COMPOSITE STUDY

For

Old Mission Road and Park Avenue
Edgewater, Volusia County

Prepared for:

VOLUSIA TPO
TRANSPORTATION PLANNING ORGANIZATION
VISION - PLAN - IMPLEMENT

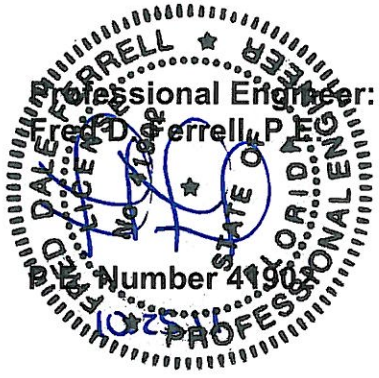
Professional Consulting Services Related To
Traffic Operations Studies and Transportation Engineering Services
TEDS Contract Number: 10210
Task Work Order: 2011-1-2

Traffic Engineering Data Solutions, Inc.

Traffic Engineering Data Solutions, Inc.
156 McGregor, Unit A
DeLand, Florida 32720

October 2011

Prepared by:
Mark Mathes, E.I.



Professional Engineer:
Fred D. Ferrell, P.E.
P.E. Number 41903

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EXECUTIVE SUMMARY

Traffic Engineering Data Solutions, Inc. (TEDS) was retained on behalf of the Volusia Transportation Planning Organization (VTPO) to conduct a qualitative assessment reviewing operations and safety of the intersection of Old Mission Road and Park Avenue. Located in the City of Edgewater, Volusia County, the study intersection is located between State Road 442 and State Road 44.

The following recommendations are provided to mitigate issues that are identified along with improvements that will enhance the operation and safety of the intersection:

- **Reconstruct the intersection to provide a southbound left turn lane;**
- **Reconstruct the asphalt area located at the abandoned rail line to remove the "bump" while still providing access to pedestrians and bicycles;**
- **Overall geometry of the intersection should be modified to provide safe and efficient access for heavy vehicles;**
- **Install guard rail along the east side of the roadway to prevent errant vehicles from encroaching into the ditch area;**
- **Reconstruct the east approach of the study intersection to reduce the skew and provide an exclusive right turn lane; and**
- **Install luminaries within construction boundaries to provide roadway lighting at the study intersection.**

An improvement diagram shown in Figure 12 graphically illustrates the improvements described above. Additionally, a cost estimate was developed for the proposed improvements utilizing a combination of the Florida Department of Transportation (FDOT) Annual Statewide Averages, FDOT Six Month Moving Average, and cost estimates for similar project available to TEDS to determine unit cost. Below is a summary of costs:

- **Construction Cost equals $470,000.00 (including contingency)**
- **Design Fee equals $75,000.00**
- **Construction Engineering Inspection equals $35,000.00**
- **Total Cost Estimate including all phases equals $580,000.00**

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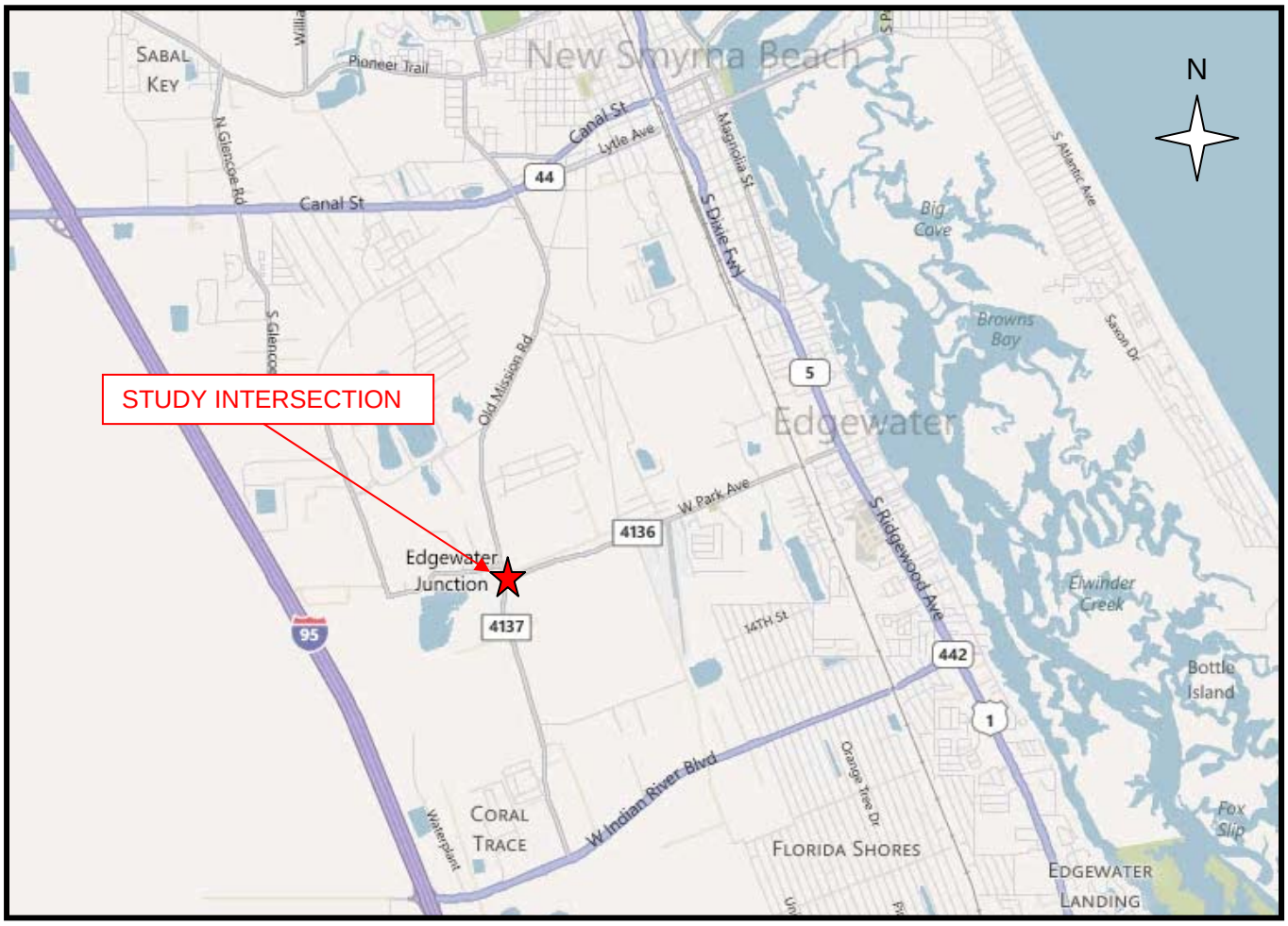
INTRODUCTION

Traffic Engineering Data Solutions, Inc. (TEDS) was retained on behalf of the Volusia Transportation Planning Organization (VTPO) to conduct a qualitative assessment reviewing operations and safety of the intersection of Old Mission Road and Park Avenue. Located in the City of Edgewater, Volusia County, the study intersection is located between State Road 442 and State Road 44 as shown in Figure 1.

Figure 1
General Location Map
Old Mission Road and Park Avenue



(Source: Bing Maps)

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EXISTING CONDITIONS

Old Mission Road is a two-lane rural major collector traveling in the north-south direction connecting State Road 44 to State Road 442. Park Avenue is a two-lane rural major collector that serves residential developments, businesses, and a local airport. Table 1 provides summarized information about existing roadway conditions and land uses of the surrounding area to the intersection. An existing condition diagram shown in Figure 2 includes pavement markings, traffic signs, land use, and roadway geometry. Additionally, photographs were taken at each approach to provide a detailed view of the intersection as shown in Figures 3-8.

Table 1
Existing Conditions
Old Mission Road and Park Avenue

Feature	Description
Main Street	Old Mission Road
Side Street	Park Avenue
Area Location	City of Edgewater, Volusia County, Florida
Adjacent Land Uses	Northeast: Residential house Northwest: Residential house Southwest: Grassy area Southeast: Wooded area
Traffic Control	Park Avenue is stop controlled and Old Mission Road has the right of way
Adjacent Signalized Intersections	State Road 442 is 1.8 miles south of study intersection. Josephine Street is 1.7 miles north of study intersection. US 1 is 2.3 miles east of study intersection.
Old Mission Road	Cross Section: 2-lane rural major collector Posted Speed Limit: 45 mph Northbound Approach Lanes: 1 shared through / right turn lane Southbound Approach Lanes: 1 shared left turn / through lane Pedestrian Crossings: None Alignment: Straight Sidewalks: None Utilities: Located on west side of the roadway south of the intersection Street Lighting: 1 luminaire located at southwest quadrant of intersection
Park Avenue	Cross Section: 2-lane rural major collector Posted Speed Limit: 45 mph Westbound Approach Lanes: 1 shared left turn / through / right turn lane Pedestrian Crossings: None Sidewalks: None Utilities: Located on south side of the roadway Street Lighting: None

0 20 100
Feet

GRASSY AREA

RESIDENTIAL HOUSE

APPARENT R.W.

APPARENT R.W.

S. TAYLOR ROAD

OLD MISSION ROAD

OLD MISSION ROAD

APPARENT R.W.

SPEED LIMIT 45

ABANDONED R.R.

BUMP

NO SHOULDER

BUMP

MASSEY ROAD

STOP

NO PARKING ON GRASS

ABANDONED R.R.

RESIDENTIAL HOUSE

WOODED AREA

SPEED LIMIT 45

PARK AVENUE

APPARENT R.W.

APPARENT R.W.

OLD MISSION RD & PARK AVENUE
VOLUSIA COUNTY - FLORIDA

Utility Pole
Traffic Sign
Luminaire

Symbols:

Traffic Controller Cabinet
Ditch Bottom Inlet
Signal Pole
Pedestrian Signal Pole
Mitered End Section

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STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

FIGURE 3
EXISTING CONDITION DIAGRAM

Figure 3
Photograph of Northbound Approach
(Looking Toward Intersection)
Old Mission Road at Park Avenue

Figure 4
Photograph of Northbound Approach
(Looking Away from Intersection)
Old Mission Road at Park Avenue

Figure 5
Photograph of Southbound Approach
(Looking Toward Intersection)
Old Mission Road at Park Avenue

Figure 6
Photograph of Southbound Approach
(Looking Away from Intersection)
Old Mission Road at Park Avenue

Figure 7
Photograph of Westbound Approach
(Looking Toward Intersection)
Park Avenue at Old Mission Road

Figure 8
Photograph of Westbound Approach
(Looking Away from Intersection)
Park Avenue at Old Mission Road

Traffic Volumes

Manual turning movement counts were collected at the intersection based on twenty-four hour automatically collected traffic volume data. The twenty-four hour count identified the eight (8) highest hours of volume entering the intersection which determined the periods of time to conduct manually collected turning movement counts.

According to the twenty-four hour count, the intersection has a total daily traffic volume of 6,294 vehicles consisting of 1,793 northbound; 2,707 southbound; and 1,794 westbound that entered the intersection.

Eight (8) hours of manual turning movement counts were collected from 7:00 a.m. to 9:00 a.m., 11:00 a.m. to 1:00 p.m., and 2:00 p.m. to 6:00 p.m. The data collected generated the following results:

- The intersection peak hour occurred from 4:00 p.m. to 5:00 p.m. 631 vehicles were counted entering the intersection during this peak hour with the following characteristics:
    - 480 vehicles entered the intersection on Old Mission Road
        - 142 vehicles were northbound movements with the following distribution:
            - 123 through and 19 right turn movements
        - 338 vehicles were southbound movements with the following distribution:
            - 154 left turn and 184 through
    - 152 vehicles were westbound movements from Park Avenue with the following distribution:
        - 27 left turn and 124 right turn movements

Four (4) bicycles and one (1) pedestrian were observed traversing Old Mission Road during the manually collected turning movement counts and field reviews.

Collision Data

Volusia County Traffic Engineering provided long form crash data for the 36-month period between October 1, 2007 and September 30, 2010. Seven (7) crashes were reported during the 36-month analysis period and consisted of the following crash types:

- Three (3) fixed object;
- Three (3) rear end; and
- One (1) angle

The crashes resulted in:

- Zero (0) fatalities and two (2) injuries;
- $35,600 in estimated property damage; and
- Zero (0) pedestrian or bicycle collisions occurred.

A detailed collision summary including crash type, time, date, roadway conditions, weather, and contributing cause of each individual crash is provided in Table 2.

Table 2
Collision Summary
Old Mission Road and Park Avenue

NO.	DATE	DAY	TIME	FATAL	INJURY	PROPERTY DAMAGE	HARMFUL EVENT	DUI	DAY / NIGHT	WET / DRY	CONTRIBUTING CAUSE
1	03/14/08	Friday	18:45	0	0	$5,000	Fixed Object	N	Night	Wet	Careless Driving
2	05/06/08	Tuesday	11:04	0	0	$1,000	Rear-End	N	Day	Dry	Careless Driving
3	05/19/08	Monday	14:50	0	1	$5,000	Rear-End	N	Day	Wet	Followed Too Closely
4	07/25/08	Friday	22:34	0	0	$5,100	Angle	N	Night	Dry	Disregard Stop Sign
5	08/21/08	Thursday	4:00	0	0	$8,000	Fixed Object	N	Night	Wet	Careless Driving
6	03/05/09	Thursday	23:30	0	1	$4,000	Rear-End	N	Night	Dry	Careless Driving
7	02/20/10	Saturday	22:02	0	0	$7,500	Fixed Object	N	Night	Dry	Careless Driving
TOTAL				**0**	**2**	**$35,600**					

Total No.	Fatal	Injury	Property Damage	Angle	Overturned	Bicycle	Rear-End	Right Turn	Fixed Object	Side-Swipe	Left Turn
7	0	2	5	1	0	0	3	0	3	0	0
PERCENT	0%	29%	71%	14%	0%	0%	43%	0%	43%	0%	0%

CONTRIB-CAUSE	Day	Night	PAVEMENT CONDITION			Mechanical Failure	Disregard Stop Sign	Careless Driving	FTYRW	Improper Turn	Followed Too Closely
			Wet	Dry	?						
TOTAL	2	5	3	4	0	0	1	5	0	0	1
PERCENT	29%	71%	43%	57%	0%	0%	14%	71%	0%	0%	14%

NTS

(GUY WIRE)

(BRUSH)

(DITCH)

COLLISION SYMBOLS

- BACKED INTO COLLISION
- PEDESTRIAN COLLISION
- FIXED OBJECT COLLISION
- PERSONAL INJURY
- FATALITY
- ANGLE COLLISION
- REAR END COLLISION
- HEAD-ON COLLISION
- SIDE SWIPE COLLISION
- OVERTURNED VEHICLE
- LEFT TURN COLLISION
- ALL OTHER COLLISION
- LOSS OF CONTROL

OLD MISSION ROAD & PARK AVENUE
VOLUSIA COUNTY - FLORIDA

Symbols:

- Utility Pole
- Traffic Sign
- Luminaire
- Traffic Controller Cabinet
- Ditch Bottom Inlet
- Signal Pole
- Pedestrian Signal Pole
- Mitered End Section

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STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

FIGURE 9
COLLISION DIAGRAM

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QUALITATIVE ASSESSMENT

The intersection of Old Mission Road and Park Avenue was observed during AM, mid-day and PM peak hours by a registered professional engineer to determine the intersection's current efficiency and safety with the goal to ascertain whether any changes are necessary to improve operational and safety characteristics of the intersection.

General Site Information:

- The study intersection is T-shaped, with the major road being Old Mission Road and Park Avenue as the minor road.
- Old Mission Road is a two lane rural major collector that connects State Road 442 to State Road 44.
- Park Avenue is a two lane rural major collector that connects Old Mission Road to US 1. Additionally, access is provided to various industrial, manufacturing, commercial, and residential developments via Park Avenue. This includes an asphalt construction company, several manufacturing facilities, a large industrial park, and a local airport.

Operations:

Observations: The following observations were made with respect to the operations and safety of the study intersection:

- Sight distance is adequate on all approaches of the intersection of Old Mission Road and Park Avenue.
- No skid marks or broken glass / plastic were noted during the field observations by the technician or engineer.
- The predominant movements at the study intersection are southbound left turns and westbound right turns. The demand for these movements is due to the connectivity provided by Park Avenue to US 1. During the peak hour period (4:00 – 5:00PM), 154 vehicles completed the southbound left turn while 124 made the westbound right turn maneuver.
- The technician observed that when a vehicle was queued at the stop bar attempting to complete a westbound left turn that northbound right turning heavy vehicles cannot complete the maneuver simultaneous due to geometric restrictions.
- An abandoned rail line exists across the north leg of the intersection that is proposed to be converted into an asphalt trail for pedestrians and bicycles. A change of vertical curvature occurs and is labeled as a "BUMP" by warning signs on either side of the crossing.

- Multiple heavy vehicles including WB-53 tractor-trailers were observed navigating the study intersection as shown in Figure 10. Additionally, the manually collected turning movement counts identified an overall heavy vehicle percentage of 3.2 percent.

Figure 10
Truck Navigating Study Intersection
Old Mission Road and Park Avenue

- Drivers were observed encroaching onto the Park Avenue channelizing island while completing the northbound right turn, southbound left turn, and westbound turning movement.

Safety:

Volusia County Traffic Engineering provided hard copies of the Florida Traffic Crash Reports for the thirty-six month period ending September 30, 2010 as shown in the data presented previously. A crash analysis was performed to determine and/or verify crash type, injury severity, location, and contributing cause. The following are observations based on crash reports, current field conditions, and engineering judgment.

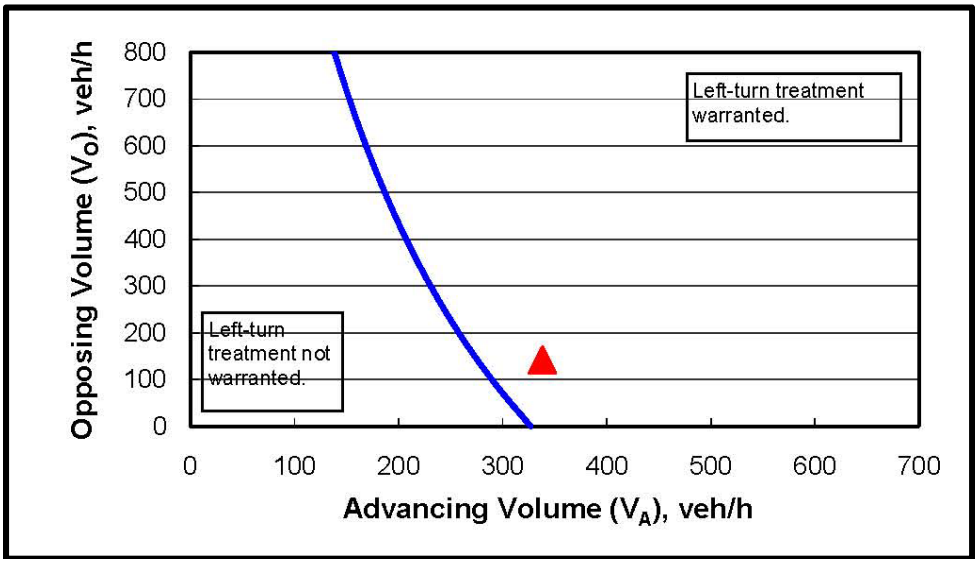
- The seven (7) vehicular crashes consisted of three (3) fixed object, three (3) rear-end and one (1) angle which resulted in two (2) injuries.
- Five (5) of the seven (7) collisions occurred at night. Additionally three (3) of the total crashes were under wet pavement conditions.
- Three (3) of the collisions were of the crash type fixed object and all occurred at night. Two (2) of the crashes were caused from vehicles heading west on Park Avenue failing to perceive and react to the upcoming geometry resulting in both vehicles leaving the paved area colliding with objects on the west side of the roadway. The study intersection has one (1) luminaire in the southwest quadrant of the intersection.
- Both injury crashes were rear end collisions that occurred on southbound Old Mission Road. Both are considered correctable with the installation of a southbound left turn lane.
- There were no pedestrian or bicycle related crashes that occurred during the 36 month period that ended September 2010.

Left Turn Lane Warrant Analysis:

Calculations for a left turn lane warrant analysis were conducted to determine if the intersection of Old Mission Road and Park Avenue met the volume criteria for considering the installation of an exclusive left turn lane. Calculations were based on the National Cooperative Highway Research Program (NCHRP) Report 457 *Evaluating Intersection Improvements: An Engineering Guide (Figure 2-5 Guidelines).* The section determining the need for a major-road left turn bay at a two-way-stop-controlled-intersection was utilized.

The busiest hour for left turns was the 4 to 5 PM peak period when mainline advancing southbound volumes totaled 338 vehicles, comprised of 154 left turns and 184 through vehicles. These were opposed by 142 northbound vehicles comprised of 123 through vehicles and 19 right turning vehicles. Given these traffic volumes and utilizing the procedure from the NCHRP guidelines it was determined that an exclusive southbound left turn lane is warranted as shown in Figure 11.

Figure 11
Left Turn Warrant Analysis Graph
Old Mission Road and Park Avenue



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RECOMMENDATIONS

The study authorized by VTPO and conducted by TEDS to determine if any safety and / or operational issues exist at the intersection of Old Mission Road and Park Avenue in the City of Edgewater, Volusia County, Florida. Recommendations are provided to mitigate any issues that are identified as shown below.

- **Reconstruct the intersection to provide a southbound left turn lane by widening Old Mission Road 12' to the west;**
- **Reconstruct the asphalt area located at the abandoned rail line to remove the "bump" while still providing access to pedestrians and bicycles;**
- **Overall geometry of the intersection should be modified to provide safe and efficient access for heavy vehicles;**
- **Install guard rail along the east side of the roadway to prevent errant vehicles from encroaching into the ditch area;**
- **Reconstruct the east leg of the study intersection to reduce the skew and provide an exclusive right turn lane;**
- **Mill and resurface entire project limits to provide uniform intersection geometry / surface; and**
- **Install luminaires on existing utility poles within construction boundaries to provide additional roadway lighting.**

An improvement diagram shown in Figure 12 graphically illustrates the improvements described above along with a cost estimate in Section 6 of this report.

RECONSTRUCT PARK AVENUE TO PROVIDE EXCLUSIVE RIGHT TURN LANE AND SHOULDERS

RECONSTRUCT OLD MISSION ROAD TO PROVIDE SOUTHBOUND EXCLUSIVE LEFT TURN LANE AND SHOULDERS

INSTALL LUMINAIRES ON EXISTING UTILITY POLES TO PROVIDE ROADWAY LIGHTING

N

0 20 100

Feet

GRASSY AREA

RESIDENTIAL HOUSE

REPLACE EXISTING STREET TERMINATION WITH UPDATED VERSION

APPARENT R.W.

APPARENT R.W.

APPARENT R.W.

OLD MISSION ROAD

OLD MISSION ROAD

S. TAYLOR ROAD

STOP

SPEED LIMIT 45

BUMP

ABANDONED R.R.

MASSEY ROAD

SHOULDER

BUMP

STOP

NO PARKING ON

ABANDONED R.R.

SPEED LIMIT 45

PARK AVENUE

WOODED AREA

RESIDENTIAL HOUSE

APPARENT R.W.

APPARENT R.W.

5' SHLDR | 12' THRU LANE | 12' TURN LANE | 12' THRU LANE | 5' SHLDR

12' WIDENING

4" 4"

TYPICAL SECTION
NTS
OLD MISSION ROAD
LOOKING SOUTH

5' SHLDR | 12' THRU LANE | 12' TURN LANE | 12' TURN LANE | 5' SHLDR

12' WIDENING

4" 4"

TYPICAL SECTION
NTS
PARK AVENUE
LOOKING WEST

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

Traffic Engineering Data Solutions, Inc.

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VOLUSIA TRANSPORTATION PLANNING ORGANIZATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
	VOLUSIA	

FIGURE 12
IMPROVEMENT DIAGRAM
OLD MISSION ROAD

SHEET NO. 17

$USER$ $DATE$ $TIME$ $FILE$

6

COST ESTIMATE

A cost estimate shown in Table 3 was developed for the proposed intersection improvements utilizing a combination of FDOT Annual Statewide Averages, FDOT Six Month Moving Average, and cost estimates for similar project available to TEDS to determine unit cost.

Table 3
Cost Estimate
Old Mission Road and Park Avenue

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST	COST
101-1	MOBILIZATION	LS	1	$17,759.30	$17,759.30
102-1	MAINTENANCE OF TRAFFIC	LS	1	$17,759.30	$17,759.30
104-10-2	BALED HAY OR STRAW	LF	10	$9.00	$90.00
104-12	STAKED TURBIDITY BARRIER	LF	30	$10.00	$300.00
104-13-1	STAKED SILT FENCE (TYPE III)	LF	500	$1.00	$500.00
104-16	ROCK BAGS	EA	10	$3.00	$30.00
110-1-1	CLEARING AND GRUBBING	AC	0.94	$7,502.00	$7,051.88
120-1	EXCAVATION, REGULAR	CY	3640	$5.00	$18,200.00
160-4	TYPE B STABILIZATION	CY	1620	$2.75	$4,455.00
285-709	OPTIONAL BASE GROUP 09 (12")	SY	3600	$14.50	$52,200.00
327-70-1	MILLING EXISTING ASPH. PAVEMENT, 1" AVE DEPTH	SY	4900	$1.70	$8,330.00
334-1-14	SUPERPAVE ASPHALTIC CONC., TRAFFIC D (3")	TN	594	$77.08	$45,785.52
337-7-45	FC 12.5 (1" THICK) (TRAFFIC D)	TN	468	$97.76	$45,751.68
425-1-552	INLET (DT BOT) (TYPE E)(> 10') large J-bottom	EA	2	$7,000.00	$14,000.00
430-175-101	PIPE CULVERT OPTIONAL (ROUND) (24"SS)	LF	260	$39.00	$10,140.00
430-175-102	PIPE CULVERT OPTIONAL (ROUND) (36"SS)	LF	240	$61.00	$14,640.00
430-175-104	PIPE CULVERT OPTIONAL (ROUND) (54\"SS)	LF	280	$240.00	$67,200.00
	U-ENDWALL	EA	1	$1,500.00	$1,500.00
430-982-129	MITERED END SECTION (24"CD)	EA	1	$700.00	$700.00
	STRAIGHT ENDWALL - TRIPLE PIPE	EA	1	$2,000.00	$2,000.00
536-1-1	GUARDRAIL, ROADWAY	LF	1024	$15.73	$16,107.52
536-73	GUARDRAIL REMOVAL	LF	85	$1.21	$102.85
700-20-40	SINGLE POST SIGN, RELOCATE	AS	4	$111.68	$446.72
700-20-60	SINGLE POST SIGN, REMOVE	EA	5	$15.57	$77.85
711-11-111	THERMOPLASTIC, STANDARD, WHITE, SOLID, 6"	NM	0.713	$4,063.97	$2,897.61
711-11-125	THERMOPLASTIC, STANDARD, WHITE, SOILD, 24"	LF	35	$3.94	$137.90
711-11-170	THERMOPLASTIC, STANDARD, WHITE, ARROW	EA	10	$60.14	$601.40
711-11-211	THERMOPLASTIC, STANDARD, YELLOW, SOLID, 6"	NM	0.9152	$3,886.09	$3,556.55
711-11-224	THERMOPLASTIC, YELLOW, SOLID 18"	LF	750	$3.30	$2,475.00
715-1-15	LIGHTING CONDUCTORS, F&I,	LF	5850	$0.76	$4,446.00
715-5-11	LIGHT POLE COMPLETE, F&I	EA	10	$3,238.25	$32,382.50
	TWENTY PERCENT CONTINGENCY	LS	1	20 % OF SUBTOTAL	$78,324.92
	CONSTRUCTION COST			TOTAL	$469,949.49
	DESIGN FEE (15% OF CONSTRUCTION COST)			15% OF CONSTRUCTION COST	$70,492.42
	CEI FEE (7.5% OF CONSTRUCTION COST)			7.5% OF CONSTRUCTION COST	$35,246.21
				TOTAL	**$575,688.13**

APPENDIX

Traffic Engineering Data Solutions Inc
VOLUME SUMMARY
Tue 8/30/2011

Site Reference: Old Mission
Site ID: 000000000000
Location: Old Mission Rd. North Bound Approach

File: NB.prn
City:
County:

TIME	1 NORTH	Total
01:00	6	6
02:00	5	5
03:00	2	2
04:00	3	3
05:00	7	7
06:00	21	21
07:00	83	83
08:00	142	142
09:00	146	146
10:00	149	149
11:00	85	85
12:00	114	114
13:00	125	125
14:00	123	123
15:00	120	120
16:00	115	115
17:00	122	122
18:00	125	125
19:00	126	126
20:00	64	64
21:00	53	53
22:00	36	36
23:00	21	21
24:00	15	15
DAY TOTAL	1808	1808
PERCENTS	100.0%	100%
AM Times	07:45	
AM Peaks	151	
PM Times	12:45	
PM Peaks	142	
GRAND TOTAL	1808	1808
PERCENTS	100.0%	100%

Traffic Engineering Data Solutions Inc
VOLUME SUMMARY
Tue 8/30/2011

Site Reference: Old Mission
Site ID: 000000000000
Location: Old Mission Rd. South Bound Approach

File: SB.prn
City:
County:

TIME	1 SOUTH	Total
01:00	17	17
02:00	9	9
03:00	5	5
04:00	5	5
05:00	8	8
06:00	26	26
07:00	68	68
08:00	164	164
09:00	144	144
10:00	130	130
11:00	164	164
12:00	185	185
13:00	233	233
14:00	193	193
15:00	221	221
16:00	294	294
17:00	311	311
18:00	336	336
19:00	141	141
20:00	26	26
21:00	15	15
22:00	7	7
23:00	3	3
24:00	2	2
DAY TOTAL	2707	2707
PERCENTS	100.0%	100%
AM Times	11:15	
AM Peaks	185	
PM Times	17:15	
PM Peaks	336	
GRAND TOTAL	2707	2707
PERCENTS	100.0%	100%

Traffic Engineering Data Solutions Inc
VOLUME SUMMARY
Tue 8/30/2011

Site Reference: 000000007450 File: WB.prn
Site ID: 000000000003 City:
Location: County:

TIME	1 WEST	Total
01:00	6	6
02:00	2	2
03:00	6	6
04:00	5	5
05:00	11	11
06:00	17	17
07:00	65	65
08:00	116	116
09:00	128	128
10:00	111	111
11:00	106	106
12:00	114	114
13:00	135	135
14:00	123	123
15:00	153	153
16:00	139	139
17:00	161	161
18:00	152	152
19:00	84	84
20:00	62	62
21:00	50	50
22:00	25	25
23:00	18	18
24:00	6	6
DAY TOTAL	1795	1795
PERCENTS	100.0%	100%
AM Times	07:45	
AM Peaks	143	
PM Times	16:45	
PM Peaks	173	
GRAND TOTAL	1795	1795
PERCENTS	100.0%	100%

FLORIDA DEPARTMENT OF TRANSPORTATION

SUMMARY OF VEHICLE MOVEMENTS

SECTION | **CITY** Edgewater | **COUNTY** Volusia

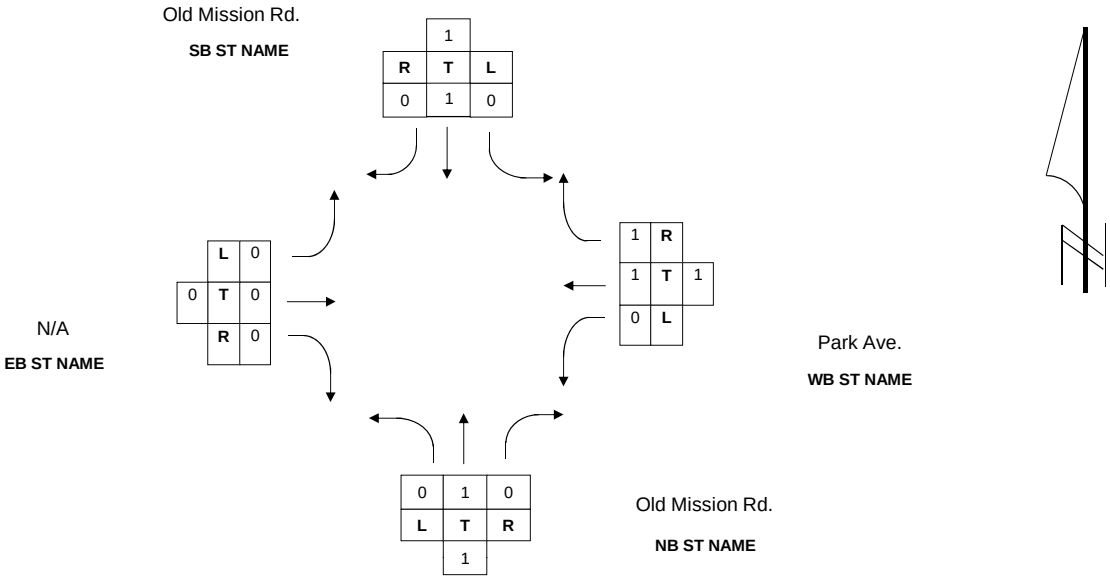
STATE ROUTE Old Mission Road | **INTERSECTING ROUTE** Park Avenue

OBSERVER DM | **DATE** 9/1/2011 | **MILEPOST**

WEATHER Sunny | **ROAD CONDITION** Good

REMARKS

FORM COMPLETED BY PHF | **DATE** 09/06/11



TIME	NORTHBOUND					SOUTHBOUND					TOTAL	EASTBOUND					WESTBOUND					TOTAL
BEGIN/END	R	T	L	U	TOT	R	T	L	U	TOT	N/S	R	T	L	U	TOT	R	T	L	U	TOT	E/W
7 - 8	9	124	0	0	**133**	0	74	108	0	**182**	**315**	0	0	0	0	**0**	105	0	16	0	**121**	**121**
8 - 9	22	140	0	0	**162**	0	73	101	0	**174**	**336**	0	0	0	0	**0**	115	0	12	0	**127**	**127**
11 - 12	14	114	0	0	**128**	0	105	89	0	**194**	**322**	0	0	0	0	**0**	107	0	13	0	**120**	**120**
12 - 1	18	97	0	0	**115**	0	152	113	0	**265**	**380**	0	0	0	0	**0**	103	0	17	0	**120**	**120**
2 - 3	15	108	0	0	**123**	0	146	134	0	**280**	**403**	0	0	0	0	**0**	138	0	17	0	**155**	**155**
3 - 4	15	117	0	0	**132**	0	184	154	0	**338**	**470**	0	0	0	0	**0**	137	0	21	0	**158**	**158**
4 - 5	19	123	0	0	**142**	0	184	154	0	**338**	**480**	0	0	0	0	**0**	124	0	27	0	**151**	**151**
5 - 6	13	134	0	0	**147**	0	184	130	0	**314**	**461**	0	0	0	0	**0**	135	0	25	0	**160**	**160**
TOTAL	125	957	0	0	**1082**	0	1102	983	0	**2085**	**3167**	0	0	0	0	**0**	964	0	148	0	**1112**	**1112**

FLORIDA DEPARTMENT OF TRANSPORTATION

PEDESTRIAN MOVEMENT SUMMARY

SECTION | **CITY** Edgewater | **COUNTY** Volusia

STATE ROUTE Old Mission Road | **INTERSECTING ROUTE** Park Avenue

OBSERVER DM | **DATE** 9/1/2011

REMARKS

FORM COMPLETED BY PHF **DATE** 09/06/11

Old Mission Rd.

SB ST NAME

7 - 8	8 - 9	11 - 12	12 - 1	2 - 3	3 - 4	4 - 5	5 - 6	Total
0	0	0	0	0	0	0	0	**0**
0	0	0	0	0	0	0	0	**0**
0	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

7 - 8	0	0	**0**
8 - 9	1	0	**1**
11 -12	0	0	**0**
12 - 1	0	0	**0**
2 - 3	0	0	**0**
3 - 4	0	0	**0**
4 - 5	0	0	**0**
5 - 6	0	0	**0**
Total	**1**	**0**	**1**

N/A

EB ST NAME

7 - 8	0	0	**0**
8 - 9	0	0	**0**
11- 12	0	0	**0**
12 - 1	0	0	**0**
2 - 3	0	0	**0**
3 - 4	0	0	**0**
4 - 5	0	0	**0**
5 - 6	0	0	**0**
Total	**0**	**0**	**0**

Park Ave.

WB ST NAME

7 - 8	8 - 9	11 - 12	12 - 1	2 - 3	3 - 4	4 - 5	5 - 6	Total
0	0	0	0	0	0	0	0	**0**
0	0	0	0	0	0	0	0	**0**
0	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Old Mission Rd.

NB ST NAME

FLORIDA DEPARTMENT OF TRANSPORTATION

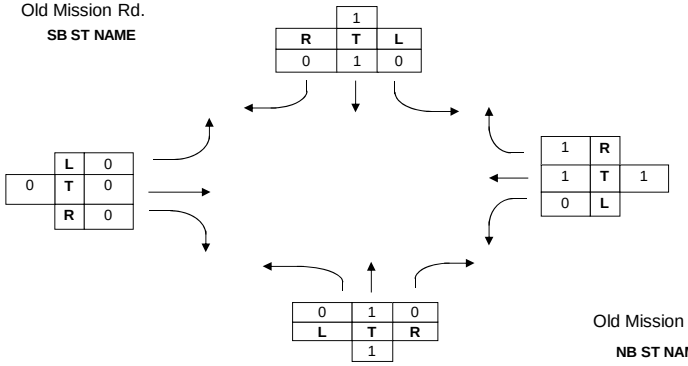
SUMMARY OF BICYCLE MOVEMENTS

SECTION
STATE ROUTE Old Mission Road
OBSERVER DM
WEATHER Sunny
REMARKS

CITY Edgewater
INTERSECTING ROUTE Park Avenue
DATE 9/1/2011
ROAD CONDITION Good

COUNTY Volusia
MILEPOST

FORM COMPLETED BY PHF **DATE** 09/06/11



TIME	NORTHBOUND					SOUTHBOUND					TOTAL	EASTBOUND					WESTBOUND					TOTAL
BEGIN/END	L	T	R	U	TOT	L	T	R	U	TOT	N/S	L	T	R	U	TOT	L	T	R	U	TOT	E/W
7 - 8		1			1		1			1	2		0			0		0			0	0
8 - 9		0			0		1			1	1		0			0		0			0	0
11 - 12		0			0		0			0	0		0			0		0			0	0
12 - 1		0			0		0			0	0		0			0		0			0	0
2 - 3		0			0		0			0	0		0			0		0			0	0
3 - 4		0			0		0			0	0		0			0		0			0	0
4 - 5		0			0		1			1	1		0			0		0			0	0
5 - 6		0			0		0			0	0		0			0		0			0	0
TOTAL	0	1	0	0	1	0	3	0	0	3	4	0	0	0	0	0	0	0	0	0	0	0

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

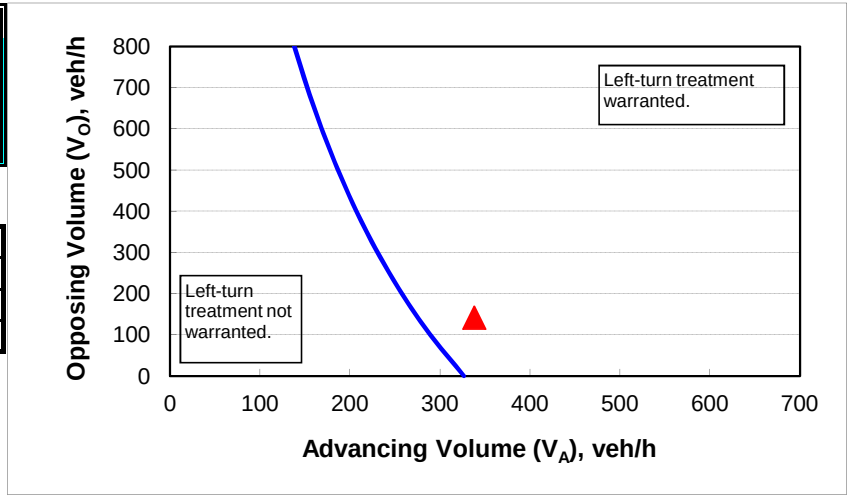
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	45
Percent of left-turns in advancing volume (V_A), %:	46%
Advancing volume (V_A), veh/h:	338
Opposing volume (V_O), veh/h:	142

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	275
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9