

# 1 Executive Summary

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## 1.1 Project Team

The team dedicated to delivering this effort includes:

Name	Title
Tom Bowen	Regional Director
Wendy Gumb	Account Manager
Ryan Dickerson	Program Manager
Peter Goodall	Architectural Auditor
Frank Garnetti	Mechanical/Electrical Auditor

## 1.2 Objectives and Deliverables

Engage in discussions with Mt. SAC to gain an understanding of current facilities and equipment management operations and planning. Perform on-site audits of the Mechanical/Electrical/Plumbing equipment on the main campus.

Review and assess:

- The facility maintenance plans of Mt. SAC and its contractors and related policies and procedures including, but not limited to safety, equipment and building maintenance plans.
- Current condition of MEP equipment.
- Current condition of the interior architectural finishes.

Deliverables:

### Maintenance Assessment

- Team interview results (current processes and perceptions).
- Engineered maintenance plan (recommendations for tasking, schedules)
- Benchmarking information (comparison to like facilities, IFMA, BOMA).
- Add equipment tags to major MEP equipment

### Facility Capital Plan

- Facility capital planning budget (20 year plan)
- Equipment inventory list (includes equipment id, estimated remaining life, criticality, and estimated replacement cost).





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- Deferred maintenance identification and recommendations for repair.

## Architectural Inventory

- Flooring, ceiling, and paint type inventory list.
- Deferred maintenance identification and recommendations for repair.

## 1.3 Assessment Methodology

- *DOCUMENTATION REVIEW AND INTERVIEWS WITH KEY ON-SITE AND CONTRACTED PERSONNEL* – The project team reviewed available documents to familiarize themselves with the facilities and to verify the current state of preparedness. Interviews with on-site management, contracted parties, and maintenance staff was then performed to gather critical information on historic performance and known deficiencies.
- *WALK-THROUGH SURVEY* – In addition to documentation review and interviews, our team also perform walk-through surveys to review current state of equipment, ensure existing policies and procedures are being adhered to, and to identify any failure to meet emergency response requirements or code/regulatory compliance.
- *REPORT* – Compile all field observation reports, along with documented interviews into a final working report document.

## 1.4 Summary of Findings

Despite the age of many of the building systems reviewed, in general we found the facilities to be reasonably maintained. Most of the buildings on campus have been renovated at least once since the original construction. A clear focus has been put on capital modernization over the last ten years.

During the assessment, over 2300 individual pieces of maintainable equipment were identified. All pieces of equipment were assigned a unique Equipment Tag Number so that they can be easily entered into the new work order management system. The Equipment Tag Number assigned follows the following naming convention:

### **Building # - Location/Floor – Equipment Name – Equipment Number**

For example, Water Heater #1 on the 2nd Floor of Building 8 was assigned “**8-2-WH-1**”

Of the 2300 pieces of equipment, over 1000 new labels were printed and hung on equipment that did not have identifying marks. A majority of the newly labeled equipment was mechanical equipment because most of the electrical equipment was already labeled to meet code requirements.

In addition to assessing the MEP equipment, our team also identified every flooring, ceiling, and wall type in every building, spanning almost 3000 different rooms. The condition of the finish or material was noted for each room as well.

## Capital Planning

While inventorying the equipment, the team also estimated the installation date of the equipment and the estimated remaining life based off of an industry estimated useful life and the current condition. Below is a



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summary of the estimated replacement costs over the next 5 years.

Year	1	2	3	4	5
Estimated Costs	\$3,452,912	\$585,617	\$673,371	\$1,369,411	\$2,166,719

The numbers were estimated to provide a ROM "like for like" replacement of the equipment. The estimate will increase or decrease by individual project based on potential engineering needs, unforeseen expenses, or other contributing factors. In general, the estimates can be used for capital planning purposes though.

It is important to know that budget numbers provided in the report represent Mt. SAC's needs just to keep up with expected equipment failure. Regular/routine maintenance repair costs are in addition to the replacement costs.

## FTE Maintenance Summary

Benchmark	IFMA Benchmark				Recommendation
	SF/FTE	Mt SAC Sq Ft Applied	Mt SAC Actual*	Variance	
Janitorial	22,536	63.65	55.00	-8.65	Increase custodial staff.
Electricians	285,000	5.03	3.00	-2.03	If additional resources are allocated, consider contracting electrical maintenance services Infrared Scans and Arc Flash Studies.
HVAC	257,000	5.58	3.00	-2.58	Additional PMs will = be coming online with the new work order system. <b>This will require more HVAC technicians to maintain the school's investment in existing and new buildings.</b>
Plumbing	495,000	2.90	3.00	0.10	No changes.
Controls	567,000	2.53	2.00	-0.53	Central Plant Employees
Painters	533,000	2.69	1.00	-1.69	Hire 1 painter.
General Maintenance Workers	121,000	11.85	3.00	-8.85	Hire at least general maintenance personnel to assist with Preventive Maintenance.
Carpenters	420,000	3.42	2.00	-1.42	Hire 1 carpenter
Locksmiths	850,000	1.69	1.00	-0.69	No changes.
Administration/Supervision	142,000	10.10	6.00	-4.10	Hire 1 Planner/Scheduler to Administer SchoolDude.
<b>TOTAL FTE SUMMARY</b>		<b>109.44</b>	<b>79.00</b>	<b>-30.44</b>	

\*Leads are counted in each trade.

## Resources:

International Facility Management Association (IFMA)

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## Maintenance Cost Summary

	IFMA Benchmark		BOMA Benchmark		Mt SAC 2013-2014 Budget		Comments
	Total	\$/SF	Total	\$/SF	Total	\$/SF	
<b>Annual Maintenance Expenses</b>	<b>\$11,469,510</b>	<b>\$8.00</b>	<b>\$12,028,929</b>	<b>\$8.39</b>	<b>\$8,966,514</b>	<b>\$6.25</b>	
Cleaning	\$3,603,228	\$2.51	\$4,024,226	\$2.81	\$4,301,227	\$3.00	
Repairs and Maintenance	\$3,815,520	\$2.66	\$3,987,649	\$2.78	\$1,782,131	\$1.24	
Utilities	\$3,614,703	\$2.52	\$3,687,141	\$2.57	\$2,790,651	\$1.95	
Roads and Grounds	\$436,059	\$0.30	\$329,913	\$0.23	\$92,505	\$0.06	

## Maintenance Staff Interview Summary

### 1. Role of Facilities:

Observation 1.1- Maintenance Group Mission- The staff was well educated on their individual responsibilities to the maintenance & operations of the college, however less supportive of the maintenance group mission.

- Recommendation: Define the role of the Facilities Planning and Management Organization in a simple, brief mission statement that the staff can remember, recite and support.

Observation 1.2- Campus Projects- More driven by Program and not by Facility Condition

- Recommendation: Use the Facility Condition Assessment, Fusion Report and other assessment documents to prepare a prioritized list of needs to drive long term facility asset preservation. This "needs assessment" should include a TCO (Total Cost of Ownership) approach for selection including maintainability, longevity, reliability, durability, etc.

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Observation 1.3- Maintenance Group Customer Satisfaction- There were no recent customer satisfaction surveys to suggest improvements and changes.

- Recommendation: Develop a list of questions that can constructively advise future use of the CMMS related to work requests, response, follow-up, comfort, expectations and needs. Create this survey, implement and initiate before introduction of the new CMMS to allow for input and modifications to the CMMS.

## 2. Organization:

Observation 2.1- Maintenance Accountability- MT SAC Facilities Operations & Maintenance is splintered into 4 work areas, Maintenance, Custodial, Energy (Central Plant), and Grounds/Transportation that report separately to the Director, Facilities Planning and Management.

- Recommendation: Consolidate the Facilities O&M by combining, at a minimum, the Energy, Maintenance and Custodial departments under a single leadership. This plan enhances the many times that coordination is required and needed between these groups and thus supports their common goals to the organization and optimization of everyone's work. Grounds and Transportation is also directly linked to these other groups; however the work and goals are not as clearly complimentary as with Energy, Maintenance and Custodial.

Observation 2.2- Maintenance Overlap- The HVAC Shop and Central Plant have similar roles and responsibilities, which can be both complimentary and conflicting, resulting in some cases of dual issue response, or worse, no response at all.

- Recommendation: Either combine these two roles or write very specific roles and responsibilities for each, including service procedures about specific work requests and where the primary role of response rests.

Observation 2.3- Maintenance Transparency- The current Facilities Planning and Management Org Chart is out of date.

- Recommendation: Revise and maintain the Organization Chart on a 6 month basis, so that everyone in the organization understands their position and role.

Observation 2.4- Maintenance Coordination/Collaboration- There is a lack of regularly scheduled and organized staff meetings.

- Recommendation: Maintain a rigorous schedule with a set agenda for meeting with all of the leads at least once a month (minimum) to discuss accomplishments since the last meeting, current issues, staffing, coordination, capital projects support, customers,



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upcoming projects or concerns, etc. Take notes and record actions items, follow-up on action item responses and issues.

Observation 2.5- Maintenance Group Reactivity- Most trade shops indicated their maintenance is primarily reactive or Corrective maintenance.

- Recommendation: Utilize the new CMMS to develop and implement preventive maintenance schedules and tasks in the system, then track any ongoing corrective maintenance on these systems and equipment to determine the impact of the preventive maintenance tasks.

Observation 2.6- Communicate Accomplishments- There is no indication that the maintenance group communicates their accomplishments.

- Recommendation: Develop fun facts that can demonstrate the value and need of a strong maintenance staff. Fun facts could include metrics relayed to performance of work or preventive maintenance, average length of experience of the Maintenance team, unusual skill sets needed for maintenance, and many different topics that can promote and communicate the value of the Maintenance team.

Observation 2.7- Recognize Accomplishments- There is no process in place to recognize or reward the maintenance staff for customer service excellence.

- Recommendation: Recognize and reward maintenance staff that continually performs beyond the normal level of service related to responses directly from customers work requests.

### 3. Staffing:

Observation 3.1- Maintenance Understaffing- Most trade shops felt they were understaffed in maintaining their work responsibilities.

- Recommendation: Develop and implement service request tracking of both corrective and preventive maintenance to understand staff utilization and service response in the maintenance group.

Observation 3.2- Custodial Absenteeism- As is common in this trade; there is a significant disruption of service and general labor inefficiency due to unscheduled or unplanned absenteeism.

- Recommendation: Gather the data related to absenteeism to understand frequency, reasons and timing. Utilize this data to understand the issues and then put a plan together to address this with the responsible personnel.

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Observation 3.3- Staff Training- many maintenance staff noted a lack of training, some related to new capital projects, but also some related to equipment (& technology) and also new responsibilities.

- Recommendation: Perform detailed skills assessments of maintenance staff related to their responsibilities for maintaining the current status and condition of systems and equipment.

Observation 3.4- Use of Technology- not all staff have the experience to manage the “technology” needed in the current operations.

- Recommendation: Assess the technology skills of the Maintenance staff and develop plans, procedures and training to bring everyone to a standard level of competence to perform their maintenance responsibilities.

Observation 3.5- Dedicated CMMS Specialist- There is no dedicated staff for implementing and managing School Dude.

- Recommendation: Hire one full time (FTE) staff to work with the implementation of the new CMMS for the Maintenance group. This position may require 3-6 months of implementation. Reassess the needs at that time to see what new responsibilities may be added if necessary, based on current work load.

Observation 3.6- Reporting- Utilization (Work Load) There is no current mechanism in place to assess staff work load.

- Recommendation: Develop and implement Maintenance Management Index reports to track staff utilization rates.

Observation 3.7- Reporting Metrics- Staffing per Square Foot (sf) of maintainable campus facilities- There is no reporting on MT SAC Staffing in comparison to industry benchmarks on a square footage basis.

- Recommendation: Develop and implement benchmarks to assess the maintenance staffing levels in comparison to other similar colleges as documented by industry standards, IFMA , BOMA, et al.

Observation 3.8- Institutional Knowledge- The maintenance staff is very experienced, which is a huge asset to the college. However some of the staff will be approaching retirement age within the next few years and plans need to be developed to capture and document the institutional knowledge of these staff prior to that time.

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- Recommendation: Develop a plan for each individual that focuses on timing, succession, responsibilities, knowledge, and history. The plan should focus on critical aspects of the campus, location of “hidden” or obscure equipment and systems, and documents & drawings that record locations for critical equipment.

## 4. Maintenance & Operations:

Observation 4.1- Facilities Website- there is no clear procedure to follow when requesting service.

- Recommendation: Establish a Facilities Website to instruct the customers on how to address work requests and specifically how to request service, who to contact, what to expect for response and follow-up, and what to do if you encounter additional issues. The website can also be used to communicate information about energy savings opportunities, capital projects, and promote staff with biographies and “fun facts” about the Maintenance group. This website can also be linked to HR for new employee orientation.

Observation 4.2- Purchasing- There was some frustration about the purchasing of supplies, equipment and vendors, which can be detrimental to delivering key services to customers.

- Recommendation: Assess the process of purchasing to see what modifications can be made in the process without eliminating or modifying any safeguards to procedures to protect budgets and finance.

Observation 4.3- Key Policy (Facility Access)- There was a great deal of frustration with the checkout, recovery and replacement of campus keys which is creating security issues and significant maintenance inefficiencies.

- Recommendation: Assess and evaluate the overall process of key issuance, as it relates to security and Human Resources.

Observation 4.4- Shop Upgrades- Many trade shops need upgraded systems and equipment to better perform their responsibilities.

- Recommendation: Assess the needs of shops by better understanding their roles and responsibilities, and what they maintain regularly.

Observation 4.5- Customer Service Expectations- There is a lack of stated customer service expectations for response, which is creating confusion between emergencies and normal requests.

- Recommendation: Establish and document measurable baselines for service expectations, and communicate these to all staff. Educate customers on the service expectations and limitations.



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Observation 4.6- Event Coordination/Impact- Campus events are disrupting normal maintenance schedules and creating inefficiencies in maintenance and operations.

- Recommendation: Develop or obtain a schedule of events that are planned (recurrent) and custom (singular or unplanned), and identify the disruption and impacts to maintenance and operations, including systems & equipment, timing, OT, resources, and supervision.

Observation 4.7- Maintenance Standards-There is a need for a greater emphasis on design and operational standards

- Recommendation: similar to recommendation 1.2 and 6.8. Maintenance staff should look closely at “what works and what doesn’t”, in all facilities, no matter the age or system. Assess the work order history to see where the most service requests are coming from and why.

Observation 4.8- Reporting Regular vs OT hours- There is a lack of reporting information which could assist in resolving staffing issues.

- Recommendation: Obtain a report comparing Regular to Overtime hours, historically, for each trade. Assess the amount of hours, timing, and reasons, and develop a plan to manage the time better if necessary.

Observation 4.9- Reporting Metrics- Cost of Maintenance & Operations per square foot (sf)- There is a lack of benchmark information which could assist in supporting better maintenance budgets.

- Recommendation: Utilize industry benchmarks to assess the levels of maintenance staffing and associated cost of operations. Compare by trade to assess where the maintenance group stands at this time.

## 5. CMMS-Facility Requests, Work Orders and Preventive Maintenance:

Observation 5.1- Existing CMMS needs better interaction with customers for follow-up, status, completion and closeout.

- Recommendation: Incorporate customer protocols in the new CMMS to improve customer visibility to their service requests.

Observation 5.2- Existing CMMS needs better Preventive Maintenance (PM) tools for scheduling, dispatch, tracking, and reporting.

- Recommendation: Implement Preventive Maintenance (PM) tasking to better manage systems and equipment condition.

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Observation 5.3- Existing CMMS needs better inventory and asset tracking to include model, s/n, manufacturer, location and serves.

- Recommendation: Organize and enter system and equipment information into new CMMS database.

Observation 5.4- Existing CMMS needs better cost tracking for labor, materials, supplies, equipment, tools and vendors.

- Recommendation: Maintenance staff needs to input labor hours, equipment, materials, supplies and vendor costs for work requests related to corrective and preventive maintenance as the work is performed.

Observation 5.5- Existing CMMS needs efficient issue routing, service procedures, status, transfer, completion and closeout process.

- Recommendation: Implement service procedures to detail work flow from request to completion and close out.

Observation 5.6- Existing CMMS utilizes too much paper and needs to incorporate more technology to be efficient.

- Recommendation: Assess the entire work flow process to identify areas that can be upgraded to be paperless, utilizing technology that is compatible to the maintenance operation.

Observation 5.7- Existing CMMS does not store documents, drawings, pictures or media related to the service request.

- Recommendation: The ability to include digital media in any work request can dramatically improve the communication of the issue as well as the status, completion and acceptance. It is recommended that whenever possible that photos are used to show conditions, documents and drawings be attached to work orders, and photos, documents and drawings be made a permanent record of the inventory of the systems and equipment.

Observation 5.8- Existing CMMS does not produce actionable data reports to manage the service request and preventive maintenance process.

- Recommendation: Develop and implement management reports to track service requests from initiation to final closing, including follow-up and work order transfers with notes and timing.

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Observation 5.9- There is no process in place to obtain and act on feedback from the customers (service requestors).

- Recommendation: Create a continuous process of feedback from the customers (service requestors) to gather data and information about needs and expectations

## 6. Facility Planning:

Observation 6.1- Capital Projects Communication- Maintenance Staff feels left out of the capital planning process, both in the planning (schematic, design and construction documents) and construction. Situation is improving but far from productive.

- Recommendation: Involve maintenance staff in all phases of the capital projects, starting with the design phase and continuing through commissioning and turnover/acceptance of the facilities.

Observation 6.2- Capital Projects Construction & Turnover- Maintenance Staff get limited access to Capital Projects during construction.

- Recommendation: Involve maintenance staff in the capital projects during the construction phase by having prearranged job site walks before construction activities bury utilities, close up walls, floors and ceilings and at final walk through's with jurisdictional authorities .

Observation 6.3- Capital Projects Commissioning- There is no formal process to the involvement of maintenance staff in Commissioning of Capital Projects.

- Recommendation: Maintenance staff (principally mechanical and electrical) should be present during startup and commissioning of systems and equipment, especially during functional performance testing.

Observation 6.4- Capital Projects Training- Maintenance staff get very little beneficial training prior to Facility Acceptance.

- Recommendation: New facility training should be scheduled for all maintainable systems and equipment, to include vendors where necessary, instruction manuals, O&M materials, video recordings and formalized classroom training for operators.

Observation 6.5- Capital Projects Warranty- Maintenance staffs are asked to provide building completion services prior to building turnovers.

- Recommendation: Refrain from using maintenance staff for building completion since this adds an additional burden and distraction to the work load of the maintenance team. This can also create warranty and liability issues for both the contractor and the owner at a time



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that is most critical to turnover of the facility. If someone else really needs to do the work, it is better to involve another contractor/sub-contractor than maintenance staff.

Observation 6.6- Capital Projects Warranty- Maintenance staffs are asked to perform warranty services after building turnover.

- Recommendation: Refrain from using maintenance staff for building completion since this adds an additional burden and distraction to the work load of the maintenance team. It would be preferable to solicit local vendors to complete such work, especially if this is to back charged to the original contractor as a warranty obligation. If maintenance staff must be called upon to complete warranty work on the facility than appropriate scope, schedule and budget must be agreed upon, and accounting codes established ahead of commencement of the work.

Observation 6.7- Capital Projects Warranty- Contractors are not held to their contractual warranty obligations.

- Recommendation: Capital Projects should hold Contractors accountable to their warranty obligations and utilize maintenance staff only as another set of eyes to understand the warranty issues or explain them to the contractor on site, if necessary. Maintenance staff should also realize that they too may have maintenance obligations during the warranty period. Contractor should turnover to Owner at Substantial Completion, a complete document of all warranties, vendors, subcontractors, and all contact information for warranty work to be executed at the least disruption to the owner.

Observation 6.8- Capital Projects Standards- Minimal standards related to the design, procurement, installation and operation of new Capital Projects exist.

- Recommendation: Standards are critical to the sustainability of the assets of the college. Maintenance staff should be responsible for defining the acceptable standards of design and operation of the products, systems, materials and equipment that are incorporated into new campus capital projects.

Observation 6.9- Capital Projects As-Builts- There does not appear to be an organized location or system to capture the institutional knowledge of campus projects, modernizations or renovations.

- Recommendation: Capital Projects and Maintenance staff should coordinate a space, accessible to both parties to organize the documents of college to be readily available for research and reproduction, as well as for outside vendors.