Summary:

The City of Rolla, Missouri Police Department is seeking bids for a network wiring project. This project would involve replacing all existing network cables in the Police Department building, as well as adding additional cables in designated rooms. Total number of cable runs will be approximately 120. The building consists pf approximately 26,000 square feet in two levels, and is of mixed cement block and drywall over metal stud construction. Note that this project will take place without evacuating the building. Replacement of existing cabling should be coordinated closely with City IT and Police staff in order to minimize disruption to ongoing operations.

Building:

Located at 1007 North Elm Street, the police department is located in a two-level building with an upper floor containing most office spaces, and a lower floor that houses a 24/7 dispatch center that serves as a PSAP (Public Safety Answering Point) for 15 emergency services agencies throughout Phelps County. The lower floor also houses the network center for the building.

Current cabling:

The existing network cabling in the building is largely Cat 5, and has been installed on a largely ad-hoc basis over the previous 25+ years by various parties as Police operations have expanded to fill the building footprint. The architecture of the cable network is largely home-run, but installation challenges have also led to a number of remote switches, both managed and unmanaged, to accommodate growth.

The City has identified three main issues with the existing cable plant that this project is intended to address. Those issues are as follows:

1) Insufficient cable runs. The initial design plan was for "home run" cabling to all endpoints. Due to the unplanned nature of the gradual expansion of the network, and the difficulty of running cables all the way to the network center, however, this plan has not been followed in a large number of cases.

   Data from both our Active Directory service and from DHCP lease information added to known static IP assignments indicate there are something in the neighborhood of 90 devices physically connected to the network by an Ethernet cable at any given time. (The uncertainty is largely due to the presence of tablets that brought in and out of the building, and may be connected to wired docking stations, or not, at any time.) However, there are only 64 connected switch ports in the network center – meaning more than 25 devices are attached to secondary switches throughout the building, several of which are not managed switches, giving no visibility into traffic or connected devices.

   This project will include the installation of all new home run cabling for all locations on each level of the building, eliminating the current unmanaged secondary switches. It will also expand the total number of drops beyond the current need for 90, to approximately 130. Location details and drop locations will be specified later in this document, as well as on an accompanying CAD drawing of the building.

2) Poor network performance. The IT department receives more complaints of network slowness from the Police department than from all other departments combined. Testing of

one cable run in the PD that should total about 56 feet gave results of over 200 feet based on signal levels. This is believed to be a non-isolated situation. Thus, merely adding additional runs is not sufficient. Even those locations with existing home run connections are to be replaced.

The alternative approach of testing every existing cable run, and only replacing - or even simply re-terminating – those that failed was rejected as potentially too expensive with too little guaranteed result.

3)   Age, routing, interference. The third category is more generic, and covers a few related issues. First is the age of much of the existing cable plant. While all cable installed during the tenure of current IT staff has been at least Cat5, most of it is not Cat5e, and some may even be pre-Cat5. The building switch infrastructure is currently Gigabit Ethernet, which may be problematic with older cabling, no matter how well installed.   In addition, much of the existing cabling is run in a haphazard fashion, and may be laying along, or on top of, fluorescent light fixtures, which may be introducing noise. Finally, current access from the lower level to the upper level is limited, and large numbers of cables have been stuffed through small spaces, potentially causing physical damage to sheathing or wiring within cables. All of these will be corrected by the installation of all new cable runs.

Design of new Cable Network:

The new cabling plan involves home-run cabling (continuous point to point link with no splicing or intermediate devices) on each level of the building. All drops on the lower level will be home-run to the current network center on that level. All drops on the upper level with be home-run to a new network closet in a central location on the upper level. This network closet will be connected to the existing network center on the lower level by a fiber optic link, provided and installed by the winning vendor. More detail follows in the Scope of Work.

Scope of Work:

Installation of new cabling.

Provide cable – all end station cabling shall be Category 6 UTP copper cable, indoor rated and unshielded. Each end station drop will have two (2) individual cables installed.   The fiber optic connection between floors shall be

Provide hangers where needed – cables shall be installed in ceiling and walls in an organized fashion, and shall be separated from potential sources of interference both horizontally and vertically if at all possible. Sufficient hangers, straps, and other hardware for this purpose shall be provided as part of any bid.

Provide wall jacks/boxes – all cables at end stations shall be terminated in a UL-listed single gang box for a single (2 cable) drop, or a double-gang box for a double (4 cable) drop. Boxes shall be installed in-wall where possible. Some walls are concrete block, and surface mount boxes shall be used in those locations. All boxes shall feature the required number of modular jacks using the EIA/TIA 568B wiring standard.

Provide patch panels – Vendors shall provide patch panels for all runs on each level. Panels shall be of the punch-down type, and shall be Category 6 rated, unshielded.

Run cables, terminate, label, and test – Vendor shall run all new cable to required locations, terminate according to specifications, label each end according to a system agreed upon with City IT Staff. All cable runs shall also be tested and certified as Category 6 compliant.

Modify structure to accommodate cables where and as needed, in consultation with City IT staff. This may include drilling new holes and/or providing conduit sleeves through existing holes in concrete structure.

Removal of existing cabling.

Existing cabling removal is part of this project. It is anticipated that most of all such removal will happen in conjunction with installation of new, as old/existing cable runs are used as guides and/or pulls for new runs.

Old cable is to be disposed of by installer. Any debris generated during the project is also to be disposed of properly by installer.

Terminations.

Remote/device end termination of all cables is to be in purpose-made wall boxes with standard RJ-45 jack plates. In-wall boxes are to be used where possible. On some walls, surface mount boxes may be required. (See CAD drawing for locations of cement block and metal stud/drywall construction.)

Single-gang duplex boxes are to be used in most locations. In certain locations, larger 2-gang boxes may be preferred – consult with City IT staff for those locations. If single drop locations are decided upon after consultation, a standard duplex box with one jack and one blank insert is acceptable.

Near end/switch termination of all cables is to be on patch panels provided by installer. Patch panels will be Cat6 rated, and utilize standard 110 punch down connections.

All patch panels and switch terminations shall be located in the respective location for each floor. See site CAD drawing for details. All endpoint connections and wall jacks will be located as designated on the site CAD drawing. This drawing indicates the number of total "drops" in each room, but does not indicate exact location for each box.

Exact box locations should conform to the current furniture layout as much as possible, allowing for easy connection of existing devices. Where more than one box location exists in a single room, placement should be according to consultation with City staff. City staff will attempt to specify locations that allow for ease of installation wherever possible, but usability will remain top priority.

Patch Panels.

Installer is to provide all necessary patch panels for termination. Racks and/or rack space for mounting these patch panels is to be provided by the City. Panels are to conform to Category 6 Ethernet specifications, and are to be of the punch-down variety, using standard 110 connections.

Labelling. (not boxes, individual cables)

All terminations shall be labelled with room and box number using the format xxx-xy (as in 105-3a). The first 3 digits shall correspond to room numbers as seen on the building layout (not included in this document – contact to obtain). The digit following the dash shall correspond to drop location within a room. The final space shall be a letter designating each individual cable/port at that drop location. Thus, for room 110 with two dual gang drop locations, they would be labelled 110-1a, 110-1b, 110-2a, and 110-2b.

Labels shall be placed on both endpoints of each cable run, to allow for quick visual identification and matching. Labels may be printed or hand written, as long as they are legible, using smear-resistant ink.

Submission Procedure

Interested parties should submit a written quote to the Rolla Police Department by 5:00 pm Friday, September 30.