



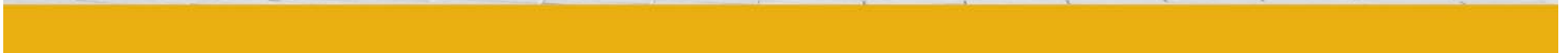
C H A B O T - L A S P O S I T A S

| *Community College District*

Total Cost of Ownership

February 21, 2017

WHAT IS TOTAL COST OF OWNERSHIP?





Total Cost of Ownership Definition

- The **total cost** of a building from start to end including:
 - Planning, Design and Construction
 - Annual Operations Cost
 - Custodial
 - Maintenance
 - Grounds
 - Utilities
 - Renovation, Repurpose, Demolition

WHY DO WE CARE ABOUT TOTAL COST OF OWNERSHIP?





Stewardship

- The District's buildings and grounds are precious assets entrusted to our governing board, to be protected, maintained and optimized for future generations.
- Represents a high level and pervasive commitment to optimize our capital investment
- Effectively utilize our resources to ensure a healthy, comfortable, and sustainable learning environment.



Key Performance Indicator

Total Cost of Ownership is a Key Performance Indicator of how cost effective an organization

- Designs
- Constructs
- Operates
- Maintains
- Upgrades and Renovates

An indicator of accountability



Accreditation

Recognizing the imperative nature of Total Cost of Ownership (TCO) to the long term viability of our educational institutions, the **Accrediting Commission for Community and Junior Colleges (ACCJC)** has made TCO an essential and required standard:

Standard II.B.4:

Long-range capital plans support institutional improvement goals and reflect projections of the total cost of ownership of new facilities and equipment.





Board Policy

BP 3250 Institutional Planning

AP 3253 Total Cost of Ownership

“Implementation of the District Facilities Master Plan will reflect projections of the total cost of ownership and be consistent with the District Total Cost of Ownership Plan which includes expenses associated with deploying, using, and retiring facilities and equipment, including operating costs for ongoing and deferred maintenance, and personnel costs, both administrative and direct staffing.”



Objective

To create a **data driven** approach to:

- Understanding
- Projecting
- Planning for
- Reducing

the **Total Cost of Ownership**

THE ELEMENTS OF TOTAL COST OF OWNERSHIP



The Building “Cycle of Life”



1. Planning, Design, Construction

- One time costs
- Capital expense funded by Bonds, State, District Funds
- Facility Master Plan supports Educational Master Plan
- Projects support Program Review
- 5-Year Capital Improvement Plan
- District Standards



2. Annual Operations

- Ongoing expenses
- Custodial
- Maintenance
- Grounds
- Utilities
- Scheduled/Preventative Maintenance
- Repairs



3. Renovation, Upgrade, Demolition

- Repurpose of existing facilities
- Updating infrastructure/Technology
- Code changes
- Major Building Component Replacements
- Demolition of facility when no longer viable



APPA Levels of Cleaning

Level 1 – Orderly Spotlessness

Level 2 – Ordinary Tidiness

Level 3 – Casual Inattention

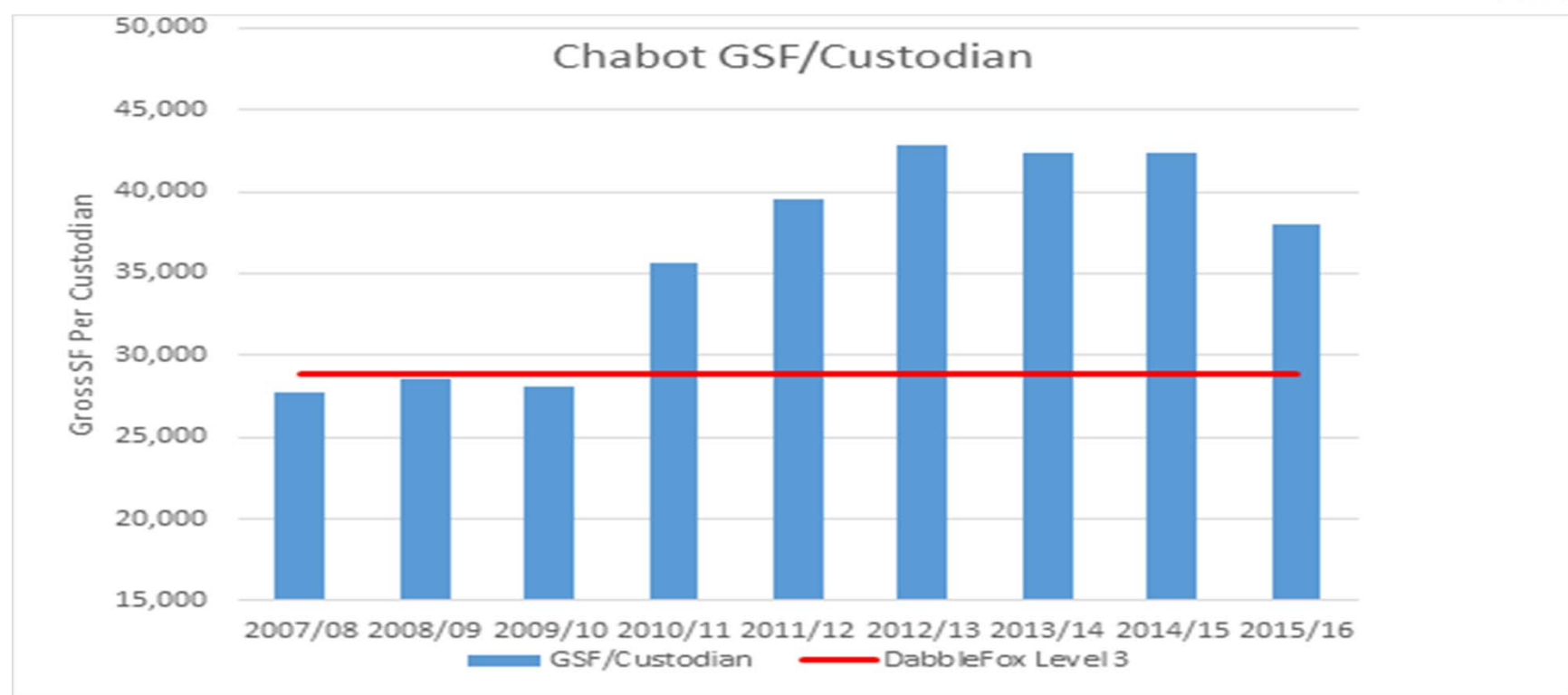
Level 4 – Moderate Dinginess

Level 5 – Unkempt Neglect

APPA – Association of Physical Plant Administrators now renamed Leadership in Educational Facilities



Districtwide GSF/Custodian



GSF – Gross Square Feet



APPA Level Staffing Recommendations

Las Positas	Level 1	Level 2	Level 3	Level 4	Level 5	Actual15/16
Maintenance	10.5	7.5	6.0	4.0	3.0	5.5
Custodial	48.0	28.5	18.0	15.0	14.0	16.0
Grounds	17.5	11.5	5.5	4.5	2	4.0

Chabot	Level 1	Level 2	Level 3	Level 4	Level 5	Actual15/16
Maintenance	17.5	13.3	10.0	6.5	4.0	7.5
Custodial	83.0	49.0	28.0	24.0	20.5	22.0
Grounds	23.0	15.0	8.5	6.0	2.5	6.0

Total			76	60		61
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“88% of Higher Education Facilities maintain a Level 3 or better standard of cleaning”



Table 4.2.2.F Combined 5 Year Projected M&O Staffing and Costs



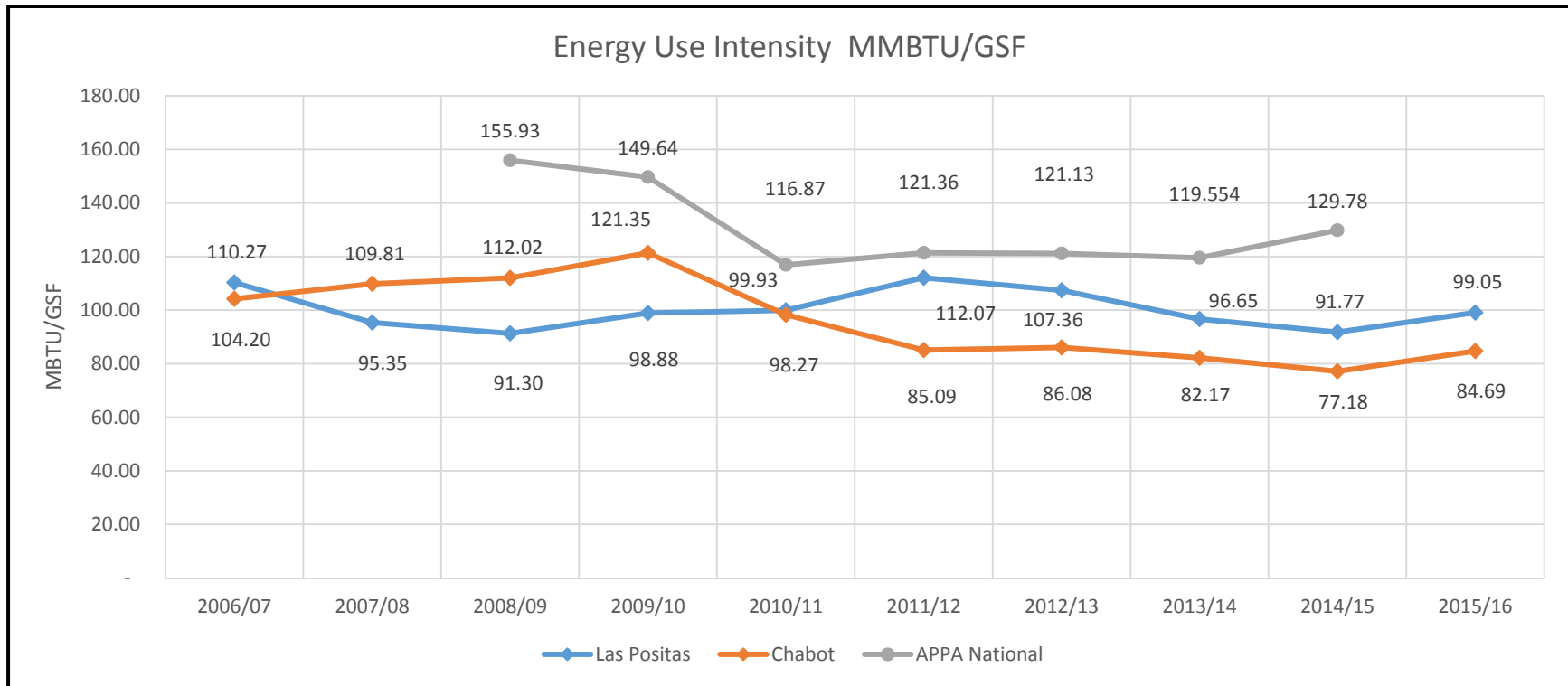
Projected M&O Staffing Costs

Current Staffing APPA Level 3 Staffing

CLPCCD	FY 16/17	FY 17/18	FY 18/19	FY 19/20	FY 20/21	FY 21/22
Gross SF	1,181,372	1,181,372	1,223,869	1,225,133	1,275,698	1,325,109
Maintenance	14	16	17	17	18	19
Custodial	38	46	48	48	50	52
Grounds	10	13	14	17	17	17
Management	4	4	4	4	4	4
Total	66	79	83	86	89	92
Est Staff Cost	\$6,262,664	\$7,206,932	\$7,576,007	\$7,865,561	\$8,248,660	\$8,633,790
Est Cost/GSF	\$5.30	\$6.10	\$6.19	\$6.42	\$6.47	\$6.52



Energy Use Intensity



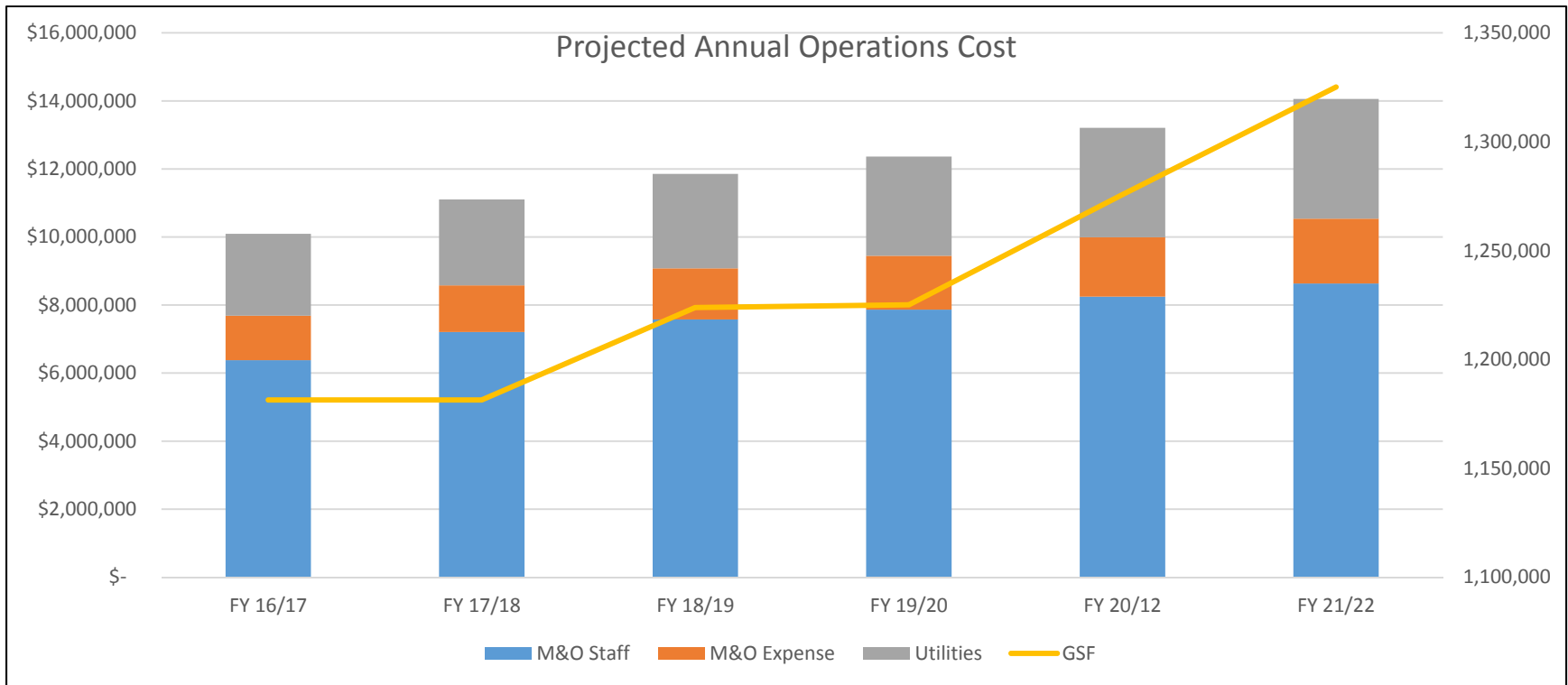
Projected Total Annual Cost

District Wide	FY 16/17	FY 17/18	FY 18/19	FY 19/20	FY 20/21	FY 21/22
Gross SF	1,181,372	1,181,372	1,223,869	1,225,133	1,275,698	1,325,109
Total Staff	66.0	79.0	83.0	86.0	89.0	92.0
Maintenance	\$1,665,879	\$1,815,805	\$1,934,889	\$1,951,091	\$2,109,566	\$2,259,583
Custodial	\$3,319,069	\$3,761,022	\$3,931,468	\$3,969,288	\$4,167,522	\$4,382,012
Grounds	\$944,381	\$1,160,165	\$1,239,710	\$1,475,242	\$1,501,632	\$1,522,255
Management	\$451,593	\$469,940	\$469,940	\$469,940	\$469,940	\$469,940
Total Staff Cost	\$6,380,922	\$7,206,932	\$7,576,007	\$7,865,561	\$8,248,660	\$8,633,790
M&O Expense	\$1,305,455	\$1,370,728	\$1,504,081	\$1,580,565	\$1,741,914	\$1,904,105
Total M&O Cost	\$7,686,377	\$8,577,660	\$9,080,088	\$9,446,126	\$9,990,574	\$10,537,895
Utility Cost	\$2,404,821	\$2,525,062	\$2,775,227	\$2,916,232	\$3,218,670	\$3,519,812
Total Operations	\$10,091,197	\$11,102,722	\$11,855,315	\$12,362,358	\$13,209,244	\$14,057,707
Year/Year Increase	0.0%	10.0%	6.8%	4.3%	6.9%	6.4%

TCO Cost is primarily a function of Square Footage



Projected Total Annual Cost



The Action Plan

1. Funding for M&O functions must be proportional to facility square footage, not FTES (Full Time Equivalent Student)
2. Project Development to consider Educational Master Plan, Program Review, Facilities Master Plan, Cap/Load Ratio, District Standards and Lifecycle Cost Analysis
3. The District set a goal and fund M&O to achieve an APPA Level 3 standard of cleaning and operations
4. The District shall develop and maintain a Preventative Maintenance Program



The Action Plan

5. M&O shall implement an updated Work Order System tracking and reporting response data
6. Lower Energy Usage and Costs per GSF by implementing energy generation and conservation projects
7. Identify and integrate deferred maintenance projects into the state funded program or as a part of Measure A



Total Cost of Ownership – Information Technology



- Technology equipment must follow the same TCO guidelines like Facilities and includes various categories of equipment to support new buildings, facility renovations, and refresh upgrade cycles for existing equipment in older buildings not under construction.
- The Measure B bond provided funding for Information Technology improvements to servers (application systems), desktops/laptops, audio-visual (smart classrooms), network and cabling infrastructure (wired and wireless), and generators/UPS for data centers.
- Growth in certain technology areas was more than four (4) times from pre-bond 2005 levels.
- For Measure B, CLPCCD District ITS and College Technology departments did follow the TCO model for hardware and software purchases, installation, training, and maintenance support.
- Staffing support lagged the levels recommended by TCO analyses since the Measure B expansion is being supported by the same staff level since 2005.



TCO for IT – Industry Definition

- Total Cost of Ownership for Information Technology was first coined by Gartner Group in 1987. Gartner, Inc. is regarded as a leading information technology research and advisory group. From the Gartner IT Glossary of terms, TCO is defined as:
“... a comprehensive assessment of information technology (IT) or other costs across enterprise boundaries over time.. including hardware and software acquisition, management and support, communications, end-user expenses and the opportunity cost of downtime, training and other productivity losses.”
- These costs extend over the “life” of the Technology, which can vary depending on economic, service/functionality and depreciation factors. (CLPCCD uses the “service life” of the equipment).
- The Gartner model uses the IT Key Metrics Data (ITKMD) to calculate a price for infrastructure and operations with recommended IT staffing levels.
- Gartner is the TCO model that was used to do an IT analysis to see how CLPCCD compares to the TCO recommendations for staffing.



TCO IT – Life Cycle

- The Total Cost of Ownership Life Cycle encompasses all phases of technology's usage from design, through procurement and deployment and through obsolescence.
- The various phases in the TCO Life Cycle include Planning, Procurement, Deployment, Management, Support, and Disposition.
- The ongoing costs of TCO include all expenses for staff, equipment, and support to execute these tasks.



TCO IT – What Costs are included?

Acquisition Costs

- System Design
- IT Hardware/Software Equipment
- Acquisition Process
- System Implementation



TCO IT – What Costs are included?

Hidden Acquisition Costs

- Diminished Performance
- Facility Improvements
- Network Upgrades
- Training (both IT and user training)
- Insurance
- Decommissioning (disposal old equipment)



TCO IT – What Costs are included?

Ongoing Costs

- System Maintenance
- System Upgrades
- User Changes (New requirements, customizations)
- System Management
- Staff Augmentation
- Ongoing Training (both IT and user training)
- System Downtime
- Audit



TCO IT – Service Life of IT Equipment

TCO costs will be based on the “service life” of the various equipment categories.
The Typical Life Cycles of IT equipment at CLPCCD are:

- Desktop/laptop computers: 4 years
- Servers: 5-7 years
- Printers: 5 years
- Network equipment: 7-10 years
- Audio-Visual equipment: 7 years
- Telephony systems: 8-12 years
- Network cabling: 20-25 years
- UPS: 15-20 years
- Generator: 20-30 years

Note: “Innovative” Technology that does not exist in the industry as of yet will make the current equipment obsolete and will reduce the “service life” when available.



TCO IT – IT Projects in Measure B

What IT projects were included in Measure B?

- Desktop refresh for 25% of desktops annual for a 4-year life cycle (11 refresh cycles completed from 2005-2016)
- Windows/Linux Server refreshes (2007, 2014) and new rollouts
- Enterprise AIX Server deployments (2007, 2012)
- Network equipment refresh (2006, 2009, 2012, 2014)
- Wireless network rollout (beginning in 2009)
- As required by new buildings and user requirements
 - Network equipment installations
 - Desktop/laptop installations
 - Audio-Visual “Smart” classrooms



TCO IT – Chabot IT Expansion

Chabot expansion during Measure B bond projects

Chabot

Resource	2005 Quantity	2016 Quantity	Growth Factor from 2005	Growth % from 2005
Servers	15	30	2 times	200%
Desktops	1600	2370	1.48 times	148%
AV (Smart classrooms)	47	161	2.46 times	246%
Network (wired)	<1800	5520	3.06 times	306%
Network (wireless)	0	118	+	



TCO IT – Las Positas IT Expansion

Las Positas expansion during Measure B bond projects

Las Positas

Resource	2005 Quantity	2016 Quantity	Growth Factor from 2005	Growth % from 2005
Servers	8	22	2.75 times	275%
Desktops	1175	1955	1.66 times	166%
AV (Smart classrooms)	21	114	5.42 times	542%
Network (wired)	<1200	4720	3.93 times	393%
Network (wireless)	0	80	+	



TCO IT – District IT Expansion

District expansion during Measure B bond projects

District

Resource	2005 Quantity	2016 Quantity	Growth Factor from 2005	Growth % from 2005
Servers	31	136	4.38 times	438%
Desktops	74	205	2.77 times	277%
Network (wired)	<48	384	8.0 times	800%
Network (wireless)	0	6	+	



TCO IT – Network Expansion

CLPCCD ITS expanded the Wide Area Network (WAN) bandwidth from the 2005 T-1 speed to the current Opt-E-Man Ethernet which was up to 22 times faster.

Connection	2005	2007	2016	Growth Factor from 2005
Chabot to LPC	3 x T-1 (4.5 Mbps)		100 Mbps	22 times
Chabot to District	1 x T-1 (1.5 Mbps)	2 x T-1 (3 Mbps)	20 Mbps	13 times
District to LPC (redundant link to Chabot)	1 x T-1 (1.5 Mbps)		20 Mbps	13 times



TCO IT – Under Measure B

Actions CLPCCD IT did to handle TCO for the Measure B expansion to reduce TCO costs and achieve productivity gains:

- Vendor Standardization: reduced incompatibility issues, support issues, administrative costs.
- Product Selection to provide the greatest performance and life cycle: Hewlett-Packard and IBM servers, Hewlett-Packard desktops, Cisco networking hardware and Commscope SYSTIMAX Category 6A cabling standards.
- Multi-Year Support Contracts with vendors for maintenance which provided increased availability of parts, skilled technicians for repair and timeliness of repairs.
- Stable IT Organization: long-time, experienced staff to keep deployments consistent and focused.



TCO IT- Under Measure A

What needs to be addressed for Measure A Bond projects?

- Develop an updated district-wide Technology Plan that addresses the technology aspects of facilities and equipment planning and aligns with the Facilities Master Plan, the College Educational Master Plans, and the District Strategic Plan.
- Follow guidelines for the TCO IT model for Acquisitions and Ongoing Support as did for Measure B.
- Addition of equipment to support Facilities Master Plan.
- Ongoing replacements for equipment life cycle and end of service life.
- Ongoing support with vendor maintenance and expertise for quick problem resolution.
- Staffing requirements: staff additions to reach Gartner and peer California Community Colleges staffing ratios.



TCO IT – Summary IT Staffing

Summary IT Staffing to Meet TCO Guidelines

Location	Actual Staff Count	Recommended Staff Count	Proposed Growth for 2017-2018	Future Growth for Measure A Phase 1
Chabot	6 (4 desktop/server, 2 AV)	9	+3	+2
Las Positas	5.5 (3 desktop/server, 2.5 AV)	7.5	+2.5	+3
District	5 (1 desktop, 3 server, 1 network)	8	+3	+1

