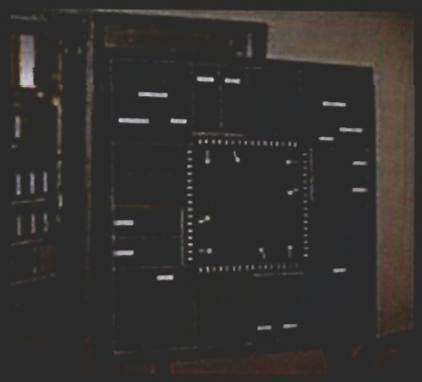
Volusia County

Traffic Signal System Upgrade



Volusia County
FLORIDA

PROPOSAL

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Executive Summary

Volusia County currently maintains all of the traffic signals in the County as well as all of the traffic signals in the cities throughout the County with the exception of the City of Daytona and the City of Deltona (305 traffic signals total). This County maintenance includes a total of 156 traffic signals that are monitored via central software utilizing closed loop signal systems. Of these 156 traffic signals, 56 are maintained via a contractual relationship between the cities and the Volusia County.

The existing Volusia County Peek Closed Loop signal system began operation in 1989 with the installation of three closed loop signal systems installed by the Florida Department of Transportation on US 17-92 in Deland. Since that time, the number of closed loop signal systems has increased to 26 coordinated signal systems, including a total of 156 traffic signals. Of the 26 signal systems, 23 of these closed loop signal systems (including over 116 signals) are on State Roads.

The existing Closed Loop signal systems are controlled using the Peek Smartways DOS Central Software from both the east and west Traffic Management Centers in Volusia County, which communicate directly to Peek 3800EL master controllers in the field. These master controllers in turn communicate to the local controllers within each signal system segment. The local controllers being utilized in these segments are Peek 1880EL controllers which are more than ten years old and are no longer supported by the manufacturer. The Smartways system is a DOS based system that utilizes computers not capable of operating the latest version of Windows and which does not meet NTCIP requirements. The speed of communications from the central software to the master controllers is limited to 1200 Baud using dial-up modems and phone lines.

Due to the popularity of the beaches and the high density concentration of hotels, restaurants and other tourism support oriented facilities, traffic demand is susceptible to wide seasonal variations. This is particularly pronounced during winter months and other tourism-influenced periods such as spring break and speed week. Beach related traffic, observed to generate random instantaneous demand peaks induced by weather conditions, also influences the variability and unpredictability of area traffic. Traffic systems capable of adjusting to these types of conditions using traffic responsive controllers to adjust the coordinated timings of the signal systems has shown to be an effective method of dealing with unpredictable traffic patterns.

Detailed engineering design plans will not be required for this project. This project consists of purchasing new Traffic Signal System Master Controllers (NTCIP compliant) for each County closed loop system, Advanced Traffic Signal Controllers to replace the local controllers (NTCIP compliant) and Ethernet switches. This architecture will allow the County to implement adaptive signal systems that will adjust to the variety of traffic situations caused by special events, beach ramps, detours and hurricane evacuations.

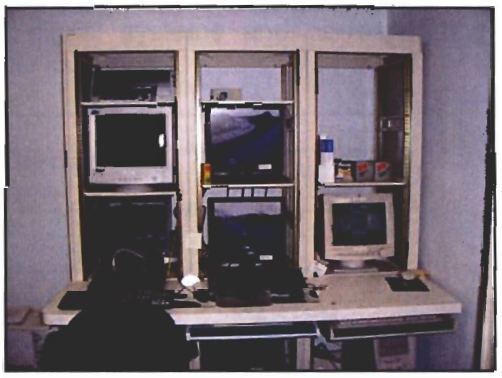
The potential benefits realizable via the implementation and proactive management of a modern computer-based traffic signal control system are as numerous as they are diverse, ranging from providing the local operating agency with a highly effective tool to enhance it's capabilities to manage the ever evolving traffic environment and special events, to the more palpable daily field traffic operational flow improvement benefits derived from reduced travel times, delay, stops, accidents, fuel consumption and pollutant emissions.

In addition to the above benefits to the public, there are a number of technological reasons for upgrading the signal systems. In the early part of the 21st Century, the regional partners of Central

Florida, including the FDOT and Volusia County developed standard MIBs that expanded on typical NTCIP compliant protocols for the region. The purpose of this standardization was to ensure that the region's various systems would work together when crossing jurisdictional lines. This would make certain that Florida's traveling public would obtain all of the benefits of a meshed regional system. As noted earlier, this project consists of purchasing new NTCIP compliant Traffic Signal System Master Controllers for each County closed loop system, and replacing the local controllers with NTCIP compliant Advanced Traffic Signal Controllers.

Finally, the current DOS based system and 1200 Baud communications technology utilized by the Volusia County are no longer supported by the manufacturer. Therefore, obtaining parts and replacement controllers as well as the appropriate communication infrastructure is no longer possible.

Existing Conditions



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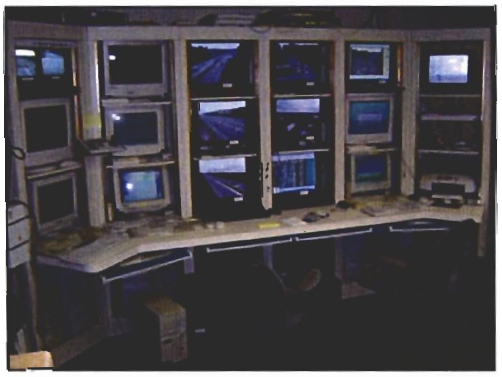

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The existing Closed Loop signal systems are controlled using the Peek Smartways DOS Central Software from both the east and west Traffic Management Centers in Volusia County, which communicate directly to Peek 3800EL master controllers in the field. These master controllers in turn communicate to the local controllers within each signal system segment. The local controllers being utilized in these segments are Peek 1880EL controllers which are more than ten years old and are no longer supported by the manufacturer. The Smartways system is a DOS based system that utilizes computers not capable of operating the latest version of Windows and which does not meet NTCIP requirements. The speed of communications from the central software to the master controllers is limited to 1200 Baud using dial-up modems and phone lines.

In order to begin upgrading the existing signal system, Volusia County Traffic Engineering recently purchased Quixote – Peek IQ Central Software and converter units so that the computers can utilize Windows as well as NTCIP standard software while communicating with our existing 1880EL traffic controllers. This new IQ Central software is also able to operate with new Peek 3000 controllers and Advance Traffic Controllers (ATC) with Adaptive Control. The ATC controllers will be available in July 2008.

SIGNAL SYSTEM INVENTORY/GIS LOCATION MAPS

The following is a summary of Volusia County's existing signal systems and corresponding intersections as well as GIS location maps showing the systems locations:

SYSTEM 01			
INTERSECTION	**SIGNAL NUMBER**	**NUMBER WITHIN SYSTEM**	
US 17-92 & VOORHIS AV	(195)	#1	
US 17-92 & HOWRY AV	(197)	#2	
US 17-92 & SR 44/NEW YORK AV	(110)	#3	MASTER
US 17-92 & INDIANA AV	(199)	#4	
US 17-92 & RICH AV	(189)	#5	
US 17-92 & WISCONSIN AV	(109)	#6	
US 17-92 & MINNESOTA AV	(198)	#7	
US 17-92 & PENNSYLVANIA AV	(174)	#8	
US 17-92 & PLYMOUTH AV	(107)	#9	
SR 44 & CLARA AV	(200)	#10	
SR 44 & FLORIDA AV	(214)	#11	
SR 44 & AMELIA AV	(182)	#12	
AMELIA AV & RICH AV	(217)	#13	
SR 44 & STONE ST	(218)	#14	
FLORIDA AV & RICH AV	(219)	#15	
AMELIA AV & PENNSYLVANIA AV	(290)	#16	
AMELIA AV & PLYMOUTH AV	(106)	#17	
SR 44 & ALABAMA AV	(366)	#18	
3800 EL MASTER			
1800 EL CONTROLLERS			
FIBER OPTIC CABLE FOR COMMUNICATION BETWEEN SIGNALS			
DIAL UP PHONE LINE TO MASTER			

SYSTEM 02			
INTERSECTION	**SIGNAL NUMBER**	**NUMBER WITHIN SYSTEM**	
US 17-92 & SR 15A/TAYLOR RD	(103)	#1	
US 17-92 & NEW HAMPSHIRE AV	(159)	#2	
US 17-92 & BERESFORD AV	(158)	#3	MASTER
AMELIA AV & BERESFORD AV	(313)	#4	
3800 EL MASTER			
1880 EL CONTROLLERS			
FIBER OPTIC CABLE FOR COMMUNICATION BETWEEN SIGNALS			
DIAL UP COM. TO MASTER			

SYSTEM 03			
INTERSECTION	**SIGNAL NUMBER**	**NUMBER WITHIN SYSTEM**	
US 17-92 & FIREHOUSE RD	(169)	#1	MASTER
US 17-92 & ORANGE CAMP RD	(108)	#2	
3800 EL MASTER			
1800 EL CONTROLLERS			
COPPER WIRE FOR COMMUNICATION BETWEEN SIGNALS			
DIAL UP COM. TO MASTER			

SYSTEM 04			
INTERSECTION	**SIGNAL NUMBER**	**NUMBER WITHIN SYSTEM**	
US 17-92 & OHIO AV	(168)	#1	
US 17-92 & BLUE SPRINGS AV	(170)	#2	
US 17-92 & GRAVES AV	(111)	#3	MASTER
US 17-92 & FRENCH AV	(163)	#4	
US 17-92 & RHODE ISLAND AV	(331)	#5	
3800 EL MASTER			
1800 EL CONTROLLERS			
FIBER OPTIC CABLE FOR COMMUNICATION BETWEEN SIGNALS			
DIAL UP COM. TO MASTER			

SYSTEM 05			
INTERSECTION	**SIGNAL NUMBER**	**NUMBER WITHIN SYSTEM**	
US 17-92 & ENTERPRISE RD	(185)	#1	
ENTERPRISE RD & 4-TOWNES SHOP CNTR	(190)	#2	
ENTERPRISE RD & SAXON BL	(230)	#3	
SAXON BL & MARKET PLACE SHOP CNTR	(231)	#4	
ENTERPRISE RD & HARLEY STRICKLAND BL/CROWN CTR	(286)	#6	
SAXON BL & THREADGILL PL/LOWE'S DRIVEWAY	(336)	#7	
SAXON BL & BROWARD AV/VETERANS M PKWY	(337)	#8	
SAXON BL & PARK & RIDE LOT	(344)	#9	
VETERANS MEMORIAL PKWY & HARLEY STRICKLAND BL	(369)	#10	
US 17-92 & SAXON BL	(300)	#11	MASTER
US 17-92 & DEBARY PLANTATION BL	(368)	#12	
US 17-92 & DOGWOOD TRL/PINE MEADOW DR	(326)	#13	
US 17-92 & HIGHBANKS RD	(112)	#14	
3800 EL MASTER			
1800 EL CONTROLLERS			
FIBER OPTIC CABLE FOR COMMUNICATION BETWEEN SIGNALS			
DIAL UP COM. TO MASTER			

SYSTEM 06			
INTERSECTION	**SIGNAL NUMBER**	**NUMBER WITHIN SYSTEM**	
DIRK/DEBRY/DOYLE/CR 4162 AV & I-4 RAMP EB	(188)	#1	MASTER
DIRK/DEBRY/DOYLE/CR 4162 AV & DELTONA BL	(258)	#2	
3800 EL MASTER			
1800 EL CONTROLLERS			
COPPER WIRE FOR COMMUNICATION BETWEEN SIGNALS			
DIAL UP COM. TO MASTER			

SYSTEM 07			
INTERSECTION	**SIGNAL NUMBER**	**NUMBER WITHIN SYSTEM**	
SR 44 & EDDIE RD	(210)	#1	MASTER
SR 44 & MISSION DR/WALLACE RD	(196)	#2	
SR 44 & MYRTLE AV	(224)	#4	
US 1 & SR 44/LYTLE AVE	(143)	#5	
US 1 & CANAL ST	(138)	#6	
US 1 & WASHINGTON	(202)	#7	
SR 44 & PALMETTO ST	(144)	#8	
SR 44 & LIVE OAK ST	(298)	#9	
3800 EL MASTER			
1800 EL CONTROLLERS			
COPPER WIRE FOR COMMUNICATION BETWEEN SIGNALS			
DIAL UP COM TO MASTER			

SYSTEM 08			
INTERSECTION	**SIGNAL NUMBER**	**NUMBER WITHIN SYSTEM**	
US 1 & MASON AV	(269)	#1	
US 1 & 2ND ST	(270)	#2	
US 1 & 3RD ST	(271)	#3	
US 1 & 6TH ST	(272)	#4	
US 1 & 8TH ST	(273)	#5	
US 1 & LPGA BLVD	(167)	#6	MASTER
US 1 & WALKER ST	(274)	#7	
US 1 & FLOMICH ST	(150)	#8	
US 1 & CALLE GRAND ST	(377)	#9	
US 1 & HAND AV	(149)	#10	
US 1 & DIVISION AV	(363)	#11	
US 1 & SR 40	(204)	#12	
SR 40 & RIDGEWOOD AV	(205)	#13	
SR 40 & BEACH ST	(183)	#14	
SR 40 & JOHN ANDERSON DR	(184)	#15	
SR 40 & HALIFAX DR	(148)	#16	
SR 40 & SR A1A/OCEAN SHORE BL	(206)	#17	
MASTER IS IN THE SHOP			
3800 EL MASTER			
1800 EL CONTROLLERS			
FIBER AND COPPER WIRE/RADIO FOR COMMUNICATION BETWEEN SIGNALS			
DIAL UP COM. TO MASTER			

SYSTEM 10			
INTERSECTION	**SIGNAL NUMBER**	**NUMBER WITHIN SYSTEM**	
US 17-92 & US 92	(216)	#1	MASTER
CR 92 EXT & GATEWAY SHOP CNTR	(306)	#2	
US 92 & AMELIA AV	(315)	#3	
US 92 & GARFIELD AV	(395)	#4	
3800 EL MASTER			
1800 EL CONTROLLERS			
FIBER OPTIC CABLE FOR COMMUNICATION BETWEEN SIGNALS			
DIAL UP COM. TO MASTER			

SYSTEM 11			
INTERSECTION	**SIGNAL NUMBER**	**NUMBER WITHIN SYSTEM**	
CLYDE MORRIS BL & RICHARD PETTY BL	(254)	#1	
CLYDE MORRIS BL & EMBRY RIDDLE UNIV	(123)	#2	MASTER
CLYDE MORRIS BL & BELLEVUE AV	(120)	#3	
CLYDE MORRIS BL & BELLEVUE AV EXT	(237)	#4	
RICHARD PETTY BL & EMBRY RIDDLE UNIV	(325)	#5	
3800 EL MASTER			
1800 EL CONTROLLERS			
COPPER WIRE FOR COMMUNICATION BETWEEN SIGNALS			
DIAL UP COM. TO MASTER			

SYSTEM 12			
INTERSECTION	**SIGNAL NUMBER**	**NUMBER WITHIN SYSTEM**	
CLYDE MORRIS BL & BIG TREE RD	(279)	#1	MASTER
CLYDE MORRIS BL & REED CANAL RD	(268)	#2	
CLYDE MORRIS BL & MADELINE AV	(280)	#3	
3800 EL MASTER			
1800 EL CONTROLLERS			
COPPER WIRE FOR COMMUNICATION BETWEEN SIGNALS			
DIAL UP COM. TO MASTER			

SYSTEM 14			
INTERSECTION	**SIGNAL NUMBER**	**NUMBER WITHIN SYSTEM**	
CLYDE MORRIS BL & BILL FRANCE BL	(356)	#1	MASTER
CLYDE MORRIS BL & JIMMY ANN DR	(238)	#2	
MASON BL & CLYDE MORRIS BL	(122)	#3	
3800 EL MASTER			
1800 EL CONTROLLERS			
FIBER OPTIC CABLE FOR COMMUNICATION BETWEEN SIGNALS			
DIAL UP COM. TO MASTER			

SYSTEM 15			
INTERSECTION	**SIGNAL NUMBER**	**NUMBER WITHIN SYSTEM**	
SR A1A & PENNINSULA AV	(297)	#1	
SR A1A & SAXON DR/HORTON ST	(142)	#2	MASTER
SR A1A & 3RD AV	(242)	#3	
3800 EL MASTER			
1800 EL CONTROLLERS			
COPPER WIRE FOR COMMUNICATION BETWEEN SIGNALS			
DIAL UP COM. TO MASTER			

SYSTEM 16			
INTERSECTION	**SIGNAL NUMBER**	**NUMBER WITHIN SYSTEM**	
US 1 & DUNLAWTON AV	(131)	#1	MASTER
US 1 & HERBERT ST	(172)	#2	
US 1 & VENTURE DR	(328)	#3	
US 1 & REED CANAL RD	(132)	#4	
US 1 & RIDGE BL	(129)	#5	
US 1 & BIG TREE RD	(128)	#6	
3800 EL MASTER			
1800 EL CONTROLLERS			
FIBER OPTIC CABLE FOR COMMUNICATION BETWEEN SIGNALS			
DIAL UP COM. TO MASTER			

SYSTEM 17			
INTERSECTION	**SIGNAL NUMBER**	**NUMBER WITHIN SYSTEM**	
NOVA RD & 6TH ST	(220)	#1	
NOVA RD & 8TH ST	(117)	#2	
NOVA RD & LPGA BL	(116)	#3	
NOVA RD & WALKER ST	(180)	#4	
NOVA RD & 15TH ST	(390)	#5	
NOVA RD & FLOMICH ST	(115)	#6	
NOVA RD & GOLF AV	(179)	#7	
NOVA RD & FLEMMING AV	(178)	#8	
NOVA RD & HAND AV	(177)	#9	
NOVA RD & VILLAGE DR/WOODLAND BL	(397)	#10	
NOVA RD & FIRESTATION	(387)	#11	
SR 40 & NOVA RD	(203)	#12	
NOVA RD & SR MAIN TRL/WILMETTE AV	(287)	#13	
US 1 & NOVA RD	(227)	#14	
SR 40 & MAIN TRL/OLD TOMOKA RD	(207)	#15	
SR 40 & CLYDE MORRIS BL	(239)	#16	
SR 40 & SEMINOLE DR	(364)	#17	
SR 40 & WILLIAMSON BL	(187)	#18	
SR 40 & I-95 NORTHBOUND RAMP	(262)	#19	
SR 40 & I-95 SOUTHBOUND RAMP	(263)	#20	
SR 40 & BOOTH RD	(346)	#21	
SR 40 & TYMBER CREEK RD	(257)	#22	
WILLIAMSON BL & ORMOND SQUARE SHOP CNTR	(334)	#23	
WILLIAMSON BL & HAND AV	(349)	#24	
NOVA RD & DIVISION AV	(398)	#25	
MASTER IN THE SHOP			
3800 EL MASTER			
1800 EL CONTROLLERS			
FIBER AND COPPER WIRE FOR COMMUNICATION BETWEEN SIGNALS			
DIAL UP COM. TO MASTER			

SYSTEM 18			
INTERSECTION	**SIGNAL NUMBER**	**NUMBER WITHIN SYSTEM**	
SAXON BL & NORMANDY BL N	(157)	#1	MASTER
SAXON BL & FINLAND DR	(321)	#2	
3800 EL MASTER			
1800 EL CONTROLLERS			
FIBER OPTIC CABLE FOR COMMUNICATION BETWEEN SIGNALS			
DIAL UP COM. TO MASTER			

SYSTEM 19			
INTERSECTION	**SIGNAL NUMBER**	**NUMBER WITHIN SYSTEM**	
US 1 & I-95 SOUTHBOUND RAMP	(256)	#1	MASTER
US 1 & I-95 NORTHBOUND RAMP	(255)	#2	
3800 EL MASTER			
1800 EL CONTROLLERS			
COPPER WIRE FOR COMMUNICATION BETWEEN SIGNALS			
DIAL UP COM. TO MASTER			

SYSTEM 20			
INTERSECTION	**SIGNAL NUMBER**	**NUMBER WITHIN SYSTEM**	
DUNLAWTON AV & PENINSULA DR	(134)	#1	MASTER
SR A1A/ATLANTIC AV & DUNLAWTON AV	(133)	#2	
3800 EL MASTER			
1800 EL CONTROLLERS			
COPPER WIRE FOR COMMUNICATION BETWEEN SIGNALS			
DIAL UP COM. TO MASTER			

SYSTEM 21			
INTERSECTION	**SIGNAL NUMBER**	**NUMBER WITHIN SYSTEM**	
LPGA BL & I-95 SOUTHBOUND RAMP	(333)	#1	
LPGA BL & I-95 NORTHBOUND RAMP	(332)	#2	MASTER
WILLIAMSON BL & LPGA BL	(228)	#3	
CLYDE MORRIS BL & LPGA BL	(240)	#4	
WILLIAMSON BL & MASON AV	(301)	#8	
3800 EL MASTER			
1800 EL CONTROLLERS			
FIBER OPTIC CABLE FOR COMMUNICATION BETWEEN SIGNALS			
DIAL UP COM. TO MASTER			

SYSTEM 22			
INTERSECTION	**SIGNAL NUMBER**	**NUMBER WITHIN SYSTEM**	
NOVA RD & SPRUCE CREEK RD	(151)	#1	
NOVA RD & VILLAGE TRL	(193)	#2	
DUNLAWTON AV & NOVA RD	(152)	#3	
NOVA RD & HERBERT ST.	(155)	#4	MASTER
NOVA RD & MADELINE AV	(153)	#5	
NOVA RD & REED CANAL RD	(175)	#6	
NOVA RD & BIG TREE RD	(127)	#7	
3800 EL MASTER			
1800 EL CONTROLLERS			
FIBER OPTIC CABLE FOR COMMUNICATION BETWEEN SIGNALS			
DIAL UP COM. TO MASTER			

SYSTEM 23			
INTERSECTION	**SIGNAL NUMBER**	**NUMBER WITHIN SYSTEM**	
DUNLAWTON AV & VILLAGE TRL S	(245)	#3	
DUNLAWTON & CITY CENTER PKWY	(251)	#4	
DUNLAWTON AV & CLYDE MORRIS BL	(191)	#5	MASTER
DUNLAWTON AV & TAYLOR RD	(192)	#6	
DUNLAWTON AV & I-95 EXT/SR 9	(211)	#7	
TAYLOR RD & WILLIAMSON BL	(277)	#8	
CLYDE MORRIS BL. & WILLOW RUN BL	(171)	#9	
CLYDE MORRIS BL & HERBERT ST	(281)	#10	
DUNLAWTON AV & YORKTOWN BL	(361)	#11	
3800 EL MASTER			
1800 EL CONTROLLERS			
FIBER OPTIC CABLE FOR COMMUNICATION BETWEEN SIGNALS			
DIAL UP COM. TO MASTER			

SYSTEM 24			
INTERSECTION	**SIGNAL NUMBER**	**NUMBER WITHIN SYSTEM**	
FLAGLER AV & PINE ST	(147)	#1	
FLAGLER AV & PENINSULA AV	(145)	#2	MASTER
3800 EL MASTER			
1800 EL CONTROLLERS			
COPPER WIRE FOR COMMUNICATION BETWEEN SIGNALS			
DIAL UP COM. TO MASTER			

SYSTEM 26			
INTERSECTION	**SIGNAL NUMBER**	**NUMBER WITHIN SYSTEM**	
SR 472 & MLK BLTWY/CR 4101	(222)	#1	MASTER
SR 472 & I-4 WEST BOUND RAMP	(358)	#2	
SR 472 & I-4 EAST BOUND RAMP	(359)	#3	
HOWLAND AV & GRAVES AV	(360)	#4	
GRAVES AV & NORMANDY BL	(347)	#5	
HOWLAND BL & DELTONA HIGH SCH/FOREST EDGE	(248)	#6	
HOWLAND BL & WOLFPACK RUN	(354)	#7	
3800 EL MASTER			
1800 EL CONTROLLERS			
FIBER OPTIC CABLE FOR COMMUNICATION BETWEEN SIGNALS			
DIAL UP COM. TO MASTER			

SYSTEM 28			
INTERSECTION	**SIGNAL NUMBER**	**NUMBER WITHIN SYSTEM**	
PROVIDENCE BL & FORT SMITH BL	(316)	#1	MASTER
PROVIDENCE BL & TIVOLI DR	(310)	#2	
3800 EL MASTER			
1800 EL CONTROLLERS			
FIBER OPTIC CABLE FOR COMMUNICATION BETWEEN SIGNALS			
DIAL UP COM. TO MASTER			

Volusia County
FLORIDA

SIGNAL SYSTEMS
VOLUSIA COUNTY PUBLIC WORKS

- East Side -

Key to Features

- Signal
- Master Signal
- Signal System

N

0 0.5 1 2 3 Miles

System 19
System 17
System 8
System 21
System 14
System 11
System 16
System 20
System 12
System 23
System 22
System 24
System 15
System 7

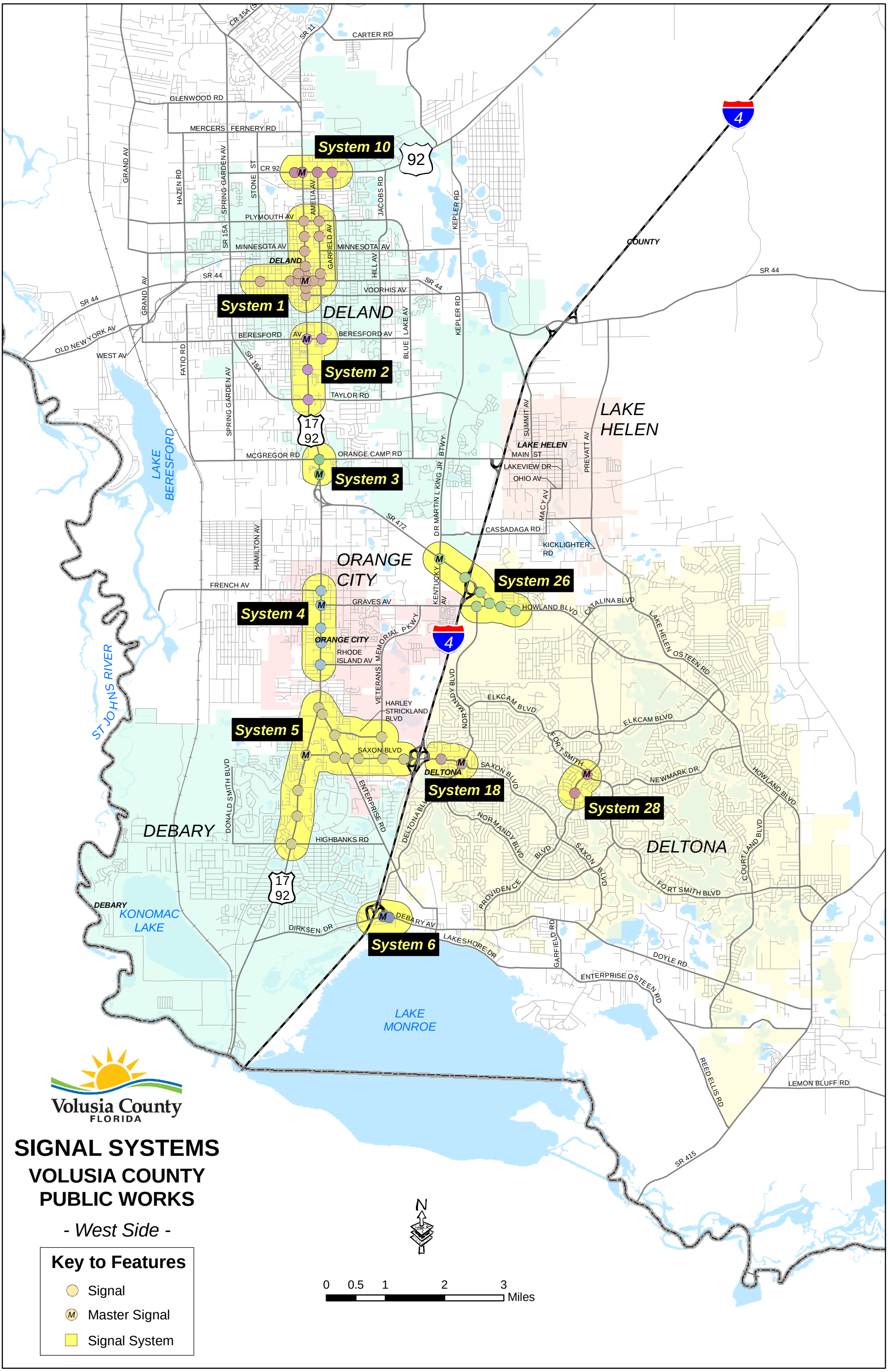
ORMOND BEACH
DAYTONA BEACH
HOLLY HILL
SOUTH DAYTONA
DAYTONA BEACH SHORES
PORT ORANGE
PONCE INLET
NEW SMYRNA BEACH

HALIFAX RIVER

95 1 92 4

BROADWAY AV
TYMBER CREEK RD N
AIRPORT RD
NOVA RD
WILMETTE AV
GRANADA BLVD
OCEAN SHORE BLVD
JOHN ANDERSON DR
N ATLANTIC AV
BEACH ST N
HALIFAX DR
BEACH ST S
SR 40
HAND AV
CLYDE MORRIS BLVD
FLOMICH ST
RIVERSIDE DR
SEABREEZE BLVD
OAK RIDGE BLVD
LPGA BLVD
JIMMY ANN DR
DERBYSHIRE RD
MASON AV
GEORGE W ENGRAM BLVD
FAIRVIEW AV
MAIN ST
SILVER BEACH AV
DUNN AV
ORANGE AV
WILLIAMSON BLVD
RICHARD PETTY BLVD
MIDWAY AV
BELLEVUE AV
TOMOKA FARMS RD N
BEVILLE RD
BIG TREE RD
REED CANAL RD
PENINSULA DR
MADELINE AV
DUNLAWTON AV
SPRUCE CREEK RD
S ATLANTIC AV
WILLOW RUN
YORKTOWN BLVD
TAYLOR RD
CR 415
AIRPORT RD
TURNBULL BAY RD
PIONEER TR
SAMSULA DR
SUGAR MILL DR
SR 44
FLAGLER AV
CAUSEWAY N
CAUSEWAY S
3RD AV
HALLECK ST
ENTERPRISE AV
WAYNE AV
CANAL ST
WALLACE RD
MISSION DR
10TH ST

Prepared by: County of Volusia Public Works/af Date: 10/25/2007 File: G:/Projects07-056/ProjFile/SignalSystemsEast.mxd



Volusia County
FLORIDA

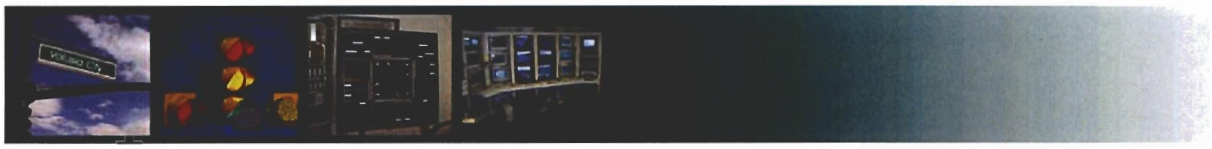
SIGNAL SYSTEMS
VOLUSIA COUNTY PUBLIC WORKS

- West Side -

Key to Features

- Signal
- Master Signal
- Signal System

Prepared by: County of Volusia Public Works/af Date: 10/25/2007 File: G:/Projects07-056/ProjFile/SignalSystemsWest.mxd



Justification

Due to the popularity of the beaches and the high density concentration of hotels, restaurants and other tourism support oriented facilities, traffic demand is susceptible to wide seasonal variations. This is particularly pronounced during winter months and other tourism-influenced periods such as spring break and speed week. Beach related traffic, observed to generate random instantaneous demand peaks induced by weather conditions, also influences the variability and unpredictability of area traffic. Traffic systems capable of adjusting to these types of conditions using traffic responsive controllers to adjust the coordinated timings of the signal systems has shown to be an effective method of dealing with unpredictable traffic patterns.

The potential impact of properly coordinated signal operations on traffic safety has been addressed in a number of studies of field conditions before and after system implementation. The incidence of traffic accidents is subject to numerous factors and influences, and generally most cannot be directly or indirectly correlated with progressive flow signalization control. However, the studies have shown that reducing the frequency of stops will induce a proportional reduction in rear end collisions.

In addition to the above benefits to the public, there are a number of technological reasons for upgrading the signal systems. In the early part of the 21st Century, the regional partners of Central Florida, including the FDOT and Volusia County developed standard MIBs that expanded on typical NTCIP compliant protocols for the region. The purpose of this standardization was to ensure that the region's various systems would work together when crossing jurisdictional lines. This would make certain that Florida's traveling public would obtain all of the benefits of a meshed regional system.

Finally, the current technology utilized by the Volusia County is no longer supported by the manufacturer. Therefore, obtaining parts and replacement controllers as well as the appropriate communication infrastructure is no longer possible.

Purpose and Scope

A study was performed (The Lorick Study) that recommended that the County upgrade the traffic signal controllers to current supported technology. The development of an area wide master plan and strategy for the implementation of a modernized traffic signal system is a complex undertaking requiring the careful evaluation of many interdependent factors to ensure that the system recommended for installation will meet special conditions/requirements.

This process begins with the definition of existing hardware and the dimensioning of existing and projected traffic conditions to which the system will have to respond. The process is then carried through the evaluation of alternative functional system design concepts to identify the system needs which will satisfy these and other requirements and conditions most economically and effectively. The process of selecting the system recommended for implementation in the study area, and of potential application elsewhere within the barrier island and mainland areas of the Volusia County is presented in the following sections of this report. The report concludes with a proposed plan and schedule for the implementation of the recommended system.

The methodologies applied in conducting the various analyses, the results obtained, conclusion reached and recommendations are summarized in detail in this report. The information documented in this report is adequate to initiate the development of the recommended system. Future activities would begin with the development of final plans specifications, and estimates and proceed through system implementation, acceptance testing, operation and maintenance.

To address the above, the County developed a comprehensive implementation plan to address all relevant elements of the traffic signal systems grouped into work tasks as follows:

- System Inventories
- Evaluate Existing Systems
- Develop Functional Alternatives
- Define and Evaluate Alternatives
- Select Preferred Alternative
- Develop Project Schedule
- Prepare Implementation Program
- Study Documentation

Based on that implementation plan, a schedule was developed to upgrade all of the County maintained signal controllers and master controllers to Peek 3000 current supported technology over a five year period. The five year period was selected based upon the current Florida DOT Traffic Operations Signal Maintenance Agreement funding reimbursement program.

According to the Implementation Plan goal, the County developed the following 5 year schedule and budget for the proposed traffic signal upgrade:

Fiscal Year 2006-2007 - $100,000.00 for the central software, 26 communication translators and support implementing the new central signal system software. In addition, the County will replace 25 Peek system controllers with Peek 3000 controllers. [*NOTE: Fiscal Year 2006-2007 currently being implemented.*]

Fiscal Year 2007-2008 - $100,000.00 for 50 Peek 3000 controllers priced at $2,000.00 each.

Fiscal Year 2008-2009 - $110,000.00 for 50 Peek 3000 controllers priced at $2,200.00 each.

Fiscal Year 2009-2010 - $120,000.00 for 50 Peak 3000 controllers priced at $2,400.00 each.

Fiscal Year 2010-2011 - $83,200.00 for 32 Peek 3000 controllers priced at $2,600.00

The City's traffic signals that are maintained by the County include 98 Peek 1880 EL controllers. These locations are not included in the above implementation plan. It was envisioned that the County would ask the local jurisdictions to also upgrade their traffic signal controllers within the same 5 year window. It was anticipated that the total cost for the controller upgrades by the local jurisdictions was going to cost approximately $200,000.00

The advantage of this implementation plan is that the County can continue to operate their existing signal system with no disruption and can start planning for more advanced signal system communications in the future, such as fiber optic cable medium and Ethernet IP direct

communication. The Quixote IQ Central Software discussed above is very powerful and can control all ITS equipment including cameras, changeable message signs and a variety of GIS maps and databases allowing for significant expansion of the traffic monitoring system. This software will serve Volusia County signal and ITS needs for many years.

Design Recommendations

Detailed engineering design plans will not be required for this project. This project consists of purchasing new Traffic Signal System Master Controllers (NTCIP compliant) for each closed loop system, Advanced Traffic Signal Controllers to replace the local controllers (NTCIP compliant) and Ethernet switches. This architecture will allow the County to implement adaptive signal systems that will adjust to the variety of traffic situations caused by special events, beach ramps, detours and hurricane evacuations.

The potential benefits realizable via the implementation and proactive management of a modern computer-based traffic signal control system are as numerous as they are diverse, ranging from providing the local operating agency with a highly effective tool to enhance it's capabilities to manage the ever evolving traffic environment and special events, to the more palpable field traffic operation flow improvement benefits derived from reduced travel times, delay, stops, accidents, fuel consumption and pollutant emissions.

As discussed earlier, Volusia County Traffic Engineering recently purchased a new computerized central signal system which will accommodate adaptive control systems. The new central system will operate with existing old Peek 1880EL controllers until new state of the art adaptive controllers are installed. This provides the ability to continue operating the existing computerized signal system and be able to upgrade as time and money permit.

The existing signal systems in place at the time of the study and their interconnect cabling and conduit facilities were inventoried in conjunction with the field survey of traffic signal hardware. The geographical area of coverage for these systems shown previously on GIS maps shows existing interconnect cable routings, type of cable and whether the cable is installed in conduit or as an overhead line.

Alternative Funding Source

Volusia County submitted an ITS/Safety/Traffic Operations Project Application over four years ago to the Volusia County Metropolitan Planning Organization (MPO) for consideration of State and Federal funding. This project has been the #1 ranked Priority Project since that time. It has only been within the last year that the Volusia County MPO reallocated the usage of their XU funds to fund these types of ITS/Safety/Traffic Operations Projects. As such, Volusia County would like to accelerate the implementation upgrade plan; however, an important difference would be the inclusion to upgrade the local jurisdiction maintained signal controllers at the same time the County is upgrading their maintained systems.

Cost Estimate

The estimated cost of this MPO funded project includes the replacement of all of the existing traffic signal controllers of the Volusia County Computerized Signal System, including the local jurisdiction maintained signal controllers. These systems consist of 26 coordinated signal systems including 156 signalized intersections. The vendors were contacted and preliminary quotes were received and the following alternatives were prepared.

Alternate 1

This alternative is based on contractors furnishing and installing the signal system masters and intersection controllers and putting the new hardware into operation. These prices are based on existing contracts and are for existing condition only and may change at the time of implementation.

(F&I)	26 Peek Masters @ $4,849.00 each =	$ 126,074.00
(F&I)	156 Controllers @ $4,780,00 each =	$ 745,680.00
	Total	**$ 871,754.00**

Alternate 2

This is based on Volusia County Traffic Engineering bidding and purchasing the 26 Peek System Masters and 156 Peek 3000 Controllers and Volusia County Traffic Signal Personnel installing the System Masters and Controllers, testing and putting the system into operation. These equipment prices are based on existing conditions and current prices and may change at the time of the actual bid.

(F)	26 Peek Masters @ $3,100.00 each =	$ 80,600.00
(F)	156 Peek Controllers @ $3,000.00 =	$ 468,000.00
	Total	**$ 548,600.00**

Alternate 3

The vendor of the traffic control equipment, Quixote – Peek has developed an Advanced Traffic Controller and they plan to release and ship this new controller in July 2008. This new controller will be state of the art and will provide for Adaptive Control, which is the technology Volusia County and the Florida DOT prefer. The cost of the controller will be about the same as the Peek 3000 but it will not use a master as it is more powerful and the local controller is constructed to also server as the master. To accommodate this enhancement requires the use of a five position switch at each controller for the fiber communications. Quixote recommends a Ruggedcom Switch at an estimated cost of $1,300.00 each.

This estimate is based on Volusia County Traffic Engineering bidding and purchasing 156 Advanced Traffic Controllers and 156 five position switches and Volusia County Traffic Signal Personnel installing the controllers and switches, testing and putting the system into operation.

These equipment prices are for existing conditions and based on current equipment cost and may change at the time of the actual bid.

(F)	156 ATC Controllers @ $3,000.00 each =	$ 468,000.00
(F)	156 Switches @ $1,300.00 each =	$ 202,800.00
	Total	**$ 670,800.00**

All controller cabinets will remain and are compatible with the new Advanced Traffic Controllers. Volusia County Traffic Engineering operates and maintains the existing Computerized Signal System and will continue to maintain and operate the new Computerized Traffic Signal System. Existing signal system timings will not be modified as part of this project.

Preferred Alternative

Volusia County Traffic Engineering recommends **Alternate 3** and with the approval of the MPO and the FDOT will enter into a LAP agreement to fund 25% of the total cost of $670,800.00 or $167,700.00 with the MPO paying 75% of the cost or $503,100.00. If funding is an issue with either the MPO or FDOT, Volusia County does not mind spreading out the project over a 2 year period in order to ensure all the local jurisdiction maintained signal controllers are upgraded. The Volusia County MPO has a policy to retain the priority ranking of the Top Priority Projects until construction is completed.

Schedule

The following is the anticipated milestone dates for this project:

Activity	Start Date	End Date
• Receive LAP Agreement from FDOT	6/01/08	7/01/08
• Council Approval of LAP Agreement	7/01/08	8/01/08
• FDOT and Federal Approval of LAP Agreement	8/15/08	9/15/08
• Receive Approved LAP Agreement From FDOT	9/15/08	10/15/08
• Advertise Bid	11/01/08	12/01/08
• Council Approval of Bid	12/15/08	1/15/09
• Award Bid	1/30/09	2/30/09
• Receive Equipment	3/01/09	4/15/09
• Install and Test Equipment	5/01/09	6/15/09
• Construction Complete		6/30/09[1]

[1] Depending upon available Volusia County MPO & FDOT Funding

Appendix

Shawna Kennedy

Subject: FW: Controller Estimate

IQATC.pdf (399 KB)

-----Original Message-----
From: Garry Lester [mailto:glester@co.volusia.fl.us]
Sent: Monday, October 29, 2007 10:06 AM
To: Jon Cheney
Cc: Deborah Owen; Jerry Hall; Dale Cody
Subject: Fwd: Controller Estimate

Jon,

Attached is info on the Advanced Traffic Controller and projected cost.

Garry

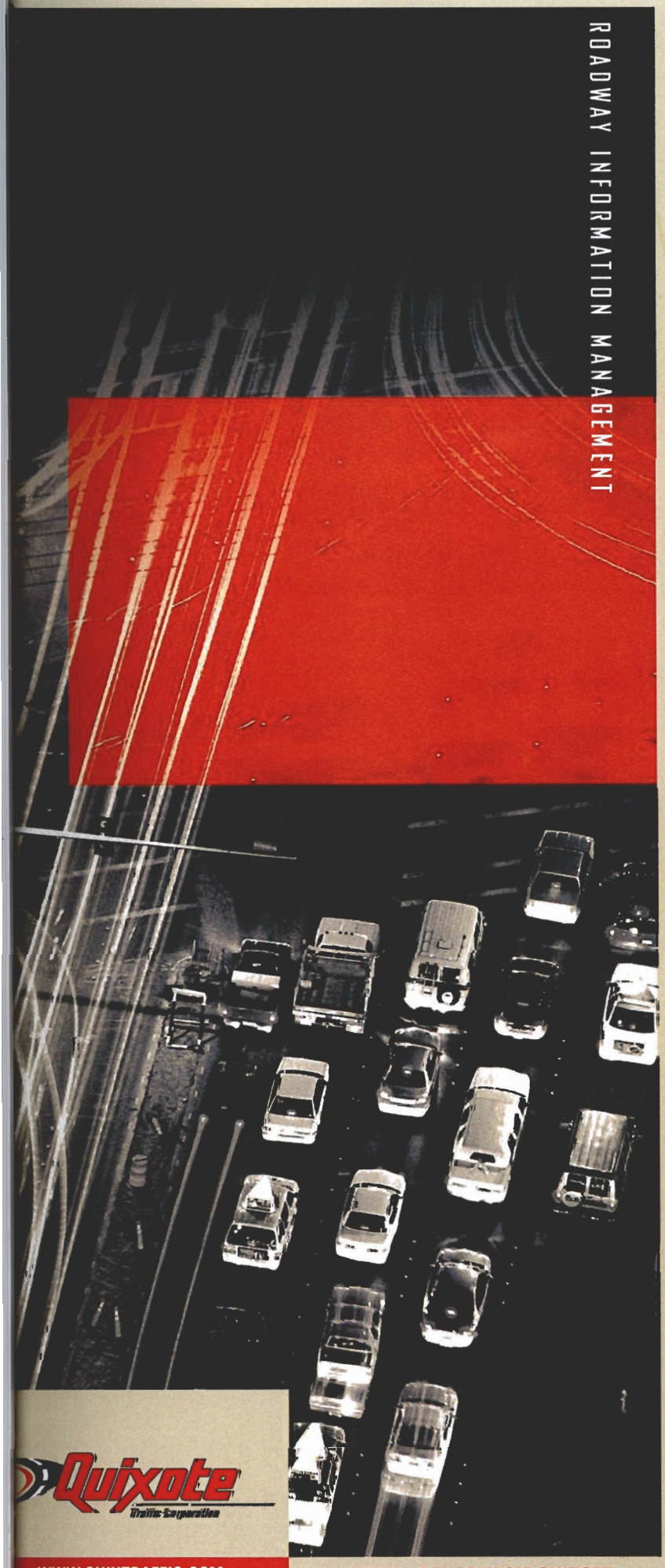
>>> Steven Gillis <sgillis@tcstraffic.com> 10/29/07 9:35 AM >>>
Garry

I forgot to send this to you last week....sorry.

This is just to confirm our conversation that a conservative estimate for controller replacement next year is $3,000.00. I have attached a cut sheet for the new controller.

Let me know if you need any more information.

Steven T. Gillis, PE
Transportation Control Systems
1030 S. 86th Street
Tampa, FL. 33619
Ph. 813.630.2800
Fax 813.630.2801
Cell 813.732.5482



IQ ATC

ADVANCED TRAFFIC CONTROLLER

MODEL 3000-PC-CBD
MODEL 3000-PC-TS2/2

OVERVIEW

The IQ ATC™ from Quixote Traffic Corporation is the next generation in advanced transportation control. It utilizes the latest in advanced embedded technology to provide the reliable and flexible operation required in today's advanced traffic control operations. The IQ ATC's innovative features, such as memory management control, allow for implementation of process isolation to ensure operational integrity. And, it works with IQCentral™.

Using an X86-based hardware platform and Real Time Operating System makes the IQ ATC extremely flexible, allowing for rapid software implementation and modification. Application software upgrades are made extremely easy using the high speed Ethernet port.

With these advanced features housed in a remarkably compact unit, the IQ ATC from Quixote Traffic Corporation sets a new benchmark for performance and versatility.

AVAILABLE MODELS

- CBD Model available for applications with space limitations
- NEMA TS2 Type 1 and Type 2 Models available for a wide range of applications

IQ ATC - CBD Model

IQ ATC - TS2 Model

Quixote Traffic Corporation

WWW.QUIXTRAFFIC.COM

INTELLIGENCE FROM QUIXOTE

FEATURES

- X86-based hardware platform with floating point and 8KB cache
- QNX Real Time Operating with memory management for process isolation.
- Compliant with NTCIP 1201, 1202
- 2070 compatible modem slot with full modem flow control support.
- 100MHz clock speed
- LCD display for status and diagnostics
- High speed USB port (optional)
- Infrared port (optional)

SPECIFICATIONS

Dimensions:	▸ 3000-PC-CBD- 8"H x10"Wx10"D (203 x 254 x 254mm)
	▸ 3000-PC-TS2- 8"H x 13"Wx10"D (203x330x254mm)
Weight:	▸ 13.2 pounds (6.0 kg) ....CBD
	▸ 12.8 pounds (5.8 kg) TS2
Power requirements	▸ 95 to 135VAC
	▸ 60Hz ± 3 Hz
	▸ 25 VA nominal
Enviroment:	▸ -35°F to + 165°F
	▸ -37°C to + 74°C
	▸ 0-95% relative humidity
Memory:	▸ 8MB Flash memory
	▸ 32MB SDRAM
	▸ 256KB SRAM
NTCIP compliant	The traffic application software is NTCIP software compliant ensuring easy integration into any NTCIP or ITS traffic control system. The IQ ATC also interfaces with IQ Central,™ Quixote Traffic Corporation's new central control system. Interfaces to both legacy PEEK & USTC controllers as well as NTCIP compliant devices.

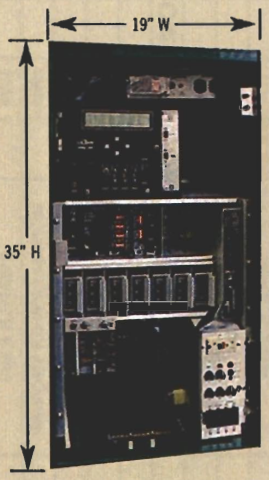
SPECIFICATIONS

Computer Interfacing	Intersections configuration is made easy with the available laptop computer interface software, allowing for prior configuration and rapid download in the field. Or, downoad from an NTCIP compliant central system. Store the configuration on a portable "flash drive" and download in the field in seconds!
Communications	Communication connectivity is easily achieved with multiple communication options available.

- 6 serial ports; SDLC support on 2 ports, RS 485 support on 1 port (jumper selectable)
- 10/100 BaseT Ethernet
- 2070 compatible modem slot with full modem control support.
- High speed USB port (optional)
- Infrared port (optional)

These options allows for interfacing to numerous communicatioins infrastructures including:

- Existing 1200 baud twisted pair
- High speed serial (RS232) up to 115kbps
- Fiber-optic modems
- Wireless systems
- LAN/WAN applications



3000-PC-CBD installed in ASTC-6 Pole-mounted cabinet (door removed).

Quixote Traffic Corporation

WWW.QUIXTRAFFIC.COM

ISO 9001: 2000 Certified Manufacturer

9603 John Street • Santa Fe Springs, CA 90670
Tel: (562) 923-9600 • Fax: (562) 923-7555
Toll Free: 1-800-733-7872

Specifications are subject to change without notice to reflect improvement and upgrades.

VOLUSIA COUNTY SIGNAL SYSTEMS COMMUNICATIONS INVENTORY

EASTSIDE LOCATIONS

MAIN STREET	FROM	TO	SM	MM	HB	C	OH	UG	DIR	LENGTH	M. LOCATION	SIDE LOCATION	GEN AREA
EDDIE RD. & SR 44 SYSTEM, NEW SYMRNA BEACH													
SR-44	EDDIE RD.	MISSION/WALACE RD.				C	OH		EB	1730	EDDIE RD.	NORTH	NSB
SR-44	MISSION/WALACE RD.	OLD MISSION RD.				C	OH		EB	1983		NORTH	NSB
SR-44	OLD MISSION RD.	MYRTLE AVE.				C	OH		EB	2550		NORTH	NSB
SR-44	MYRTLE AVE.	PALMETTO ST.				C	OH		EB	2002		SOUTH	NSB
SR-44	PALMETTO ST.	LIVE OAK ST.				C		UG	EB	384		NORTH	NSB
SR-44	MYRTLE AVE.	SR 44/LYTLE AVE.				C		UG	EB	1350		NORTH	NSB
SR 5/US 1	LYTLE AVE.	CANAL ST.				C	OH		NB	1072		WEST	NSB
SR 5/US 1	CANAL ST.	WASHINGTON ST.				C	OH		NB	875		WEST	NSB
							total length:			11946			
DUNLAWTON & NOVA RD. SYSTEM, PORT ORANGE													
SR 5A/NOVA RD	VILLAGE TRAIL	SR 421/DUNLAWTON AVE.		6MM				UG	NB	1130		EAST	PO
SR 421/DUNLAWTON AVE.	SR 5A/NOVA RD	VILLAGE TRAIL		4MM				UG	WB	2550	NOVA RD.	SOUTH	PO
SR 421/DUNLAWTON AVE.	VILLAGE TRAIL	CITY CENTER PKWY.		4MM				UG	WB	2200		SOUTH	PO
SR 421/DUNLAWTON AVE.	CITY CENTER PKWY.	CLYDE MORRIS BLVD.		4MM				UG	WB	2200		SOUTH	PO
SR 421/DUNLAWTON AVE.	CLYDE MORRIS BLVD.	YORKTOWNE BLVD.		4MM				UG	WB	1500		NORTH	PO
SR 421/DUNLAWTON AVE.	YORKTOWNE BLVD.	TAYLOR RD.		4MM				UG	WB	1500		NORTH	PO
SR 421/DUNLAWTON AVE.	TAYLOR RD.	I-95 S.B.RAMPS		4MM				UG	WB	1200		NORTH	PO
SR 421/DUNLAWTON AVE.	I-95 S.B. RAMPS	AIRPORT RD.\WILLIAMSON		4MM				UG	WB	702		NORTH	PO
CLYDE MORRIS BLVD.	SR 421/DUNLAWTON AVE.	CITY CENTER PKWY.		10MM			OH		NB	3300		WEST	PO
CLYDE MORRIS BLVD.	CITY CENTER PKWY.	HERBERT ST.		10MM			OH		NB	1500		EAST	PO
							total length:			17782			
SR-40 & I-95 SYSTEM, ORMOND BEACH													
SR-40	TYMBER CREEK RD.	BOOTH RD.				C		UG	EB	2775		NORTH	OB
SR-40	BOOTH RD.	I-95 S.B. RAMP				C		UG	EB	1400		NORTH	OB
SR-40	I-95 S.B. RAMP	I-95 N.B. RAMP				C		UG	EB	315	I-95 S. B. RAMP	NORTH	OB
SR-40	I-95 N.B.RAMP	WILLIAMSON BLVD.				C		UG	EB	840		SOUTH	OB
SR-40	WILLIAMSON BLVD.	SEMINOLE DR.				C		UG	EB	2570		SOUTH	OB
SR-40	SEMINOLE DR.	CLYDE MORRIS BLVD.				C		UG	EB	4610		SOUTH	OB
SR-40	CLYDE MORRIS BLVD.	MAIN TRAIL				C		UG	EB	1740		SOUTH	OB
SR-40	SR-40	ORMOND SQUARE SHOP CNTR		12MM			OH		SB	660		EAST	OB
WILLIAMSON BLVD.	ORMOND SQUARE SHOP CNTR	HAND AVE.		12MM			OH		SB	2580		EAST	OB
							total length:			17490			

VOLUSIA COUNTY SIGNAL SYSTEMS COMMUNICATIONS INVENTORY

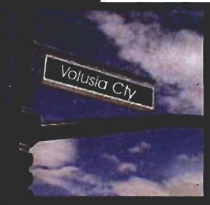
EASTSIDE LOCATIONS

MAIN STREET	FROM	TO	SM	MM	HB	C	OH	UG	DIR	LENGTH	M.LOCATION	SIDE LOCATION	GEN AREA
NOVA RD. HOLLY HILL SYSTEM													
WALKER ST.	HOLLY HILL SHOP	WALKER ST.TO NOVA RD	12SM	12MM	HB		OH		WB	4469	HOLLY HILL SHOP	SOUTH	HH
SR 5A/NOVA RD	HAND AVE.	FLEMMING AVE.				C		UG	SB	1310		WEST	OB
SR 5A/NOVA RD	FLEMMING AVE.	GOLF AVE.				C		UG	SB	2620		WEST	HH
SR 5A/NOVA RD	GOLF AVE.	FLOMICH ST.				C		UG	SB	2670		WEST	HH
SR 5A/NOVA RD	FLOMICH ST.	WALKER STREET				C		UG	SB	2519		EAST	HH
SR 5A/NOVA RD	WALKER STREET	LPGA BLVD				C		UG	SB	1288		EAST	HH
SR 5A/NOVA RD	LPGA BLVD	8 TH STREET				C		UG	SB	2719		EAST	HH
SR 5A/NOVA RD	8 TH STREET	6 TH STREET				C		UG	SB	1320		EAST	HH
SR 5A/NOVA RD	6 TH STREET	3 RD STREET				C		UG	SB	2400		EAST	DB
						total length:				16846			
CLYDE MORRIS & RICHARD PETTY SYSTEM,DAYTONA BEACH													
SR 483/CLYDE MORRIS BLVD.	RICHARD PETTY BLVD.	EMBRY RIDDLE DRIVE				C		UG	SB	1500	RICHARD PETTY BL.	WEST	DB
SR 483/CLYDE MORRIS BLVD.	EMBRY RIDDLE DRIVE	BELLEVUE AVE.				C		UG	SB	2650		WEST	DB
SR 483/CLYDE MORRIS BLVD.	BELLEVUE AVE.	BELLEVUE EXT.				C		UG	SB	1502		EAST	DB
RICHARD PETTY BLVD.	SR 483/CLYDE MORRIS BLVD.	EMBRY RIDDLE DRIVE				C		UG	WB	775		SOUTH	DB
						total length:				6427			
US1 & LPGA SYSTEM, HOLLY HILL													
SR 5/US 1	2 ND STREET	3 RD STREET		12MM			OH		NB	936		EAST	HH
SR 5/US 1	3 RD STREET	6 TH STREET		12MM			OH		NB	1855		EAST	HH
SR 5/US 1	6 TH STREET	8 TH STREET		12MM			OH		NB	1340		EAST	HH
SR 5/US 1	8 TH STREET	LPGA BLVD		12MM			OH		NB	2635		EAST	HH
SR 5/US 1	LPGA BLVD	WALKER STREET		12MM			OH		NB	1320	LPGA BLVD.	EAST	HH
SR 5/US 1	WALKER STREET	FLOMICH STREET		12MM			OH		NB	2595		WEST	HH
						total length:				10681			
SR40 & BEACH SYSTEM, ORMOND BEACH													
SR-40	US-1	RIDGEWOOD AVE.				C		UG	EB	1170		SOUTH	OB
SR40	RIDGEWOOD AVE.	BEACH STREET				C		UG	EB	1112		SOUTH	OB
SR40	BEACH STREET	JOHN ANDERSON DR.				RF			EB	2822	BEACH STREET	NORTH	OB
SR40	JOHN ANDERSON DR.	HALIFAX DR.				C		UG	EB	760		NORTH	OB
SR40	HALIFAX DR.	SR-A1A				C		UG	EB	1922		NORTH	OB
						total length:				7786			

VOLUSIA COUNTY SIGNAL SYSTEMS COMMUNICATIONS INVENTORY

EASTSIDE LOCATIONS

MAIN STREET	FROM	TO	SM	MM	HB	C	OH	UG	DIR	LENGTH	M. LOCATION	SIDE LOCATION	GEN AREA
US-1 & DUNLAWTON SYSTEM, PORT ORANGE													
SR 5/US 1	SR 421/DUNLAWTON AVE.	HERBERT ST.		12MM			OH		NB	750	SR 421/DUNLAWTON	WEST	PO
SR 5/US 1	HERBERT ST.	VENTURE DR.		12MM			OH		NB	3493		WEST	PO
SR 5/US 1	VENTURE DR.	REED CANAL RD.		12MM			OH		NB	1989		WEST	PO
SR 5/US 1	REED CANAL RD.	RIDGE BLVD.		12MM			OH		NB	3511		WEST	PO
SR 5/US 1	RIDGE BLVD.	BIG TREE RD.		12MM			OH		NB	2690		WEST	PO
SR 5/US 1						total length:				12433			
US-1 & I-95 SYSTEM, ORMOND BEACH													
SR 5/US 1	I-95 N.B. RAMPS	I-95 S.B. RAMPS				C		UG	SB	950	I-95 N.B. RAMPS	WEST	OB
						total length:				950			
DUNLAWTON & A1A SYSTEM, DAYTONA BEACH SHORES													
SR 421/DUNLAWTON AVE.	SR 441/PENINSULA DR.	SR A1A/ATLANTIC AVE.				C		UG	EB	810	SR 441/PENINSULA	NORTH	DBS
						total length:				810			
L.P.G.A & I-95 SYSTEMS, HOLLY HILL													
L.P.G.A	I-95 S.B.RAMPS	I-95 N.B. RAMPS				C		UG	EB	760	I-95 S.B. RAMPS	SOUTH	HH
L.P.G.A	I-95 N.B. RAMPS	WILLIAMSON BLVD.				C		UG	EB	3000		SOUTH	HH
L.P.G.A	WILLIAMSON BLVD.	CLYDE MORRIS BLVD.				C		UG	EB	2400		NORTH	HH
WILLIAMSON BLVD	L.P.G.A.BLVD.	MASON AVE.	4SM	6MM	HB		OH		SB	3714		EAST	DB
						total length:				9874			
NOVA RD. SYSTEM, SOUTH DAYTONA													
SR 5A/NOVA RD	HERBERT STREET	MADELINE AVE.		6MM				UG	NB	2720	HERTBERT STREET	WEST	PO
SR 5A/NOVA RD	MADELINE AVE.	REED CANAL RD.		6MM				UG	NB	3890		EAST	SD
SR 5A/NOVA RD	REED CANAL RD.	BIG TREE RD.		6MM				UG	NB	4500		EAST	SD
						total length:				11110			
FLAGLER AVE. SYSTEM, NEW SYMRNA BEACH													
FLAGLER AVE.	PINE ST.	PENINSULA AVE.				C		UG	WB	660	PENINSULA AVE	NORTH	NSB
						total length:				660			
A1A/3RD. ST. SYSTEM, NEW SMYRNA BEACH													
SR A1A/3RD STREET	PENINSULA AVE.	SAXON DR.				C		UG	EB	1800		SOUTH	NSB
SR A1A/3RD STREET	SAXON DR.	3 RD. STREET				C		UG	EB	1000	SAXON DR.	NORTH	NSB
						total length:				2800			


Volusia City