

TECHNOLOGY

DESCRIPTION and EXTENT of EXISTING TECHNOLOGY INTEGRATION

The following is our initial assessment portion of the report.

Our observations during the site visit relative to existing technology in this facility are presented for your use, review and consideration.

FACILITY LAYOUT:

In this section we present our observations of the physical building and structure relative to its supporting of technology. Any commentary made about building materials and related items is made from the perspective of its relationship with and to technology, not on its condition, suitability or other capability. Comments and assessments from other engineering disciplines for these areas are included in other sections of this report.

The high school is comprised of multiple buildings configured with common exterior areas. Instructional and functional programs designate the buildings. We observed block walls with suspended ceilings. The construction of hard walls and suspended ceilings result in surface mounted outlets and horizontal cabling along corridor locations. Conduit is installed between and among the buildings.

For this study, we present our observations by categories that have shown to be beneficial in clearly showing the relationship and function of technology. The categories of the physical infrastructure will be presented first, followed by the various systems and components. For example, the voice wiring observations will be presented in the infrastructure, but the telephone system and instruments will be presented in the voice systems.

INFRASTRUCTURE:

In today's schools, the term infrastructure is applied to the cable, wire and systems installed to provide the capability to connect technology devices for access to resources. To be more specific, the typical and common educational infrastructure would be comprised of the wiring for the telephone and public address system, the data network and the video network. This is generally referred to as the voice, video and data network. The person reading this report may want to think of this area as the physical wiring and cabling that is in the walls and not readily seen. This is also the area that is typically the hardest and most costly to deal with "after the fact." The infrastructure is not limited to these topologies and technologies.

VOICE INFRASTRUCTURE:

The Wayland High School has a voice infrastructure in place. The wiring system supports telephone, intercom and public address functions. There is wiring in place to a combination clock/speaker unit in the classrooms. Telephone instruments in office areas are supported by the current voice infrastructure. The current voice infrastructure runs via conduits from the system location to the various buildings.

VIDEO INFRASTRUCTURE:

The Wayland High School has no video distribution wiring system in place. A cable television franchise I-loop feed and interface were brought to the campus some time ago but are not in usable condition.

DATA INFRASTRUCTURE:

The Wayland High School has a data infrastructure in place. We observed category 5 cabling outlets at locations throughout the facility. The typical classroom has one (1) data drop connected to switches / hubs located in the individual building and then fed to the head-end via the underground conduits. Likewise, there are three (3) computer labs wired with network drops with hubs utilized to achieve the desired connectivity counts. The typical office has one (1) data drop per person with one (1) data drop per office cluster for printers. There are no drops in various common spaces. There is a data drop for a networked printer in each building. The placement of the data drops reflects the ability to install the infrastructure given the material composition of the walls and the layout of the facility. Volunteers accomplished the current data infrastructure installation during NetDay.

The current data infrastructure is category 5 drops emanating from the room locations to a wiring point in each building run back to the main head-end location via underground conduit. The exception to this is the Fine Arts building where there is a four-strand multimode fiber optic cable run between this building and the head-end. The selection of wiring locations and the layout of the existing wiring infrastructure and how this is accomplished highlight the considerations that must be given to infrastructure wiring. Understanding the limitations of the various topologies relative to price and performance is important. Consideration for distance limitations must be taken. The current wiring distribution locations points out one of the issues associated with a facility that has aged and was not originally designed to accommodate facility-wide technology cabling and wiring.

SYSTEMS AND COMPONENTS

VOICE SYSTEMS:

The voice technology system in the Wayland High School is a mix of communications equipment. The intercom and public address controller is a Rauland Telecenter system. The typical classroom has a ring-down style phone providing intercom functionality only. There are combination clock/speaker units with call switches in common areas. The

interface and installation of these systems and products results in the level of functionality currently in place at the school.

There is a limited telephone system in place. Telephone instruments are installed in office areas of the buildings. We observed AT&T handsets in place. Centrex service from Verizon is utilized for the telephone system with voice mail being provided through Verizon's current voicemail service.

VIDEO SYSTEMS:

We did not observe any building-wide video wiring in place. No active video head-end distribution equipment/system was observed. No cable TV broadcast or reception equipment was observed.

There is a satellite dish. We were told that the dish is not utilized due to low interest and the MCET program being discontinued.

We observed no television sets or permanently mounted video monitors. The school has a small quantity of audiovisual equipment such as digital cameras, video cameras, quick cams, etc.

DATA SYSTEMS:

The current data infrastructure is supported at the wiring distribution locations by category 5 devices. The devices include patch panels, 10/100 switches, hubs, switch and fiber optic modules. The backbone is 100 Mbps with 10 Mbps to the classrooms. All devices are industry standard devices and match the configuration and layout. Components observed were Cisco and HP.

As stated previously the current wiring distribution locations are spaces/areas that were not originally designed for these functions. These locations lack the proper environmental and physical considerations.

TECHNOLOGY COMPONENTS:

The school is predominantly Apple / MAC based. 99% of the instructional computers are Apples / MACs. These are comprised of PowerMac 5500, IMacs and IBooks. Offices and administrative areas have PCs. The typical classroom has one (1) workstation. There are printers networked at various locations in the buildings. Typically there is one (1) networked printer for each instructional area. There are three (3) dedicated computer lab spaces. There is also one (1) Apple mobile lab. There are workstations available in the Library.

In addition to the aforementioned devices the school has approximately six (6) scanners, digital cameras, digital video cameras, VCRs, video editing equipment, midi keyboards

for music and various external workstation devices and accessories such as probes for science.

The High School serves as the head-end for all of the schools. Twelve (12) servers and the school district's firewall are housed in this facility. There is a VPN set up with access through a cable modem. The school administration building is served via an ISDN circuit. The school is using LOTUSNotes for e-mail.

MASTER CLOCK SYSTEM:

A master clock system is installed in the main office. Various clocks were replaced last year.

INITIAL COMMENTS & RECOMMENDATIONS:

INFRASTRUCTURE:

The data infrastructure in place does provide capabilities to the different areas of the building. The physical structure of the building does not make additions to this network easy. We commend those volunteers who have provided the infrastructure in its present form. The main wiring distribution locations function adequately given the conditions. In their present condition, there are drawbacks (location of equipment, environmental issues, expansion limitations, etc). We would look at options during a renovation / addition to address these issues. Again, we recognize that someone had the creativity to utilize these spaces as they have. We realize that current building options are limited and this is why these alternatives were chosen. A renovated facility would provide for designed wiring locations and enable a comprehensive and complete data infrastructure to be in place. The infrastructure would provide for outlets terminated in outlet boxes and wiring routed in conduit or in an appropriate manner. This infrastructure would also allow for a greater density of technology outlets in all classrooms and spaces through the facility. The cost to do this during renovation or addition is far less than a piece-by-piece approach with the current facility conditions. Dependent upon what direction and scope the project would take, consideration would be given as to the feasibility of retaining the existing infrastructure.

We would also recommend that a fiber optic backbone be installed to and between all of the buildings.

It would be our recommendation to provide a dedicated technology outlet for the teacher / instructional person in each space. This drop would encompass not only data but video and other technological capabilities as well. For example, this would allow for the display of information on the teacher's workstation to be viewed on a large screen monitor or projection screen in the room. We would also recommend that a review of the number of drops per room be undertaken. It is our understanding that the reasons for the current

configuration of one (1) data drop per typical classroom were funds/budget and electrical outlet limitations. It is our opinion that there would be a desire to increase the quantity of data drops throughout the facility. This would also address connectivity in areas that presently do not have any drops.

There should be an analysis of and plan relative to video infrastructure. Consideration should be made regarding this topology and its potential offerings to the students and staff. Educational video programming and bi-directional programming could be powerful educational tools. Discussions with the local cable television franchisee should take place so that services could be provided to the facility that are in line with those being provided to other educational institutions.

We strongly recommend that the voice infrastructure be reviewed and analyzed. The problems reported with the intercom system could be attributed to the current routing of the infrastructure and the associated conduit. The condition of the cabling and/or the associated conduits underground may be compromised and the source of the problems. In a new or renovated facility conduit and cabling for the specific conditions would be provided.

SYSTEMS:

All of the systems for all of the technologies would be reviewed as part of a renovation or new facility project.

The current network system equipment would be replaced with newer higher speed systems in a redesigned head-end location. The existing equipment would be evaluated as to re-purpose or other functionality.

An adequately designed video head-end system could be installed to provide true educational video functionality. This would allow for information from various and different information sources to be received and utilized in the classrooms and other locations in and among the buildings. There would need to be a discussion relative to this functionality since it represents the expenditure of funds and may or may not be aligned with the school's educational or community philosophy.

The voice system would be analyzed extensively in light of the various operational and functional issues. An upgrade or replacement of the existing system could be proposed such as to provide for intercom and public address system functionality along with fully functional telephone instruments. This would also take into consideration user system requirements and other communications advances, as well as compatibility with various voice communications services. One option would be to install a full PBX with its own voice-mail system. We would also look at the current Centrex service going forward.

COMMENTS AND CURRENT CONCERNS:

Technology repair and maintenance is done “in-house.” This is to be commended. Service and maintenance should be discussed going forward so that as “other” are added or current technologies change, there is a plan for handling and providing the level of service desired.

The current voice communications system, infrastructure and pathways are a major item that should be brought to a resolution as soon as possible.

There are concerns relative to the ability to provide additional electrical outlets and service for additional technology devices.

The wiring distribution locations (head-end, switch locations, etc.) would be provided with proper space and environmental considerations, such as air treatment.