West French Avenue Shared-Use Path Feasibility Study

Orange City, Florida

Prepared For:

VOLUSIA TPO
2570 W. International Speedway Boulevard
Suite 100
Daytona Beach, FL 32114-8145

Prepared By:

SPRINKLE CONSULTING, INC.
18115 U.S. Hwy 41 N.
Ste. 600 Lutz, FL 33549
Ph: 813-949-7449

Florida Board of Professional Engineers
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EXECUTIVE SUMMARY

This report assesses the feasibility of a shared-use path along West French Avenue in Orange City. As directed by the City, we have reviewed the feasibility of a ten-foot wide shared-use path in the northern apparent right of way. This shared-use path will begin at the existing eight-foot sidewalk at Valentine Park and extend westward approximately 2,940 feet along the north side of W French Ave to connect to the Spring to Spring Trail (see Exhibit 1, Location Map).

A conceptual alignment is described in this report. This alignment places the northern edge of the proposed shared-use path at the apparent right of way line. Right of way acquisition will be required; a preliminary estimate of the required takings is included. A temporary construction easement will also be required in order to place forms and match grades at the apparent right of way. Coordination with the local electric utility will be required in order to move the power line poles to the south side of the roadway in order to allow adequate horizontal separation from the path.

A construction estimate of $2,236,659.77 was calculated (in 2012 dollars) for this recommended alignment. Long Range Estimates were also developed for Fiscal Years 2013 to 2016, at which time the total cost would rise to $2,931,804.70.

The project is found to be technically feasible. Financial feasibility is subject to funding constraints of the sponsoring agencies.

INTRODUCTION

Orange City is considering the construction of a ten-foot wide shared-use path along West French Avenue. This project would consist of extending the pathway along the north side of the roadway from the existing eight-foot sidewalk at Valentine Park to meet the existing Spring to Spring Trail. This shared-use path project will provide a pathway for visitors to Blue Springs Park.

Currently, there are no pedestrian or bicycle facilities west of Valentine Park. Visitors to the park who wish to arrive by walking or bicycling must use the roadway. An eight-foot sidewalk runs along the edge of the park on the north side of W French Avenue. This project, in conjunction with the W French Avenue sidewalk project will complete the pedestrian and bicycle connection to surrounding streets and continues to the signalized intersection of W French Avenue with N Volusia Avenue.

The project is feasible from a technical standpoint. No “fatal flaws” were discovered in the development of this study. The ultimate design of the shared-use path will have to carefully manage operational safety of the sidewalk as the alignment is situated with respect to conflicts with traffic on the adjacent roadways and efforts to mitigate impacts to the drainage system along the roadway. These challenges are certainly manageable by a conscientious designer.

PROJECT PURPOSE & SCOPE

The proposed project is to construct a shared-use path that connects to the existing sidewalk along Valentine Park. This study evaluates existing conditions and proposes recommendations for the construction of the desired shared-use path. The length of the proposed route is approximately 3,205 feet. A recommended conceptual alignment is presented. A cost estimate for the recommended alignment is summarized in this report. A detailed cost estimate is provided in the appendix to assist the TPO and the City in budgeting and planning.

DESIGN CRITERIA

The following Florida Department of Transportation (FDOT) documents are the basis of the design criteria used in this study: *Plans Preparation Manual, 2010 edition* (*PPM*) and

the *Manual of Uniform Minimum Standards for Design, Construction and Maintenance for Streets and Highways, 2007 edition* (Florida *Greenbook*).

The US Department of Transportation – Federal Highway Administration's: *Manual on Uniform Traffic Control Devices for Street and Highways* (*MUTCD*) 2009 edition is used for signalization design criteria.

Shared-use Path Width

The Florida *Greenbook* recommends a minimum width of 10 feet for shared-use paths, and allows the paths to be narrowed down to eight feet, under constrained conditions. The *PPM*'s minimum width for shared-use paths is 12 feet, and allows paths to be narrowed under severely constrained conditions. Volusia County has a practice of designing trails at 12 feet. Due to constrained apparent right of way within the West French Avenue corridor, this study considers the feasibility of a 10-foot wide path, which may be narrowed as necessary (to a minimum of eight feet) under constrained conditions.

Roadway Separation

Both the *PPM* and the Florida *Greenbook* require a minimum five-foot separation between the outside edge of the roadway's shoulder and the shared-use path. This study considers this criterion met if a four-foot separation from the back of curb, or a five-foot separation from the edge of the roadway shoulder when there is no curbing. The portion of West French Avenue subject to this study is a rural section roadway, without curbing. Thus a minimum separation of 5 feet from the edge of pavement will be sought for this project. Any portion with less separation will require some sort of vertical barrier be installed.

Vertical and Horizontal Clearance

Both the *PPM* and the Florida *Greenbook* require a minimum eight-foot vertical clearance, and a two-foot shoulder on both sides of the path with a maximum slope of 1:6. The *PPM* requires a four-foot clearance from horizontal obstruction on both sides of the path, while the Florida *Greenbook* requires a two-foot clearance. For both manuals, the horizontal clearance is measured from the edge of the path. This study considers a minimum eight-foot vertical and four-foot horizontal clearance as a minimum. Under constrained conditions, this is reduced to two-foot horizontal clearance. This minimum two-foot horizontal clearance is used to determine the minimum right of way required for the shared-use path.

Cross-slopes and Grades

Both the *PPM* and the Florida *Greenbook* require shared-use paths to meet the Americans with Disability Act Accessibility Guidelines, if the path is to be opened to pedestrian traffic. This study allows for a maximum cross-slope of 2%, and a maximum longitudinal slope of 5%, except for curb ramps, which have a maximum slope of 8.33% and up to a 6-inch rise.

Surrounding Land Use and Major Destinations

The project provides a link between Orange City and several recreational destinations (Valentine Park, Volusia County Spring to Spring Trial, and Blue Springs State Park), and so will accommodate bicyclists from outside the immediate vicinity. It also runs adjacent to residential neighborhoods, and thus will provide access to the parks and the Spring to Spring Trail for residents.

PHYSICAL INVENTORY & RIGHT OF WAY ASSESSMENT

Volusia County provided GIS files with parcel boundaries for the study area. Aerial imagery from Florida DOT was also consulted. Actual survey data was not available. Two site visits were conducted to evaluate onsite conditions, opportunities and constraints. This information was evaluated and compiled to form the basis of the feasibility study and conceptual plan.

The consultant team has developed a recommended conceptual alignment. An alternate alignment along the south side of the roadway was considered, but pursuant to direction by the City and TPO to place the shared-use path along the north side of the road, no alignment was developed for the southern option.

The following is a narrative inventory of the proposed shared-use path corridor, listing the recommended conceptual alignment.

RECOMMENDED CONCEPTUAL ALIGNMENT

Segment 1.1: Volusia County Multi-Use Trails Spring-to-Spring Trail Segment 3 to Railroad; +/- 375 feet.

The shared-use path is proposed to begin at the existing trailhead on the southern end of Volusia County Multi-Use Trails Spring-to-Spring Trail Segment 3, located on the north side of West French Avenue, directly across from the entrance to Blue Springs State Park.

Figure 1 - Shared-use path to begin at Spring-to-Spring trailhead

From this entrance, the proposed 10-foot wide shared-use path will head east within the northern apparent right of way of West French Avenue. Field investigations indicate that approximately 5 feet of cleared apparent right of way is available on the north side of West French Avenue in this location. A fence line and power line are located at the edge of the cleared area. In order to place a 10-foot shared-use path in the northern right of way of West French Avenue while maintaining adequate lateral clearance, the power line must be relocated to the south side of the road. It is anticipated that this

Figure 2 - Clearing and fence relocation will be required

relocation will be performed by the utility. No costs related to this relocation are included in the cost estimate. The fence in this segment must also be relocated.

R/W Maintenance Map MB 1 Pg 3, as per information provided by Volusia County, indicates that the apparent right of way width in this segment tapers from 19 feet at the existing trailhead to 16 feet at the railroad. One foot of additional right of way may need to be acquired in this area (see Exhibits 2 and 3).

Segment 1.2: Railroad Crossing; +/- 180 feet.

This segment consists of the railroad crossing on West French Avenue. The existing bridge is narrow, with the bridge being only slightly wider than the road width. No shoulders are available for the shared-use path. Due to the age and condition of the bridge, expansion to accommodate a path was determined to be infeasible.

Figure 3 - Restricted shoulder on existing bridge

A new, separate, bridge will be required in order to provide a crossing for the shared-use path. Volusia County has developed separate plans for a pedestrian overpass for the Spring to Spring Trail (FPID No. 417016-1-58-01, FAN No. 8887-853-A) which include schematic plans for a weathered steel truss with 5" (min.) concrete deck with PVC black coated cage fence. A similar bridge would be appropriate in this location.

Right of way acquisition will be required for the bridge and associated foundations. The extent of right of way acquisition will need to be determined by the structural engineer during the preliminary design phase. Through coordination with right of way mapping and survey, the amount of required right of way will then be able to be quantified.

Segment 1.3: Railroad to Valentine Park; +/- 2,650 feet.

This segment extends from the east side of the railroad bridge to Valentine Park. Immediately east of the railroad bridge, the shared-use path alignment crosses Werley Trail, an unpaved roadway serving residential properties along the railroad. Werley Trail has two existing turnouts from West French Avenue. The westernmost turnout is in line with the roadway, while an easterly turnout arcs away from the railroad. A thickened concrete path is recommended across both roadway entrances. Asphalt turnouts should be constructed between the edge of pavement and the trail. It is expected that the path will be able to be constructed roughly at grade through this area, with minor grade adjustments in some areas.

Figure 4 - Werley Trail intersections (westernmost intersection in foreground, easternmost in background)

Approximately 120 feet east of the eastern entrance to Werley Trail, grades within the apparent right of way begin to drop steeply away from West French Avenue. At this point, a boardwalk is recommended in order to avoid excessive grading and right of way acquisition. The boardwalk should maintain the same alignment, 5' from edge of pavement, as the

Figure 5 - Grade falls away from road

shared-use path.

The alternative to a boardwalk would be to fill this area in order to construct a paved shared use path. If this approach were taken, a 2' flat area on either side of the trail would be recommended. After that point, a 3:1 side slope is recommended to tie down slopes from the outer edge of the shared use path to existing grade. Although detailed topographic information is not available for this area, it is expected that a paved shared use path would require approximately a 20 foot right of way acquisition in this area. Grade changes associated with this option would also require extensive tree clearing. While a paved path generally requires less maintenance than a boardwalk, the boardwalk option is presented herein as the most economical option.

The proposed boardwalk will extend across several existing driveways. At these crossings, the boardwalk should match grade. Minor grading may be required in these areas to maintain accessible grades. A thickened concrete path is recommended across the driveway areas to prevent damage to the path from vehicular loadings. The westernmost driveway is unpaved, and will require an asphalt turnout.

Figure 6 - Retaining wall required at Grand Avenue

Approximately 245 feet west of Grand Avenue, the grades in the apparent right of way north of West French Avenue raise to become higher than the edge of pavement. In order to minimize right of way acquisition while maintaining accessible grades, a retaining wall will be required along the apparent right of way line. This retaining wall will extend to approximately 370 feet east of Grand Avenue. A thickened concrete path and asphalt turnout will be required at Grand Avenue, which is currently an unpaved roadway.

After the termination of the retaining wall, grades within the apparent right of way will allow for a 10-foot wide shared use path to be constructed at grade for approximately 105 feet, at which point a second boardwalk will be required. This boardwalk will extend approximately 400 feet, at which point existing grades will allow for an at-grade path. This at-grade concrete shared use path will extend to Bishop Avenue, which is the westernmost entrance to Valentine Park. The shared-use path alignment will match that of the existing 8-foot sidewalk running across the frontage of Valentine Park. The existing driveway in this location is rough, with apparent ponding where the driveway meets the roadway. It is recommended that the existing drainage issues be addressed and the turnout for this driveway be reconstructed as part of the shared-use path project.

Figure 7 - Entrance to Valentine Park to be reconstructed to mitigate grades and drainage issues

Per information provided by Volusia County, right of way throughout this section varies in width from an 8-foot prescriptive easement at the narrowest point to a 33-foot right of way exception in some areas. The anticipated required acquisition area as well as the recommended alignment is shown in Exhibit 1.

ADDITIONAL CONCERNS

This section describes additional items that could be addressed during the construction of the sidewalk. Inaction on these items would not prevent the feasibility of the path; however, they are worth special attention.

Existing Signage

All existing signs within the sidewalk alignment would need to be relocated at a minimum two feet from the edge of the path, and provide an eight-foot vertical clearance.

Tree Care

An arborist's opinion should be obtained for any substantial tree work, including root pruning. Tree canopies that extend over the sidewalk would need to be trimmed to provide an eight-foot vertical clearance.

Public Involvement

Construction of this facility may be more easily accepted by adjacent property owners if they are included early in the design process.

Underground Utilities

Survey and utility mapping were not available at the time of the preparation of this report. Field investigations indicate that communication lines may be buried in the area of the proposed shared-use path. A portion of these utilities will most likely be relocated to the south side of the roadway along with the power poles due to their connections with the overhead components of those utilities.

Permitting

Per Florida Administrative Code Rule 40C-4.051, the construction of the proposed shared-use path is exempt from permitting requirements through the St. John's River Water Management District. A Volusia County use permit will be required to install a shared use path and/or boardwalk within County right of way.

FINANCIAL FEASIBILITY

To estimate the preliminary cost for the shared-use path several items were evaluated. The methods for estimating: right of way, permitting, utility relocation and construction costs are described on their respective sections below. For the purpose of this study, a Level F right of way cost estimate confidence rating was used. FDOT district 5 guidelines define a Level F confidence level as follows:

F – No confidence – None of the three elements consisting of plans/maps, market data, or adequate time necessary for the development of an accurate cost estimate are provided or available for consideration by the estimator.

Right of Way Easements / Acquisitions

Based on the right of way information provided by Volusia County, additional right of way will be required in various areas. The required acquisition areas are shown in Exhibits 2-10, and tabulated in Exhibit 11. Approximately 11,360 square feet of additional right of way will be required across four properties.

Due to the lack of market data or detailed right of way maps, preparation of a detailed acquisition cost was not feasible. As an initial planning-level estimate, land values were obtained from the Volusia County Property Appraiser. The 95th percentile land value for parcels within the study area was used as the base land value for the acquisition area. A 2.0 multiplier was used to account for the various consultant and litigation costs associated with the eminent domain process. Using this methodology, a preliminary right of way acquisition cost of $4,449.37 was generated.

Construction

Construction unit prices were calculated for each of the described segments for Fiscal Years 2012 through 2016. Detailed Long Range Estimate calculations for each segment are included in the appendix. The item numbers and unit of measure are based on the Florida Department of Transportation (FDOT) Basis of Estimate Manual.

The FDOT Basis of Estimates Manual describes that detectable warnings (truncated domes) at the beginning of ramps are incidental to the construction for concrete sidewalks. Short ramps/sidewalks are indicated for points where the asphalt trail crosses a vehicular way. The cost to remove trees identified in this study is considered within the Clearing and Grubbing pay item.

As a summary of the construction cost estimating, the total estimated cost of the recommended conceptual alignment (Segments 1.1 through 1.3) is $2,236,659.77; this figure includes estimated construction costs, survey and design fees (calculated as 20% of construction costs) and CEI fees (calculated as 10% of the construction costs and design fees).

Future year costs for all items were calculated, with an annual inflationary factor of 7%. The resulting rise in the total cost of the recommended conceptual alignment is shown in Table 1.

Table 1: Estimated total construction costs for Recommended Conceptual Alignment

Fiscal Year	2012	2013	2014	2015	2016
Total Cost	$2,236,659.77	$2,393,225.95	$2,560,751.77	$2,740,004.39	$2,931.,804.70

APPENDIX: DETAILED LONG RANGE ESTIMATES

LONG RANGE ESTIMATE - FRENCH AVENUE SHARED USE PATH (ORANGE CITY)

Approx. 3101'

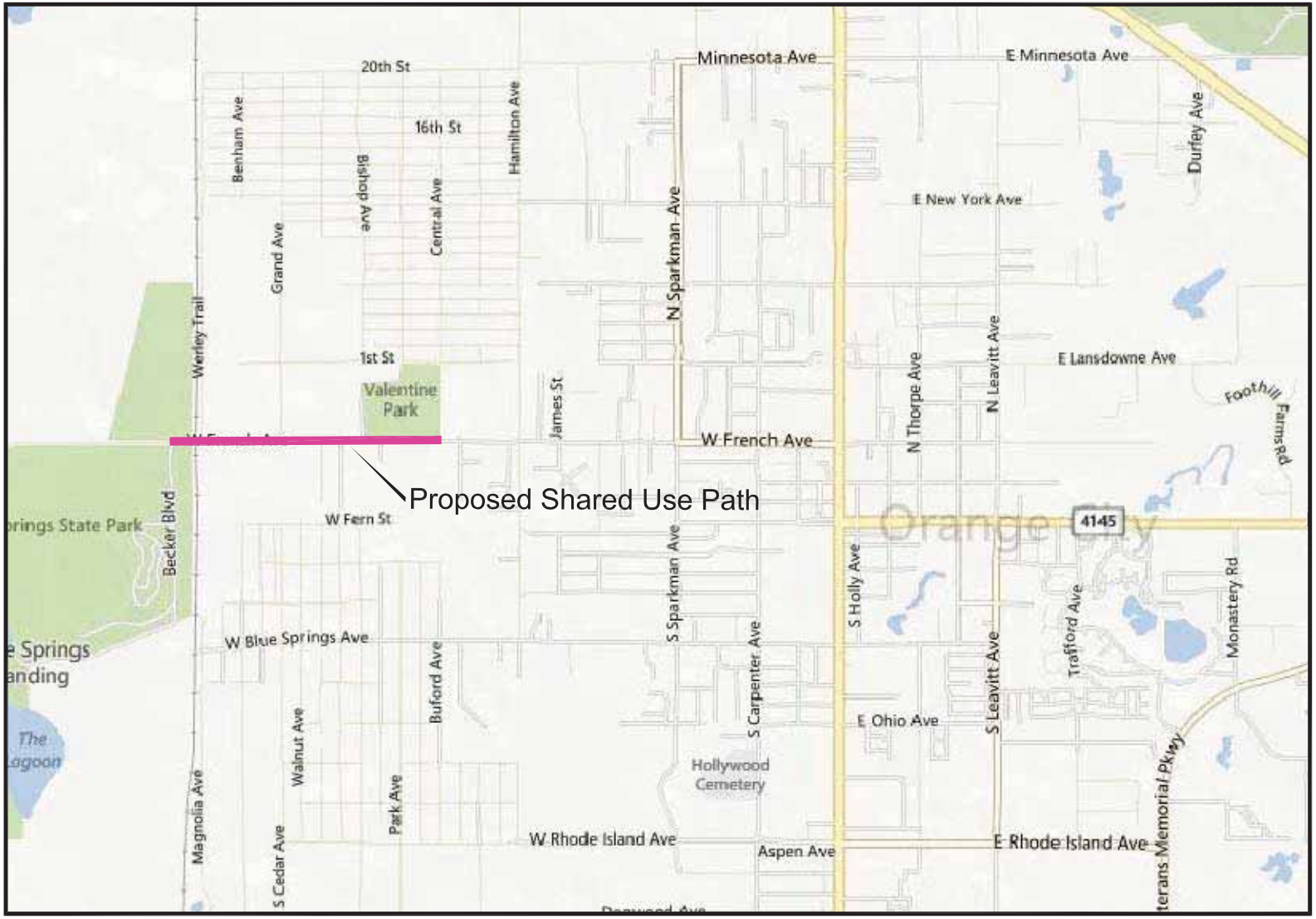
ITEM NO.	ITEM DESCRIPTION	QUANTITY	UNIT	Fiscal Year 2012		Fiscal Year 2013		Fiscal Year 2014		Fiscal Year 2015		Fiscal Year 2016	
				UNIT PRICE	TOTAL COST	UNIT PRICE	TOTAL COST	UNIT PRICE	TOTAL COST	UNIT PRICE	TOTAL COST	UNIT PRICE	TOTAL COST
101- 1	MOBILIZATION	1	LS	$197,363.82	$197,363.82	$211,179.29	$211,179.29	$225,961.84	$225,961.84	$241,779.17	$241,779.17	$258,703.71	$258,703.71
102- 1	MAINTENANCE OF TRAFFIC	1	LS	$197,363.82	$197,363.82	$211,179.29	$211,179.29	$225,961.84	$225,961.84	$241,779.17	$241,779.17	$258,703.71	$258,703.71
104- 10-3	EROSION CONTROL	3,101	LF	$1.00	$3,101.00	$1.07	$3,318.07	$1.14	$3,550.33	$1.23	$3,798.86	$1.31	$4,064.78
	SIGNING & PAVEMENT MARKING	1	LS	$6,920.05	$6,920.05	$7,404.45	$7,404.45	$7,922.77	$7,922.77	$8,477.36	$8,477.36	$9,070.77	$9,070.77
110-1-1	CLEARING & GRUBBING	0.71	AC	$7,587.69	$5,387.26	$8,118.83	$5,764.37	$8,687.15	$6,167.87	$9,295.25	$6,599.63	$9,945.91	$7,061.60
120-1	REGULAR EXCAVATION	1,000	CY	$4.16	$4,160.00	$4.45	$4,451.20	$4.76	$4,762.78	$5.10	$5,096.18	$5.45	$5,452.91
120-6	EMBANKMENT	1,000	CY	$5.83	$5,830.00	$6.24	$6,238.10	$6.67	$6,674.77	$7.14	$7,142.00	$7.64	$7,641.94
285-704	OPTIONAL BASE GROUP 4	2,074	SY	$11.09	$23,000.66	$11.87	$24,610.71	$12.70	$26,333.46	$13.59	$28,176.80	$14.54	$30,149.17
	ASPHALT TRAIL	1,741	LF	$47.94	$83,461.85	$51.29	$89,304.17	$54.89	$95,555.47	$58.73	$102,244.35	$62.84	$109,401.45
522-1	CONCRETE SIDEWALK, 6" THICK (DRIVEWAYS)	92	SY	$39.60	$3,630.00	$42.37	$3,884.10	$45.34	$4,155.99	$48.51	$4,446.91	$51.91	$4,758.19
548-12	RETAINING WALL	605	LF	$23.44	$14,181.20	$25.08	$15,173.88	$26.84	$16,236.06	$28.72	$17,372.58	$30.73	$18,588.66
570-1-2	SODDING	1,037	SY	$5.00	$5,185.00	$5.35	$5,547.95	$5.72	$5,936.31	$6.13	$6,351.85	$6.55	$6,796.48
	CONCRETE BRIDGE	2,160	SF	$175.00	$378,000.00	$187.25	$404,460.00	$200.36	$432,772.20	$214.38	$463,066.25	$229.39	$495,480.89
570-1-2	BRIDGE APPROACHES	2,520	SF	$140.00	$352,800.00	$149.80	$377,496.00	$160.29	$403,920.72	$171.51	$432,195.17	$183.51	$462,448.83
	BOARDWALK	10,920	SF	$40.00	$436,800.00	$42.80	$467,376.00	$45.80	$500,092.32	$49.00	$535,098.78	$52.43	$572,555.70
	TURNOUT CONSTRUCTION	92	SY	$13.10	$1,200.83	$14.02	$1,284.89	$15.00	$1,374.83	$16.05	$1,471.07	$17.17	$1,574.05
	MAILBOX / SIGN RELOCATION	18	EA	$117.89	$2,122.02	$126.14	$2,270.56	$134.97	$2,429.50	$144.42	$2,599.57	$154.53	$2,781.54
	SUB- TOTAL				**$1,720,507.51**		**$1,840,943.04**		**$1,969,809.05**		**$2,107,695.69**		**$2,255,234.38**
	SURVEY AND DESIGN FEES (20%)				**$344,101.50**		**$368,188.61**		**$393,961.81**		**$421,539.14**		**$451,046.88**
	CEI FEES (10%)				**$172,050.75**		**$184,094.30**		**$196,980.91**		**$210,769.57**		**$225,523.44**
	TOTAL ESTIMATED CONSTRUCTION COST (2012) :				**$2,236,659.77**		**$2,393,225.95**		**$2,560,751.77**		**$2,740,004.39**		**$2,931,804.70**

ESTIMATE BASIS AND ASSUMPTIONS:

- Estimate does not include utility relocation costs.
- The mobilization costs are based on 15% of the construction cost
- Estimate includes maintenance of traffic costs (15% of construction costs).
- Regular excavation & embankment to 1 ft depth
- Survey and design fees include right of way mapping
-No specialized landscaping (beyond sodding)
-Utility relocations by others
-7% Yearly Escalation

EXHIBIT 1: LOCATION MAP

Location Map



Sprinkle CONSULTING
Planners + Engineers + Landscape Architects

18115 U.S. Hwy. 41 N, Suite 600
Lutz, Florida 33549
Ph. 813.949.7449 Fax. 813.948.1712
www.sprinkleconsulting.com

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W French Ave Shared Use Path - Exhibit 1

Project #: 8298-12

Feb 07, 2013 – 4:32pm Location Map evans

EXHIBITS 2-10: PROPOSED ALIGNMENT

Sprinkle CONSULTING
Planners + Engineers

18115 U.S. Hwy. 41 N, Suite 600
Lutz, Florida 33549
Ph. 813.949.7449 Fax. 813.909.9840
www.sprinkleconsulting.com

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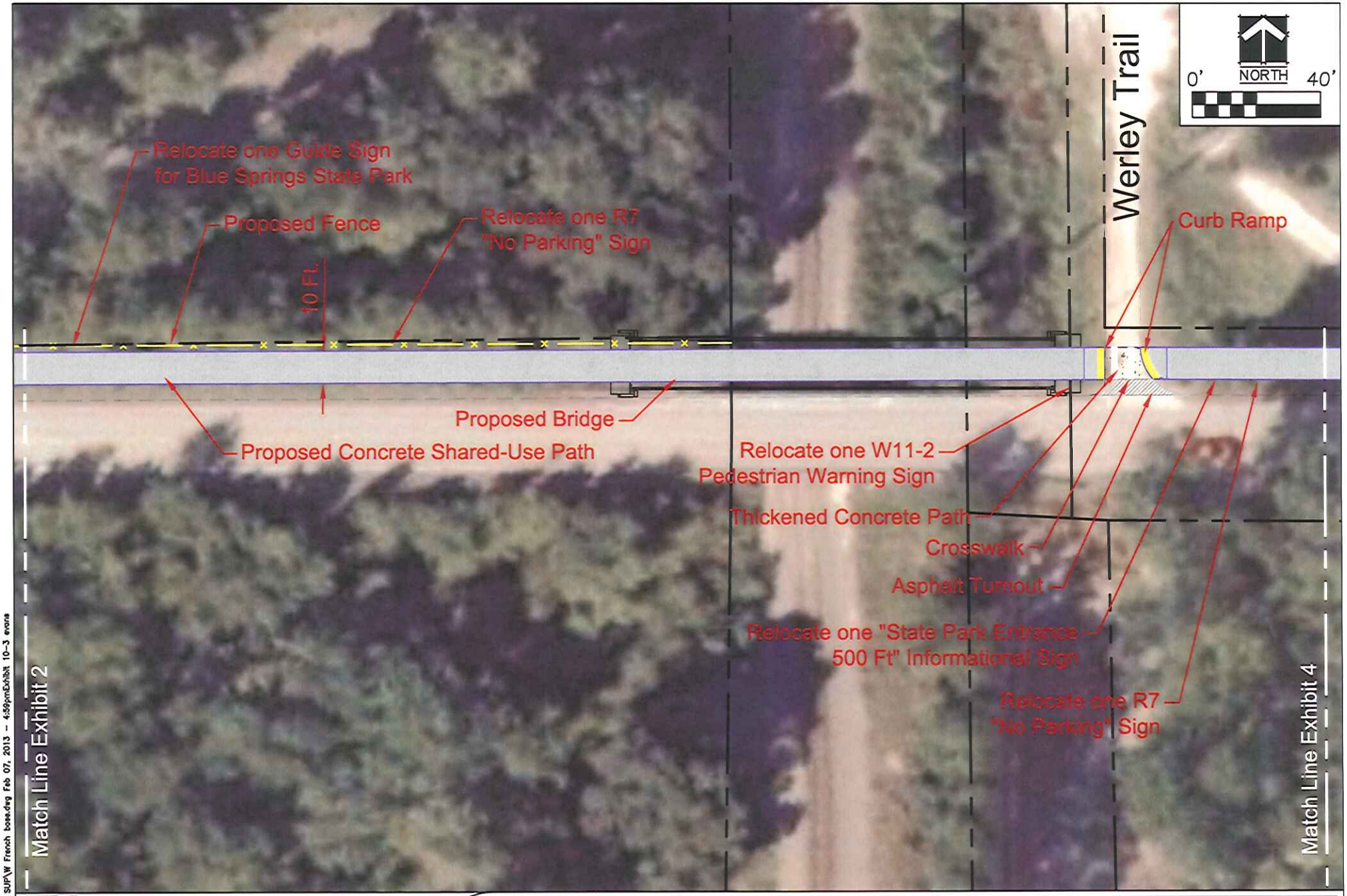
W French Ave Shared Use Path - Exhibit 2

Project #: 8299-12



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Planners + Engineers
18115 U.S. Hwy. 41 N, Suite 600
Lutz, Florida 33549
Ph. 813.949.7449 Fax. 813.909.9840
www.sprinkleconsulting.com

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W French Ave Shared Use Path - Exhibit 3

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Sprinkle CONSULTING
Planners + Engineers

18115 U.S. Hwy. 41 N, Suite 600
Lutz, Florida 33549
Ph. 813.949.7449 Fax. 813.909.9840
www.sprinkleconsulting.com

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W French Ave Shared Use Path - Exhibit 4

Project #: 8299-12

W:\8298-12 W French Ave SUP\W French base.dwg Feb 07, 2013 - 4:59pm Exhibit 10-4 evans

Sprinkle CONSULTING
Planners + Engineers

18115 U.S. Hwy. 41 N, Suite 600
Lutz, Florida 33549
Ph. 813.949.7449 Fax. 813.909.9840
www.sprinkleconsulting.com

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W French Ave Shared Use Path - Exhibit 5

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Sprinkle CONSULTING
Planners + Engineers

18115 U.S. Hwy. 41 N, Suite 600
Lutz, Florida 33549
Ph. 813.949.7449 Fax. 813.909.9840
www.sprinkleconsulting.com

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W French Ave Shared Use Path - Exhibit 6

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Sprinkle CONSULTING
Planners + Engineers

18115 U.S. Hwy. 41 N, Suite 600
Lutz, Florida 33549
Ph. 813.949.7449 Fax. 813.909.9840
www.sprinkleconsulting.com

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W French Ave Shared Use Path - Exhibit 7

Project #: 8299-12

W:\8\8299-12 W French Ave SUP\W French base.dwg Feb 07, 2013 - 5:01pm Exhibit 10-7 evans

Sprinkle CONSULTING
Planners + Engineers

18115 U.S. Hwy. 41 N, Suite 600
Lutz, Florida 33549
Ph. 813.949.7449 Fax. 813.909.9840
www.sprinkleconsulting.com

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W French Ave Shared Use Path - Exhibit 8

Project #: 8299-12

W:\8299-12 W French Ave SUP\W French boa.dwg Feb 07, 2013 - 5:01pm Exhibit 10-8 evans

Sprinkle CONSULTING
Planners + Engineers

18115 U.S. Hwy. 41 N, Suite 600
Lutz, Florida 33549
Ph. 813.949.7449 Fax. 813.909.9840
www.sprinkleconsulting.com

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W French Ave Shared Use Path - Exhibit 9

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Sprinkle CONSULTING
Planners + Engineers
18115 U.S. Hwy. 41 N, Suite 600
Lutz, Florida 33549
Ph. 813.949.7449 Fax. 813.909.9840
www.sprinkleconsulting.com

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W French Ave Shared Use Path - Exhibit 10

Project #: 8299-12

EXHIBIT 11: RIGHT OF WAY COST ESTIMATE

EXHIBIT 11 - RIGHT OF WAY COST ESTIMATE

Parcel Number (W to E)	Total Parcel Value ($)	Parcel Sq Footage	Lenth of Parcel (Ft)	Value per Sq foot ($)	Depth of Taking (Ft)	Total Area Taking (Ft)	Total Value of Taken Area ($)
04-18-30-00-00-0480	**42,952.00**	**198198**	**323**	**$0.22**	0	0	$0.00
04-18-30-00-00-0560	**29,500.00**	**108900**	**322**	**$0.27**	7	2254	$610.61
04-18-30-00-00-0470	**42,500.00**	**217800**	**322**	**$0.20**	7	2254	$439.76
04-18-30-00-00-0491	**59,000.00**	**217800**	**322**	**$0.27**	5.38	1732.36	$469.30
04-18-30-00-00-0430	**60,000.00**	**435600**	**640**	**$0.14**	8	5120	$705.02
04-18-30-00-00-0070	**42,500.00**	**217800**	**320**	**$0.20**	0	0	$0.00
04-18-30-00-00-0391	**34,000.00**	**217800**	**320**	**$0.16**	0	0	$0.00

95th Percentile Value	Total Area Taking	Subtotal
$0.27	11,360	$2,224.68

Total Cost (2.0 multiplier)
$4,449.37