptual extension of SE 6th Street between SE 4th Avenue and SE 5th Avenue, (2) along SE 7th Street, and (3) along a new utility corridor adjacent and east of the SWBC. The preferred option is Option (1), which GRU has estimated to cost $342,000. GRU estimated costs for Options (2) and (3) to be $1,000,000 and $355,000, respectively.
3. Relocate the existing overhead electric lines east of SWBC between SE 4th Avenue and SE 5th Avenue. Three relocation options were developed: (1) along the conceptual extension of SE 6th Street between SE 4th Avenue and SE 5th Avenue, (2) along SE 6th Terrace, and (3) along a new utility corridor adjacent and east of the SWBC. Option (1) is the preferred option, which GRU estimated the cost to be $80,000 for the overhead relocation and $232,000 for the underground relocation. GRU-estimated costs for Option (2) are $65,000 for the overhead relocation and $185,000 for the underground relocation and for Option (3) are $82,000 for the overhead relocation and $232,000 for the underground relocation.
4. Modify the St. Johns River Water Management District (SJRWMD) Depot Park Credit Basin permit to include the Power District Redevelopment area.
5. Conduct a Hydrologic and Hydraulic (H&H) study to address the upstream issues between SE 2nd Place and SE 4th Avenue including high velocities, erosion (water quality), short periods of flooding at SE 4th Avenue, and unsafe culvert conditions on the north side of SE 4th Avenue. Perform an updated H&H study to account for changes in the watershed since the previous study and to determine the stream response to smaller storm events, such as the 1.33-year, 1.5-year, and 2-year return events, to size the stream channel. Address the capacity of the existing drainage structures on the north and south sides of SE 4th Avenue. Investigate stabilizing the upstream section of SWBC between SE 2nd Place and SE 4th Avenue. Examine the potential for designing and integrating a detention basin for flow attenuation. This study will need to be performed and decisions made to address issues upstream of SE 4th Avenue, before suggested project #9 can occur. The estimated cost for this study is $40,000.The estimated cost for this study is $40,000.
6. Perform an updated H&H study to delineate the 100-year floodplain and submit a FEMA Letter of Map Revision (LOMR) for SWBC between SE 4th Avenue and Depot Avenue. The estimated cost for this study and the LOMR process is $50,000. This H & H study needs to happen subsequent to suggested project #5 above and upstream issues' solutions being designed.
7. Perform a structural analysis of SWBC culverts at SE 4th Avenue and SE 5th Avenue, as well as the box culvert between these two roads. The estimated cost of this analysis is $25,000.
8. Replace SE 4th Avenue and SE 5th Avenue SWBC culverts, if deemed necessary. If the SE 4th Avenue culvert is replaced, it should be replaced with a new culvert that can accommodate the 100-year flow rate, as long as no adverse impacts occur to the downstream 100-year floodplain. The estimated cost for replacing both culverts is $570,000 ($285,000 for each culvert crossing at SE 4th Avenue and SE 5th Avenue).
9. Design a stormwater system so that the GRU Administration Building stormwater pond can be used for development. The design will need to maintain an outflow/discharge for the building footer drain. The evaluation of the use of Depot Park for treatment, while also providing required rate attenuation, should be evaluated in the design. The estimated cost for the design is $40,000.
10. Determine the design and aesthetic goals for the Daylighting project.
11. Evaluate the need to maintain the 18-inch RCP stormwater culvert that connects to the 9-foot-x-7-foot box culvert midway through the DSA.
12. Relocate the GRUCom conduit on the south end of the DSA and relocate the small-diameter potable water service line that runs midway through the DSA.
13. Assess the culverts and retaining wall for asbestos-containing material (ACM) occurrence before finalizing plans for remodeling or demolition. Re-assess the soil and groundwater in the vicinity of SB-4 (SE 4th Avenue) for Arsenic. Assess the Tetrachloroethene (PCE, a chlorinated solvent) in the soil and groundwater in the vicinity of SB-1 and TMW-1.
14. CoG may want to consider a plan to evaluate Sweetwater Branch Creek in terms of the larger context of the City-owned property along the creek to the north from E University Avenue to SE 4th Avenue. CoG may want to consider creating a phased master plan to daylight and restore SWBC as the creek flows through CoG-owned property to the south, between SE 5th Avenue to SE Depot Avenue and Depot Park.

DAYLIGHTING SUMMARY AND RECOMMENDATION

The daylighting design must accommodate a wide range of flows. The normal flows are small enough that a large cross-section will have low velocities. This will allow sediment conveyed by the stream to settle and will negatively impact the benthic communities in the stream. The storm flows in relation to the watershed size are larger than is typical of a natural stream in Florida because a large amount of impervious area in Downtown Gainesville drains directly to Sweetwater Branch. The storm flows are large enough that a small cross section will have high velocities and therefore erosion. The flow in Sweetwater Branch increases dramatically during storm events. The floodplain must be designed wide enough to allow the 100-year event to spread out and slow down enough to not erode the vegetation in the floodplain. The design should account for the time needed to establish robust and dense vegetation capable of resisting storm damage.

As part of the project, the CRA coordinated a 35+ member Technical Advisory Team (TAT). The purpose of the TAT is to have a working group of technical stakeholders to actively participate in the redevelopment of the Power District. Once the engineering analysis determined the daylighting was feasible, a smaller Sweetwater Branch Creek (SWBC) Work Group was formed. This inter-departmental work group focused on refining the Sweetwater Branch Creek Daylighting concept. The Work Group meetings and efforts resulted in the recommended 96-foot Sweetwater Branch Creek Daylighting conceptual cross-section.

This 96-foot typical cross-section has the potential to improve the floodplain storage, increase ecological value, improve water quality, increase adjacent property values, preserve developable land, tell the story of the "urban stream", and creates a significant destination for the Power District. This conceptual cross-section accomplishes the daylighting via a floodway zone, earthen slopes, and retaining walls coupled with two 20' minimum public access corridors (e.g., walkways and bikeways, hardscape, furnishings, landscape, outdoor cafe areas) on either side of the creek. The National Development Council (NDC) is consulting with the Community Redevelopment Agency regarding the Power District property disposition strategy. The NDC has suggested that the daylighting of Sweetwater Branch Creek could be a significant catalyst to the redevelopment of the Power District that could bring positive attention to the district. The benefits of daylighting the SWBC must be balanced with the cost of the project including the loss of potentially developable within the Power District.

Figure ES-1 Sweetwater Branch Creek Daylighting Conceptual Rendering

Figure ES-2 Sweetwater Branch Creek Daylighting Conceptual Rendering Cross Section

SWEETWATER BRANCH CREEK DAYLIGHTING CONCEPT

Figure ES-3 Sweetwater Branch Creek Daylighting Conceptual Renderings

Sweetwater Branch Creek Daylighting Concept - Eye Level View From Walkway

Sweetwater Branch Creek Daylighting Concept - Flood Level

Sweetwater Branch Creek Daylighting Concept – Bird's Eye View

Sweetwater Branch Creek Daylighting Concept - Flood Level View From Bridge

SECTION 1

INTRODUCTION

1 INTRODUCTION

1.1 BACKGROUND

Jones Edmunds & Associates, Inc. was contracted by the City of Gainesville's (CoG) Community Redevelopment Agency (CRA) to prepare two reports: (1) *Power District Infrastructure Analysis* (IA) and (2) *Sweetwater Branch Creek Daylighting Feasibility Study*. This document addresses the *Sweetwater Branch Creek Daylighting Feasibility Study (SWBCDFS)*.

Currently, the Sweetwater Branch Creek is underground within a 9-foot-x-7-foot concrete box culvert, through the Power District Redevelopment Area. Daylighting refers to the concept of removing the box culvert and exposing the creek to air and light. The *SWBCDFS* limited the daylighting study to the area between SE 4th Avenue and SE 5th Avenue because GRU is still actively using the area between SE of 5th Avenue and Depot Avenue for power generation activities. GRU plans to use the JR Kelly Power Station through at least 2050. Sweetwater Branch is a small urban creek that runs through the oldest section of Gainesville, including the Power District. For this study, the Power District is defined as the area bounded by SE 4th Avenue on the north, SE 3rd Street on the west, SE 7th Street on the east, and Depot Avenue on the south. The Power District is adjacent to and east of the Gainesville Regional Utilities (GRU) JR Kelly Power Station on property owned by GRU. The JR Kelly Power Station is an active power plant and is integral to the character of the Power District. This feasibility analysis assesses and documents the existing infrastructure, regulations, constraints, opportunities, and required work associated with the concept of daylighting the creek. It was determined through the process of this study and investigation, that it is achievable to daylight the Sweetwater Branch Creek between SE 4th Avenue and SE 5th Avenue within the central area of the Power District.

In 1999, Gainesville Regional Utilities (GRU) hired the planning firm of Dover Kohl to host a series of stakeholder meetings and develop a Master Plan for the Depot Neighborhood and the GRU Campus in the area near the JR Kelly Power Station. Stakeholders identified several concepts at the workshops. The daylighting of Sweetwater Branch Creek (SWBC) was one of the most popular and reoccurring. In 2013, Perkins and Will completed an updated redevelopment plan for the Power District, which is shown in Figure 1-1. Jones Edmunds used Perkins and Will's conceptual building footprints, daylighting study area, and street layouts as the background for the figures presented in this report. The 2013 Redevelopment Plan summarizes stakeholder engagement efforts, the planning process, core development principles, a Phase 1 Master Plan, and implementation steps.

The 2013 Redevelopment Plan identified 18 implementation or action items for redeveloping the Power District. This *Sweetwater Branch Creek Daylighting Feasibility Study (SWBCDFS)* addresses Plan Elements 9 and 14 (SWBC daylighting feasibility study).

The Plan identified Core Planning Principles that drive the redevelopment of the Power District. Jones Edmunds prepared this report using these Core Planning Principles:

- Build on what exists.
- Strengthen connections.
- Plan incrementally and build slowly.
- Make it unique.

1.2 OBJECTIVES

The *Sweetwater Branch Daylighting Feasibility Analysis* assesses and documents the existing infrastructure locations and conditions within the Daylighting Study Area (DSA) and uses that information to assess the opportunities, constraints, consequences, and benefits associated with the concept of daylighting the existing culverted creek.

The first step in the project was to research and gather existing infrastructure information within the Daylighting Study Area (DSA) as part of the Power District Infrastructure Analysis (IA). The following sections present the results and evaluation of the data with respect to the *Sweetwater Branch Daylighting Feasibility Analysis*. Attachment A lists the data sources and contact information for the 35+ member Technical Advisory Team (TAT).

1.3 POWER DISTRICT TECHNICAL ADVISORY TEAM (TAT)

As part of the project, the CRA coordinated a 35+ member Technical Advisory Team (TAT). The purpose of the TAT is to have a working group of technical stakeholders to actively participate in the redevelopment of the Power District. The TAT members reviewed the information collected as part of the Infrastructure Analysis and provided feedback on the daylighting concept at three review meetings. The TAT members also provided written comments on the draft reports. A complete TAT list is located in Attachment A.

The TAT's mission is to review and provide feedback to Jones Edmunds and the CRA on the following tasks:

- Collect, inventory, and synthesize existing data, codes, policies, and programs.
- Evaluate the existing conditions.
- Identify the redevelopment conflicts, challenges, and opportunities concerning the existing site conditions and the proposed Power District project area redevelopment plan and the maximum potential build-out.
- Provide a list of suggested projects, which includes financial implications, to coordinate short-term and long-term planning.

An initial meeting with the TAT was held on October 22, 2014. The purpose of the meeting was to provide background to and coordination with interested parties regarding the proposed redevelopment of the Power District. A second TAT meeting was held on January 22, 2015. The purpose of the meeting was to provide an update on the *Infrastructure Report* and *Daylighting Report* and to coordinate with interested parties regarding the proposed redevelopment of the Power District. A third TAT meeting was held on July 23, 2015. The purpose of the meeting was to review the Final Draft of the *Infrastructure Report* and *Daylighting Report* and to discuss the path forward on suggested projects.

A smaller Sweetwater Branch Creek Work Group was formed subsequent to the larger 35+ member Power District Technical Advisory Team to focus on further evaluating the concept of Sweetwater Branch Creek daylighting. The SWBC Work Group meetings and efforts resulted in the recommended Sweetwater Branch Creek Daylighting conceptual cross-section (Figures ES-1, ES-2, and ES-3).

2013 Power District Redevelopment Plan – Daylighting Concept

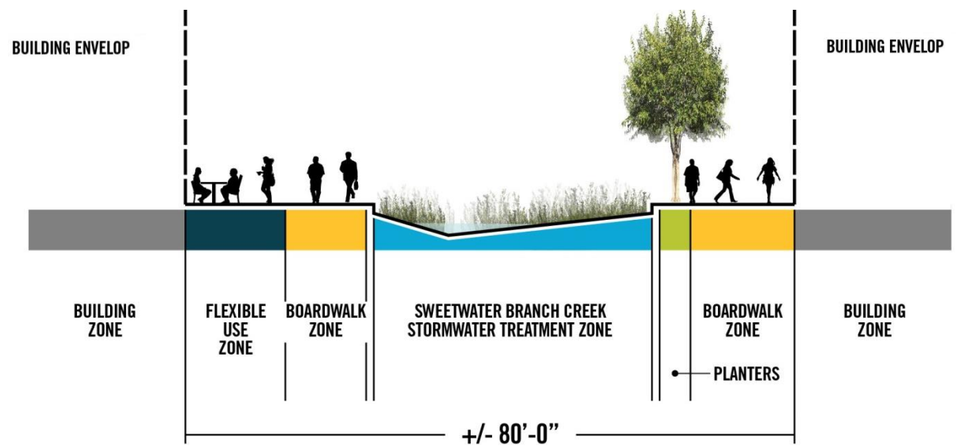


Figure 1-1 Power District Conceptual Redevelopment Plan

SECTION 2

DATA REVIEW

2 DATA REVIEW

Jones Edmunds reviewed GIS maps and data, utility maps, stormwater maps and reports, easement information, land use and zoning maps, survey data, record plats, environmental overlays, and other relevant reports to assess the condition of Sweetwater Branch and to identify design opportunities and constraints. The information was obtained primarily from GRU, CoG (e.g., Public Works, CRA, CoG Planning Department), Alachua County, the St. Johns River Water Management District (SJRWMD), and past reports authored by Jones Edmunds for the CoG.

2.1 HISTORY

Historically, Sweetwater Branch was an intermittent stream that meandered south through the sloping uplands of Gainesville as it approached Paynes Prairie. Once it reached Paynes Prairie, Sweetwater Branch spread out and evenly flowed across the north region of the Prairie. Ultimately, the north region of the Prairie drained into Alachua Sink to the east (Gottgens and Montague, 1988). Stormwater management in the past focused on water quantity issues with little or no regard for water quality and relied on channelization and storm sewer networks to convey surface waters off site as rapidly as possible. Figure 2-1 is the earliest aerial photograph found (1937) and shows that Sweetwater Branch was a narrow channel with a concrete retaining wall on the west side. Figure 2-2 is a 1964 aerial photograph that shows that Sweetwater Branch was partially directed into a culvert. The City provided plans from 1970 for a project to expand the culvert. As development in Downtown Gainesville increased, so did the impervious area, which forced more stormwater with higher peak flows into the Creek. This sometimes results in severe channel erosion, sedimentation, and flooding.

2.2 STREAM FLOW

SJRWMD provided data from two flow monitoring stations in the study area – one near SE Depot Avenue (1999–2005) and one on the upstream side of the box culvert running under Williston Road (1997–present). Stream stage data were recorded at 15-minute intervals, and a rating curve was used to develop flow data from the stage measurements.

The closest gauge to the DSA is the Depot Avenue gauge. Figure 2-3 summarizes the data from this gauge and shows a time series plot of 15-minute stream discharge rates. Figure 2-4 shows cumulative frequency distribution of flow rates, which demonstrates that 99% of the observations are less than 30 cfs. The median discharge rate for the period of record shown (10/1/1999–2/26/2005) was 1.1 cfs. However, the gauge was in operation for a fairly short period and did record flows in excess of 200 cfs.

The Federal Emergency Management Agency (FEMA) defines the current, effective Special Flood Hazard Areas (SFHA) along Sweetwater Branch as Zone A, which means the Base Flood Elevation (BFE) is not defined. The base flood is the flood with a 1% chance of being equaled or exceeded each year. The base flood is commonly referred to as the 100-year flood. In 2004, Jones Edmunds prepared an unsteady-state HEC-RAS model of Sweetwater Branch for CoG. In our opinion, this model provides the best available data to estimate the BFE and the peak flow rate resulting from the 100-year, 24-hour event. Jones Edmunds also modeled the 10-year, 24-hour and 25-year, 24-hour return period storm events.

The SJRWMD gauge data provide the best estimate of the “low-flow” condition, and the 2004 HEC-RAS model provides the best estimate of the storm event response. The low-flow condition is assumed to be the median flow of 1.1 cfs, and the depth was estimated using Manning’s Equation applied to the channel in Sweetwater Park. Table 1 summarizes the flows and elevations used to evaluate the daylighting alternatives. Before a full-fledged design can begin, additional data collection and modeling will be needed to confirm the appropriate design criteria.

Table 1 Sweetwater Branch- Estimated Flood Stage and Peak Flow at SE 4th Avenue

Event	Flood Stage (feet NAVD 88)	Flow (cfs)
Median Flow[1]	137.25	1.1
10-year[2]	143.32	427
25-year[2]	144.11	637
100-year[2]	144.48	865

[1]SJRWMD gauge data

[2]2004 HEC-RAS model

2.2.1 CONCLUSIONS AND RECOMMENDATIONS

The daylighting design must accommodate a wide range of flows. The normal flows are small enough that a large cross-section will have low velocities. This will allow sediment conveyed by the stream to settle and will negatively impact the benthic communities in the stream. The storm flows in relation to the watershed size are larger than is typical of a natural stream in Florida because a large amount of impervious area in Downtown Gainesville drains directly to Sweetwater Branch. The storm flows are large enough that a small cross section will have high velocities and therefore erosion.

The flow in Sweetwater Branch increases dramatically during storm events. The floodplain must be designed wide enough to allow the 100-year event to spread out and slow down enough to not erode the vegetation in the floodplain. The design should account for the time needed to establish robust and dense vegetation capable of resisting storm damage. To design this type of the channel, stream response to smaller storm events, such as the 1.33-year, 1.5-year, and 2-year return events data is needed, to size the stream channel.

2.3 GEOMORPHIC DATA

Redesigning a creek requires a good understanding of the creek’s geomorphology so that the design does not inadvertently create instabilities in the creek bed upstream or downstream of the project. At this stage, we do not have detailed data to evaluate the upstream and downstream conditions. However, we have recent photographs of the stream in Sweetwater Park and some data from Jones Edmunds (2004).

In 2004 Jones Edmunds worked with Wolf Engineering to collect data and perform a geomorphic analysis of Sweetwater Branch. Since then Sweetwater Branch has undergone significant changes upstream in the Duck Pond area and downstream due to Depot Park. The 2004 report notes that “because of the intensive development in the headwater reaches of Sweetwater Branch and the two long culverts, the channel is relatively stable north of Depot Avenue. In this regard, Sweetwater Branch is quite different from other Gainesville streams, such as Hogtown and Possum Creeks, where [incision] in headwater streams is generating large quantities of sediment that inundate downstream reaches.” (Jones Edmunds, 2004).

As part of our current project, Jones Edmunds staff walked the streambank upstream of SE 4th Avenue to review the condition of the streambank. The streambanks were cut and eroded, as Exhibit 1 shows; therefore, we are concerned that widening the main channel in the Daylight Study Area (DSA) may result in sediment depositing in the floodplain.

Jones Edmunds reviewed the parcel data to determine the extent of Sweetwater Park. Figure 2-5 shows the City-owned land upstream of the daylighting project. The City Of Gainesville (CoG) should investigate stabilizing the upstream banks and potentially design an integrated detention basin in the SWBC area between SE 2nd Place and SE 4th Avenue. This option has the following benefits:

- Reduces streambank erosion.
- Reduces downstream sediment deposition.
- Increased floodplain storage can be incorporated.
- Decreased peak stream flows can be designed.
- Re-envisions Sweetwater Park into a more inviting active urban space for multi-modal transportation and recreation, while connecting the public with the Downtown amenities and the Power District/Depot Park.

Exhibit 1 Streambank Erosion in Sweetwater Park (Between SE 2nd Place and SE 4th Avenue)

2.3.1 Conclusions and Recommendations

The upstream channel indicates erosion of the stream banks; however, because of the "intensive development" and the resulting frequent culvert crossings in the Downtown area, Sweetwater Branch will stay at the same grade as it is now. Jones Edmunds recommends that the daylighting design be evaluated for the ability to transport or deposit sediment from the upstream reaches.

This study only considers daylighting the section of Sweetwater Branch between SE 4th Avenue and SE 5th Avenue. The City of Gainesville (CoG) may want to consider a plan to evaluate Sweetwater Branch in terms of the larger context of the CoG-owned property along the creek to the north, from E University Avenue to Depot Park. The City may also want to consider creating a phased master plan to daylight and restore Sweetwater Branch as the creek flows through the City-owned property to the south of the current DSA, between SE 5th Avenue and SE Depot Avenue to Depot Park.

2.4 Infrastructure Analysis

Figure 2-6 shows the current utilities within or adjacent to the Daylight Study Area (DSA). Table 2 and Table 3 summarize the utilities in and adjacent to the DSA. The Table 2 recommendation column lists solutions to several design constraints caused by the proximity of the utilities to the DSA. The existing land surface elevations and stormwater infrastructure are integral to the daylighting study; therefore, enlarged versions of these maps are presented in Figures 2-7 and 2-8.

The 1-foot elevation contours, Figure 7, show the land in the Power District generally slopes toward the Creek and from north to south. North of the Power District, the Creek is an open channel. At SE 4th Avenue, it flows into a culvert and stays underground as it flows through the Power District. The Creek bisects the Power District between SE 4th Avenue and SE 5th Avenue and is west of the Power District between SE 5th Avenue and Depot Avenue.

Figure 8 shows the existing stormwater infrastructure, including the culverts described in Table 2 and Table 3 that forms the main drainage system through Downtown. The secondary stormwater collection system includes a 30-inch pipe along SE 4th Avenue from the west and an 18-inch pipe from the east that both flow into the Creek. An 18-inch pipe between SE 4th Avenue and SE 5th Avenue west of the Creek connects to the box culvert. The storm sewer system along SE 5th Avenue includes 18-inch corrugated metal pipes (CMP) both west and east that flow into the box culvert. The Gainesville regional Utilities (GRU) Campus between SE 5th Avenue and Depot Avenue includes an internal drainage system that eventually flows to the box culvert. The CoG Public Works Department provided GIS data for the existing stormwater infrastructure. The main stormwater collection feature in the Power District is the Sweetwater Branch Creek 9-foot-x-7-foot concrete box culvert. Table 3 describes the culverts, in order from upstream to downstream, that the Sweetwater Branch Creek flows through from SE 4th Avenue to Depot Avenue.

In Figure 2-1, the earliest aerial photograph found (1937); shows that the Sweetwater Branch Creek was a narrow channel and SE 4th Avenue and SE 5th Avenue do not appear to have a culverted crossing at that time. In the 1964 aerial photograph, Figure 2-2, Sweetwater Branch is underground. Additionally, SE 4th Avenue and SE 5th Avenue cross Sweetwater Branch Creek. Neither the age of the SE 4th Avenue and SE 5th Avenue culvert's design nor installation is unknown. The Sweetwater Branch Creek 9-foot-x-7-foot concrete box culvert was installed in 1970 according to plans provided by Public Works.

In general, engineers design culverts to be relatively maintenance-free for 25 years for secondary roads and for 40 years or more for highways. Because the newest culvert in the Daylighting Study Area (DSA) is 45 years old, we recommend inspecting the condition of all the culverts (SE 4th Avenue crossing, SE 5th Avenue crossing, and the 9-foot-x-7-foot concrete box culvert between both roads) before deciding to continue to use them to convey the flow from Sweetwater Branch. This is particularly true for the culverts crossing under SE 4th Avenue and SE 5th Avenue. The American Concrete Pipe Association (1991) uses a design nomograph to predict the service life of concrete pipe as a function of pH and pipe slope. This is because concrete pipe placed in a low-pH environment will corrode and steeply sloped pipe may be subjected to abrasion and erosion. A low-sloped concrete pipe installed in a neutral pH environment may function for well over 100 years.

Exhibit 2 Sweetwater Branch Creek Park at SE 4th Avenue

Table 2 Daylighting Study Area – Summary of Existing Infrastructure

Location	Infrastructure	Element	Infrastructure Analysis Report Figure Number	Recommendation
SE 4th Avenue	Potable Water	12-inch Main	Figure 6	Relocate for daylighting or avoid by adjust daylighting work area
SE 4th Avenue	Wastewater	80-inch VCP	Figure 8	Relocate for daylighting or avoid by adjust daylighting work area
SE 4th Avenue	Electrical	Secondary Overhead	Figure 9	Relocate for daylighting or avoid by adjust daylighting work area
SE 4th Avenue	Natural Gas	Service to A-3.2,3,4	Figure 10	Relocate for daylighting or avoid by adjust daylighting work area
SE 4th Avenue	Cox Cable	Underground	Figure 13	Relocate for daylighting
SE 4th Avenue	AT&T	Underground Coax	Figure 12	Relocate for daylighting
SE 4th Avenue-Parallel	Stormwater	18” RCP	Figure 19	Incorporate in daylighting project.
SE 4th Avenue- Crossing	Stormwater	9-foot-x-4-foot Box Culvert	Figure 19	Evaluate condition. Evaluate daylighting options
SE 4th Avenue to SE 5th Avenue	Stormwater	9-foot-x-7-foot Box Culvert	Figure 19	Evaluate condition. Evaluate daylighting options
SE 4th Avenue to SE 5th Avenue	Buried Retaining Wall	Retaining Wall	Not Shown	Relocate for daylighting
A-2.3 to A-3.3	Potable Water	Service Line	Figure 6	Relocate for daylighting
A-2.2	Stormwater	18-inch RCP	Figure 19	Incorporate in daylighting project
A-2.2	Stormwater	GRU Admin Building Footer Drain	Not Shown	Incorporate in daylighting project
A-2.1,2	Stormwater	Stormwater Pond	Figure 20	Relocate according to the Infrastructure Analysis
SE 5th Avenue	Potable Water	24-inch Main	Figure 6	Relocate for daylighting or avoid by adjust daylighting work area
SE 5th Avenue	Electrical	Secondary Overhead	Figure 9	Relocate for daylighting or avoid by adjust daylighting work area
SE 5th Avenue to A-3.1	GRUCom	Underground Fiber Optic & Conduit	Figure 11	Relocate for daylighting
SE 5th Avenue- Crossing	Stormwater	2, 72-inch RCP	Figure 19	Evaluate condition. Evaluate daylighting options.
SE 5th Avenue- Crossing	Stormwater	1, 15-inch RCP	Figure 19	Evaluate condition. Evaluate daylighting options.
Adjacent to DSA to East	Wastewater	15-inch VCP	Figure 8	Relocate according to the Infrastructure Analysis
Adjacent to DSA to East	Electrical	Primary Overhead	Figure 9	Relocate according to the Infrastructure Analysis

Table 3 Sweetwater Branch Culvert Descriptions

Location Description	Culvert Description	Length	Slope	Flow Area	Velocity 25-year event	Install Date	Typical Design Life
SE4th Avenue Crossing	One 9-foot-x-4-foot reinforced concrete box culvert	53.1 feet	0.5%	36 ft^2	18 fps	Pre-1964	25 to 50 years
Proposed Daylighting Area	One 9-foot-x-7-foot reinforced concrete box culvert	394.5 feet	0.7%	63 ft^2	10 fps	1970	25 to 50 years
SE 5th Avenue	Two 72-inch-diameter reinforced concrete pipe	73 feet	0.4%	56.5 ft^2	11 fps	Pre-1964	25 to 50 years
SE 5th Avenue	One 15-inch-diameter reinforced concrete pipe	52 feet	44%	1.23 ft^2	unknown	Unknown	25 to 50 years
GRU Campus North	One 9-foot-x-7-foot reinforced concrete box culvert	470.8 feet	0.8%	63 ft^2	10 fps	Pre-1964	25 to 50 years
GRU Campus South	Two 66-inch-diameter (material not noted)	62.6 feet	0.8%	47.5 ft^2	13 fps	Pre-1964	25 to 50 years
Depot Avenue Crossing	Two 66-inch-diameter, reinforced concrete pipe	137.4 feet	2%	47.5 ft^2	13 fps	Pre-1964	25 to 50 years

2.4.1 Conclusions and Recommendations

- The culvert inlet on the north side of SE 4th Avenue is a 9-foot-x-4-foot culvert. The banks on either side of the culvert are steep. The inlet is not protected by an inlet grate or weir structure that would prevent a person from accidentally being swept into the culvert during a storm event. The inlet should be reconfigured to increase safety. This should be done as quickly as possible and regardless of the daylighting project.
- Maintain the existing GRU gas, Cox Coaxial line, and AT&T communication line on the south side of SE 4th Avenue. Relocate for daylighting or avoid by adjust daylighting work area (Figure 2-6).
- Relocate the stormwater pond for the GRU Administration Building. Incorporate LID features where possible.
- Evaluate the need to maintain the 18-inch RCP stormwater culvert.
- Relocate the GRUCom conduit on the south end of the Daylight Study Area (DSA).
- Maintain the outfall for the building footer drain for the GRU Administration Building with any daylighting option that requires relocating the stormwater facility currently serving the GRU Administration Building.
- Relocate the potable water service line that runs from Block A-2.3 to A-3.3, approximately 100 feet south of SE 4th Avenue.
- Raise the invert of the daylighted stream to 135 feet NAVD to match the invert of the 9-foot-x-4-foot reinforced concrete box culvert. This will reduce the amount of excavation required for the daylighting options.
- Consider maintaining the split between the three culverts under SE 5th Avenue to allow for low flow and storm flow. This may require replacing the 15-inch culvert with a slightly larger culvert. This may also require connecting the existing culverts to the daylighting project with a new cast-in-place structure.
- Incorporate energy dissipation in all daylighting options because the peak velocities through the culverts are very high.
- Include wide floodplain features in the daylighting options to allow stormwater to spread across floodplain at the north end of the DSA and to concentrate at the south end of the DSA.
- Evaluate the condition of the concrete culverts under SE 4th Avenue and SE 5th Avenue before planning any roadwork in the area. Incorporate culvert replacement or culvert repair in the road project if it is necessary.
- Evaluate the condition of the 9-foot-x-7-foot concrete box culvert if the City decides to leave it in place. Repair or replace the box culvert before redeveloping the Power District.

2.5 Effective Special Flood Hazard Area

Jones Edmunds downloaded the current, effective SFHAs from FEMA through the online FEMA server. Jones Edmunds downloaded the data in September 2014, which is shown in Figure 2-9.

The area shown as the “100-year Floodplain” is designated by FEMA as Zone A, which means the Base Flood Elevation (BFE) is not defined. The base flood is the flood with a 1% chance of being equaled or exceeded each year. The base flood is commonly referred to as the 100-year flood.

The current effective FEMA floodplain shows a large area of flooding through the Power District, including within the proposed building footprints in Blocks A-2.1 to A-2.4 and Blocks A-3.1 to A-3.4. The Zone A areas include the SE 4th Avenue crossing, the Daylight Study Area (DSA), and along both sides of the Creek south of Depot Avenue. The current floodplain includes the building footprints on both sides of the daylighting area.

The FEMA floodplain is an obstacle to development. This requires a flood study to establish the Base Flood Elevation (BFE). The BFE will be used by the architect to determine the Finished Floor Elevation (FFE) and the structural engineer to determine the foundation requirements. CoG may choose to incorporate the goal of reducing the BFE and the flood hazard area into the daylighting design. As noted by the Public Works Department during one Technical Advisory Team (TAT) meeting, one option is to provide a linear park or open space designed for passive recreation and to allow flooding. This can be done by using the City-owned property to the north, with or without daylighting the creek though the Daylight Study Area (DSA).

2.5.1 Estimated Flood Areas

In 2004, Jones Edmunds prepared an unsteady-state HEC-RAS model of Sweetwater Branch for CoG. This model provides the best available data to estimate the BFE and the peak flow rate resulting from the 100-year event. The 10-year and 25-year return period storm events were also modeled (see Table 4 for the flood state and flow for the different return periods). Figure 2-10 shows the flood areas from the 2004 model, which are labeled as “estimated” because they are not approved FEMA SFHAs. Stormwater infrastructure in the area has changed since Jones Edmunds modeled Sweetwater Branch in 2004 – specifically, the reconfiguration of Sweetwater Branch in the Duck Pond area and the construction of Depot Avenue Park and its pump station. This may have changed the floodplains. Daylighting Sweetwater Branch may further alter the floodplain.

Table 4 Sweetwater Branch- Estimated Flood Stage and Peak Flow at SE 4th Avenue

Event	Flood Stage (feet NAVD 88)	Flow (cfs)
10-year	143.32	427
25-year	144.11	637
100-year	144.48	865

The 2004 model indicates that SE 4th Avenue floods in the 10-year event – the smallest event modeled. During the TAT meeting, we asked GRU employees if they had noticed flooding and they responded that they had not. However, based on the model, the staining on the concrete headwall, and photographs the CRA provided, we believe SE 4th Avenue frequently floods for short periods. The CRA photographed the headwall upstream of SE 4th Avenue in August 2014 before and during a storm. About 3.2 inches of rainfall was recorded near the Duck Pond for this storm event, starting at about 3:30 PM. The modeled 10-year event was 6 inches of rainfall. Figure 2-11 shows three photographs of the stream: the *left* shows before the storm and after several days without rain, the *center* shows Sweetwater Branch during the storm, and the *right* shows after the storm and a wrack line of storm debris almost to the top of the headwall.

2.5.2 Conclusions and Recommendations

- Incorporate updated Hydrologic and Hydraulic (H&H) modeling in the daylighting design for the purposes of determining the design conditions, evaluating the anticipated design performance, and applying for a FEMA Flood Map Revision.

2.6 Historical Environmental Issues and Constraints Review

Environmental Consulting & Technology, Inc. (ECT) performed three Phase I (2007) and two Phase II (2011 and 2012) Environmental Site Assessments (ESA) for the Power District. They also performed a Phase I Site Assessment on the Former Fleet Maintenance Facility (2014) and Professional Services Industries, Inc. (PSI) performed a Phase II ESA for the Former Fleet Maintenance Facility (2015). The CRA provided Jones Edmunds with partial copies of the reports. ECT provided their CAD files and data used to prepare the reports. ECT and PSI provided comments on the environmental analysis of these reports for the entire Power District. These comments are incorporated within this report. Figure 13 shows the areas described in the ECT and PSI reports.

The ECT and PSI reports use the following terminology:

- Parcel 1 – Includes the area east of SWBC between SE 4th Avenue and SE 5th Avenue (Blocks A-3.1 to A-4.4).
- Parcel 2 – Includes the area between SE 5th Avenue and Depot Avenue and between SE 7th Street and the JR Kelly Power Plant (Blocks B-1.1 to B-2.5).
- Parcel 3 – Includes the GRU Storage Yard south of Depot Avenue.
- Parcel 4 – Includes the area west of SWBC between SE 4th Avenue and SE 5th Avenue (Blocks A-1.1 to A-2.4).

This section only looks at Parcels 1 and 4 that are within and applicable to the area within the Daylight Study Area (DSA).

2.6.1 Summary of Previous Assessment Activities

2.6.1.1 Parcel 1

The Phase I ESA report for Parcel 1 did not identify recognized environmental conditions (RECs) in accordance with ASTM E1527-13; however, the report identified possible mold on walls of the field services building and potential asbestos containing materials (ACMs) throughout the building. If the building is intended for future use, a mold survey is recommended to be performed by a Florida-licensed mold assessor (FLMA), and if confirmed the impacted materials may require removal. If not already prepared, a Lead and Asbestos Operations and Maintenance (O&M) Plan should be developed and implemented to maintain the lead-based paint (LBP) and ACMs documented in the Phase II ESA report. If the building is not intended for future use, ACMs identified by the asbestos survey may be required to be abated or demolished in place under wet conditions by a Florida-licensed abatement contractor before or during demolition. To evaluate costs associated with mold abatement, a mold survey would need to be completed first. To evaluate the costs associated with lead and asbestos O&M or abatement, additional information regarding the quantity and condition of each LBP and ACM would be necessary.

ECT performed Phase II ESA activities at the site in April 2011, including collecting eight soil samples and two groundwater samples for laboratory analysis. The Phase II ESA report for Parcels 1 and 2 identified the following:

- No test parameters were detected at concentrations above Chapter 62-777, FAC Soil Cleanup Target Levels (SCTLs) in the soil samples collected from Parcel 1.
- One polynuclear aromatic hydrocarbon (PAH) test parameter was detected at a concentration above its Chapter 62-777, FAC Groundwater Cleanup Target Level (GCTL) in the groundwater sample collected from Soil Boring SB-4. Benzo(a)anthracene was detected at 0.64 microgram per liter (µg/L), which exceeds the GCTL of 0.05 µg/L. The groundwater sample was collected from the northwest portion of the property.

Based on limited assessment data known for Parcel 1, no soil impacts have been identified that would require further assessment or remediation. The limited groundwater data indicate that the site groundwater may be impacted above Chapter 62-777, FAC GCTLs. However, the groundwater samples collected in 2011 were collected from temporary points. Therefore, PSI recommends initially installing a monitoring well using hollow-stem auger methods and sampling according to Florida Department of Environmental Protection (FDEP) standard operating procedures (SOPs) to confirm the groundwater results in the vicinity of SB-4. If groundwater impact is confirmed in this area, PSI recommends additional groundwater assessment activities to evaluate the extent of the impact.

The Phase II ESA report also documented results of lead paint sampling and an asbestos survey performed at the site. Lead was detected in five of the material samples collected from Parcel 1, including one sample from the field services technician building and four samples from the wastewater building. Asbestos was identified in three of the samples collected from Parcel 1, including one sample from the wastewater building and two samples from the field services technician building.

Based on the 2011 Phase II ESA data, active groundwater remediation is unlikely to be required to achieve regulatory closure for Parcel 1.

2.6.1.2 Parcel 4

The Phase I ESA report for Parcel 4 identified the following RECs: the subject property was listed as a Leaking Underground Storage Tank (LUST) facility with a reported historical petroleum discharge that impacted site soil and groundwater, as well as previous uses of various site structures including automotive repair, historical paint shop, car wash area, and underground sediment collection sump. The Phase I ESA did not discuss mold, LBP, or potential ACMs. No documents regarding lead or asbestos sampling have been provided to PSI for Parcel 4. If the site buildings are intended for future use, an LBP and asbestos survey should be performed. If either materials are identified, an O&M Plan should be prepared and implemented for the property.

The current site conditions related to the LUST designation were assessed by ECT in March through May 2015. No petroleum-impacted soil or groundwater was identified at concentrations above Chapter 62-777, FAC SCTLs or GCTLs by ECT in 2015. In their June 2015 Low-Scored Site Initiative (LSSI) Report, ECT concluded that the site met the qualifications for an LSSI No Further Action (NFA). The report also recommended that one additional groundwater sampling event be performed in August 2015 to achieve the NFA requirements. FDEP issued a July 28, 2015, comment letter regarding the July 2015 report. In the letter, FDEP agreed with ECT's recommendation to perform another groundwater sampling event. However, FDEP needs to issue a new work order to ECT so that they can perform the sampling activities. Therefore, when the groundwater sampling event will be scheduled is not known.

In June 2015, PSI performed Phase II ESA activities at Parcel 4 to address the RECs identified in ECT's October 2014 Phase I ESA report, with the exception of the former petroleum impacts associated with the LUST that are being addressed by ECT. PSI collected three soil samples and three groundwater samples for laboratory analysis. The Phase II ESA report for Parcel 4 identified the following:

- Tetrachloroethene (PCE, a chlorinated solvent) was detected in Soil Sample SB-1@1', collected inside the main maintenance building, at a concentration above the LSCTL; however, below the DE-I SCTL and DE-II SCTL.
- PCE was detected in the groundwater sample collected from Temporary Monitoring Well TMW-1, also inside the main maintenance building east of SB-1@1', at a concentration of 5.3 μg/L, which exceeds the GCTL of 3 μg/L.

Based on limited assessment data currently known for Parcel 4, soil and groundwater impacts above Chapter 62-777, FAC cleanup target levels were identified in one soil sample and one groundwater sample collected. PSI recommends additional soil and groundwater sampling activities to evaluate the extent of the site impacts. Since the groundwater sample collected in 2015 was collected from a temporary well, PSI recommends initially installing a monitoring well using hollow stem auger methods and sampling according to FDEP SOPs to confirm the groundwater results in the vicinity of TMW-1. If groundwater impact is confirmed in this area, PSI recommends additional groundwater assessment activities to evaluate the extent of the impact.

2.6.2 Conclusions and Recommendations

From a regulatory point of view, the primary concern with daylighting Sweetwater Branch is water quality; the project cannot adversely impact the water quality of Sweetwater Branch. Groundwater flows from the Former Fleet Maintenance site the southeast and SWBC. Contaminated groundwater cannot be permitted into the SWBC. Another concern is the cost and proper disposition of any soil excavated from the area.

Based on the ECT Phase I and Phase II ESA findings and conclusions, Jones Edmunds recommends the following:

- Assess the culverts and retaining wall for ACM occurrence before finalizing plans for remodeling or demolition.
- Re-assess the soil and groundwater in the vicinity of SB-4 (SE 4th Avenue) for Arsenic. Assess the Tetrachloroethene (PCE, a chlorinated solvent) in the soil and groundwater in the vicinity of SB-1 and TMW-1.

Environmental Testing in the Power District

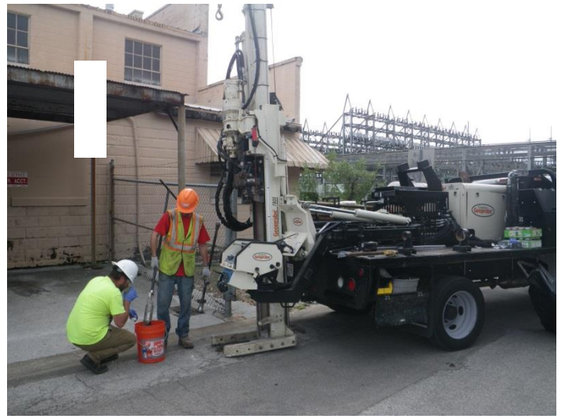


Figure 2-1 Power District in 1937

Figure 2-2 Power District in 1964

Figure 2-3 **Measured Discharge at Depot Avenue**

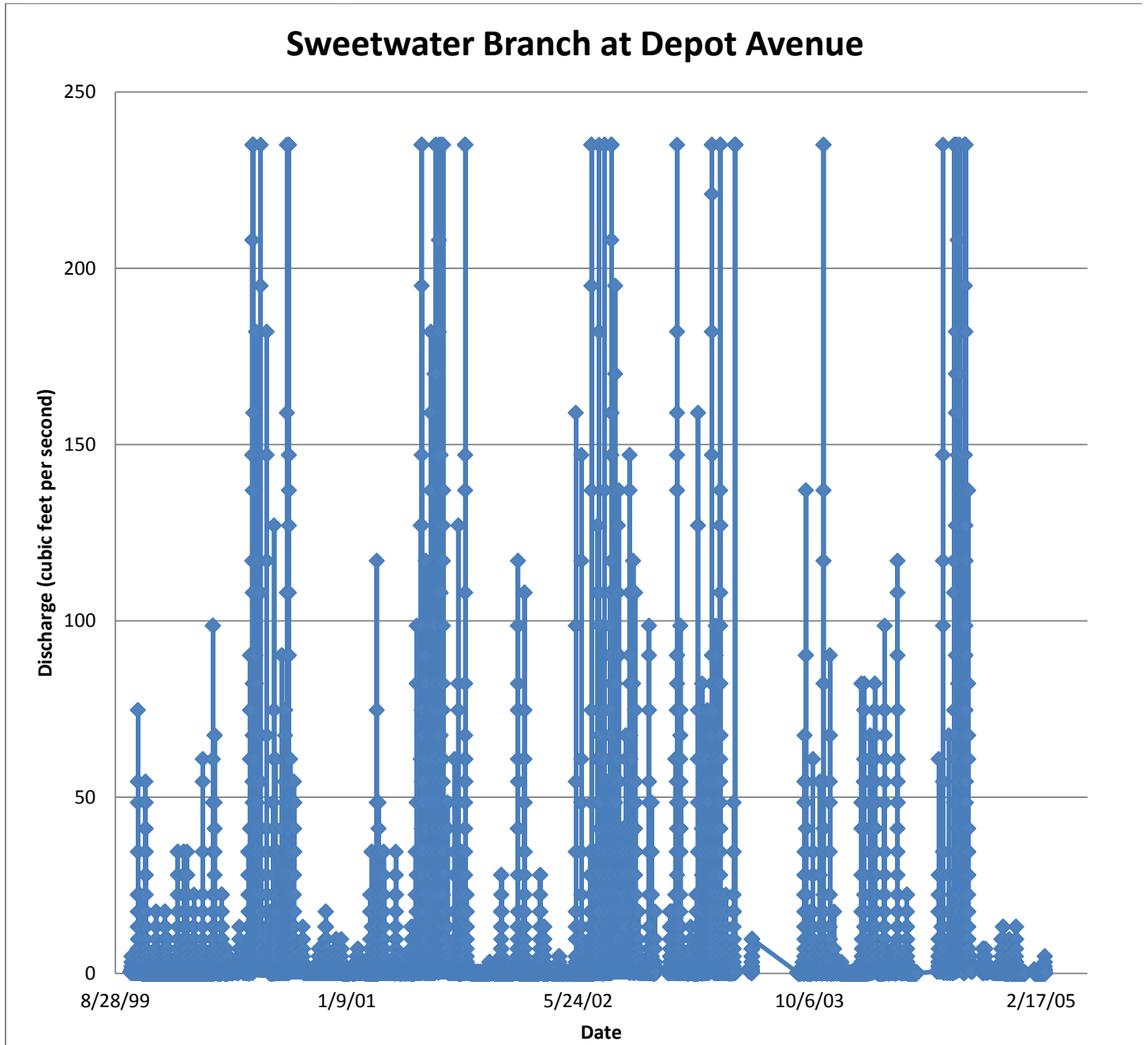


Figure 2-4 **Sweetwater Branch at Depot Avenue Cumulative Measured Discharge Distribution**

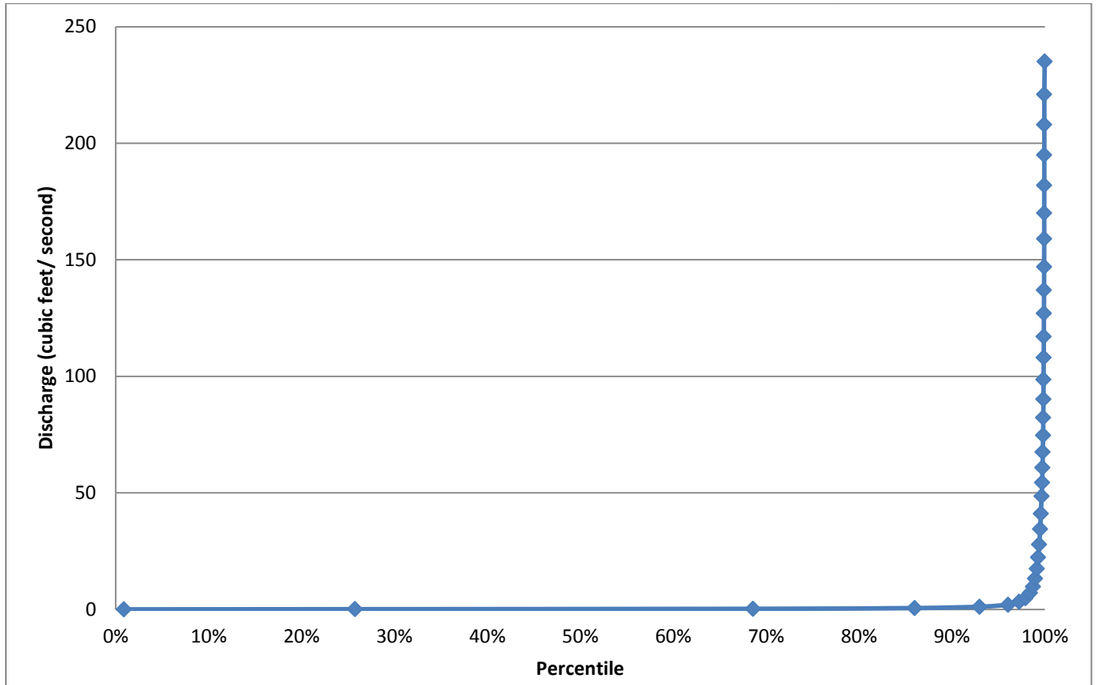


Figure 2-5 City Owned Property Upstream of SE 4th Avenue

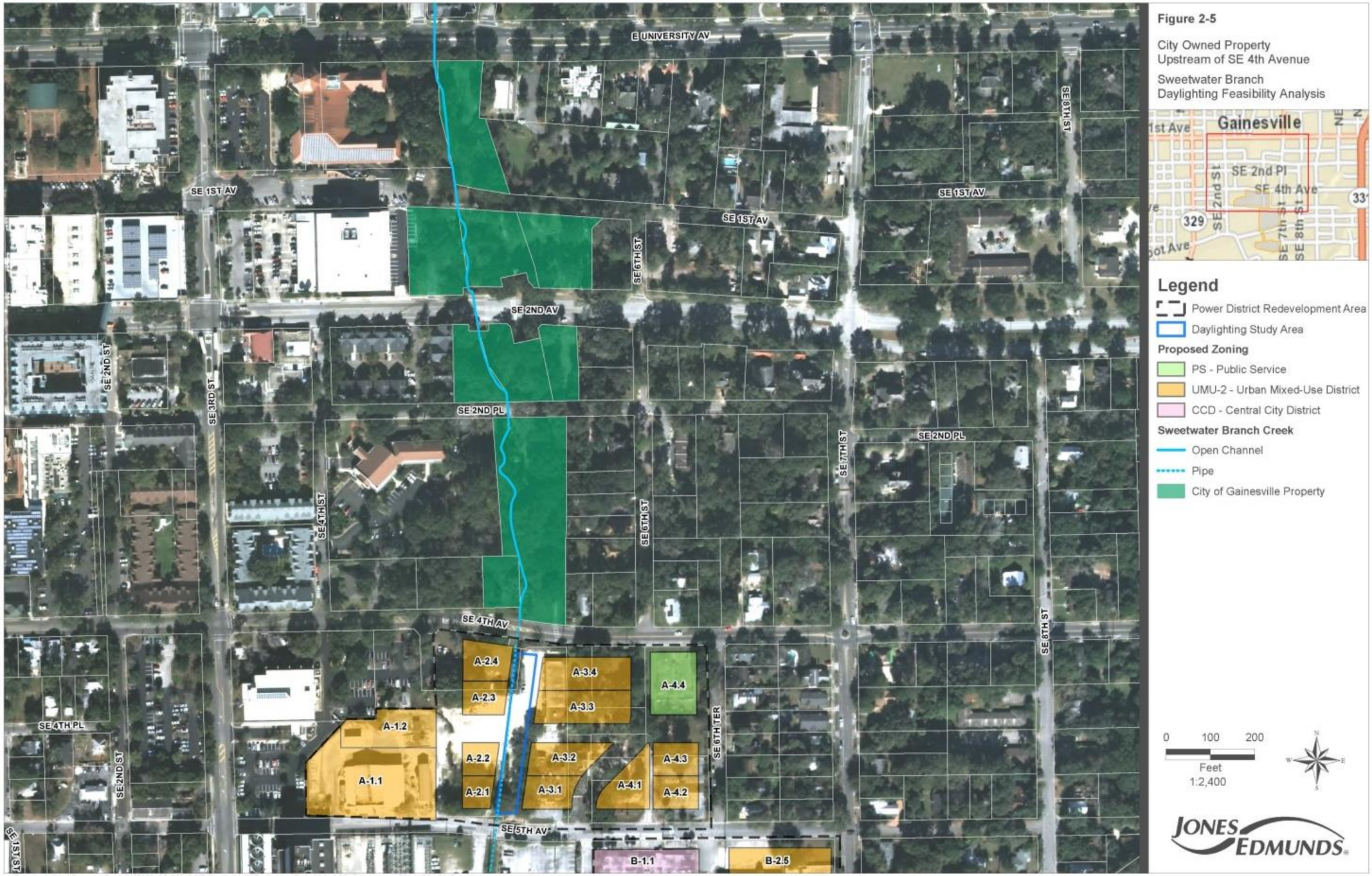


Figure 2-6 Daylighting Study Area Composite Existing Utilities

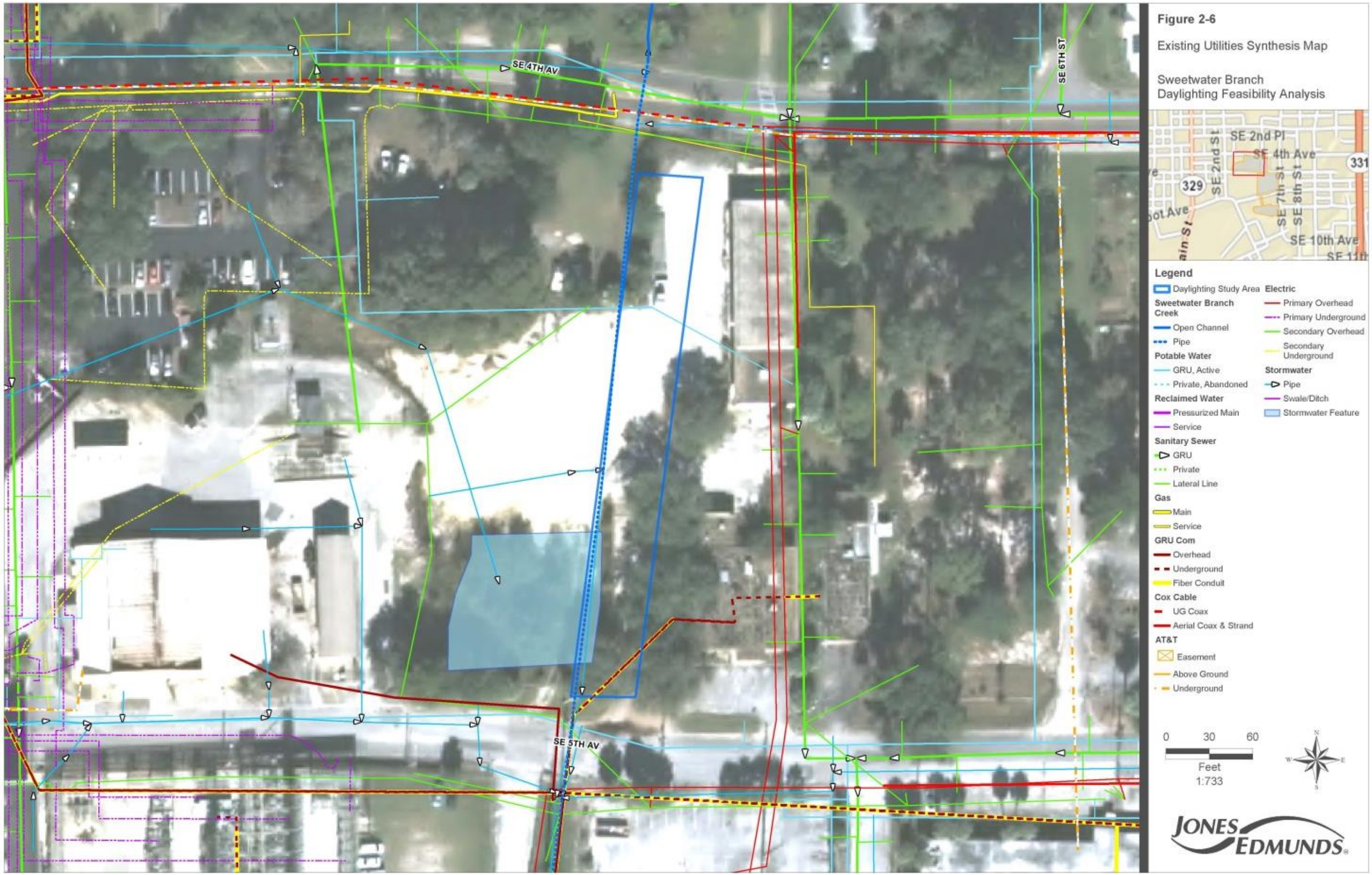


Figure 2-7 1-foot LIDAR Contours

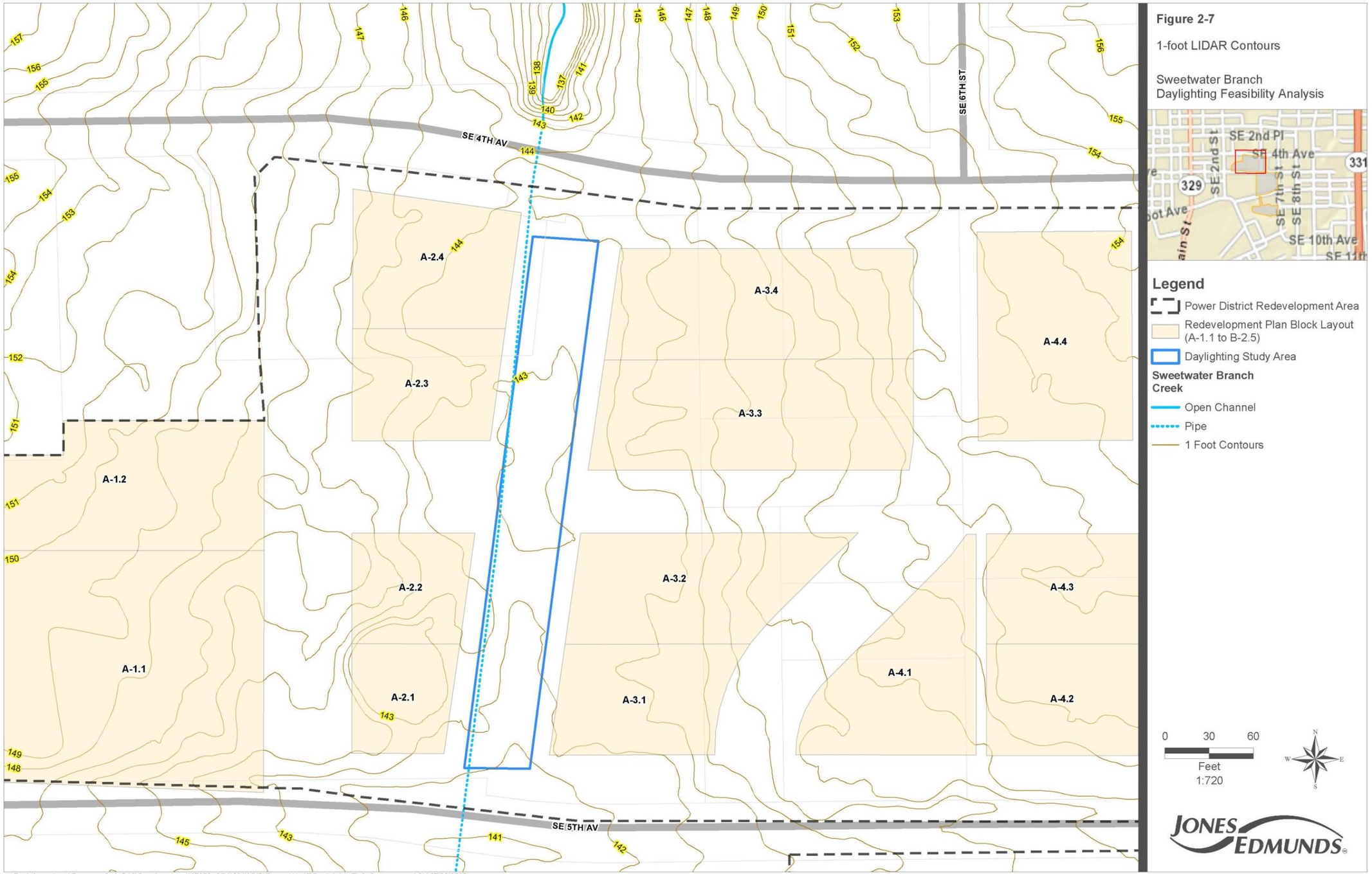


Figure 2-8 Stormwater Infrastructure

Figure 2-9 Effective FEMA Special Flood Hazard Areas

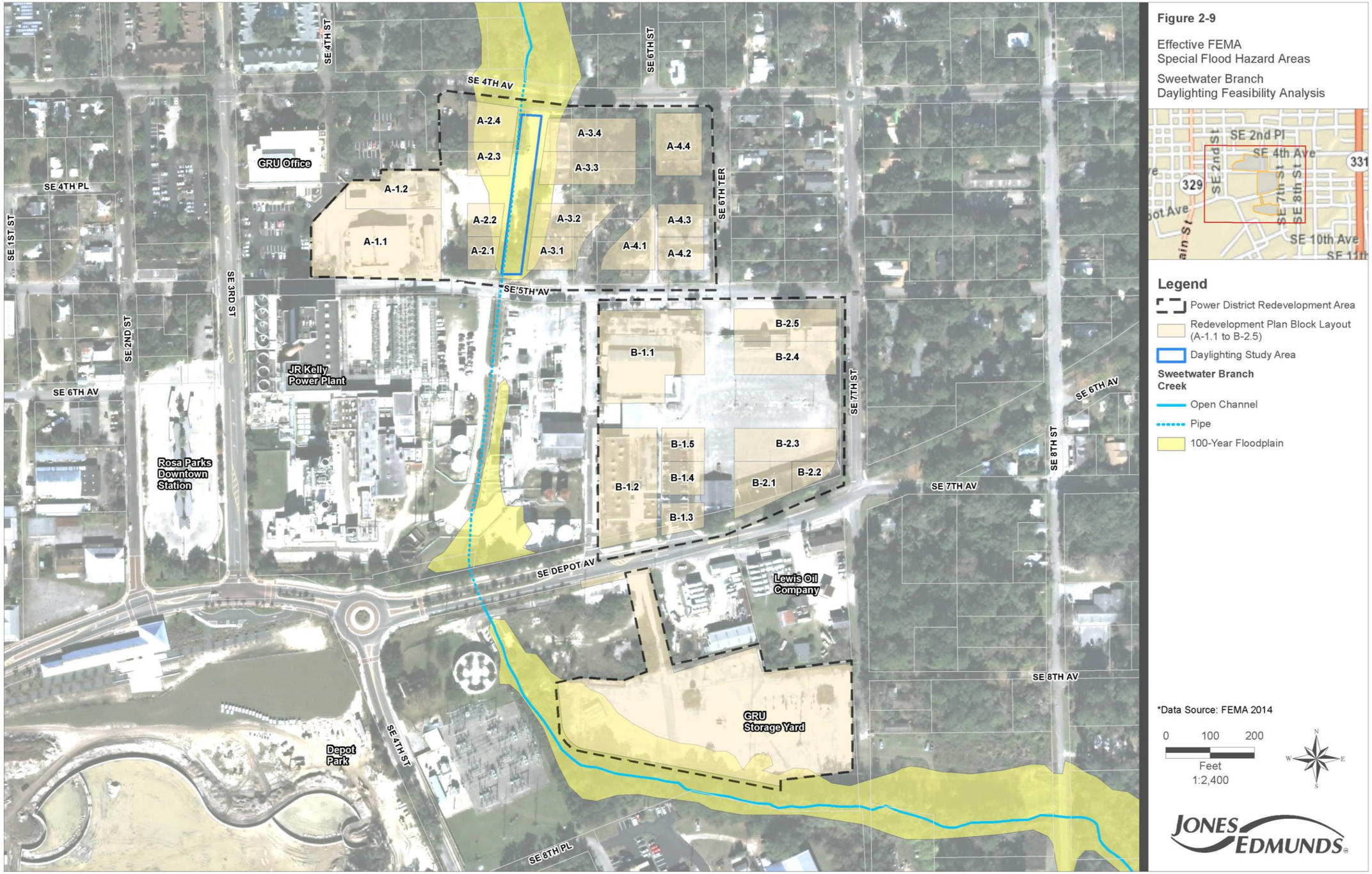


Figure 2-9

Effective FEMA
Special Flood Hazard Areas

Sweetwater Branch
Daylighting Feasibility Analysis

Legend

- Power District Redevelopment Area
- Redevelopment Plan Block Layout (A-1.1 to B-2.5)
- Daylighting Study Area

Sweetwater Branch Creek

- Open Channel
- Pipe
- 100-Year Floodplain

*Data Source: FEMA 2014

0 100 200
Feet
1:2,400

JONES EDMUNDS

Figure 2-10 Estimated Floodplains

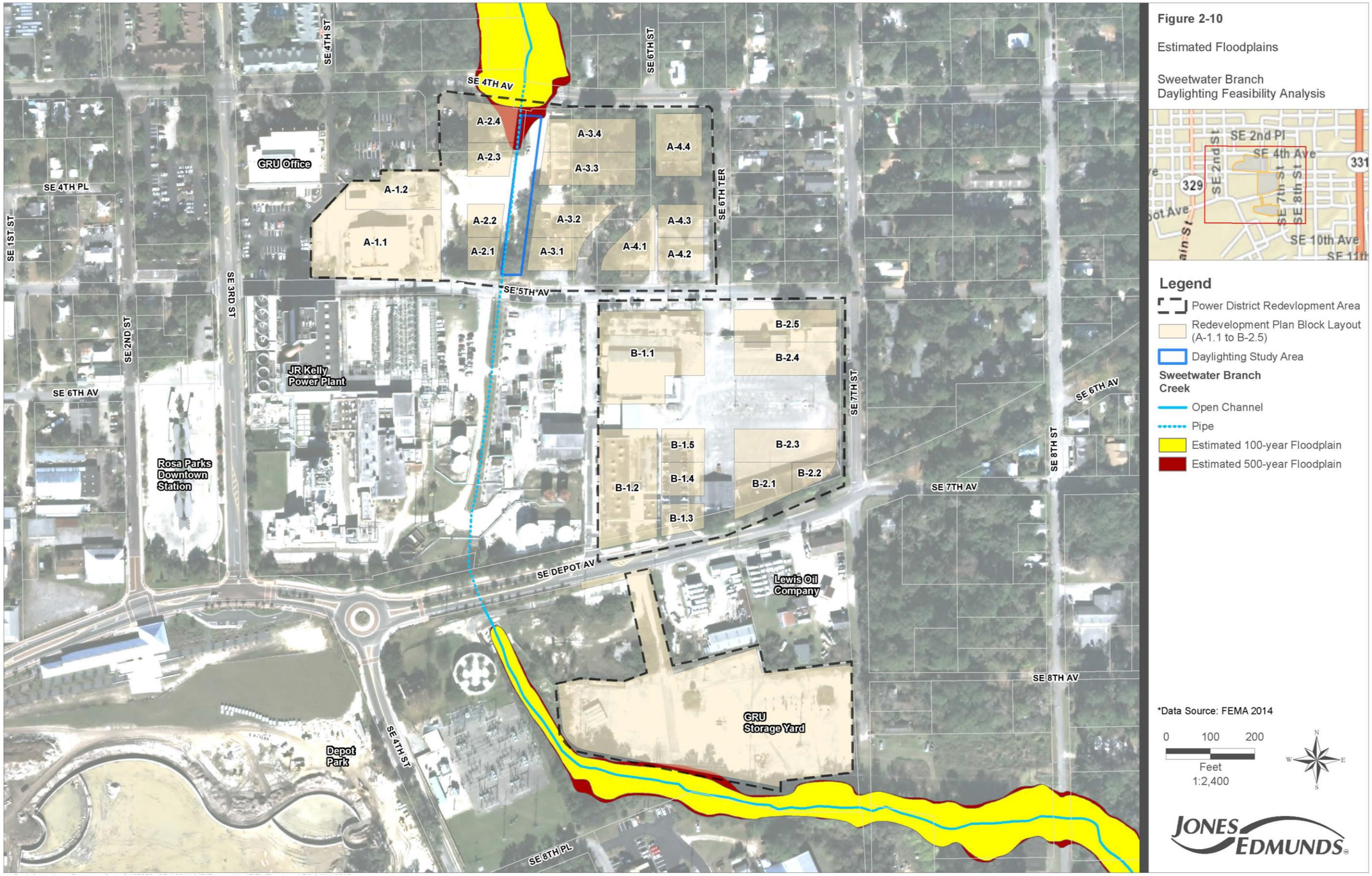
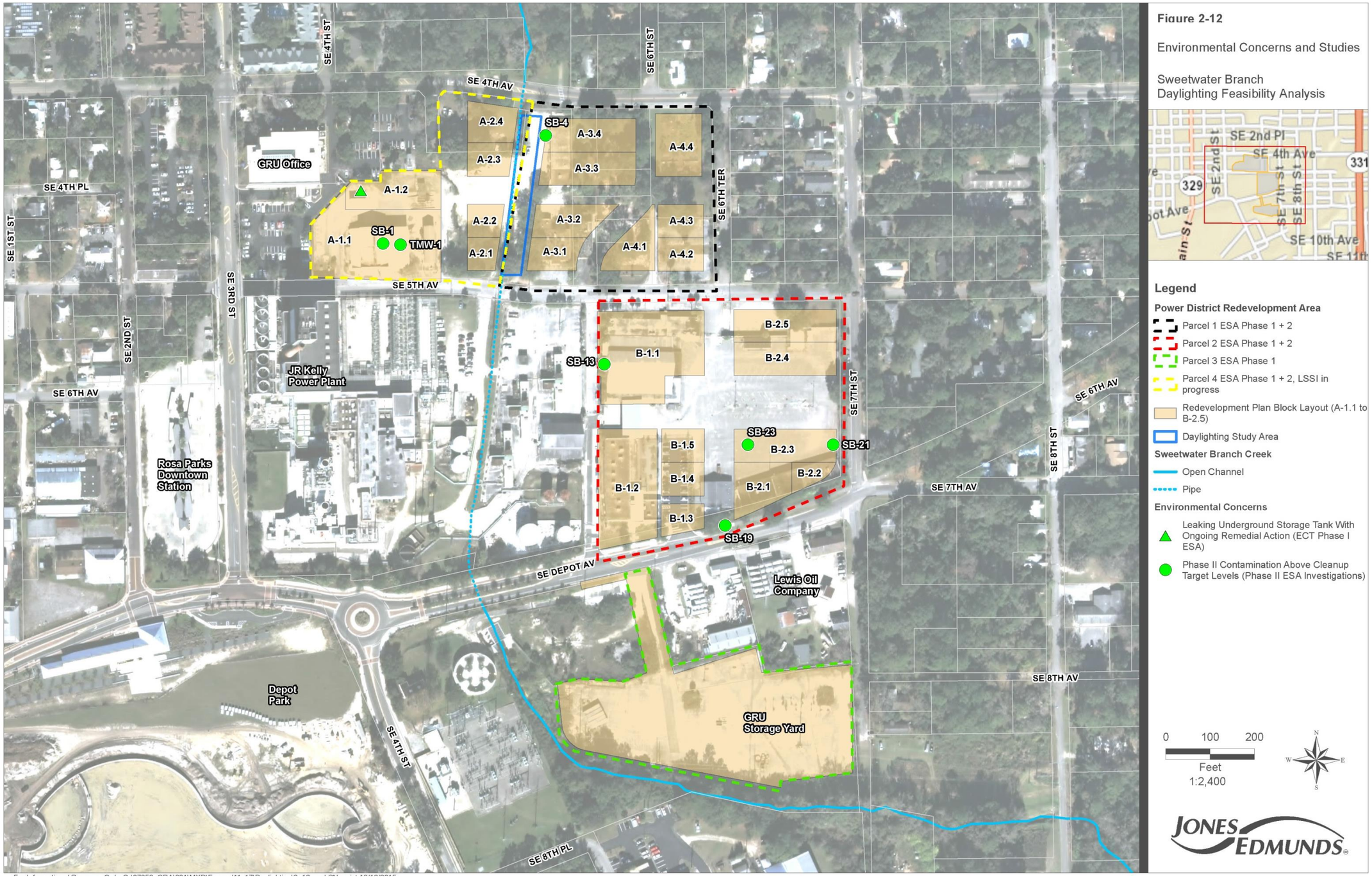


Figure 2-11 Inlet to the SE 4th Avenue Culvert

Figure 2-12 Environmental Concerns and Studies



SECTION 3

DAYLIGHTING

3 DAYLIGHTING

Over the past 25 years, CoG has worked to improve water quality, flood storage, and stream function along Sweetwater Branch with projects such as the Duck Pond Redesign, Sweetwater Branch Park and baffle box, Depot Park, Rosewood Branch Sediment and Trash Trap, and Sweetwater Branch Sheetflow Restoration Project. Daylighting Sweetwater Branch is an opportunity to continue to improve our urban water environment while attracting economic investment and adding to the character of the community.

This section of the Daylighting Feasibility Analysis summarizes the evaluation for three options to daylight Sweetwater Branch. The evaluation of each option was based on engineering criteria, ability to function, impacts to developable land, and collaborative input from both the multi-disciplinary Technical Advisory Team, and the inter-departmental Sweetwater Branch Creek (SWBC) Work Group inter-departmental team assessment. The three options evaluated for daylighting the Sweetwater Branch Creek were:

- Option 1: Remove the box culvert and replace it with retaining walls. This option uses an open channel coupled with retaining walls, blocks, gabions, or a similar hardened structure.
- Option 2: Remove the box culvert and replace it with an earthen channel and low retaining walls. This option uses a combination of the earthen side slopes and retaining walls to provide another alternative for green space areas larger than retaining walls alone but smaller than the earthen side slopes/littoral zone option.
- Option 3: Remove the box culvert and replace it with an earthen channel. This option uses modified urban channel designs based on natural stream processes and might include elements such as grade control structures, earthen side slopes, planted littoral zones, and a meandering flow line to reduce erosion effects.

Other alternatives were also evaluated, including the cost of the "do nothing" option. The "do nothing" option cost is associate with the age of the 9-foot-x-7-foot concrete box culvert between SE 4th And SE 5th Avenues, and the unknown age of the culvert crossings under both SE 4th Avenue and SE 5th Avenue. The other alternatives evaluated were:

- Leave the box culvert in place and daylight a portion of the stream. This alternative uses the box culvert to convey large storm flows and creates a new stream channel for the normal flow.
- Create an open channel using the box culvert. This alternative uses the existing concrete box culvert bottom and sides to remain in place but removes the top of the culvert.
- Create an architectural representation of the underground creek—called architectural daylighting. This alternative preserves the existing box culvert and creates a faux channel. Interpretive elements call attention to the underground creek.
- Do nothing and leave the culverts under SE 4th Avenue and SE 5th Avenue and the box culvert between these roads.

The alternatives do not include a full "restoration" of the Creek. Historically the Creek was an intermittent stream, and the watershed had significant soil storage and wetlands. Even without full restoration, daylighting this portion of the Sweetwater Branch Creek between SE 4th and SE 5th Avenues can provide an environmental, economic, and social benefit.

Each option is presented with a rough order-of-magnitude cost for design and construction as well as an estimate of the economic loss caused by the loss of developable land. These estimates are presented in detail in Attachment C.

The Feasibility Analysis also does not include the landscape design or public access elements that may be included in the final project. Daylighting projects may be accomplished using a variety of methods and materials to create signature features within an urban landscape. This report provides several rough concepts, but the interpretation and implementation of those concepts – the look, feel, smell, and sound of the landscape – will need to be designed.

3.1 QUALITATIVE EVALUATION METHODOLOGY

The potential benefits of daylighting Sweetwater Branch Creek (SWBC) include mitigating flooding by restoring the floodplain, improvements to water quality within the branch, improved ecological value, increased access to green space for recreation, increased property values contiguous with the branch, aesthetic value, and the potential for education about the "urban stream." The relative benefits of daylighting SWBC (Table 6) must be balanced with the cost of the project (Attachment C), including the loss of potentially developable land (Attachment D). All cross-sections have two 20-foot public access corridors on each side. This corridor will need to be evaluated as to how best to accommodate a variety of user groups and urban design features such as pedestrians, bicycles, landscaping, hardscaping, furnishings (e.g., benches, planters, bicycle racks), and café outdoor spaces.

Table 6 Relative Potential Benefits List

Floodplain storage
Water Quality
Ecological Value
Public Access to Recreation
Public Education
Aesthetic Value
Developable Land Impacts
Increased Property Values

- The relative benefits were evaluated as the conceptual options and alternatives were examined.
- The SWBC Work Group deduced that the public access to recreation and the public education opportunities were relatively the same across all options. Additionally, the aesthetic value was assumed to be very highly variable and subjective across all options.
- The SWBC Work Group then evaluated the options on the remaining relative potential benefits including floodplain storage, water quality, potential increased property values, and developable land impacts.
- The SWBC Work Group agreed on the recommended conceptual cross-section (Figures ES-3 and 3-4) as a starting place for SWBC daylighting. This conceptual cross-section accommodates daylighting using a series of terraced retaining walls along with a vegetative slope. The cross-section also includes two public access corridors (e.g., pedestrian/bike trail, hardscape, landscape, outdoor café area) on both sides for a total width of 96-feet. This section has the potential to improve the floodplain storage, increase ecological value, improve water quality, and potentially increase property values. It also minimizes the impact to developable land.

3.2 CURRENT CONDITION

Currently Sweetwater Branch flows into a 4-foot-x-9-foot box culvert just north of SW 4th Avenue. The upstream invert of the culvert is 135.42 feet NAVD 88, and at the downstream end it connects to a 7-foot-x-9-foot box culvert with an upstream invert of 132.25 feet NAVD 88 and a downstream invert is 132.12 feet NAVD 88. The culvert conveys both the normal stream flow and the storm flow.

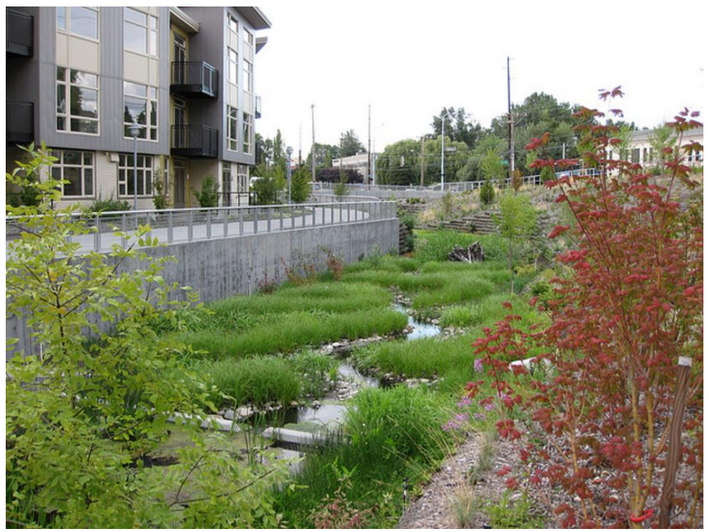
Figure 3-5 shows the cross section and plan view of the current condition related to the planned development area. There are costs are associated with this "do nothing" alternative. The "do nothing" option cost is associate with the age of the 9-foot-x-7-foot concrete box culvert between SE 4th And SE 5th Avenues, and the unknown age of the culvert crossings under both SE 4th Avenue and SE 5th Avenue.

3.3 OPTION 1 – RETAINING WALLS

Option 1, shown in Figure 3-1, uses retaining walls to minimize the top width and increase the land available for development while maintaining the benefits of a wide floodplain. Exhibit 2 shows two real-world examples from Hagen, Germany and Milwaukee, Wisconsin. In Hagen, Germany, the retaining wall includes a series of steps to provide pedestrian access to the paths and stream. A high path is provided to use when the stream in flooded. In the second image, the retaining walls and hand-rails are designed to protect the channel and discourage pedestrian access.

Exhibit 3 Examples of a Stream Channel and Floodplain with Retaining Walls

(River Volume Restoration in Hagen, Germany. Source: http://www.dreiseitl.com/index.php?id=80&lang=en)



(Source: https://www.flickr.com/photos/svrdesignco/3923884355/sizes/z/)

Figure 3-1 is a conceptual sketch of a plan and cross section of Sweetwater Branch. The existing culvert, retaining wall, and proposed building are included for scale and as a reminder of the 6-foot elevation drop. Many options and configurations for providing retaining walls are available – from a vertical retaining wall to a terraced garden. This option is similar to Options 2 and 3 in that it has a stream for normal flow and provides floodplain storage. The floodplain maintains low average velocities even during the expected 100-year event. The channel dimensions are based on:

- The existing culvert inverts are maintained. The existing inverts are at 135.12 feet NAVD 88 upstream and 132.12 feet NAVD 88 downstream, and the surrounding landscape is approximately 143 feet NAVD 88.
- The stream channel has a shallower slope than the floodplain because the sinuous curves increase the channel length.
- The stream cross section using Manning's Equation and median flow of 1.1 cfs. The cross-sectional area allows a normal average velocity less than 1.5 fps, which is expected to result in a stable channel, even if the channel bottom is bare sand.
- The channel bottom is 40 feet wide.

This option:

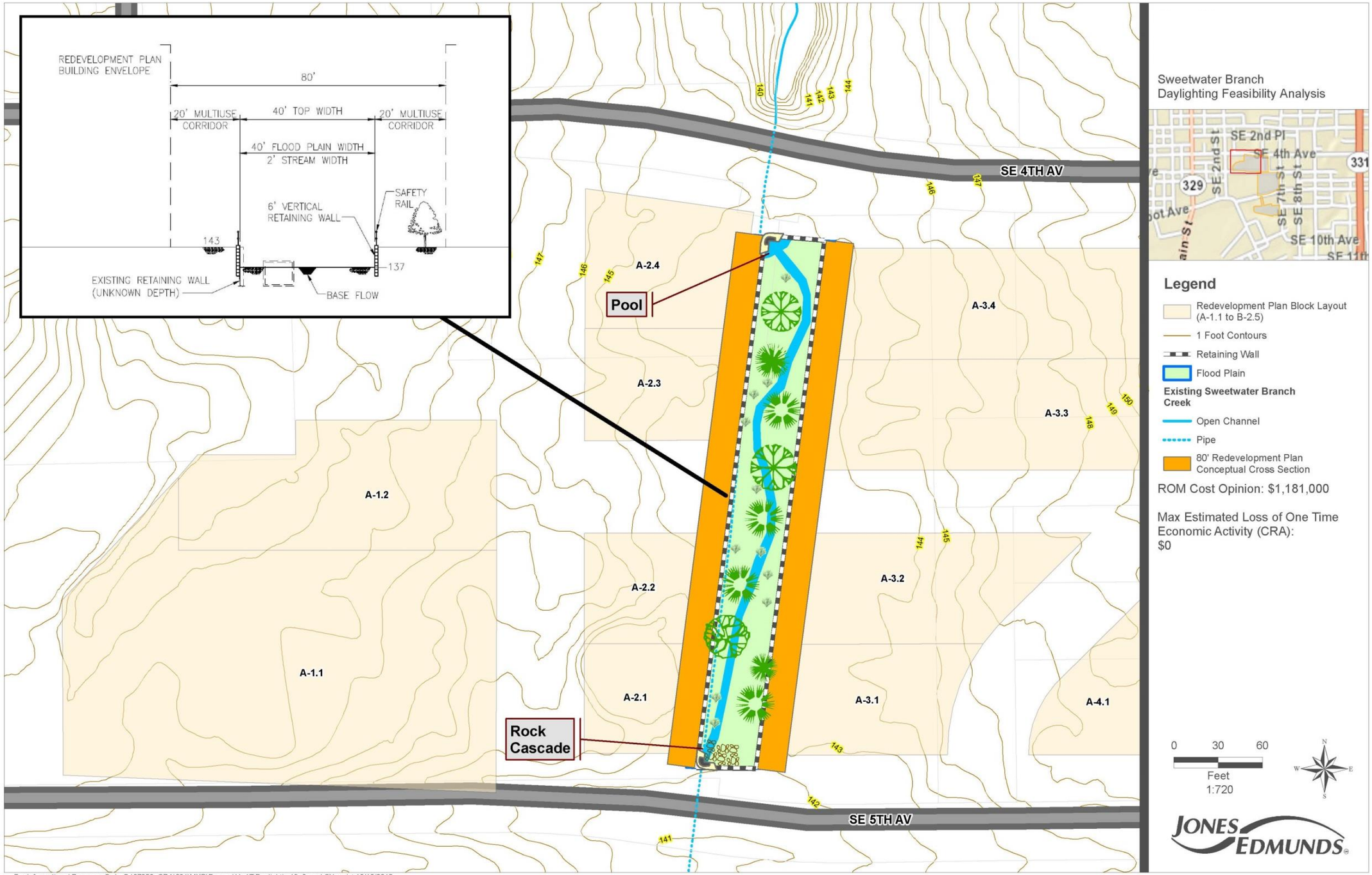
- Provides a flood-prone width capable of conveying the 100-year flood.
- Even with a 40-foot-wide channel bottom, the average velocity increases to 7.7 fps during the expected 100-year storm flow because of the loss of the trapezoidal cross-section. Requires safety railing because of the vertical side slopes with retaining walls. The bottom of the flood area is about 6 feet below the surrounding landscape.
- Results in a top width of about 40 feet, with an additional 40 feet (20 feet each side) of public access corridor, for a total an 80-foot cross-section. This is the 80-foor cross-section that was conceptually outlined in the Power District Redevelopment Plan (see Figure 3-6).
- Decreases projected developable area from the current condition but provides more developable land than Option 2 or 3.
- Is achievable within the 80-foot total conceptual corridor from the *Power District Redevelopment Plan* (see Figure 3-6).
- Provides public access to the Creek and an opportunity to view the water. The sheer walls and limited access to the stairs are a concern given the speed at which the flow rate of Sweetwater Branch can increase during a storm.
- Would provide a barrier to potential contaminated groundwater mitigation from the former Fleet Maintenance Facility, if detected and not rectified, prior to daylighting this section of Sweetwater Branch Creek from SE 4th Avenue and SE 5th Avenue.

The following aesthetic options are not specifically shown in concept plan but may be incorporated in the design:

- Stream bed riffles and pools.
- Drop structure such as a cascade or waterfall to connect to the SE 5th Avenue culvert.
- Pedestrian paths and stairs.

This option provides retaining walls that may be incorporated with stairs to allow limited public access. The retaining walls minimize the top width and eliminate the impacts to the developable land. This section is contained within the *Power District Redevelopment Plan* conceptual cross-section of 80 feet (see Figure 3-6) . To provide flood storage and keep velocities low, we recommend providing a bank-full stream channel with a floodplain.

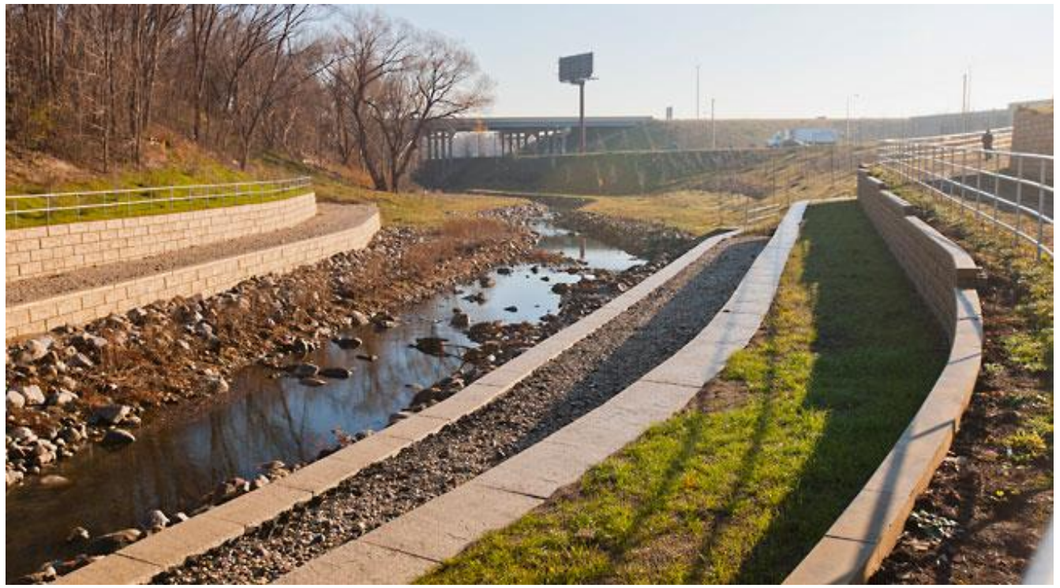
Figure 3-1 Daylighting Concept 1 – Retaining Walls



3.4 Option 2 – Earthen Channel and Low Retaining Walls

Retaining walls are an attractive option to accommodate the vertical grade changes, minimize the top width, and increase the land available for development. Exhibit 4 shows a real-world example from Milwaukee, Wisconsin where Kinnickinnic River was daylighted to create a park with trails, planted beds, and an overlooking pavilion with benches. Figure 3-2 is a conceptual sketch of a plan and cross section of Sweetwater Branch. The existing culvert, retaining wall, and proposed building are included for scale and as a reminder of the 6-foot elevation drop. Many options and configurations are possible by way of a combination of vegetated side slopes and retaining walls.

Exhibit 4 Example of an Earthen Channel with Low Retaining Walls



(Kinnickinnic River in Milwaukee, Wisconsin. Source: http://www.sehinc.com/news/kinnickinnic-river-rehabilitation)

This option is similar to Option 3 in that it has a stream for normal flow and provides floodplain storage. The floodplain maintains low average velocities even during the expected 100-year event. The channel dimensions are based on:

- The existing culvert inverts are maintained. The existing inverts are at 135.12 feet NAVD 88 upstream and 132.12 feet NAVD 88 downstream, and the surrounding landscape is approximately 143 feet NAVD 88.
- The stream channel has a shallower slope than the floodplain because the sinuous curves increase the channel length.
- The stream cross section uses Manning's Equation and median flow of 1.1 cfs. The cross-sectional area allows a normal average velocity less than 1.5 fps, which is expected to result in a stable channel, even if the channel bottom is bare sand.
- The bottom channel width is about 40 feet.

This option:

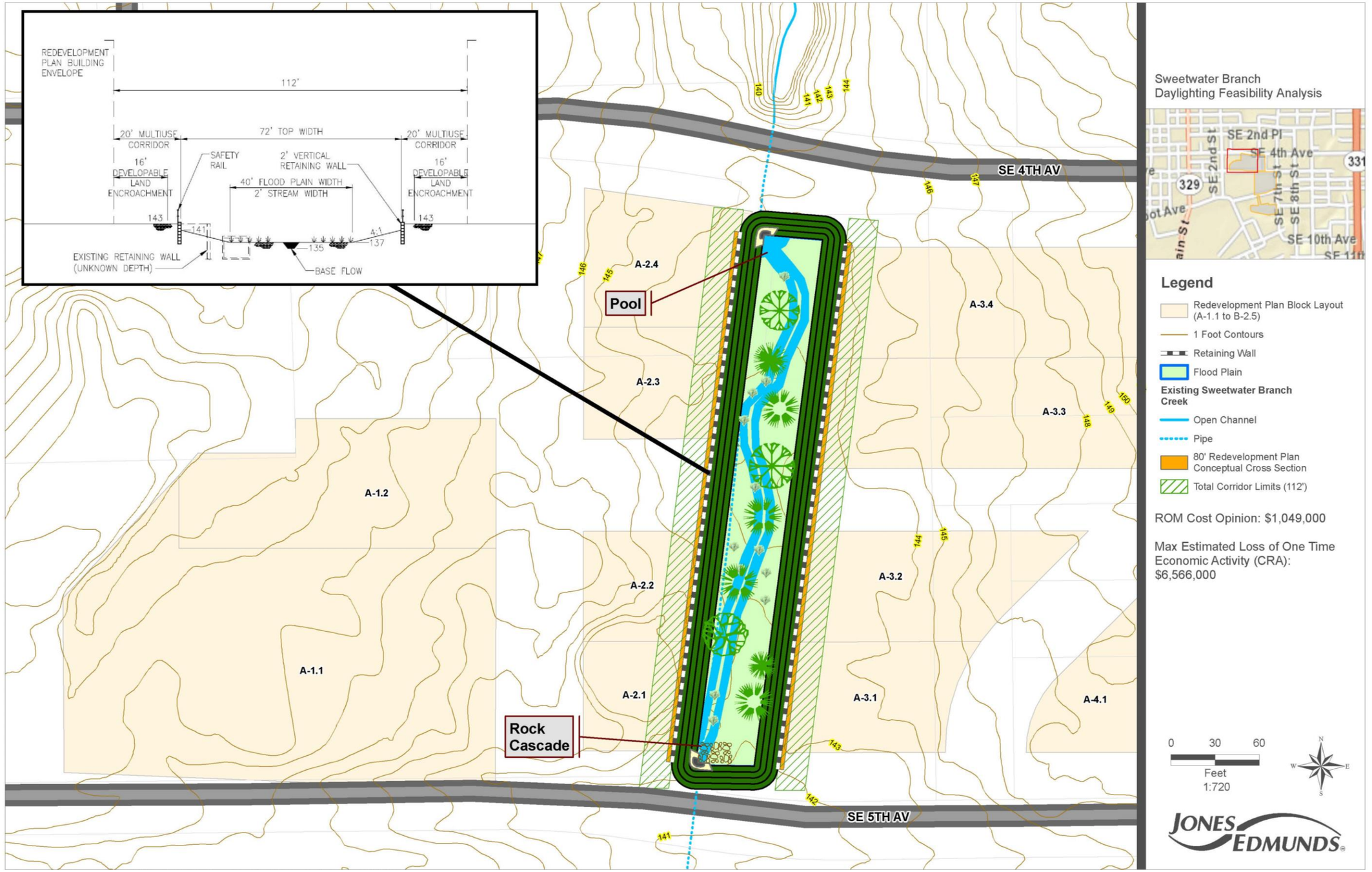
- Provides a flood-prone width capable of conveying the 100-year flood.
- Maintains an average velocity of 4.5 fps during the expected 100-year storm flow. Includes a short retaining wall with a drop of less than 30 inches that does not require safety railing.
- Results in a top width of about 72 feet, with an additional 40 feet (20 feet each side) of multi-use corridor, for a total of a 112-foot cross-section.
- Decreases projected developable area compared to the current condition, but has less of impact compared with Option 3.
- Provides public access to the Creek and an opportunity to view the water.

The following aesthetic options are not specifically shown in concept plan but may be incorporated in the design:

- Stream bed riffles and pools.
- Pedestrian paths and stairs.
- Drop structure such as a cascade or waterfall to connect to the SE 5th Avenue culvert.

Exhibit 5 Sweetwater Branch Creek Daylighting Conceptual Rendering

Figure 3-2 Daylighting Concept 2 – Earthen Channel and Low Retaining Walls



3.5 Option 3 – Earthen Channel

Option 3 uses earthen side slopes, which we assumed are stabilized with a mix of sod and native riparian vegetation, to create a natural channel similar to the Duck Pond area channel. Figure 3-3 conceptually shows this option.

Option 3 provides a stream channel for normal flow and a wide floodplain for larger storm events. The goal of this natural channel design is to emulate a natural stable channel. This type of design allows storm flow to spread across a wide channel, thereby preventing soil erosion that can happen when a channel cuts into a streambank. The channel upstream of SE 4th Avenue must also be a stable channel; otherwise soil that is eroded upstream of SE 4th Avenue will be deposited this section of the Sweetwater Branch daylighted area.

Ideally, during the design the stream channel will be sized for a bank-full condition based on the normal groundwater seepage rate and the response to the 1.5-year return event (Blanton et al., 2010). Because these data are not readily available, we estimated the stream using the median flow, 1.1 cfs, as recorded on the SJRWMD gauge at Depot Avenue. The stream channel dimensions are based on:

- The existing culvert inverts are maintained. The existing inverts are at 135.12 feet NAVD 88 upstream and 132.12 feet NAVD 88 downstream, and the surrounding landscape is approximately 143 feet NAVD 88.
- The stream channel has a shallower slope than the floodplain because the sinuous curves increase the channel length.
- The cross-sectional area allows a normal average velocity less than 1.5 fps in the main stream channel assuming a median flow of 1.1 cfs, which is expected to result in a stable channel, even if the channel bottom is bare sand.
- The floodplain cross-sectional area allows an average velocity of 4.5 fps during the expected 100-year storm flow.

This option:

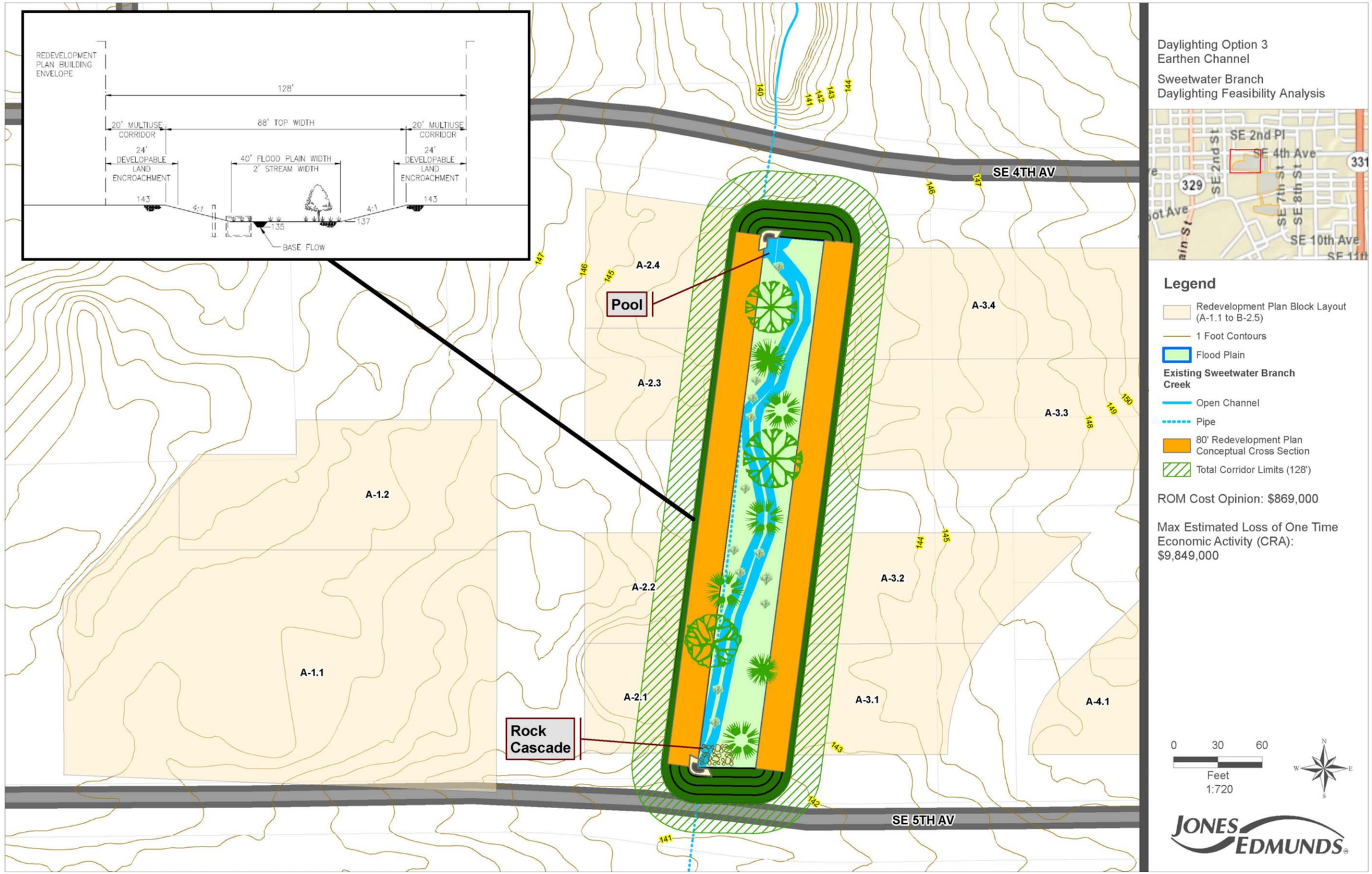
- Provides a flood-prone width capable of conveying the 100-year flood.
- The low velocity in the floodplain decreases the risk of storm damage during the period in which the vegetation is established. Ideally the channel will be stabilized with a combination of erosion control fabric and native vegetation with deep roots. However, the low velocity also allows some or all of the floodplain channel to be stabilized with sod.
- Dissipates energy and allows storm flow to spread over the floodplain because of a small pool in the channel inlet.
- Has a rock cascade in the channel outlet that creates a grade control structure and dissipates energy as the floodplain is constricted back into the culvert under SE 5th Avenue.
- Includes side slopes that are 4:1 or shallower to allow for stability, maintenance, and public access to the Creek.
- Connects the bottom of the flood area to the surrounding landscape, which is about a 6-foot difference in elevation.
- Results in a top width of about 88 feet, with an additional 40 feet (20 feet on each side) of public access area, for a total of a 128-foot wide cross-section.
- Significantly reduces the area available for development.

The following aesthetic options are not specifically shown in concept plan but may be incorporated in the design:

- Stream bed riffles and pools.
- Pedestrian paths.

Source (http://mmmgrouplimited.com/expertise/environment/environmental-design/)

Figure 3-3 Daylighting Concept 3 – Earthen Channel



3.6 Other Alternatives Evaluated

3.6.1 Leave the Box Culvert in Place and Daylight Base Flow

This alternative uses a new culvert under SE 4th Avenue to divert the normal stream flow into a new stream channel that runs through the DSA. The culvert inlet on the north side of SE 4th Avenue will be reconstructed to create a diversion weir to route storm flow into the existing culvert. The goal of this option is to create a stable channel that mimics the flow in an undisturbed rural stream. The downstream end of the channel will connect back into the existing culvert under SE 5th Avenue or will use a new culvert under SE 5th Avenue to connect into the 7-foot x 9-foot box culvert that runs through the JR Kelly Power Station.

Ideally, during the design process the stream channel will be sized for a bank-full condition based on the normal groundwater seepage rate and the response to the 1.5-year return event (Blanton et al., 2010). Because these data are not readily available, we estimated the stream using the median flow, 1.1 cfs, as recorded on the SJRWMD gauge at Depot Avenue. The stream channel will include a small riparian plant zone capable of handle a small designed "storm" event of approximately 30 cfs.

This option:

- Uses the existing culvert to convey storm events.
- Creates a small stream channel for the normal stream flow and a nominal amount of stormwater.
- Diverts the normal flow in Sweetwater Branch through a new culvert under SE 4th Avenue.
- Changes the culvert inlet at SE 4th Avenue and provides an opportunity to incorporate safety upgrades to reduce the risk of a person being swept into the storm culvert.
- Could allow for the replacement of the culvert under SE 4th Avenue with a new culvert that could accommodate the 100-year rates, as long as it would not adversely affect the downstream 100-year floodplain.
- Has a rock cascade in the channel to allow for a drop in elevation and connect back into the existing culvert.
- Includes side slopes that are 4:1 or shallower to allow for stability, maintenance, and public access to the Creek.
- Maintains the area available for development.

The following aesthetic options are not specifically shown in concept plan but may be incorporated in the design:

- Stream bed riffles and pools.
- Window in the existing storm culvert to highlight the urban storm flow.
- Pedestrian paths with educational elements.

This alternative provides a small, designed stream. The design uses the existing culvert for storm flow and does not provide additional flood storage. However it does allow for public access to the stream, and provides a unique opportunity to show how much stormwater is routed into our streams. This alternative is a viable alternative. When it became apparent that options removing the box culvert completely were achievable, the focus was placed on evaluating those options 1, 2, and 3.

3.6.2 Create an Open Channel Using the Box Culvert

This alternative explores maintaining the existing walls and floor of the box culvert and daylighting the stream by removing the top of the culvert. This evaluation does not address the structural considerations of cutting into the culvert. We assumed for the cost-estimating purposes that new sheet pile walls need to be constructed just outside the existing culvert walls. The sheet pile will support the load of the surrounding soil. We also included a concrete top cap and safety railing for the length of the channel.

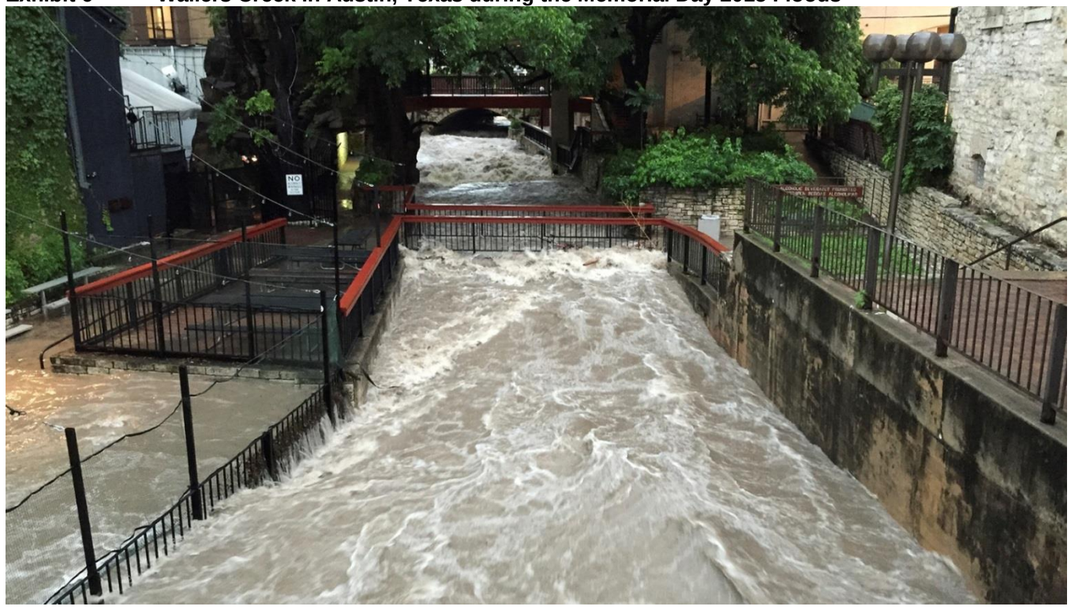
One example of removing the top of a box culvert was referenced in the literature – Grand River Cap Removal project in Jackson, Michigan. The project was in a highly built portion of the city, and the main driver for the project was a series of drowning deaths from persons being swept into the culvert. If this is done for Sweetwater Branch, we envision that the narrow open channel may appear similar to Waller Creek in the Narrows section of Austin, Texas (Exhibit 6). The photograph of Waller Creek is from the 2015 Memorial Day floods and highlights our concern about having a narrow confined channel of swiftly moving water. It is easy to visualize someone falling into the channel. Under normal conditions, Sweetwater Branch would be in an unattractive, deep, concrete canyon. This design will require safety railing to protect people from falling.

This option:

- Increases the land area available for development.
- Increase the potential floodplain area within the Power District Redevelopment area.
- Reduces the future potential to daylight and restore Sweetwater Branch from SE 4th Avenue to Depot Park.
- Decreases public access to the Creek but may increase the green space for recreation and aesthetic enjoyment.
- Does not improve water quality within Sweetwater Branch.
- Does not improve aquatic habitat quality.

This alternative is not a viable alternative because of its potential to increase flooding and the floodplain area within the Power District Redevelopment area.

Exhibit 6 Wallers Creek in Austin, Texas during the Memorial Day 2015 Floods



(Source: https://www.wallercreek.org/)

Exhibit 7 Blue Road in Drachten

3.6.3 Create an Architectural Representation of the Underground Creek

Cities with large master plans to daylight and restore creeks sometimes use a technique called “Architectural Daylighting” to create public awareness of the underground creeks. A City in the Netherlands (Drachten) painted a road blue to symbolize the stream flowing under the road (Exhibit 7).

This examples of architectural daylighting is temporary and can be used to cultivate public support for a daylighting project. CoG has the option is to leave Sweetwater Branch culvert in place and use the land above the culvert to create a linear park that highlights the stream beneath. Many options are available to do this. Some ideas include:

- Using stone to create a “dry” stream bed.
- Using blue concrete or blue mosaic tiles to create a path.
- Creating planting beds that use plants and color to invoke the feeling of a stream.
- Installing a window in the underground culvert, similar to the window in the baffle box at Depot Park.
- Creating public art spaces to allow local artists to create temporary exhibits that call attention to the underground stream.

This is a viable alternative. When it became apparent that options removing the box culvert completely were achievable, the focus was placed on evaluating those options 1,2, and 3.

3.6.4 “DO NOTHING”

This alternative would leave the existing box culvert in place. The “do nothing” option cost is associate with the age of the 9-foot-x-7-foot concrete box culvert between SE 4th And SE 5th Avenues, and the unknown age of the culvert crossings under both SE 4th Avenue and SE 5th Avenue (see Attachment C).). The 9-foot-x-7-foot concrete box culvert is assumed to need to be replaced due to its age in the “Do Nothing” cost estimate.

This option:

- Limits developable land due to floodplain impacts.
- Uses the existing culvert to convey storm events.
- Minimizes impacts to existing utilities.
- Decreases public access to the Creek but may increase the green space for recreation and aesthetic enjoyment.
- Does not improve water quality within Sweetwater Branch.
- Does not improve aquatic habitat quality.
- Maintains the area available for development.

This alternative would potentially require the following actions:

- Perform a structural analysis of SWBC culverts at SE 4th Avenue and SE 5th Avenue, as well as the box culvert between these two roads. The estimate cost of this analysis is $25,000.
- Replace SE 4th Avenue and SE 5th Avenue SWBC culverts, if deemed necessary. If the SE 4th Avenue culvert is replaced, it should be replaced with a new culvert that can accommodate the 100-year flow rate, as long as no

adverse impacts occur to the downstream 100-year floodplain. The estimated cost for replacing both culverts is $570,000 ($285,000 for each culvert crossing at SE 4th Avenue and SE 5th Avenue).

- Replace the 7-foot x 9-foot concrete box culvert between SE 4th Avenue and SE 5th Avenue. The cost is estimated to be $300,000.

- Design a stormwater system so that the GRU Administration Building stormwater pond can be used for development. The design will need to maintain an outflow/discharge for the building footer drain. The estimated cost for the design is $40,000.

3.7 SUMMARY

The daylighting of Sweetwater Branch Creek has the potential to catalyze investment and interest in the Power District Redevelopment Area, while also continuing to make improvements to the overall watershed. If designed thoughtfully it can become a unique urban destination and asset for the entire Gainesville community. The Sweetwater Branch Creek (SWBC) Work Group agreed on the recommended conceptual cross-section as a starting place for Sweetwater Branch Creek daylighting design (see Figures ES-2 and 3-4). This conceptual cross-section accommodates daylighting using an earthen channel with a low retaining wall to create a compact cross-section. The cross-section also includes two public access corridors (e.g. walkways and bikeways, hardscape, furnishings, landscape, outdoor cafe areas) on both sides for a total width of 96-feet. If it is decided to move forward with the necessary work associated with the daylighting of Sweetwater Branch Creek, a thorough design process will be an important step in the visioning process.

The daylighting of SWBC should be done in coordination with the relocation of existing utilities and the overall redevelopment of the Power District.

Figure 3-4 Preferred Option – Concept Cross-Section with Earthen Channel and Low Retaining Walls

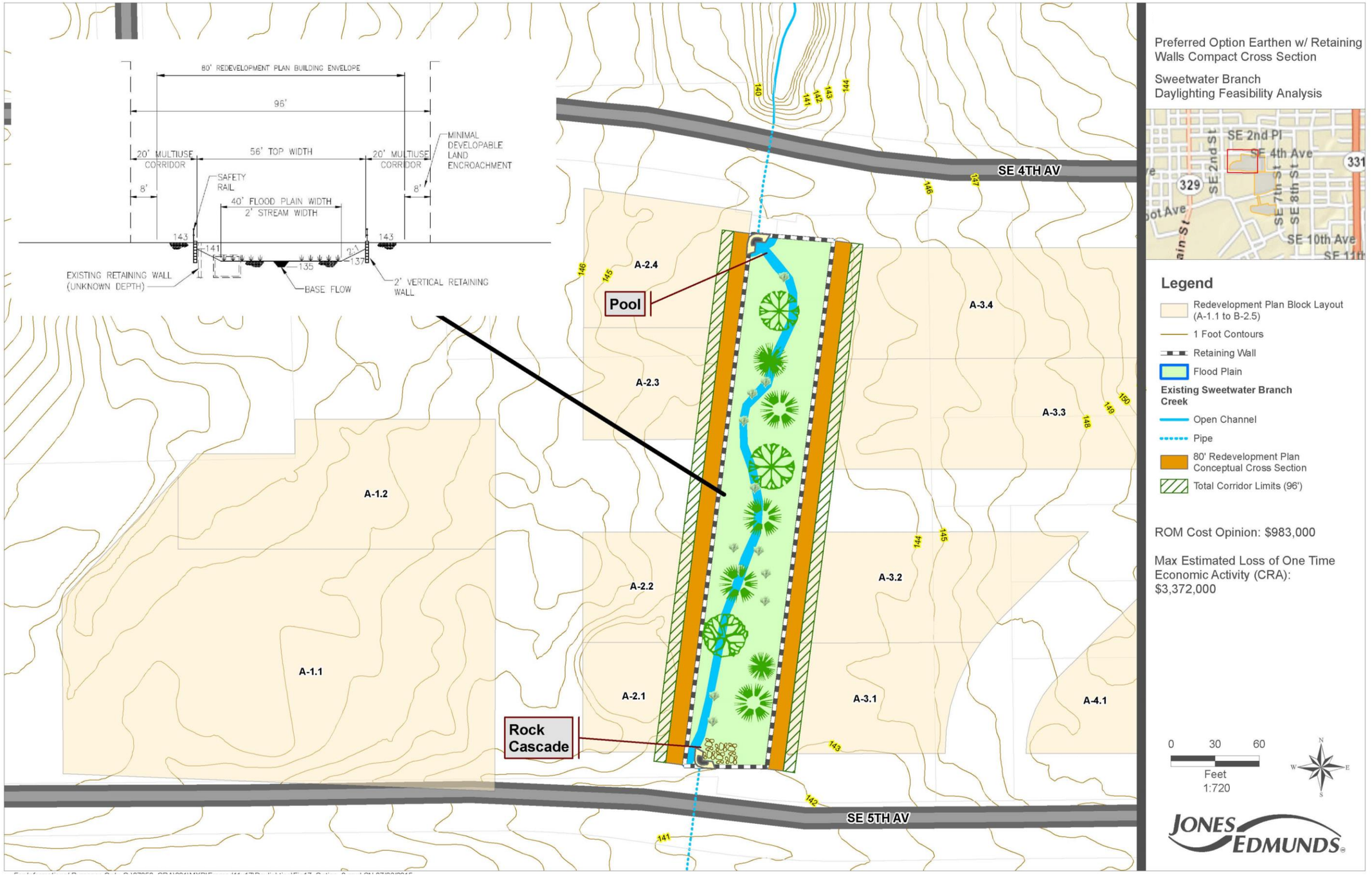


Figure 3-5 Sweetwater Branch Current Conditions

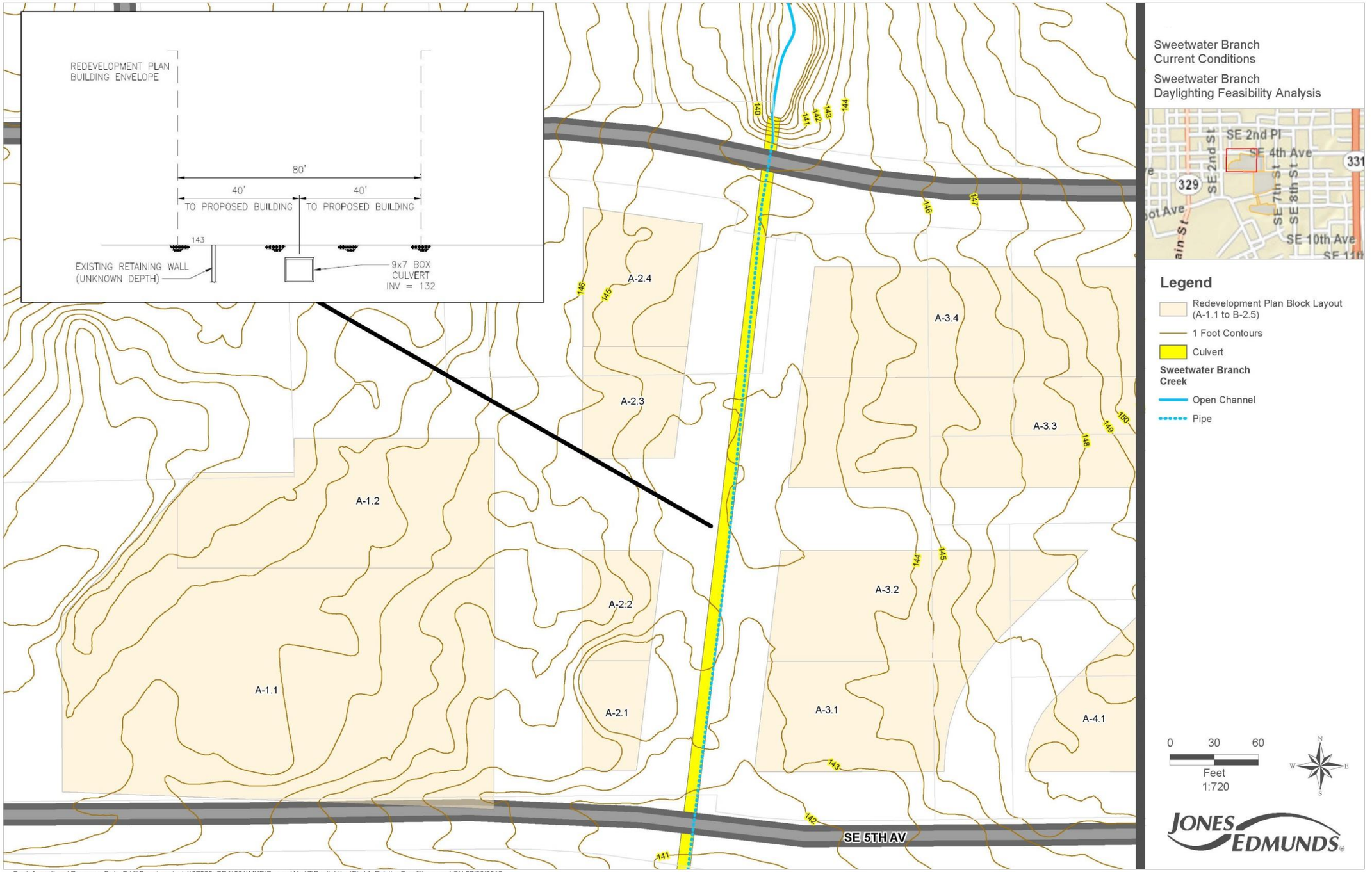
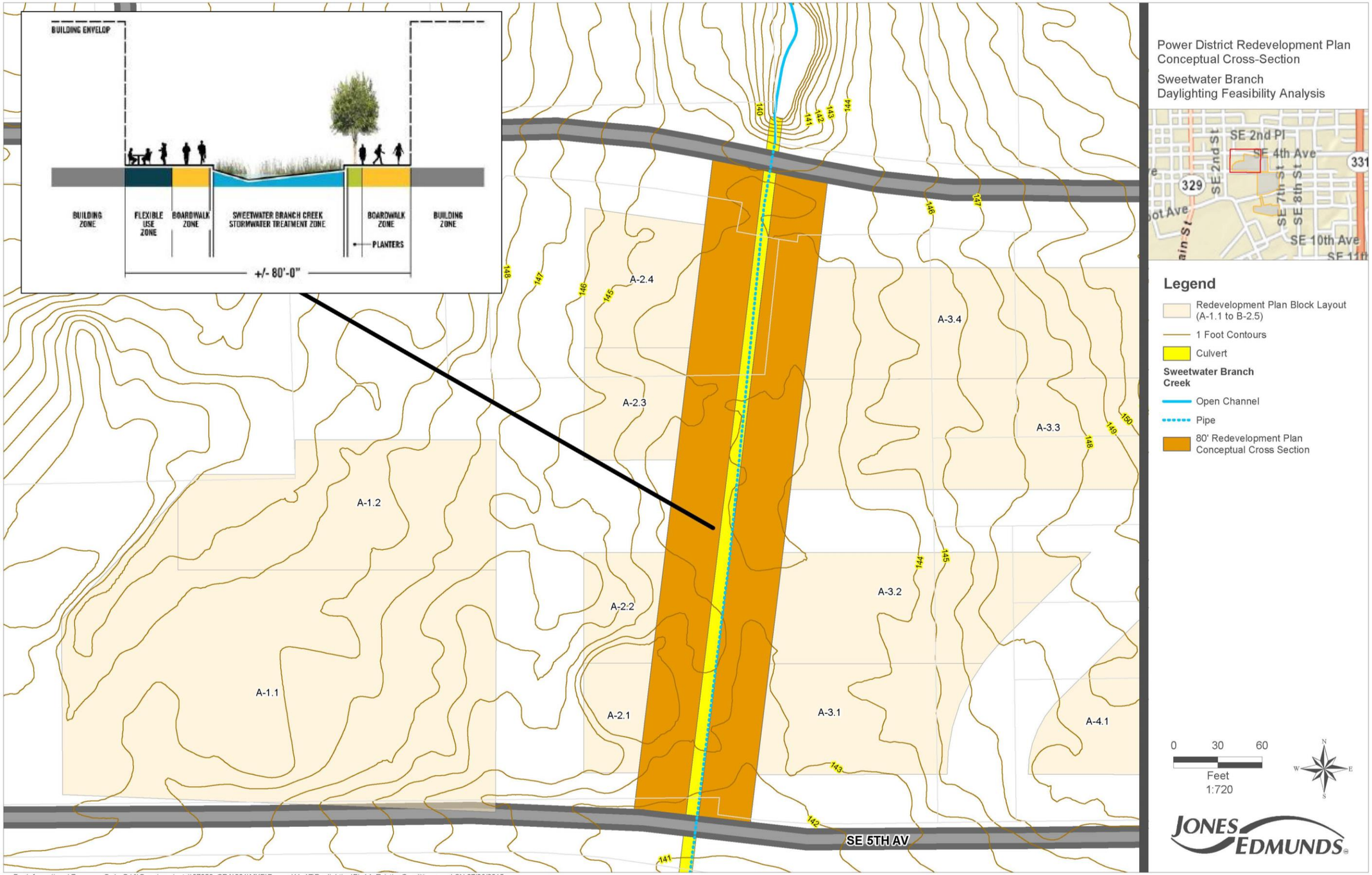


Figure 3-6 Power District Redevelopment Plan Conceptual Cross-Section



SECTION 4

PERMITTING & REGULATION

4 PERMITTING AND REGULATION

The Power District area was developed before stormwater regulations. The main stormwater infrastructure consists of a network of culverts that route stormwater runoff into Sweetwater Branch. The culverts were designed when good stormwater design was defined by the ability to quickly drain streets to avoid flooding; water quality was not considered. Now, stormwater regulations require development to not increase the peak rate or volume of stormwater entering a receiving stream and to provide water quality treatment. The St. Johns River Water Management District (SJRWMD) agreed that for any redevelopment the existing condition will serve as "pre-development" condition, which will make it fairly easy for the developer to meet the requirement not to increase the peak rate or the stormwater volume. In addition, CoG created a water quality treatment credit basin program to promote redevelopment and improve water quality in the urban core. CoG's Land Development Code also allows infill projects to use an off-site stormwater management facility to meet the standards required by the CoG's public works design manual. The Power District area is within the Sweetwater Branch Watershed and is served by the Depot Park Credit Basin, which has adequate credits available for redevelopment, as soon as CoG Public Works modifies the SJRWMD Depot Park Credit Basin Permit to include the Power Redevelopment Area within the Depot Park watershed area.

Daylighting Sweetwater Branch in the Power District area is a unique project, but lessons can be learned from the Duck Pond Redesign and Sweetwater Branch Park. The Duck Pond is in northeast Gainesville and receives stormwater from an approximately 434-acre watershed (Crisman et al., 1999). This pond was originally constructed between 1925 and 1927 and was simply a concrete water collection pond in Sweetwater Branch. In 2001 the CoG re-designed Sweetwater Branch north of the Duck Pond to create a sinuous stream with a riparian zone for flood storage. The Duck Pond itself was redesigned as a larger and deeper wet detention pond using retaining walls to fit within the available land. Sweetwater Branch Park is 5.60-acre linear park with a paved trail that lies along Sweetwater Branch between E. University Avenue and SE 4th Avenue. Within the Park, Sweetwater Branch is a fairly straight, regular channel, with a forested floodplain. CoG also has two sediment traps − one baffle box and one vortex separator − within Sweetwater Branch Park. From these projects we have learned that the design to daylight Sweetwater Branch in the Power District must include:

1. Erosion and sediment control management practices that are designed for a wide range of flow rates.
2. Turbidity control during any construction activities within Sweetwater Branch or related to the bypass of Sweetwater Branch.
3. Detailed sequence for construction that includes detailed erosion, sediment, and turbidity control plans.

The land within the Power District has a large percentage of impervious area. Only a small percentage of the area is served by a stormwater management facility, which is a small pond that serves the GRU Administration Building and is north of SE 5th Avenue and west of the SWBC. This facility has FDEP Environmental Resource Permit (ERP) permit #42-001-30982-1. If this facility is relocated during the daylighting process, then compensating stormwater storage and treatment volume, as well as compensatory flow rate attenuation, must be provided within the same sub-basin area. The outflow/discharge for the GRU Administration Building footer drain needs to be maintained. Infrastructure may already exist to convey stormwater for the GRU Administration Building to the Depot Park Credit Basin.

4.1 FEDERAL

4.1.1 UNITED STATES ARMY CORPS OF ENGINEERS (USACE)

The USACE regulatory program is based on Section 10 of the River and Harbors Act of 1899 and Section 404 of the Clean Water Act. Permits issued by USACE are commonly referred to as Section 10 and Section 404 permits. Section 10 permits regulate the creation of obstructions within navigable waters – for example, docks, weirs, and canals – and are most likely not applicable to the Sweetwater Daylighting project. Section 404 permits regulate the discharge of material into Waters of the United States.

Daylighting Sweetwater Branch by removing the culvert will require disturbing the substrate of the Branch, which will likely result in a discharge of material into Waters of the United States and therefore require a permit. Options to daylighting the Branch that do not disturb the substrate theoretically would not require a permit from USACE.

USACE issues two types of Section 404 permits:

- General permit
- Nationwide permits

Two possibilities are available for a nationwide permit:

- Nationwide 19 permit for minor dredging
- Nationwide 27 permit for aquatic habitat improvements

The USACE Nationwide 19 permit requires moving less than 25 cubic yards of material and is not a likely scenario. The USACE Nationwide 27 permit is for aquatic habitat restoration, habitat establishment, and enhancement activities and is a likely scenario.

4.1.2 FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA)

FEMA's current, effective Special Flood Hazard Area (SFHA) shows that a portion of the redevelopment footprint is in Zone A, which means the Base Flood Elevation (BFE) is not defined. The base flood is the flood with a 1% chance of being equaled or exceeded each year. The base flood is commonly referred to as the 100-year flood. The Zone A areas include the SE 4th Avenue crossing, the proposed daylighting area, and along both sides of the Creek south of Depot Avenue. The current floodplain includes the building footprints on both sides of the DSA. To permit development within the Zone A area, an engineer must establish the Base Flood Elevation (BFE). The BFE will be used by the architect to determine the FFE and the structural engineer to determine the foundation requirements.

4.2 STATE

4.2.1 FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

The Florida Department of Environmental Protection is responsible for reviewing any earthwork that may be impacted by soil contamination. At this time these requirements are not fully known, but the assessments to determine soil contamination are underway. Please see Section 2.6.

4.2.2 ST. JOHNS RIVER WATER MANAGEMENT DISTRICT

The Power District area not served by an existing stormwater management facility will fall under either of two scenarios outlined below. Scenario 1 discusses on-site stormwater treatment, and Scenario 2 discusses off-site stormwater treatment.

4.2.2.1 Scenario 1

This redevelopment will fall under 62-330.055, FAC and 62-330.450, FAC, (effective October 1, 2013). This rule is applicable to a county or municipality for activities occurring within urban infill and redevelopment areas or CRAs. Section 62-330.055, FAC, allows for a conceptual approval permit with a 20-year duration with a potential one-time extension for an additional 10 years. This conceptual permit does not authorize construction. The requirements in Section 62-330.055, FAC must be met to obtain the conceptual approval. Alternatively, net improvement of water quality can be demonstrated by providing a pollutant load analysis.

SJRWMD wants overall improvements to stormwater quality and maximization of on-site infiltration. SJRWMD looks favorably on incorporating LID methods throughout the redevelopment area to achieve an overall pollutant loading decrease. The University of Central Florida's BMPTRAINS model is a generally accepted model to demonstrate net improvement of stormwater quality. However, SJRWMD does not accept BMPTRAINS results that demonstrate more than 38% of Total Nitrogen removal and more than 64.5% of Total Phosphorus removal for wet detention ponds.

The redevelopment area must be designed to maintain or decrease the pre-development peak runoff rates. As previously stated, the pre-development condition is the current condition. SJRWMD would review the maintenance requirements of the designed stormwater treatment or LID practice to ensure the facilities can function over time.

A timetable for redevelopment, including the requested duration of the conceptual approval permit, is required for conceptual approval. This construction can be for any phase of the conceptual plan. The 62-330.450, FAC (Environmental Resources) General Permit authorizes construction that is consistent with the conceptual approval permit and is valid for construction for 5 years.

4.2.2.2 Scenario 2

The water quality treatment requirements for the Power District Redevelopment Area can be purchased from the Depot Park Credit Basin after CoG modifies the permit to adjust the drainage basin boundaries to include the Power District Redevelopment Area. The CoG Public Works Department is pursuing a permit modification to include the entire Power District Redevelopment Area. After SJRWMD approves the permit modification, a developer may purchase credit from CoG to support their redevelopment project. The developer will need to submit their plan and request the number of water quality credits from CoG. Once CoG approves the plan and the purchase of the credits, the CoG Public Works Department will provide SJRWMD with a letter outlining the developer's project and a calculation of the required water quality treatment credits. SJRWMD will use the letter from the CoG to modify the Depot Park Credit Basin the ERP permit #40-001-111266-6.

This scenario allows a developer to purchase water quality credits from CoG to satisfy the treatment requirement. As previously noted, the redevelopment design will also need to attenuate the peak stormwater runoff rate so that the post-development rates are less than or equal to the pre-development discharge rates for the 25-year, 24-hour storm event. SJRWMD agreed that the pre-development condition is the current condition. Permit applications must meet conditions and additional conditions for permit issuance pursuant to 62-330.301 and 62-330.302, FAC.

4.3 LOCAL

4.3.1 CITY OF GAINESVILLE

Section 30-304(a)(2) of the CoG Codified Ordinances contains the following applicable exemption:

> *Any public works or utilities projects initiated by the city or by a property owner acting with the authorization of the city and state agencies (the state department of environmental protection or the appropriate water management district) to provide utility services or to maintain or modify existing public works or utilities infrastructure or to provide controlled stormwater discharge to the creek, lake or wetland. However, such projects shall not be exempt from first avoiding loss or degradation of wetland functions and habitats, and then minimizing unavoidable loss or degradation of wetland function and habitats. Such projects that cause unavoidable loss or degradation of wetland functions or habitats shall be clearly in the public interest.*

We believe that the options presented meet the terms of this exemption based on their restorative nature. None of the requirements of Section 30-302, such as buffers/setbacks or level of review, would be applicable based on this exemption. However, this exemption is provisional and needs to be formally confirmed during the conceptual plan approval process.

In November 2014, the City Commission amended the Code of Ordinances relating to floodplain management. The new ordinance has not been codified in the Land Development Code yet but is expected to be before redevelopment of the Power District occurs. The new ordinance coordinates local floodplain management regulations with the Florida Building Code and the National Flood Insurance Program. The provisions of the ordinance apply to all development that is wholly within any Special Flood Hazard Area (SFHA), including but not limited to excavation, grading, filling, building, and utility installations.

Development within the Special Flood Hazard Area (SFHA) will require a floodplain development permit, though another option is to leave the flood area as a designated open space. The open space may be used for hiking, biking, walking, picnics, gardens, play areas, and parking without a permit provided it contains no additional fill, buildings, or structures.

The ordinance outlines several paths for applying for a floodplain development permit. At this point, Jones Edmunds assumes that the floodplain administrator will require the developer or the CRA to determine the BFE and apply for a Letter of Map Change or to assume that the Base Flood Elevation (BFE) is 3 feet higher than the adjacent grade at the location of the development and to protect all building systems from flooding. As the CRA refines the development options, we will discuss the options with the floodplain administrator.

SECTION 5

RECOMMENDATIONS & IMPLEMENTATION STRATEGY

5 RECCOMMENDATIONS & IMPLEMENTATION STRATEGY

These studies and additional data collection will need to be evaluated and prioritized. The priorities will be determined by the CRA based on the redevelopment strategy established. The numbering is a random list in no particular order or ranking.

Sweetwater Branch Creek and Daylighting Projects:

1. Solicit input from the neighborhood, community stakeholders, and the CRA Downtown Redevelopment Advisory Board and the CRA Board.

2. Conduct a Hydrologic and Hydraulic (H&H) study to address the upstream issues between SE 2nd Place and SE 4th Avenue including high velocities, erosion (water quality), short periods of flooding at SE 4th Avenue, and unsafe culvert conditions on the north side of SE 4th Avenue. Perform an updated H&H study to account for changes in the watershed since the previous study and to determine the stream response to smaller storm events, such as the 1.33-year, 1.5-year, and 2-year return events, to size the stream channel. Address the capacity of the existing drainage structures on the north and south sides of SE 4th Avenue. Investigate stabilizing the upstream section of SWBC between SE 2nd Place and SE 4th Avenue. Examine the potential for designing and integrating a detention basin for flow attenuation. The estimated cost for this study is $40,000.

3. Perform an updated H&H study to delineate the 100-year floodplain and submit a FEMA Letter of Map Revision (LOMR) for SWBC between SE 4th Avenue and Depot Avenue. The estimated cost for this study and the LOMR process is $50,000. . This H & H study needs to happen subsequent to suggested project #2 above and upstream issues' solutions being designed.

4. Perform a structural analysis of SWBC culverts at SE 4th Avenue and SE 5th Avenue, as well as the box culvert between these two roads. . The estimated cost of this analysis is $25,000.

5. Develop design criteria for the aesthetic goals for the daylighting project – how does CoG want this to look and feel? How does it integrate with the rest of the Sweetwater Branch Creek Park and City-owned property?

6. Develop design criteria for any other goals associated with the project – flood storage, water quality, aquatic habitat, etc.

7. Assess the culverts and retaining wall for ACM occurrence before finalizing plans for remodeling or demolition.

8. Re-assess the soil and groundwater in the vicinity of SB-4 (SE 4th Avenue) for Arsenic. Assess the Tetrachoroethene (PCE, a chlorinated solvent) in the soil and groundwater in the vicinity of SB-1 and TMW-1.

Related Infrastructure Projects:

1. Relocate the existing 12-inch water main that runs north-south, east of SWBC. Three relocation options were developed: (1) along the conceptual extension of SE 6th Street between SE 4th Avenue and SE 5th Avenue, (2) along SE 7th Street, and (3) along a new utility corridor adjacent and east of the SWBC. The preferred option is Option (1), which GRU has estimated to cost $100,000 to $150,000 (See companion report *Power District Infrastructure Analysis October 2015*, Figure ES-1).

2. Relocate the existing 15-inch VCP sanitary sewer line that runs north-south, east of SWBC. Three relocation options were developed: (1) along the conceptual extension of SE 6th Street between SE 4th Avenue and SE 5th Avenue, (2) along SE 7th Street, and (3) along a new utility corridor adjacent and east of the SWBC. The preferred option is Option (1), which GRU has estimated to cost $342,000. GRU estimated costs for Options (2) and (3) to be $1,000,000 and $355,000, respectively (See companion report *Power District Infrastructure Analysis October 2015*, Figure ES-1).

3. Relocate the existing overhead electric lines east of SWBC between SE 4th Avenue and SE 5th Avenue. Three relocation options were developed: (1) along the conceptual extension of SE 6th Street between SE 4th Avenue and SE 5th Avenue, (2) along SE 6th Terrace, and (3) along a new utility corridor adjacent and east of the SWBC. Option (1) is the preferred option, which GRU estimated the cost to be $80,000 for the overhead relocation and $232,000 for the underground relocation. GRU-estimated costs for Option (2) are $65,000 for the overhead relocation and $185,000 for the underground relocation and for Option (3) are $82,000 for the overhead relocation and $232,000 for the underground relocation (See companion report *Power District Infrastructure Analysis October 2015*, Figure ES-1).

4. Replace SE 4th Avenue and SE 5th Avenue SWBC culverts, if deemed necessary is the recommended studies. If SE 4th Avenue culvert is replaced, it should be replaced with a new culvert that can accommodate the 100-year flow rates, as long as it would not adversely affect the downstream 100-year floodplain. The estimated cost for replacing both culverts is $570,000 ($285,000 for each culvert crossing at SE 4th Avenue and SE 5th Avenue).

5. Design a stormwater system so that the GRU Administration Building stormwater pond can be used for development. The design will need to maintain an outflow/discharge for the building footer drain. The estimated cost for the design is $40,000.

6. Evaluate the need to maintain the 18-inch RCP stormwater culvert that runs through the middle of the DSA.

7. Relocate the GRUCom conduit on the south end of the DSA.

8. Modify the St. Johns River Water Management District (SJRWMD) Depot Park Credit Basin permit to include the Power District Redevelopment area

9. Relocate the potable water service line that runs from west to east through the middle of the DSA.

10. Incorporate energy dissipation in all daylighting options because the peak velocities through the culverts are very high.

SECTION 6

REFERENCES

REFERENCES

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ATTACHMENT A

POWER DISTRICT TECHNICAL ADVISORY

TEAM & DATA SOURCES

Attachment A **Technical Advisory Team & Data Sources**

Organization	Name	Position	Email	Phone
Alachua Co. Environmental Protection	Tim Ramsey	Program Supervisor	thr@alachuacounty.us	(352)264-6843
AT&T	Stuart Nolen	GEO Manager	sn5728@att.com	(352) 371-5278
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CoG - Community Redevelopment Agency	Suzanne Wynn	Project Manager	wynnsm@cityofgainesville.org	(352)393-8208
CoG - Community Redevelopment Agency	Andrew Meeker	Project Manager	meekerag@cityofgainesville.org	(352)393-8205
CoG - Economic Development	Erik Bredfeldt	Economic Development & Innovation	bredfeldea@cityofgainesville.org	(352)393-8614
GRU Land Rights Coordinator	Kristie Williams	Land Rights Coordinator	williamska@gru.com	(352) 393-1231
GRU AGM - Customer/Admin Services	Bill Shepherd	AGM - Customer/Admin Services	shepherdwj@gru.com	(352)393-1412
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CoG - Public Works	Andy Roberts	Stormwater Management - Engineer	RobertsAS@cityofgainesville.org	(352)334-8408
CoG - Public Works	Teresa Scott	Director CoG PW	scottta@cityofgainesville.org	(352)393-8801
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Jones, Edmunds Associates (JEA)	Bruce Myhre	UIA Manager	BMyhre@jonesedmunds.com	(352) 377-5821
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SJRWMD	Upasana Srivastava	Engineer III	usrivastava@sjrwmd.com	(386) 312-2312
SJRWMD	Barbara Hatchitt	Supervising Regulatory Scientist	bhatchitt@sjrwmd.com	(386) 329-4151
SJRWMD	David Jeff	Regulatory Scientist	DJeff@sjrwmd.com	(386)329-4151

ATTACHMENT B

SWEETWATER BRANCH CREEK (SWBC) WORK GROUP

Attachment B **Sweetwater Branch Creek (SWBC) Daylighting Work Group**

Organization	Name	Position	Email	Phone
Alachua Co. Environmental Protection	Greg Owen		gowen@alachuacounty.us	(352)264-6843
CoG - Community Redevelopment Agency	Suzanne Wynn	Project Manager	wynnsm@cityofgainesville.org	(352)393-8208
CoG - Community Redevelopment Agency	Andrew Meeker	Project Manager	meekerag@cityofgainesville.org	(352)393-8205
GRU Land Rights Coordinator	Kristie Williams	Land Rights Coordinator	williamska@gru.com	(352) 393-1231
GRU AGM - Customer/Admin Services	Bill Shepherd	AGM - Customer/Admin Services	shepherdwj@gru.com	(352)393-1412
CoG - GRU Water & Wastewater	Barbara Misener	Engr. Utility Engr. 4	misenerbj@gru.com	(352)393-1613
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PRCA	John Weber	Parks Manager	weberjf@cityofgainesville.org	(352)393-8186

ATTACHMENT C

ROUGH ORDER OF MAGNITUDE COST OPINIONS

Preferred 96' Concept

JONES EDMUNDS

PROJECT NAME: Sweetwater Branch Daylighting Feasibility
PROJECT No.: 07050-00-01
DATE: 25 September 2015
SUBMITTAL: CONCEPTUAL

ROUGH ORDER OF MAGNITUDE OPINION OF COST

PROJECT SEGMENT:	Preferred Option - Earthen Channel and Low Retaining Walls - 96' Width	CLIENT:	Gainesville Community Redevelopment Agency
ESTIMATE TYPE:	DESIGN SERVICES & CONSTRUCTION ROM	PREPARED BY:	A. Goodden
		CHECKED BY:	

FDOT ITEM NUMBER	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	COST
101-1	MOBILIZATION (10%)	LS	1	$38,651.90	$38,651.90
102-1	DEWATERING (5%)	LS	1	$19,325.95	$19,325.95
	EROSION, SEDIMENT, AND TURBIDITY CONTROL (10%)	LS	1	$38,651.90	$38,651.90
	PORTADAM - TEMPORARY DIVERSION OF CREEK	LF	365	$132.00	$48,180.00
110-1-1	CLEARING & GRUBBING	AC	0.47	$10,000.00	$4,692.38
120-1	EXCAVATION	CY	3,926	$4.97	$19,511.12
	HAULING - EXCAVATED CLEAN EARTH	CY	0	$5.00	$0.00
530-3-3	BANK AND SHORE - ENERGY DISSIPATION	TN	200	$82.66	$16,532.00
	RIPARIAN PLANTING	AC	0.3	$5,000.00	$1,675.85
	LARGE TREES	EA	5.0	$700.00	$3,500.00
570-1-2	EMBANKMENT - SODDING	SY	1,474	$2.19	$3,228.06
120-1	COIR EROSION CONTROL FABRIC	SY	1,622	$5.75	$9,327.78
400-2-2	CONCRETE WALL, OUTLET- CONCRETE CLASS II, ENDWALL	CY	13	$1,453.40	$19,378.67
	BLOCK RETAINING WALL	SF	4,380	$19.00	$83,220.00
110-20-2	REMOVAL OF EXISTING RETAINING WALL	SF	2,555	$18.94	$48,391.70
120-6	REMOVAL OF EXISTING 7 X 9 BOX CULVERT	LF	365	$353.10	$128,881.50
	DESIGN CONTINGENCY AMOUNT (20%) - DESIGN IS LESS THAN 5% COMPLETE	LS	1	$96,630.00	$96,630.00
	CONSTRUCTION CONTINGENCY AMOUNT (30%) -STREAM WORK IS HIGH RISK	LS	1	$144,945.00	$144,945.00
				CONSTRUCTION SUBTOTAL	$725,000.00
	SURVEYING AND TESTING (5%)	LS	1	$36,250.00	$36,250.00
	DESIGN (15%)	LS	1	$108,750.00	$108,750.00
	DESIGN OF RELOCATIN OF GRU ADMIN STORMWATER FACILITY	LS	1	$40,000.00	$40,000.00
	PERMITTING (5%)	LS	1	$36,250.00	$36,250.00
	CONSTRUCTION ADMINISTRATION & OBSERVATION (5%)	LS	1	$36,250.00	$36,250.00
				PROFESSIONAL SERVICES SUBTOTAL	$257,500.00
	SURVEYING AND TESTING (5%)	LS	1	$12,875.00	$12,875.00
	TOTAL COST ESTIMATE				$983,000.00

Note: Unit prices are based on FDOT Area 7 prices, and FDOT statewide prices.
A contingency of 20% was used to account for uncertainties in conceptual level design.
Recommend the owner carry a construction contingency of 30% to account for the high risk of damage from storm events.

"Do Nothing" Option

JONES EDMUNDS

PROJECT NAME: Sweetwater Branch Daylighting Feasibility
PROJECT No.: 07050-00-01
DATE: 25 September 2015
SUBMITTAL: CONCEPTUAL

ROUGH ORDER OF MAGNITUDE OPINION OF COST

PROJECT SEGMENT:	"Do Nothing" Option	CLIENT:	Gainesville Community Redevelopment Agency
ESTIMATE TYPE:	DESIGN SERVICES & CONSTRUCTION ROM	PREPARED BY:	A. Goodden
		CHECKED BY:	

FDOT ITEM NUMBER	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	COST
101-1	MOBILIZATION (10%)	LS	1	$60,570.41	$60,570.41
102-1	DEWATERING (5%)	LS	1	$30,285.21	$30,285.21
	EROSION, SEDIMENT, AND TURBIDITY CONTROL (10%)	LS	1	$60,570.41	$60,570.41
	PORTADAM - TEMPORARY DIVERSION OF CREEK	LF	365	$132.00	$48,180.00
110-1-1	CLEARING & GRUBBING	AC	0.34	$10,000.00	$3,351.70
120-1	EXCAVATION	CY	3,277	$4.97	$16,286.14
	HAULING - EXCAVATED CLEAN EARTH	CY	3,277	$5.00	$16,384.44
570-1-2	SODDING	SY	13,333	$2.19	$29,200.00
400-2-2	CONCRETE WALL, OUTLET- CONCRETE CLASS II, ENDWALL	CY	13	$1,453.40	$19,378.67
	CONSTRUCTION OF NEW 7' x 9' BOX CULVERT	LF	365	$810.00	$295,650.00
110-20-2	REMOVAL OF EXISTING RETAINING WALL	SF	2,555	$18.94	$48,391.70
120-6	REMOVAL OF EXISTING 7' X 9' BOX CULVERT	LF	365	$353.10	$128,881.50
	DESIGN CONTINGENCY AMOUNT (20%) - DESIGN IS LESS THAN 5% COMPLETE	LS	1	$151,426.00	$151,426.00
	CONSTRUCTION CONTINGENCY AMOUNT (30%) -STREAM WORK IS HIGH RISK	LS	1	$227,139.00	$227,139.00
				CONSTRUCTION SUBTOTAL	$1,136,000.00
	SURVEYING AND TESTING (5%)	LS	1	$56,800.00	$56,800.00
	DESIGN (15%)	LS	1	$170,400.00	$170,400.00
	STRUCTURAL EVALUATION OF BOX CULVERT & SE 4th AVE CULVERTS	LS	1	$25,000.00	$25,000.00
	H&H STUDY AND SUMBIT LETTER OF MAP REVISION TO FEMA	LS	1	$50,000.00	$50,000.00
	DESIGN OF RELOCATIN OF GRU ADMIN STORMWATER FACILITY	LS	1	$40,000.00	$40,000.00
	PERMITTING (5%)	LS	1	$56,800.00	$56,800.00
	CONSTRUCTION ADMINISTRATION & OBSERVATION (5%)	LS	1	$56,800.00	$56,800.00
				PROFESSIONAL SERVICES SUBTOTAL	$455,800.00
	SURVEYING AND TESTING (5%)	LS	1	$22,790.00	$22,790.00
	TOTAL COST ESTIMATE				$1,592,000.00

Note: Unit prices are based on FDOT Area 7 prices, and FDOT statewide prices.
A contingency of 20% was used to account for uncertainties in conceptual level design.
Recommend the owner carry a construction contingency of 30% to account for the high risk of damage from storm events.

Option 1 **Retaining Walls**

JONES EDMUNDS

PROJECT NAME: Sweetwater Branch Daylighting Feasibility
PROJECT No.: 07050-00-01
DATE: 25 September 2015
SUBMITTAL: CONCEPTUAL

ROUGH ORDER OF MAGNITUDE OPINION OF COST

PROJECT SEGMENT:	Option 1: Remove the box culvert and replace it with a retaining wall	CLIENT:	Gainesville Community Redevelopment Agency
ESTIMATE TYPE:	DESIGN SERVICES & CONSTRUCTION ROM	PREPARED BY:	A. Goodden
		CHECKED BY:	

FDOT ITEM NUMBER	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	COST
101-1	MOBILIZATION (10%)	LS	1	$46,820.98	$46,820.98
102-1	DEWATERING (5%)	LS	1	$23,410.49	$23,410.49
	EROSION, SEDIMENT, AND TURBIDITY CONTROL (10%)	LS	1	$46,820.98	$46,820.98
	PORTADAM - TEMPORARY DIVERSION OF CREEK	LF	365	$132.00	$48,180.00
110-1-1	CLEARING & GRUBBING	AC	0.34	$10,000.00	$3,351.70
120-1	EXCAVATION	CY	3,277	$4.97	$16,286.14
	HAULING - EXCAVATED CLEAN EARTH	CY	3,277	$5.00	$16,384.44
530-3-3	BANK AND SHORE - ENERGY DISSIPATION	TN	200	$82.66	$16,532.00
	RIPARIAN PLANTING	AC	0.3	$5,000.00	$1,675.85
	LARGE TREES	EA	5.0	$700.00	$3,500.00
570-1-2	EMBANKMENT - SODDING	SY	0	$2.19	$0.00
120-1	COIR EROSION CONTROL FABRIC	SY	1,622	$5.75	$9,327.78
400-2-2	CONCRETE WALL, OUTLET- CONCRETE CLASS II, ENDWALL	CY	13	$1,453.40	$19,378.67
	BLOCK RETAINING WALL	SF	5,840	$19.00	$110,960.00
110-20-2	REMOVAL OF EXISTING RETAINING WALL	SF	2,555	$18.94	$48,391.70
120-6	REMOVAL OF EXISTING 7 X 9 BOX CULVERT	LF	365	$353.10	$128,881.50
	ALUMINUM FENCE - CITY OF GAINESVILLE STANDARD	LF	810	$56.00	$45,360.00
	DESIGN CONTINGENCY AMOUNT (20%) - DESIGN IS LESS THAN 5% COMPLETE	LS	1	$117,052.00	$117,052.00
	CONSTRUCTION CONTINGENCY AMOUNT (30%) -STREAM WORK IS HIGH RISK	LS	1	$175,579.00	$175,579.00
	CONSTRUCTION SUBTOTAL				$878,000.00
	SURVEYING AND TESTING (5%)	LS	1	$43,900.00	$43,900.00
	DESIGN (15%)	LS	1	$131,700.00	$131,700.00
	DESIGN OF RELOCATIN OF GRU ADMIN STORMWATER FACILITY	LS	1	$40,000.00	$40,000.00
	PERMITTING (5%)	LS	1	$43,900.00	$43,900.00
	CONSTRUCTION ADMINISTRATION & OBSERVATION (5%)	LS	1	$43,900.00	$43,900.00
	PROFESSIONAL SERVICES SUBTOTAL				$303,400.00
	SURVEYING AND TESTING (5%)	LS	1	$15,170.00	$15,170.00
	TOTAL COST ESTIMATE				$1,181,000.00

Note: Unit prices are based on FDOT Area 7 prices, and FDOT statewide prices.
A contingency of 20% was used to account for uncertainties in conceptual level design.
Recommend the owner carry a construction contingency of 30% to account for the high risk of damage from storm events.

Option 2 **Retaining Walls and Earthen Channel**

JONES EDMUNDS

PROJECT NAME: Sweetwater Branch Daylighting Feasibility
PROJECT No.: 07050-00-01
DATE: 25 September 2015
SUBMITTAL: CONCEPTUAL

ROUGH ORDER OF MAGNITUDE OPINION OF COST

PROJECT SEGMENT:	Option 2: Remove the box culvert and replace it with an earthen channel and retaining wall	CLIENT:	Gainesville Community Redevelopment Agency
ESTIMATE TYPE:	DESIGN SERVICES & CONSTRUCTION ROM	PREPARED BY:	A. Goodden
		CHECKED BY:	

FDOT ITEM NUMBER	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	COST
101-1	MOBILIZATION (10%)	LS	1	$41,395.80	$41,395.80
102-1	DEWATERING (5%)	LS	1	$20,697.90	$20,697.90
	EROSION, SEDIMENT, AND TURBIDITY CONTROL (10%)	LS	1	$41,395.80	$41,395.80
	PORTADAM - TEMPORARY DIVERSION OF CREEK	LF	365	$132.00	$48,180.00
110-1-1	CLEARING & GRUBBING	AC	0.60	$10,000.00	$6,033.06
120-1	EXCAVATION	CY	4,575	$4.97	$22,736.09
	HAULING - EXCAVATED CLEAN EARTH	CY	4,575	$5.00	$22,873.33
530-3-3	BANK AND SHORE - ENERGY DISSIPATION	TN	200	$82.66	$16,532.00
	RIPARIAN PLANTING	AC	0.3	$5,000.00	$1,675.85
	LARGE TREES	EA	5.0	$700.00	$3,500.00
570-1-2	EMBANKMENT - SODDING	SY	1,474	$2.19	$3,228.06
120-1	COIR EROSION CONTROL FABRIC	SY	1,622	$5.75	$9,327.78
400-2-2	CONCRETE WALL, OUTLET- CONCRETE CLASS II, ENDWALL	CY	13	$1,453.40	$19,378.67
	BLOCK RETAINING WALL	SF	4,380	$19.00	$83,220.00
110-20-2	REMOVAL OF EXISTING RETAINING WALL	SF	2,555	$18.94	$48,391.70
120-6	REMOVAL OF EXISTING 7 X 9 BOX CULVERT	LF	365	$353.10	$128,881.50
	DESIGN CONTINGENCY AMOUNT (20%) - DESIGN IS LESS THAN 5% COMPLETE	LS	1	$103,490.00	$103,490.00
	CONSTRUCTION CONTINGENCY AMOUNT (30%) -STREAM WORK IS HIGH RISK	LS	1	$155,234.00	$155,234.00
	CONSTRUCTION SUBTOTAL				$776,000.00
	SURVEYING AND TESTING (5%)	LS	1	$38,800.00	$38,800.00
	DESIGN (15%)	LS	1	$116,400.00	$116,400.00
	DESIGN OF RELOCATIN OF GRU ADMIN STORMWATER FACILITY	LS	1	$40,000.00	$40,000.00
	PERMITTING (5%)	LS	1	$38,800.00	$38,800.00
	CONSTRUCTION ADMINISTRATION & OBSERVATION (5%)	LS	1	$38,800.00	$38,800.00
	PROFESSIONAL SERVICES SUBTOTAL				$272,800.00
	SURVEYING AND TESTING (5%)	LS	1	$13,640.00	$13,640.00
	TOTAL COST ESTIMATE				$1,049,000.00

Note: Unit prices are based on FDOT Area 7 prices, and FDOT statewide prices.
A contingency of 20% was used to account for uncertainties in conceptual level design.
Recommend the owner carry a construction contingency of 30% to account for the high risk of damage from storm events.

Option 3 **Earthen Channel**

JONES EDMUNDS

PROJECT NAME: Sweetwater Branch Daylighting Feasibility
PROJECT No.: 07050-00-01
DATE: 25 September 2015
SUBMITTAL: CONCEPTUAL

ROUGH ORDER OF MAGNITUDE OPINION OF COST

PROJECT SEGMENT:	Option 3: Remove the box culvert and replace it with an earthen channel	CLIENT:	Gainesville Community Redevelopment Agency
ESTIMATE TYPE:	DESIGN SERVICES & CONSTRUCTION ROM	PREPARED BY: CHECKED BY:	A. Goodden

FDOT ITEM NUMBER	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	COST
101-1	MOBILIZATION (10%)	LS	1	$34,021.11	$34,021.11
102-1	DEWATERING (5%)	LS	1	$17,010.55	$17,010.55
	EROSION, SEDIMENT, AND TURBIDITY CONTROL (10%)	LS	1	$34,021.11	$34,021.11
	PORTADAM - TEMPORARY DIVERSION OF CREEK	LF	365	$132.00	$48,180.00
110-1-1	CLEARING & GRUBBING	AC	0.7	$10,000.00	$7,373.74
120-1	EXCAVATION	CY	5,224	$4.97	$25,961.07
	HAULING - EXCAVATED CLEAN EARTH	CY	5,224	$5.00	$26,117.78
530-3-3	BANK AND SHORE - ENERGY DISSIPATION	TN	200	$82.66	$16,532.00
	RIPARIAN PLANTING	AC	0.3	$5,000.00	$1,675.85
	LARGE TREES	EA	5.0	$700.00	$3,500.00
570-1-2	EMBANKMENT - SODDING	SY	2,233	$2.19	$4,891.00
120-1	COIR EROSION CONTROL FABRIC	SY	1,622	$5.75	$9,327.78
400-2-2	CONCRETE WALL, OUTLET- CONCRETE CLASS II, ENDWALL	CY	13	$1,453.40	$19,378.67
	BLOCK RETAINING WALL				
110-20-2	REMOVAL OF EXISTING RETAINING WALL	SF	2,555	$18.94	$48,391.70
120-6	REMOVAL OF EXISTING 7 X 9 BOX CULVERT	LF	365	$353.10	$128,881.50
	DESIGN CONTINGENCY AMOUNT (20%) - DESIGN IS LESS THAN 5% COMPLETE	LS	1	$85,053.00	$85,053.00
	CONSTRUCTION CONTINGENCY AMOUNT (30%) -STREAM WORK IS HIGH RISK	LS	1	$127,579.00	$127,579.00
	CONSTRUCTION SUBTOTAL				$638,000.00
	SURVEYING AND TESTING (5%)	LS	1	$31,900.00	$31,900.00
	DESIGN (15%)	LS	1	$95,700.00	$95,700.00
	DESIGN OF RELOCATIN OF GRU ADMIN STORMWATER FACILITY	LS	1	$40,000.00	$40,000.00
	PERMITTING (5%)	LS	1	$31,900.00	$31,900.00
	CONSTRUCTION ADMINISTRATION & OBSERVATION (5%)	LS	1	$31,900.00	$31,900.00
	PROFESSIONAL SERVICES SUBTOTAL				$231,400.00
	SURVEYING AND TESTING (5%)	LS	1	$11,570.00	$11,570.00
	TOTAL COST ESTIMATE				$869,000.00

Note: Unit prices are based on FDOT Area 7 prices, and FDOT statewide prices.
A contingency of 20% was used to account for uncertainties in conceptual level design.
Recommend the owner carry a construction contingency of 30% to account for the high risk of damage from storm events.

ATTACHMENT D

CRA ESTIMATED ECONOMIC LOSSES FOR CREEK DAYLIGHTING

Estimated Economic Loss from Creek Encroachment into Developable Land

	Losses are based on economic losses beyond the 80-foot conceptual design from the 2013 Power District Redevelopment Plan						
	Maximum Estimated Economic Losses for each of the Creek Options		**Recommended Cross-Section**	**Do Nothing**	**Option 1**	**Option 2**	**Option 3**
	Corridor assumes maximum allowable buildout for Tech Company Office		**Earthen with Retaining Walls Compact Cross-Section (Dimension = 96 ft)**	**(Dimension = 80 ft)**	**Retaining Walls per Power District Redevelopment Plan (Dimension = 80 ft)**	**Earthen with Retaining Walls (Dimension = 112 ft)**	**Earthen Channel (Dimension = 128 ft)**
	Reduction of Building Square Footage (s.f.)		28,100	0	0	54,720	82,080
1	Construction costs $120/sq ft*	120	$3,372,000		$0	$6,566,400	$9,849,600
	Max Estimated Loss of One Time Economic Activity:		**$3,372,000**	**$0**	**$0**	**$6,566,400**	**$9,849,600**
2	Appraisal value of improvements	80% construction costs	$2,697,600	$0	$0	$5,253,120	$7,879,680
3	Tech company jobs	120 sq ft per employee	234	0	0	456	684
	Property Tax on Improvements (2014 Rate)	0.023741	$64,047	$0	$0	$124,720	$187,080
	Land Area Consumed Beyond Power District Redvelopment Plan (s.f.)		6,000	0	0	12,000	18,000
	Acres		0.1377	0	0	0.2755	0.4132
4	Land Value	$2.5/sq ft $108,900 per acre	$15,000	$0	$0	$30,000	$45,000
	Annual Property Tax on Land (2014 Rate)		$356.12	$0	$0	$712	$1,068
	Total Annual Property Tax		$64,403	$0	$0	$125,432	$188,148
5	Average Annual Tech Company Salaries*	$54,099	$12,668,183	$0	$0	$24,669,144	$37,003,716
6	Janitorial*	$0.115 sq ft/month	$38,778	$0	$0	$75,514	$113,270
7	Pest Control*	$0.00129 sq ft/month	$435	$0	$0	$847	$1,271
8	Building Maintenance*	$0.140833 sq ft/month	$47,489	$0	$0	$92,477	$138,715
9	GRU Bill*	$0.23734 sq ft/month	$80,031	$0	$0	$155,847	$233,770
10	Ethernet*	$0.18987 sq ft/month	$64,024	$0	$0	$124,676	$187,014
	Max Estimated Loss of Annual Economic Activity after Construction:**		**$12,963,342**	**$0**	**$0**	**$25,243,937**	**$37,865,905**
	*Estimated costs for informational purposes. Each building will have unique construction costs/salary/utility and maintenance costs specific to its activities and building construction type.						
	**Max Estimated Loss of Annual Economic Activity after Construction is limited to the site and does not include indirect job creation numbers which may include up to the additional following lost economic potential:						
	Indirect Jobs Created	4.3 per job	1006.916667	0	0	1,961	2,941
	Indirect Jobs Annual Salaries	35,000 average	$35,242,083	$0	$0	$68,628,000	$102,942,000
	Additional notes: 1) Based upon developer estimates for the local market 2) Based on Property Appraiser's advice on projected values 3) Based on developer projections of typical square footage per employee in the tech sector 4) Based on April 2013 Appraisal "NW Quadrant of SE 7th Avenue and SE 7th Street, Gainesville, FL" 5) Based on 150% of local Alachua County wages for 2014 6) Based on local example of newly constructed office building costs from 7) Based on local example of newly constructed office building 8) Based on projected numbers for building maintenance costs for new 9) Based on local example of newly constructed office building 10) Based on local example of newly constructed office building						