UNIVERSITY OF CALIFORNIA, SAN FRANCISCO
AUDIT AND ADVISORY SERVICES

Facilities Maintenance
Project #19-054

January 2019
EXECUTIVE SUMMARY

I. BACKGROUND

As a planned audit for Fiscal Year 2019, Audit and Advisory Services (A&AS) conducted a review of facilities maintenance by Medical Center Facilities Management (MCFM) to determine the adequacy of internal controls and processes in place related to facilities maintenance and monitoring.

MCFM provides preventative maintenance (PM) and corrective maintenance (CM) for UCSF Health buildings and assets on a recharge basis. MCFM carried out its responsibilities with a budget of $59.26 million in Fiscal Year 2018 (FY18). Additionally, MCFM receives recharge fees that generate revenue for work performed. Facilities maintenance operations are one of the most significant expenses related to buildings and assets and include the following primary interconnected maintenance activities:

- Planned/preventive maintenance (PM) – Maintenance works that are scheduled, routine and recurring maintenance to prevent breakdowns and mitigate deterioration
- Corrective/repair maintenance (CM) – Maintenance works that are required to correct both emergency and non-emergency deficiencies

In February 2015, MCFM started implementing a Computerized Maintenance Management System (CMMS), Maximo, to track planned and completed work orders (WO) for required PM and requested CMs. The implementation was completed in January 2017, and MCFM is currently optimizing the Maximo deployment for facilities maintenance operations and exploring Maximo functionality that hasn’t been used yet in order to pursue improvement opportunities. Work orders for PM and CM in Maximo are generated and assigned to MCFM staff. Planned/actual labor hours and materials purchased (if any) are also tracked in each work order.

For FY18, the following work orders were created for PM and CM in Maximo:

<table>
<thead>
<tr>
<th>Type of Work Orders</th>
<th># of Parent(^1) Work Orders</th>
<th># of Child Work Orders</th>
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</thead>
<tbody>
<tr>
<td>Planned/preventive Maintenance (PM) (Total # of Work Orders = 60,534)</td>
<td>38,191</td>
<td>22,343</td>
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<tr>
<td>Corrective/repair Maintenance (CM) (Total # of Work Orders = 10,071)</td>
<td>9,412</td>
<td>659</td>
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</table>

Work orders for PM and CM created in Maximo are assigned to MCFM resources that include UCSF trade/craft employees and contracted stationary engineers from Able Engineering Services with a wide range of skills needed to provide facilities maintenance services to hospitals and clinics.

Achieving balanced PM and CM is critical for an effective and efficient facilities maintenance operations. A successful facilities maintenance program can help UCSF Health provide better services and safer facility environment to customers and patients.

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\(^1\) Many of the “parent” work orders resulted in associated “child” work orders for individual tasks.
II. AUDIT PURPOSE AND SCOPE

The purpose of this review was to determine the adequacy of internal controls and processes in place related to facilities maintenance and monitoring, specifically in the following areas:

- Planned/preventative maintenance (PM)
- Corrective/repair maintenance (CM)
- Asset management for preventive maintenance
- Customer management
- Facilities staff/resource management such as professional licenses and certifications; workload planning and monitoring
- Management monitoring (e.g. backlogs, analysis for effective long-term plans/budgets)

The scope of the review covered transactions and activities for the period of July 2017 to June 2018.

Procedures performed as part of the review included interviews with MCFM management and walkthroughs to understand facilities maintenance processes; review of contractual documents, sample testing work orders in Maximo, and customer complaints in ServiceNow. For more detailed steps, please refer to Appendix A.

Work performed was limited to the specific activities and procedures described above. As such, this report is not intended to, nor can it be relied upon to provide an assessment of compliance beyond those areas specifically reviewed. Fieldwork was completed in November 2018.

III. SUMMARY

Based on work performed, MCFM’s facilities maintenance control procedures are generally conducive to accomplishing its business objectives. They are focused on continuous improvement and are innovating new building information systems and reports to increase transparency and productivity to enhance facilities maintenance operations.

Opportunities for improvement exist in the areas of communication with other departments, vendor and resource management, and documentation and training on operational procedures. The specific observations from this review are listed below.

1. Preventive maintenance was not performed for some assets as information in Maximo was not properly updated.
2. Certification and/or qualification required for performing maintenance jobs are not clearly identified, documented, or considered for allocating and assigning qualified resources.
3. Work orders are not always created/closed properly or timely.
4. There is no process to ensure that customer complaints are adequately addressed.
5. Written operational procedures for facilities maintenance are not sufficient.

Additionally, during the course of this review, a potential opportunity for improvement was noted for the capturing of more accurate start and finish times for projects to better monitor resource utilization and improve budgeting accuracy.
IV. OBSERVATIONS AND MANAGEMENT CORRECTIVE ACTIONS

No. | Observation                                                                                                                                                                                                 | Risk/Effect                                                                                                                                  | Recommendation                                                                                     | Management Corrective Action                                                                 |
--- |------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
1   | Preventive maintenance was not performed for some assets as information in Maximo was not properly updated.                                                                                               | Failure to maintain accurate information increases risks that assets are used for operations or patient care without adequate preventive or corrective maintenance. | a) There should be sufficient Service Level Agreements (SLAs), defining client departments’ responsibility to notify MCFM when assets are added, removed, and/or changed/moved. This can be a single master document tailored to individual partners. | a) Sufficient Service Level Agreements (SLAs) will be established.                                                                 |
     | Review of work orders in Maximo for a judgmental sample of 20 beds (being used in patient settings)/freezers (as listed in AwarePoint²) identified the following assets did not have appropriate records of preventive maintenance (PM) due to the following situations in Maximo: |                                                                                                                                             |                                                                                                       | Target Completion Date: July 1, 2019 Responsible Party: MCFM management |
|    |                                                                                                                                             |                                                                                                                                             | b) There should be a defined process that MCFM is always notified when new assets that should have preventive maintenance are purchased. |                                                                                                       |                                                                                             |
|    |                                                                                                                                             |                                                                                                                                             | c) A process to periodically confirm accuracy                                                                                                       |                                                                                                       |                                                                                             |
| 2   | Asset Information In Maximo: Categorized as “Unable to locate (UTL)” in Maximo, Not Found in Maximo, Categorized as “Not Ready” in Maximo                                                                 |                                                                                                                                             |                                                                                                       |                                                                                                       |                                                                                             |
| 1   | Asset Information In Maximo: Not Found in Maximo                                                                                               |                                                                                                                                             |                                                                                                       |                                                                                                       |                                                                                             |
| 4   | Asset Information In Maximo: Not Found in Maximo                                                                                               |                                                                                                                                             |                                                                                                       |                                                                                                       |                                                                                             |

Further discussion with MCFM management identified the following:
- MCFM is not always notified of purchase, changes, and/or movement in assets that should have preventive maintenance, resulting in obsolete or missing asset information in Maximo.
- MCFM management recognizes the need for the following:

² A location tracking system mainly used for medical equipment
<table>
<thead>
<tr>
<th>No.</th>
<th>Observation</th>
<th>Risk/Effect</th>
<th>Recommendation</th>
<th>Management Corrective Action</th>
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<tr>
<td>2</td>
<td><strong>Certification and/or qualification required for performing maintenance jobs are not clearly identified, documented, or considered for allocating and assigning qualified resources.</strong></td>
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<td>We selected a sample of 20 work orders in Maximo and requested the following information to MCFM management:</td>
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<tr>
<td></td>
<td>1. Certification and/or qualification required for performing maintenance jobs specified in the selected work orders (if required).</td>
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<td>2. A copy of certification and/or qualification for MCFM resources who performed the maintenance job(s) if any certification and/or qualification was required.</td>
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<td>However, we were unable to obtain the above information from MCFM management.</td>
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<td>a) Maintenance jobs that require any regulatory certification and/or qualification should be clearly identified and documented.</td>
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<td>Failure to clearly identify required certification and/or qualification increases risks that maintenance jobs are performed by unqualified or unskilled personnel.</td>
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</tbody>
</table>
|     | | | a) Maintenance jobs that require any certification and/or qualification will be clearly identified and documented. | **Target Completion Date:** December 1, 2019  
**Responsible Party:** MCFM management |
|     | | | b) Status/validity of required certification and/or qualification will be tracked and monitored. | |
Further discussion with MCFM management identified the following:
- Types of maintenance jobs that require any certification and/or qualification are not clearly identified and documented.
- There are Fire Pump certifications for MCFM resources that will expire on 12/31/2018; however, MCFM management is having a difficulty in certifying (and/or renewing an existing certification for) the MCFM resources responsible for performing maintenance jobs for fire related assets due to unclear authority of various units/departments involved³.
- The status/validity of certification and/or qualification that MCFM resources have for performing maintenance jobs and accessing patient care areas is not tracked and monitored⁴. This is due to contracted engineers from Able Engineering Services not being categorized as employees by UCSF Human Resources (HR), preventing MCFM management’s abilities to ensure compliance⁵.
- Assignment of work orders that was not always based on qualification of resources.

### Work orders are not always created/closed properly or timely.

We reviewed a sample of 40 PM work orders from 1,758 PM work orders (4.6% of total (38,191)) that were not closed within one month or had no owner assigned⁶ and identified the following key causes:

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<tr>
<th>No.</th>
<th>Observation</th>
<th>Risk/Effect</th>
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<tbody>
<tr>
<td>3</td>
<td>Work orders are not always created/closed properly or timely.</td>
<td>Failure to properly complete and document work orders for maintenance operations</td>
</tr>
</tbody>
</table>

### Recommendation

<table>
<thead>
<tr>
<th>Recommendation</th>
<th>Management Corrective Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) There should be clearly defined operational procedures and user manuals for properly using Maximo.</td>
<td>a) Operational procedures and user manual (for Maximo) to ensure facilities maintenance operations are properly completed and documented will be developed and implemented.</td>
</tr>
<tr>
<td>c) Procedures should be developed and implemented to assign qualified resources for performing maintenance jobs.</td>
<td>c) Procedures to assign qualified resources for performing maintenance jobs will be developed and implemented.</td>
</tr>
</tbody>
</table>

³ Including the Office of the State Fire Marshal (OSFM), UCSF Fire Marshals (Campus and MC) and Office of Environment, Health and Safety (EH&S).
⁴ While HR compliance requirements were out of scope for this review (e.g. flu shots, safety, Cyber-Security and Sexual Harassment training, etc.), these may also be affected and excluded from tracking and monitoring.
⁵ A historic population of contracted engineers from Able Engineering Services was entered into Huntington Business System (HBS); however, this population has not been updated as people have left and new people have joined.
⁶ “# of Closed/Completed WOs that took more than 1 month to close” = 1,283, “# of WOs not Closed/Completed” = 188, and “# of Closed/Completed WOs without Owner assigned” = 287
### Facilities Maintenance

<table>
<thead>
<tr>
<th>No.</th>
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<th>Recommendation</th>
<th>Management Corrective Action</th>
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</thead>
</table>
|     | - User errors – 24 work orders (60%)  
- Shortage of resources to perform jobs – 11 work orders (28%)  
- Inability for electricians to get access – 2 work orders (5%) | increases risks that facilities and assets are not properly maintained or repaired.  
The lack of accurate “Planned Labor Hours” for work orders precludes MCFM management’s ability from using the data for planning resource, utilization, and budgeting. | b) User training for operational procedures and proper use of Maximo should be provided to MCFM resources.  
c) Legacy work orders in Maximo should be re-evaluated.  
d) Feasibility in Maximo to identify work orders without accurate information (e.g. “Owner”, “Planned Labor Hours”) should be assessed. If feasible, it should be configured in Maximo; so that inaccurate information can be corrected. |  
**Target Completion Date:** October 31, 2019  
**Responsible Party:** MCFM management  
b) User training for operational procedures and proper use of Maximo will be provided.  
**Target Completion Date:** September 1, 2019  
**Responsible Party:** MCFM management  
c) Legacy work orders in Maximo will be re-evaluated.  
**Target Completion Date:** March 1, 2019  
**Responsible Party:** MCFM management  
d) Feasibility in Maximo to identify work orders without accurate information (e.g. “Owner”, “Planned Labor Hours”) will be assessed. If feasible, it will be configured in Maximo; so that inaccurate information can be corrected. |

Additionally, not all work orders had “Planned Labor Hours” entered.

We also selected a sample of 40 CM work orders from 1,780 CM work orders (18.9% of total (9,412)) that were not closed within one month or had no owner assigned and requested information to assess causes; however, MCFM management was unable to provide the requested information.

Further discussion with MCFM management identified the following:
- Compliance reports for outstanding work orders are provided to Chief Engineers and a manager of crafts on a weekly and monthly basis; however, it appears that the reports are not being used effectively to identify and correct errors in work orders as work orders were not always created/closed properly or timely.
- Many legacy work orders were carried over from a previous system (“FM track”) to Maximo, resulting in incomplete work orders in Maximo that are considered non-critical due to shortage of MCFM resources. MCFM management recognizes the need for re-evaluation of existing work orders in Maximo.
- Missing “Planned Labor Hours” was due to assigned personnel who did not follow proper workflows and processes in completing work orders in Maximo.

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7 Based on responses obtained from MCFM management, user errors may be due to duplicated work orders created, no owner assigned, wrong person/group assigned, ambiguous descriptions, and/or failure to change status.

8 "# of Closed/Completed WOs that took more than 1 month to close" = 1,149, "# of WOs not Closed/Completed" = 105, and "# of Closed/Completed WOs w/o Owner assigned" = 526
<table>
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<tr>
<th>No.</th>
<th>Observation</th>
<th>Risk/Effect</th>
<th>Recommendation</th>
<th>Management Corrective Action</th>
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</thead>
</table>
| 4   | **There is no process to ensure that customer complaints are adequately addressed.**  
Customers who requested corrective/repair maintenance works through ServiceNow have an opportunity to submit their feedback or complaints through the ServiceNow Customer Satisfaction Survey after work orders were closed, which is then received by Medical Center Support Services (MCSS).  
Further discussion with MCFM management identified the following:  
- MCFM management was not sent all of the complaints/comments submitted (for corrective/repair maintenances provided by MCFM) through ServiceNow Customer Satisfaction Survey from MCSS.  
- Assigned MCFM personnel are required to perform a walkthrough with customers/requesters for obtaining an agreement (for works completed) for some cases; however, the process/requirement has not been clearly defined.  
- MCFM management is aware of the need for improvement opportunities to address customer complaints/comments and has a plan to collaborate with MCSS for developing and implementing more effective and efficient processes.  
   | Failure to address customers’ complaints/comments precludes MCFM management’s abilities from identifying insufficient or incomplete maintenance works performed by MCFM or improving existing processes. | a) A process to adequately address customer complaints should be developed and implemented.  
   b) Operational procedures need to state when assigned personnel should obtain an agreement from customers/requesters. | a) A process to adequately address customer complaints will be developed and implemented.  
   | | **Target Completion Date:** May 1, 2019  
   | | **Responsible Party:** MCFM management |
| 5   | **Written operational procedures for facilities maintenance are not sufficient.**  
MCFM team has developed several operational procedures, including “MCFM Departmental Policy for Preventative Maintenance” and “Class Definitions for Maximo”. However, clearly defined processes | The lack of operational procedures that clearly define processes and responsibilities | There should be written operational procedures that clearly define processes and responsibilities | Written operational procedures that clearly define processes and responsibilities related to facilities maintenance operations will be developed and implemented.  
| | | **Target Completion Date:** August 1, 2019  
| | | **Responsible Party:** MCFM management |

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and responsibilities have not been fully developed for the following areas of facilities maintenance operations:

- Corrective/repair maintenance (CM)
- Customer complaint handling
- Resource management, including:
  - Maintaining professional licenses/certifications required
  - Allocation of qualified resources
  - Labor hours tracking, resource assignment/utilization management
- Asset information management in Maximo

As identified in the previous observations, there were cases where maintenance operations performed or use of Maximo by MCFM personnel were incorrect or not performed as expected by MCFM management.

### V. OPPORTUNITIES FOR IMPROVEMENTS

<table>
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<tr>
<th>No.</th>
<th>Observation</th>
<th>Risk/Effect</th>
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<th>Management Corrective Action</th>
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<tr>
<td>1</td>
<td>Use of accurate “Actual Start Date/Time” and “Actual Finish Date/Time” information can be valuable for managing and monitoring MCFM facilities maintenance operations.</td>
<td>The lack of accurate information may preclude MCFM management’s abilities to monitor resource, utilization, and budgeting.</td>
<td>We recommend to reconfigure Maximo to capture correct “Actual Start Date/Time” and “Actual Finish Date/Time”; so that it can be used for monitoring/reporting compliance, completion rate for work orders, resource budget, and/or labor hours.</td>
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<td>No.</td>
<td>Observation</td>
<td>Risk/Effect</td>
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<td>• The issues causes misleading information to be retained; however, it does</td>
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<td>not impact facilities maintenance operations as “Actual Start Date/Time”</td>
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<td>and “Actual Finish Date/Time” are not currently used for monitoring resource</td>
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<td>hours or completion of work orders.</td>
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<td>• MCFM management recognizes that there are potential opportunities to use</td>
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<td>the information for monitoring/reporting compliance, completion rate for</td>
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<td>work orders, resource budget, and/or labor hours if the issues can be</td>
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<td>fixed in the future.</td>
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APPENDIX A

To conduct our review the following procedures were performed for the areas in scope:

- Interviewed MCFM management and reviewed documented procedures to gain an understanding of the facilities maintenance operations;
- Reviewed samples of work orders in Maximo to validate work orders were completed in an appropriate and timely manner by MCFM personnel who are qualified for performing jobs specified in work orders;
- Reviewed assets and work orders in Maximo for samples of assets being used (as listed in AwarePoint) to validate appropriate maintenance services were provided for the assets; and,
- Assessed and determined that the adequacy of internal controls and processes in place related to facilities maintenance operations and monitoring.