

Chabot-Las Positas Community College District  
**Bond Measure**  
**Technology Improvements**  
**Supplement to Capital Improvement Program**

**Guidelines for Technology Estimates:**

The Capital Improvement Program for both Chabot and Las Positas Colleges contain new construction projects or facility renovations that require technology improvements in the data network and computer equipment as well. The new technology improvements required to support this capital project effort are addressed in two parts. The first part includes technology changes related to the facility structure such as fiber optic wiring and conduit between buildings required for the District networking infrastructure. These types of costs have been incorporated in the facility costs for all the college buildings for both renovations as well as new structures under the category “Campus Repairs”. The second part includes classroom equipment, network devices, communication equipment to support data, video, or voice, and all technology advancements that support the instructional environment. These types of costs are either segregated to the specific college under the category “Computers & Equipment” or aggregated for shared network and communication equipment under the “Technology Upgrades” category for both colleges.

The ultimate desire for the students is to have open access to learning experiences and college services at any time and any place. Therefore, the advances in technology to provide on-line access either from campus or from a remote location achieves this objective and additionally improves the overall communication with the students to help them succeed in their educational goals. So technology is no longer just an “nice-to-have” aspect of our educational environment, but now has become an integral part of the student learning experience for all disciplines, even with the most unconventional uses of computers like art and music. Therefore, the District wants to ensure that it provides high quality technology support for all instructional programs and administrative services.

**Network Infrastructure:**

Network equipment and cabling upgrades for the colleges has progressed at a slow pace contingent on available budgetary funds which did not allow the District to make modernization improvements as needed to keep up with the current technology trends. Therefore, the bond measure will give us an opportunity to replace or upgrade the entire campus infrastructure to achieve a state-of-the-art topology.

The technology improvements will include a new fiber optic cable plant with sufficient strands of both multi-mode and single-mode fiber from the computer data center to each of the college buildings. At Chabot College, all buildings with the antiquated coax cable will be updated to the latest wiring standard. The objective is to get rid of all the old coax

and cat3 cabling throughout the Chabot campus, which was, not only slow but also had the potential of bringing entire segments of computers down when a failure occurred. At Las Positas College, there exists no coax cable in the existing buildings and so the intent is to continue the fiber optics and communication loop on campus for all new structures. Future data and video networking technologies will include high-bandwidth transport and a comprehensively planned cable installation. In addition, fiber should be installed to support future voice communications so that we can achieve voice over IP, thus merging the data and voice components. Plans for the fiber installation will continue to perform upgrades every 2-3 years on the edge switches to take advantage of the emerging technology to migrate from 100 MB fiber to 1 GB fiber then to 10 GB and finally to 100 GB.

The technology infrastructure upgrades will include a dedicated technology closet or room with appropriate security, environmental conditioning, and alarms. The planned modifications require a complete renovation of the campus data communications main distribution facility (MDF).

Another area that needs to be addressed is updates to the core switches and routers within the network infrastructure. The District did adopt several years ago the Cisco switch and router as equipment standards for all locations; however, funding has limited the replacement of existing switches and hubs, especially at the older Chabot college. The new switches will handle the new IP video as well as voice over IP.

Investment in new network monitoring and alert tools will need to be added to ensure 24 x 7 availability and to identify potential traffic congestions that could affect the network performance. As technology becomes a more integrated entity in our educational environment, the need to maintain, monitor, and manage technology performance standards to ensure the network infrastructure meets the needs of the college community becomes increasingly important. The network traffic tools will analyze inbound and outbound activity and provide on-line alarms and various reporting to track trends. Additional test equipment and network analyzers will be provided to troubleshoot fiber optic connections and network connectivity.

In addition, security enhancements to the PIX firewalls will be required to keep abreast of the technology to avoid unauthorized entry into our secure network. The new equipment will provide for "fail over" redundancy as well.

### **Other Network and Hardware Improvements:**

All campus servers will be replaced with the latest hardware technology to maximize processor capacity and speed to support the college computer needs. Redundancy of servers will be a requirement for all critical applications to guarantee system operation.

Hardware upgrades will also be performed where appropriate based on the Total Cost of Ownership (TCO) model utilized by the California Community Colleges. Hardware replacements or updates need to be implemented to ensure 100TX connectivity to the

workstation and gigabit connectivity to the backbone. Also, the colleges need to maintain currency with industry practices and other transfer institutions. Printer capabilities will be consolidated where appropriate across the campus. Network and local printers will be replaced or upgraded as well in accordance with the TCO model.

Uninterrupted Power Supply (UPS) devices are crucial to the operation of our network services when unexpected power outages occur at the colleges. Replacement and/or upgrade of the UPS will be performed every few years based on network stability statistics.

The network infrastructure and security protections will be upgraded to implement Virtual Private Network (VPN) capabilities to make on-line resources accessible from off campus. Currently, the District has made selected services available such as email, discussion board, and library databases and catalogs, but was not able to do so for all other resources without the additional VPN infrastructure.

As the data improvements are implemented, the need to integrate the voice services will be amplified in order to take advantage of the new technology capabilities. With the new fiber network, new phone services with voice over IP features will be installed for both campuses.

### **District Data Center**

The physical location of the District Data Center, which provides the network connectivity, hardware, and software to support the instructional and administrative computer needs at both colleges, was reviewed for potential options. With the advancement in technology for data lines and bandwidth, the location of the Data Center can be in at any one of the three sites – District, Chabot, and Las Positas.

The District facility was eliminated as a choice since there is not ample square footage available to house even the existing District ITS space, nevertheless, allow for expansion in the future. The Chabot campus has been historically the site of the Data Center; however, the college has experienced increasing demands for classroom space that conflicts with the District ITS space needs. The current ITS facilities at Chabot are inadequate in size and configuration to meet the current and anticipated staffing and technology infrastructure requirements of the colleges. In contrast, the Las Positas campus has adequate space available to build an Information Technology Services (ITS) Building, which can be shared by both the District ITS and Las Positas ITS resources. Additionally, the current ITS data center at Chabot is extremely vulnerable to natural disasters such as earthquakes due to its location along the Hayward fault line whereas at the Las Positas campus the risk associated with earthquakes is considerably less.

The Las Positas option was deemed the best choice based on space availability and reliability as well as proximity to the District where other ITS resources exist. This proposed building will be 8,500 square feet and will provide adequate expansion, added security, operational efficiencies, and better protection against potential earthquake

disasters. This building will consolidate the network infrastructure, administrative and instructional servers utilized by the District as well as the colleges, and office space for the ITS staff from both the District and Las Positas.

It should be noted that the costs for relocating the Data Center will still be realized if the Chabot site was selected, since the renovations of Building 300 would still require an alternate site for data communication and server services during the construction. In the case of Las Positas, the new site would be built first and then the Data Center relocated. For Chabot, the equipment would require moving to the alternate site while renovation is in progress and then relocating back to the original site. This would result in much more labor and equipment costs during the construction period as well as it would introduce more system downtime for the critical District IT operations. Therefore, it makes more prudent and economic sense to select the alternative with the least costs and least interruption of service.

For the primary data center location, generators will be purchased to ensure full operation during any major power outages. In the past, these unplanned power outages have interrupted the instructional services by as much as one full day, impacting instructors and students during registration, final tests, and on-line course work. Smaller generators will be acquired for the phone system for both colleges as well as the remote server room at the college that does not house the primary data center.

All primary data lines will be upgraded from T1 to T3 for increased bandwidth and traffic throughput. These include port-to-port T1 lines as well as ISP lines for Internet services. All servers supporting the campus wide general services such as email and Web applications for Internet and Intranet will be upgraded and maintained under the TCO model.

### **Classroom Advancements:**

Portable wireless technology will be introduced into the classroom environment with the appropriate security levels due to the escalating demand for flexibility and sharing of computer assets for instruction. Mobile carts will be adopted so that the wireless technology can be shared across campus locations. The vision for the classroom environment is to seamlessly allow students to connect their own laptops or Personal Data Assistant (PDA) to the appropriate campus server using wireless technology; thus allowing faculty to access student's work on-line.

Wireless technology is simply a replacement for the single cable that connects every campus computer to the network. Instead of wiring, a small radio transmitter and receiver replace the wiring allowing communication over limited distances, typically 300 feet or less. For wireless technology to operate, the user's computer needs a wireless adapter card and there needs to be a wireless access point connected to the physical network. As is evident, the wireless technology provides an easy and cheap method for access throughout the colleges as well as the ultimate flexibility for transportability.

The classroom setting continues to expand its usage of computer applications, videos, DVD, and Internet access to augment the learning setting. "Smart classrooms" are electronic or technology enhanced classrooms that integrate networking, computers, and audiovisual technologies to allow multimedia and Internet access within the classroom. In addition to local computer access, there is a need for expansion to show information or research data from outside resources worldwide. It is envisioned that the lecture classroom settings will require the installation of multi-media PC/video/audio capability. The lecture rooms will be designed to become "smart classrooms" with computer workstations, wireless keyboards, LCD projectors, VCR and DVD facilities, retractable viewing screens, touch screen control, slide projector, cassette player, and stereo amplified sound. Currently there are not very many "smart classrooms" at Chabot College whereas Las Positas has most of their classrooms with this technology. The objective is to make this the standard classroom setting for both colleges and to continue to upgrade the equipment as new technology advances are on the market. Portable laptops for instructors will contain standard application software with plug-ins for usage in any classroom. Facilities for digital media will be improved to encompass audio, video, film, and graphic design.

A less mature technology is emerging in the classroom replacing the chalkboards or whiteboards. "Smart" boards are essentially electronic whiteboards with the capability of recording pen strokes. These pen strokes can be transmitted to remote sites, recorded as streaming media, or storing and posting snapshots of the board to a server for usage as a web page. These devices will be incorporated in the majority of the college classrooms. In addition, electronic scanners for facilities access and services will be utilized where appropriate throughout the campus.

With the continued expansion of Distance Education courses as well, the computerized facilities are becoming an integral part of the student experience. The recent adoption of the Blackboard Course Management Software system for the Chabot and Las Positas colleges as the District standard has facilitated the expansion of these offerings. For some classrooms, the ability to broadcast on-going teaching sessions to the Web in "live" streaming mode will provide another forum to provide distance education to students. Technology improvements will be implemented to handle video on demand as well as streaming multi-way audio for faculty and students with connectivity through the Web. These streaming audio and video facilities will provide the forum for desktop videoconferencing in the future without needing to go to special facilities for such services.

For each college, conference room capabilities with a technology focus will be required to support technology-enhanced instructional and community conferences, similar to the current model used in industry for executive education. These reserved spaces would serve as a multi-purpose amphitheater with rows of linked tables, built-in computers with display screens, with projection and broadcast camera capability. The tables or desks will be designed so that they can be used for general conference purposes and then converted into computer tables by using pull-up panels with the computer display and keyboards. The proposed Multi-Disciplinary Education Building at Las Positas is an

example of this type of facility with accommodations for conferences, smart classrooms, media center, and instructional design innovation center.

Videoconferencing facilities will be expanded at each of the colleges to provide increased accessibility to this technology for meetings and conferences across the District. In addition, the video conferencing will be converted to IP technology so that the site connections can accommodate more than two locations. The data communication lines supporting the Videoconferencing will also be upgraded to handle increased bandwidth and additional lines will be installed as traffic increases. Extension of these Videoconferencing facilities for usage outside the District to other colleges or universities will also be made available.

With the introduction of these expanded technologies, the colleges will make the shift from a campus-centric to a consumer-centric model where learning centers will extend to homes, libraries, networks, job sites, and community groups. Thus, course content will include video and digital images with text and audio rather than blackboards and books.

### **Application Software Enhancements:**

There are several software improvements that the District will pursue to improve the instructional environment for faculty and students as well as benefit the administrative resources.

Within the Banner Student Information System there exists a module “Web for Faculty” that would allow all faculty activities to be performed via the Web. This would include all student rosters, student grades, grade posting, and all classroom oriented tasks. In addition, the District will be acquiring a third party product to facilitate Room Scheduling with resource assignment and tracking capabilities. Both these software tools will significantly enhance the faculty’s on-line functions.

Throughout both colleges, the demand for a centralized Document Management System for storage and retrieval continues to increase. In addition, the variety of forms and procedures associated with the usage of these forms has warranted the need for a more automated approach with on-line Forms management containing electronic signature capabilities. Finally, a method to consolidate electronic correspondence such as email, voicemail, and fax services to facilitate the flow of information and improve the usability will be pursued. The District will provide an automated district-wide solution for these services so that we can transact business using our automated information systems.

### **Summary of Computer Technology Costs:**

The facility improvements at each of the colleges determined the extent of the proposed technology enhancements to support the modernization plans for existing buildings as well as the addition of new buildings. In the following chart, the proposed technology costs are categorized by college and by type of equipment.