DEPARTMENTAL INPUT
CONTRACT/PROJECT MEASURE ANALYSIS AND RECOMMENDATION

☐ New   ☐ OTR   ☐ Sole Source   ☑ Bid Waiver   ☐ Emergency   Previous Contract/Project No.
   Contract   n/a

☐ Re-Bid   ☐ Other   LIVING WAGE APPLIES: ☐ YES ☑ NO

Requisition No./Project No.: TBD/BW9971, 2, 3   TERM OF CONTRACT ** YEAR(S) WITH 0 YEAR(S) OTR

Requisition /Project Title: Prototype Demonstration of a Central Traffic Signal Control System

Description:

The county requires the emergency services of three venors to conduct a product demonstration of their Central Traffice Control System. The vendor will install their traffic controller 10 intersections, test for 60 days, then return the existing controller.

Issuing Department: DTPW   Contact Person: Fran Aira   Phone: 305-679-0002

Estimate Cost: $75,000 ea.

	GENERAL	FEDERAL	OTHER
Funding Source:	Operating		

ANALYSIS

Commodity Codes:	55080				

Contract/Project History of previous purchases three (3) years
Check here ☑ if this is a new contract/purchase with no previous history.

	EXISTING	2ND YEAR	3RD YEAR
Contractor:			
Small Business Enterprise:			
Contract Value:	$	$	$

Comments:

Continued on another page (s): ☐ YES ☑ NO

RECOMMENDATIONS

	Set-aside	Sub-contractor goal	Bid preference	Selection factor
SBE				

Basis of recommendation:

Signed: Brian Webster	Date sent to SBD: 03/28/2018
	Date returned to DPM:

Revised April 2005

DEMONSTRATION OF NTCIP COMPLIANT CENTRAL SOFTWARE SYSTEM USING CALTRANS-
APPROVED MODEL 2070LX CONTROLLERS

A. BACKGROUND:

Miami-Dade County has selected the Caltrans 2070LX model class controllers as the successor to the County's aging D170E controllers. Through sequential pilot-scale and small-scale deployments, the County has acquired familiarity with the Model 2070LX controller hardware, the controller's local software, and their performance within the existing traffic signal system infrastructure. Migrating to the new controllers will require upgrading the County's central monitoring software to a unified software platform that is capable of communicating with the new controllers using a nationally recognized communications protocol established by the National Transportation Communications for ITS Protocol (NTCIP) family of standards.

The County intends to let out a project in 2018 to migrate the entire Miami-Dade County Traffic Signal System to a fully NTCIP compliant central software system using the new Model 2070LX controllers. In preparation and in support of the process for preparation of the necessary technical documents, the County is interested in trial demonstrations of all NTCIP compliant central traffic signal control software systems that meet the requirements set forth herein. A system, when referred to herein, includes the central traffic management software, local controller software, and supported controllers.

The County may select multiple vendors based on their qualifications and send the invitations to them to provide the system demonstration. Each qualified vendor will be assigned a small-scale project encompassing five (5) intersections with the similar operational conditions to deploy their solution.

B. PRODUCT REQUIREMENTS:

1) Only products that meet the following requirements will be considered:

   a. Central software. Central traffic management system software must be a scalable commercially-available off-the-shelf (COTS) with latest Windows-based Advanced Traffic Management System (ATMS) client-server software package from a traffic controller manufacturer. ATMS Software must:

      i. Support transportation system management and operations of 3,500 intersections, including active arterial management, and be scalable to accommodate future growth of intersections and other devices.

      ii. Provide full-functionality for operations with County-approved Caltrans Model 2070LX traffic signal controllers using the National Transportation Communication for ITS Protocol (NTCIP).

      iii. Support use of NTCIP for all communication with field controllers and must support all mandatory NTCIP objects defined in NTCIP 1101 and NTCIP 1201 and all mandatory and optional traffic signal controller requirements defined in NTCIP 1202. The system must comply with NTCIP standards for communication over TCP/IP.

      ~~iii.~~ iv.   Operate properly using the County's existing cellular 4G LTE communications to field controllers.

b. Local software. Controller software must be a COTS product from the traffic controller manufacturer designed to run on a Linux operating system and 2070LX hardware platform compliant with Miami-Dade County traffic signal controller hardware specifications and Caltrans TEES 2009 requirements including all Errata for a 2070LX Traffic Signal Controller unit. The controller software must:

    i. Be compatible with all 170 type cabinets, including, but not limited to Miami-Dade County MD-552 and MD-660 series controller cabinets.

    ii. Fully support Caltrans TEES 2009 2070LX and ATC 5201 v06.25 controller requirements.

    iii. Provide functionality that meets or exceeds operational characteristics, including ~~National Transportation Communications for ITS (Intelligent Transportation Systems) Protocol (~~NTCIP~~)~~ support, as described in National Electrical Manufacturers Association (NEMA) TS-2-2016.

    iv. Support all mandatory traffic signal controller requirements and objects defined in NTCIP 1202.

c. Controller hardware. Each traffic signal controllers must be a Caltrans 2070LX ~~model class~~ controller unit comprised of a 2070 unit chassis, 2070-1C CPU, 2070-2E+ field I/O module, 2070-3B Front Panel, and 2070- 4A Power Supply that is:

    i. Compliant with Caltrans TEES, dated March 12, 2009, and TEES 2009 Errata; and FDOT Standards Specifications for Road and Bridge Construction, Section 671;

    ii. Listed as a "Model 2070LX Controller Unit" on the Caltrans Qualified Products List (QPL); and

    iii. Listed on the FDOT Approved Products List (APL).~~; and~~

    ~~. Qualify for and has submitted for listing as a Model 2070LX controller on the Miami-Dade County Traffic Signals and Signs Division Qualified Products List (TSSQPL).~~

1) Systems Synopsis (Step 1)

A vendor interested in participating in the demonstration must first submit for review a Systems Synopsis document. The Systems Synopsis document must substantially identify and describe a system comprised of a central software, local software, and controller hardware that meets the above requirements organized in the following format:

a. System Overview (i.e. proposed central software, local software, and controller hardware and respective technical summaries)

b. Examples of Existing Vendor's Systems in Operation in the U.S. with over 2,500 signalized intersections

c. System Architecture Diagram to display how the various components of the system will be installed and connected to each other using the County's existing communication network. The County IT team members will review the proposed System Architecture, and will provide feedback. As the number of signalized intersections increase, need to support multiple

Applications, Communications Servers, etc. Support of Application Clustering with multiple servers. Need to grow server infrastructure horizontally by adding servers. Ability to have a separate server for Audit Log to track Central System and Controller Database changes and have ability to specify retention periods for logs throughout the entire system. The System Architecture must include the requirements of each server that's needed in the Virtual Machine (VM) environment.

d. Integration with Time Synchronization Systems (e.g. Central System integration with GPS Synchronized Clock System using Network Time Protocol (NTP), ability to use an NT Clock and a Backup NT Clock). The Central System needs to provide controllers the NT Clock's time regularly to keep their times synchronized.

e. High System Availability and Redundancy - Should we list any additional requirements in this category?

f. Client in Citrix Environment capability to run the Client software in the Citrix environment

g. Lightweight Directory Access Protocol (LDAP) Integration with Active Directory (AD) with the County's Federation Services

h. Licenses needed for System Architecture need to be listed, and if they can support the enterprise, or are needed by user

i. Controllers Supported (i.e. types of controllers and controller software supported) by the proposed central software

d.j. Cabinets Supported by the proposed controller software (i.e. 170, NEMA, ITS, etc.)

e.k. Signal Control Strategies (e.g. Time of Day (TOD), manual control, free mode, grouping, tTraffic rResponsive, Adaptive Signal Control, Peer-to-Peer, etc.)

l. Remote Monitoring provided by the proposed central software (e.g. controller status, Malfunction Management Unit (MMU) status, etc.)/

m. Interagency Capabilities (e.g. Center to Center (C2C) via NTCIP &, Traffic Management Data Dictionary (TMDD)etc.)

f.n. Network Bandwidth Requirements for Central System and from Field to Central System per Intersection

g.o. Communications modes supported by the proposed central software (e.g. Internet Protocol, serial communications, TCP/IP, etc.)

h.p. Traffic Engineering Support tools (e.g. dynamic time-space diagram, split monitoring, Synchro interface, Method of Effectiveness (MOE) reports, etc.)

q. Database Mmanagement Functions (e.g. upload/download, comparing, archiving, restoring, data validation, data retention periods, etc.) using enterprise databases in the County's Shared Services enterprise environment, such as MS SQL 2017, and the latest Oracle versions in a highly reliable redundant and load balanced environment. The vendor must provide the database requirements, and the estimated size of the database for this demonstration, as well as the database server's requirements.

r. ~~and~~ Graphical User Interface (e.g. customizable map display, integration with ArcGIS mapping tools, pop-up multiple display, menu icons and controls, visual and audio alarms for various events, etc.)

s. Traffic Responsive/Traffic Adaptive/Adaptive Signal Control (provide details on optimization algorithm, ~~how provided, limitations~~ detection locations and threshold values configuration, etc.)

t. Transit Signal Priority (TSP) and Bus Rapid Transit (BRT) operations provided by the proposed central software (e.g. via C2C interface between Central System and multiple CAD/AVL Systems used by Miami-Dade County)

u. Emergency Vehicle Pre-emption (EVP) operations provided by the proposed central software (e.g. via C2C interface between Central System and Computer Aided Dispatch/Automatic Vehicle Locator (CAD/AVL) Systems used by Miami-Dade County and other Public Safety agencies)

v. Available Central System Integration with other Systems that's currently being used by customers, such Video Wall Management Systems, Video Wall Management Systems, etc.

w. Event Scheduler (e.g. system commands, time of day/day of week, holiday, permanent/temporary commands, etc.)

x. System Security/User Access (e.g. user privileges assignment, Virtual Private Network (VPN) access, mobile device access, Secure File Transfer Protocol (sftp) or 443 SSL certificates to securely transfer files, Payment Card Industry (PCI) requirements compliance supported by Central System, audit trail of every action of each system user, etc.) System must pass security vulnerability scans. Need to be able to schedule installation of Anti-Virus and OS Patches automatically.

y. Alarms/Events and Reporting with configurable alarms/alerts, (e.g. critical alarms, operator alerts, automated malfunction reports, device status reports, controller local software and firmware drifts from standard adopted, etc.). Central System must allow users to run and abort reports without impacting production environment.

z. Signal Performance Measures (SPM) functions (e.g. Purdue University Signal Performance Metrics, FDOT SR 671-2 high resolution data logging requirements, etc.)

aa. Additional System Functionality (DMS, CCTV, streaming video format supported (e.g. MPEG4 and H.264), capability to share video with other departments or agencies, School Zone Flashers (SZF) Systems, Web interfaces provided by controller, etc.)

bb. Types of Intelligent Transportation Systems (ITS) Devices Supported by Central System

cc. Connected Vehicle Functionality supported by the Central System

The submittal must be organized into a single bound volume ~~not to exceed 20 pages~~ and provided in both hardcopy and digital formats. Hard copy must on white 8 ½" x 11" Recycled Paper, minimum 12 point font, and digital copy on electronic media such as thumb drive or CD. Marketing and personnel information may be provided but only as a physically separate volume. The systems synopsis submittals will be reviewed by the County to qualify vendors that have solutions that meet the aforementioned requirements. Qualified vendors will be invited to participate in Step 2 below.

2) Proposal for System Demonstration (Step 2)

Vendors invited to submit a "proposal for system demonstration" must submit a technical proposal that provides for a comprehensive demonstration of their proposed system solution at minimal cost to Miami-Dade County. The proposal and solutionfor system demonstration must:

a. Meet the product Product requirements Requirements stipulated in Paragraph B.1) herein.

b. Include a detailed schedule of tasks which allows for a final completion of all activities milestones within 9060 Days or less from NTP;

c. Provide the names of Key Personnel on the Proposer's team, as well as a resume for each individual, Key Personnel proposed and a description of the functions and responsibilities of each key person relative to the task to be performed.

b.

d.e. Be provided at no cost to the County with the exception of any ordinary cost for County employees or consultants to review such technology, products or services, and the stipend fee detailed in Step 3 below;

e.f. Not contain any exclusive dealing, in-kind or advertising commitments by the County;

f.g. Provide for indemnification of the County and ;

g.h. Provide for County ownership of any data generated during the testing and observation period; and

i. Be terminable at will by the County; and.

h.j. Provide for a detailed systems demonstration that includes:

central software solution;

ii. With the supports of the County's IT Department, Ssetting-up the necessary servers needed for the a demonstration server in the Miami-Dade County's Virtual Machine (VM) Enterprise environment provided by the County, Traffic Management Center with the demonstration central software that is capable of communicating with a minimum of ten five signal controllers;

iii. Conversion of timing plans for use with proposed controller software at a minimum of five (5) intersections that will be selected by the County;

iv. Programming the demonstration signal controllers;

v. Full testing of timing of programmed controllers by vendor's qualified technical staff for field deployment approval by the County;

vi. Successful integration by vendor's qualified technical staff of the controllers with the demonstration central software in the presence of Miami-Dade County staff;

vii. Release of the by the County of controllers for scheduled field deployment;

viii. Successful field deployment of the five controllers by vendor's qualified technical staff in the presence of Miami-Dade County staff. Immediate availability of vendor's

technical staff is required throughout the completion of the demonstration until all intersections are restored to pre-existing conditions;

    ix.   Overview training for TSS Staff for the system functions and features.

    x.   Five (5) day detailed demonstration of central software using the deployed controller with existing vehicle detection to include, if possible, the central software's ability to integrate controllers running other manufacturer's local software; and

    xi.   Restoring site conditions at the five intersection to pre-existing conditions.

The submittal must be organized into a single bound volume and provided in both hardcopy and digital formats. Hard copy must on white 8 ½" x 11" Recycled Paper, minimum 12 point font, and digital copy on electronic media such as thumb drive or CD. Proposals for systems demonstrations will be evaluated. All proposers that meet the specified requirements will be invited to proceed subject to the requirements of any necessary negotiations.

Proposals for systems demonstrations will be reviewed by the County. Vendors whose proposals are determined to meet the requirements herein will be invited to participate in Step 3 (Demonstration Project) subject to the requirements of the work authorization.

3) Demonstration Project (Step 3)

Proposals for systems demonstrations will be evaluated. All proposers that meet the specified requirements will be invited to proceed subject to the requirements of any necessary negotiations.

The County will provide a stipend to vendors for their engineering and technical efforts in demonstrating a complete system, including trainingtraining, in the amount of $75,000 Lump Sum amount which will be paid based on the completion of the following progress payment milestones:

Progress Payment Milestone	Payment
a. Completed set-up and testing of demonstration VM servers needed.	25% LS
b. Completed conversion, programming and testing of controllers for five intersections	15% LS
c. Successful field deployment, and integration of five signal controllers, and training	25% LS
d. System demonstration of complete system and central software interface using the five successfully deployed and integrated controllers	15%
e. Completed restoration of the five intersections to preexisting conditions	20% LS

Payments will be made sequentially upon the County's determination of the completion of the scheduled progress payment milestone.

4) Submittal Schedule

Document	Due
Systems Synopsis (Step 1)	TBD
Proposal for System Demonstration (Step 2)	TBD