



Welcomes you to the  
**Spring General Membership Meeting**  
June 13, 2024



# Meet Your Presenters



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# ***Navigating Facility Excellence: The Power of KPI's"***

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June 13, 2024*

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Questions to specific materials, methods or services will be addressed at the conclusion of this presentation.

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# Course Description

In the world of facility management, Key Performance Indicators (KPIs) are quietly revolutionizing operations. Join us as we explore their practical applications and transformative potential.

Discover how KPIs provide a roadmap for operational efficiency, guiding decisions from day-to-day tasks to strategic planning. From maintenance prioritization to risk management, we'll delve into how KPIs can drive success at every level of your organization.

# Learning Objectives

1. Learn to manage facilities with data-driven precision.
2. Implement a KPI-driven approach with practical insights and commitment.
3. Uncover strategies for organizational efficiency through thoughtful analysis and KPI utilization.
4. Gain a deeper understanding of your business to make informed decisions.



# Common KPI's

## 1. Financial KPI's

- Revenue Growth
- Profit Margins
- Return on investment (ROI)

## 2. Operational KPI's

- Efficiency/Effectiveness
- Production
- Customer satisfaction
- Inventory/asset management

## 3. Employee/Staff KPI's

- Utilization rates
- Productivity
- Training

# Approach

1. Define Clear Objectives
  - ❑ SMART goals (**S**pecific, **M**easurable, **A**chievable, **R**elevant, **T**ime Bound)
2. Select Relevant KPI's
  - ❑ Select measurables that align with your strategies
  - ❑ Maximize your staff potential
  - ❑ Don't overload
3. Collect quality data
  - ❑ Accurate and dependable data
  - ❑ Asset Management
4. Analyze and Interpret data
  - ❑ Identify patterns and trends
  - ❑ Isolate root causes and performance fluctuations



***KPI's are a management tool as well as a mindset that emphasizes continuous improvement, accountability and strategic alignment.***

# Data Supported Decision Making Process

Developing Key Performance Indicators (KPI)  
June 13, 2024

# Table of Content

- Individual Acumen
- Asset Management
- Data to Information
- Work Code Alignment
- Calculating Positions
- Key Performance Indicators (KPI)
- State of Equilibrium



Source: Google Images



Source: Google Images

# Management Theory | Strategic in Nature, Tactical in Application



Source: Google Images



Source: Google Images

- Business Acumen
  - Agent of change
  - Emotional intelligence
  - Character, willingness to help
  - Strategic agility/intellectual horsepower
  - Resource management
  - Effective communication and soft skills
  
- Technical Acumen
  - Asset management
  - Building systems
  - Strategic leadership
  - Regulatory compliance
  - Day-to-day operations

# Asset Management

- Building Portfolio

- Building count
- Gross square feet
- Campus summary
- Shop load
- Shared understanding



Source: Google Images

- Asset Portfolio

- Mechanical
- Electrical
- Plumbing
- Shop load
- Operational support



Source: Google Images

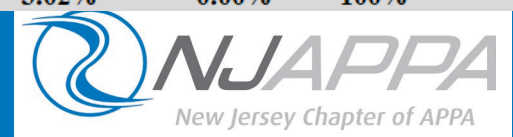
# Building Inventory Detail Summary

| Line item           | Shop  | Campus         | ≤ 5kgsf       | > 5kgsf, < 10 kgsf | > 10 kgsf, ≤ 20 kgsf | > 20 kgsf, ≤ 30 kgsf | > 30 kgsf, ≤ 50 kgsf | > 50 kgsf, ≤ 100 kgsf | > 100 kgsf, ≤ 150 kgsf | > 150 kgsf, ≤ 200 kgsf | > 200 kgsf, ≤ 250 kgsf | > 250 kgsf, ≤ 300 kgsf | > 300 kgsf, ≤ 350 kgsf | Total       | (%) of Total |
|---------------------|-------|----------------|---------------|--------------------|----------------------|----------------------|----------------------|-----------------------|------------------------|------------------------|------------------------|------------------------|------------------------|-------------|--------------|
| 1                   | MA-01 | Livingston     | 7             | 27                 | 4                    | 1                    | 0                    | 6                     | 2                      | 1                      | 0                      | 0                      | 0                      | 48          | 9.90%        |
| 2                   | MA-02 | Busch          | 3             | 2                  | 3                    | 2                    | 2                    | 3                     | 2                      | 2                      | 0                      | 0                      | 0                      | 19          | 3.92%        |
| 3                   | MA-03 | Busch          | 9             | 2                  | 5                    | 2                    | 2                    | 3                     | 1                      | 1                      | 0                      | 1                      | 0                      | 26          | 5.36%        |
| 4                   | MA-04 | All            |               |                    |                      |                      |                      | 0                     | 0                      | 0                      | 0                      | 0                      | 0                      | 0           | 0.00%        |
| 5                   | MA-05 | Busch          |               |                    |                      |                      |                      | 1                     | 6                      | 2                      | 1                      | 0                      | 0                      | 16          | 3.30%        |
| 6                   | MA-06 | Off Site       | 98            | 16                 | 4                    | 3                    | 2                    | 0                     | 0                      | 0                      | 0                      | 0                      | 0                      | 123         | 25.36%       |
| 7                   | MA-08 | College Avenue | 8             | 9                  | 8                    | 3                    | 4                    | 4                     | 1                      | 1                      | 0                      | 0                      | 0                      | 38          | 7.84%        |
| 8                   | MA-09 | Douglass       | 18            | 10                 | 9                    | 5                    | 8                    | 4                     | 1                      | 0                      | 0                      | 0                      | 0                      | 55          | 11.34%       |
| 9                   | MA-10 | College Avenue | 25            | 11                 | 3                    | 1                    | 1                    | 5                     | 0                      | 1                      | 2                      | 0                      | 0                      | 49          | 10.10%       |
| 10                  | MA-11 | Cook           | 67            | 19                 | 8                    | 4                    | 5                    | 7                     | 0                      | 1                      | 0                      | 0                      | 0                      | 111         | 22.89%       |
| <b>Total</b>        |       |                | <b>237</b>    | <b>97</b>          | <b>47</b>            | <b>21</b>            | <b>25</b>            | <b>38</b>             | <b>9</b>               | <b>8</b>               | <b>2</b>               | <b>1</b>               | <b>0</b>               | <b>485</b>  | <b>100%</b>  |
| <b>(%) of Total</b> |       |                | <b>48.87%</b> | <b>20.00%</b>      | <b>9.69%</b>         | <b>4.33%</b>         | <b>5.15%</b>         | <b>7.84%</b>          | <b>1.86%</b>           | <b>1.65%</b>           | <b>0.41%</b>           | <b>0.21%</b>           | <b>0.00%</b>           | <b>100%</b> | <b>~</b>     |

Estimated 80 or 16.49% of 485 properties

Estimated 6.053 MGSF 66.67% of 9.068 MGSF

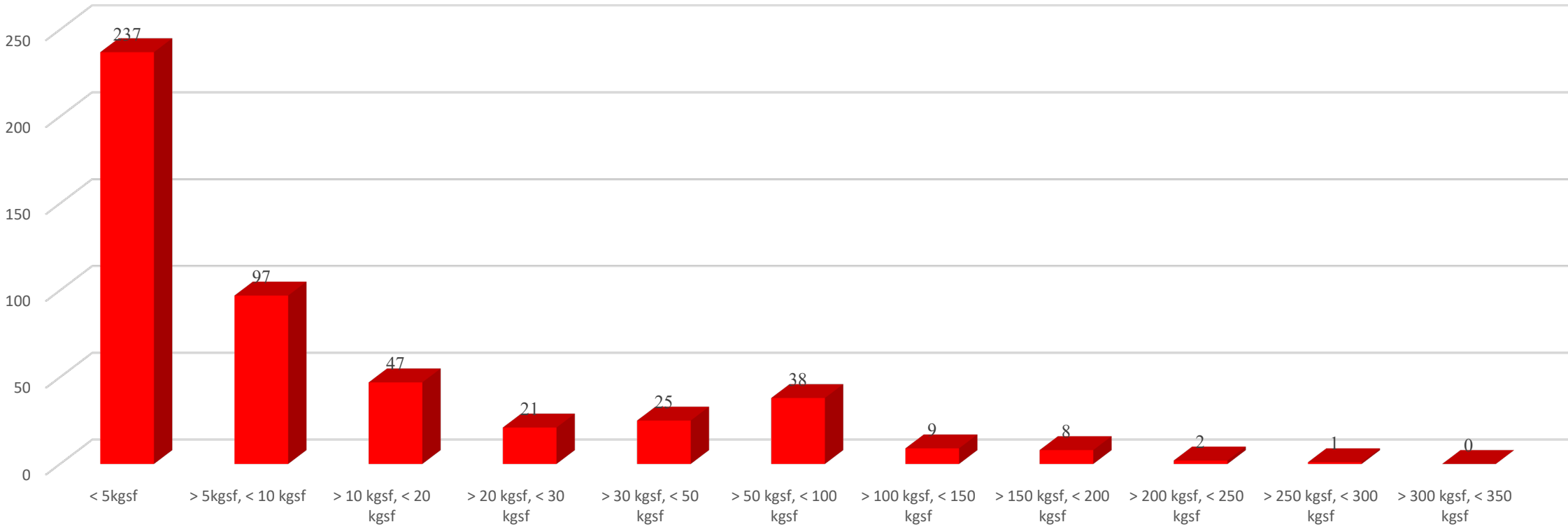
| Line item           | Shop  | Campus         | ≤ 5kgsf        | > 5kgsf, < 10 kgsf | > 10 kgsf, ≤ 20 kgsf | > 20 kgsf, ≤ 30 kgsf | > 30 kgsf, ≤ 50 kgsf | > 50 kgsf, ≤ 100 kgsf | > 100 kgsf, ≤ 150 kgsf | > 150 kgsf, ≤ 200 kgsf | > 200 kgsf, ≤ 250 kgsf | > 250 kgsf, ≤ 300 kgsf | > 300 kgsf, ≤ 350 kgsf | Total            | (%) of Total |
|---------------------|-------|----------------|----------------|--------------------|----------------------|----------------------|----------------------|-----------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------|--------------|
| 1                   | MA-01 | Livingston     | 8,403          | 236,817            | 48,967               | 20,082               | 0                    | 362,429               | 268,689                | 155,800                | 0                      | 0                      | 0                      | 1,101,187        | 12.14%       |
| 2                   | MA-02 | Busch          | 4,659          | 15,277             | 43,351               | 40,760               | 68,728               | 210,328               | 247,521                | 335,974                | 0                      | 0                      | 0                      | 966,598          | 10.66%       |
| 3                   | MA-03 | Busch          | 21,500         | 11,450             | 70,000               | 54,000               | 74,036               | 218,188               | 145,000                | 183,299                | 0                      | 273,556                | 0                      | 1,054,969        | 11.63%       |
| 4                   | MA-04 | All            |                |                    |                      |                      | 0                    | 0                     | 0                      | 0                      | 0                      | 0                      | 0                      | 0                | 0.00%        |
| 5                   | MA-05 | Busch          | 5,112          | 7,520              | 39,925               | 0                    | 39,652               | 435,266               | 249,811                | 156,672                | 0                      | 0                      | 0                      | 933,756          | 10.30%       |
| 6                   | MA-07 | Off Site       | 137,527        | 104,976            | 45,768               | 72,441               | 73,588               | 0                     | 0                      | 0                      | 0                      | 0                      | 0                      | 434,300          | 4.79%        |
| 7                   | MA-08 | College Avenue | 23,533         | 56,527             | 105,977              | 66,222               | 152,083              | 243,836               | 101,517                | 160,000                | 0                      | 0                      | 0                      | 909,695          | 10.03%       |
| 8                   | MA-09 | Douglass       | 38,868         | 74,167             | 128,802              | 118,780              | 324,544              | 265,621               | 145,000                | 0                      | 0                      | 0                      | 0                      | 1,095,782        | 12.08%       |
| 9                   | MA-10 | College Avenue | 73,474         | 71,826             | 39,993               | 27,791               | 37,079               | 394,724               | 0                      | 179,412                | 446,488                | 0                      | 0                      | 1,270,787        | 14.01%       |
| 10                  | MA-11 | Cook           | 124,406        | 133,540            | 104,309              | 113,869              | 200,675              | 444,012               | 0                      | 180,241                | 0                      | 0                      | 0                      | 1,301,052        | 14.35%       |
| <b>Total</b>        |       |                | <b>437,485</b> | <b>711,902</b>     | <b>630,190</b>       | <b>514,781</b>       | <b>970,385</b>       | <b>2,574,404</b>      | <b>1,157,538</b>       | <b>1,351,398</b>       | <b>446,488</b>         | <b>273,556</b>         | <b>0</b>               | <b>9,068,127</b> | <b>100%</b>  |
| <b>(%) of Total</b> |       |                | <b>4.82%</b>   | <b>7.85%</b>       | <b>6.95%</b>         | <b>5.68%</b>         | <b>10.70%</b>        | <b>28.39%</b>         | <b>12.76%</b>          | <b>14.90%</b>          | <b>4.92%</b>           | <b>3.02%</b>           | <b>0.00%</b>           | <b>100%</b>      | <b>~</b>     |





# Building Count Detail Summary

Mechanical Maintenance & Planning  
Building Composition Schedule  
FY 2024

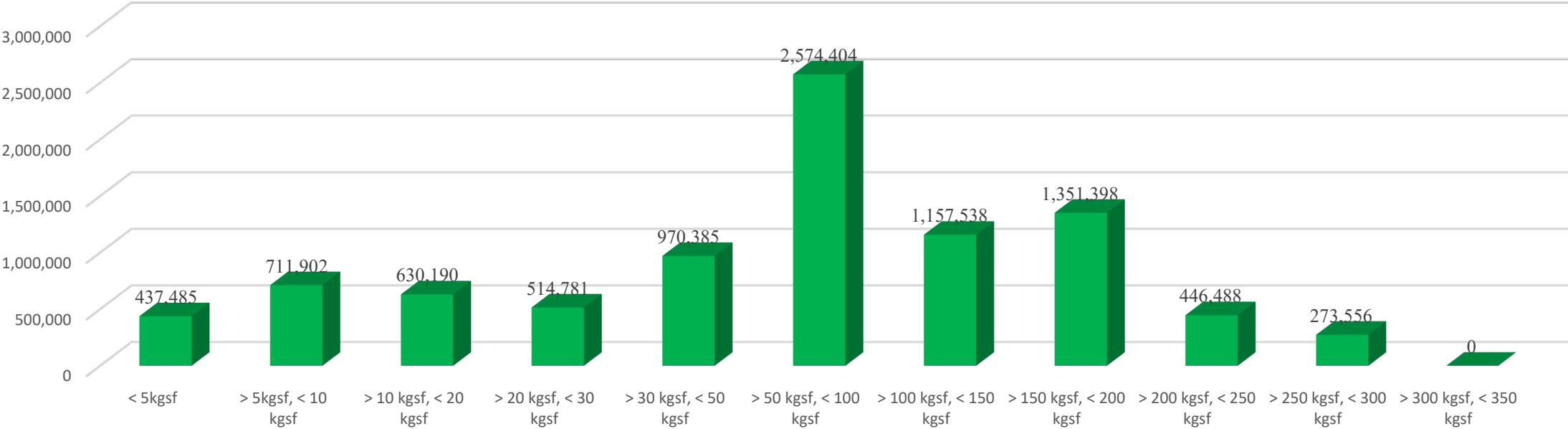


Source: Archibus



# Building Gross Square Feet (GSF) Detail Summary

Mechanical Maintenance & Planning  
Building GSF Composition  
FY 2023

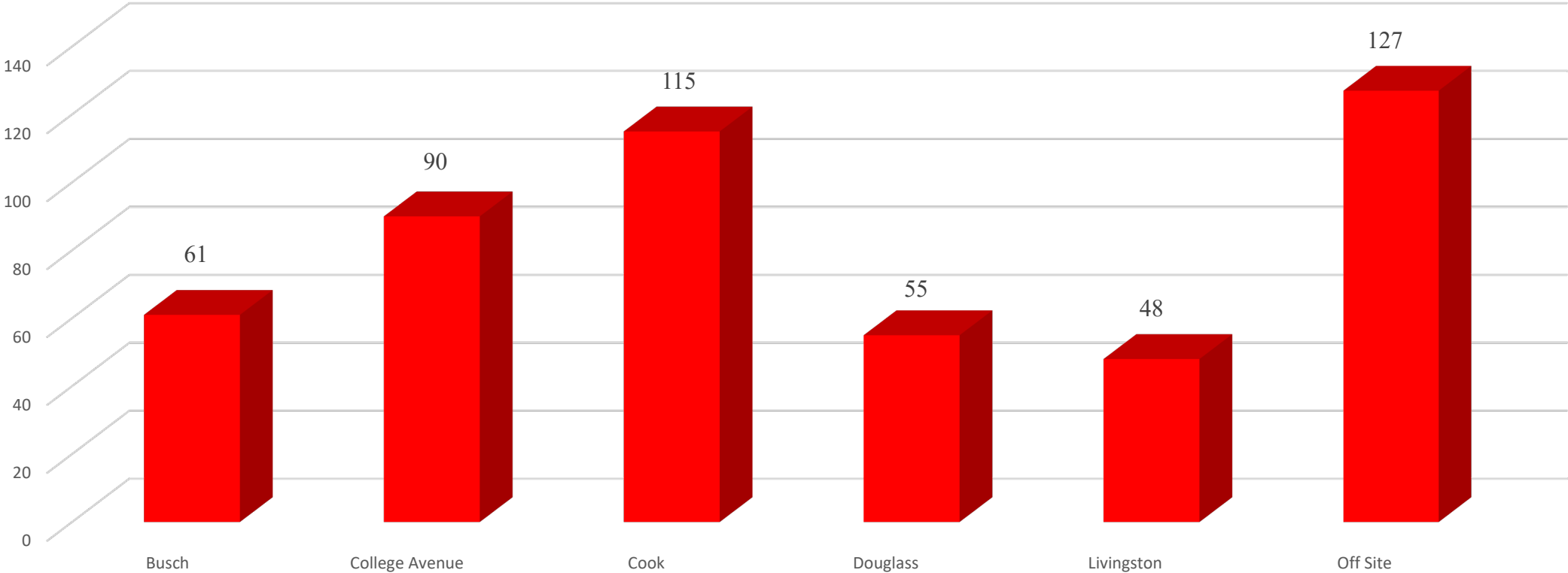


Source: Archibus



# Building Count by Campus Detail Summary

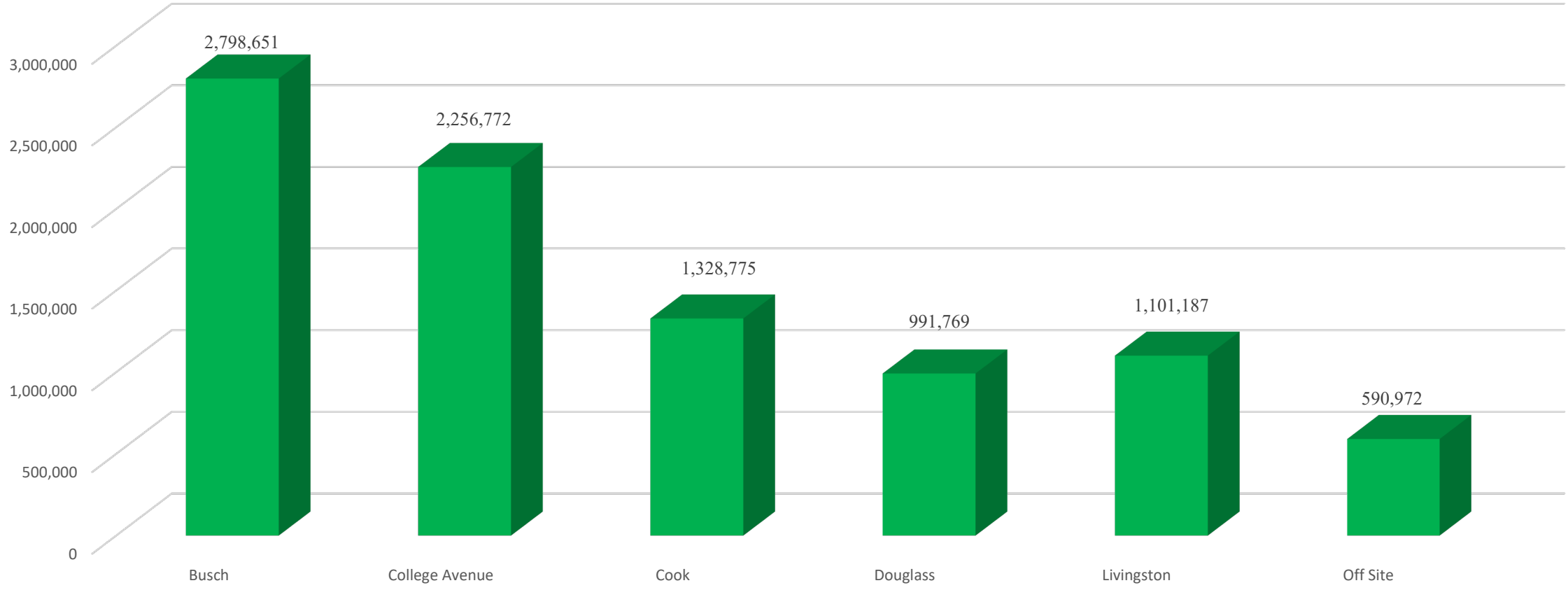
Mechanical Maintenance & Planning  
Building Count by Campus  
FY 2023



Source: Archibus

# Building GSF by Campus Detail Summary

Mechanical Maintenance & Planning  
GSF by Campus  
FY 2024

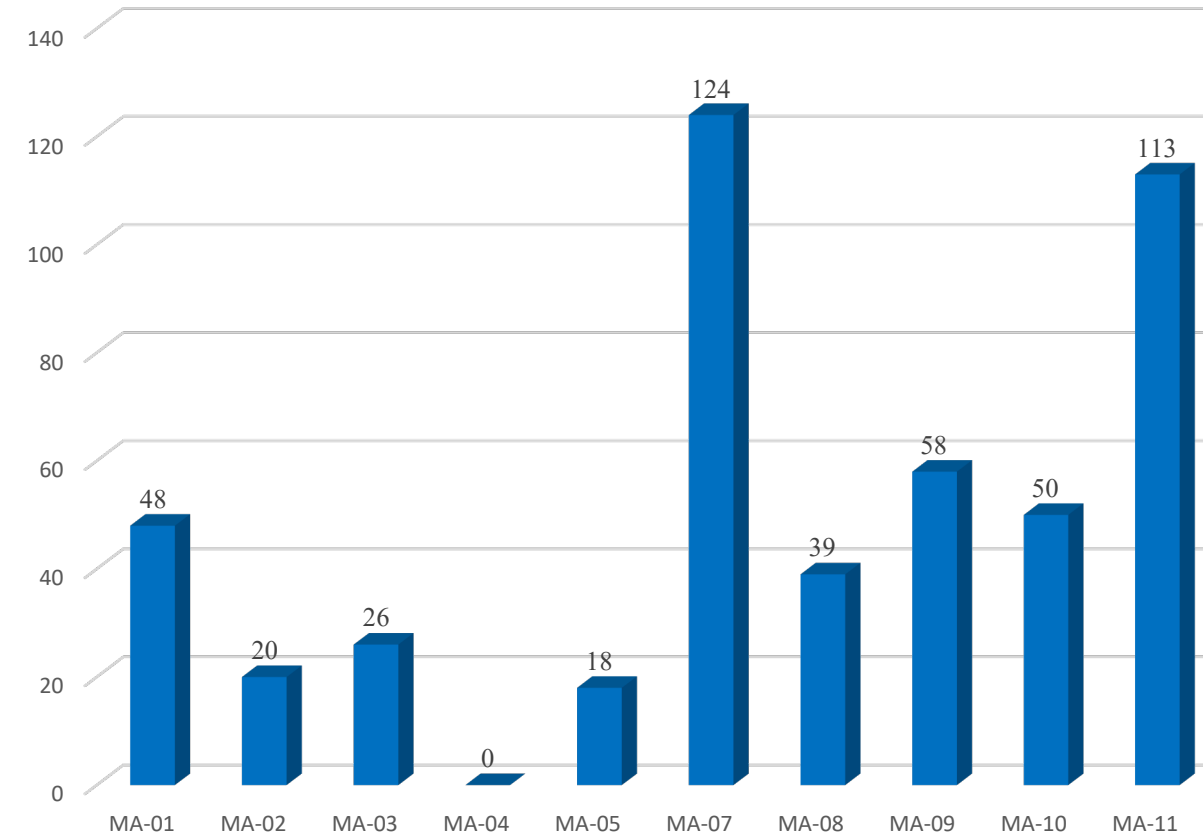


Source: Archibus



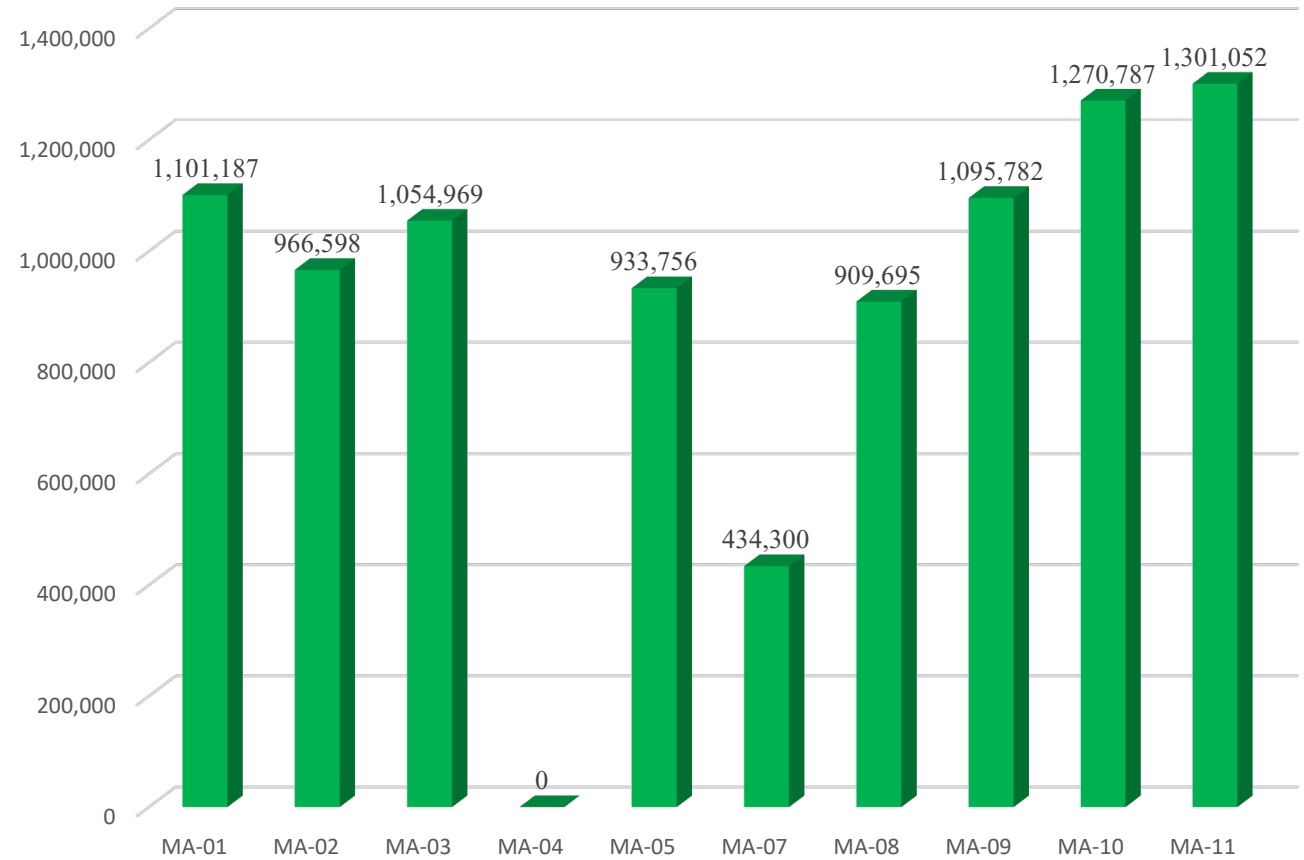
# Shop Count and GSF Comparison

Mechanical Maintenance & Planning  
Building Count by Shop  
FY 2023



Source: Archibus

Mechanical Maintenance & Planning  
GSF by Shop  
FY 2023



Source: Archibus

# Asset Count and Frequency

| FY 2024 Count |             |           |  |   |           |               |         |      |        |           |         |          |          |         |          |       |       |       |       |       |              |       |        |      |
|---------------|-------------|-----------|--|---|-----------|---------------|---------|------|--------|-----------|---------|----------|----------|---------|----------|-------|-------|-------|-------|-------|--------------|-------|--------|------|
| Line item     | Template ID | Asset Tag | Asset Description  | ~ | Frequency | Schedule Date | Time in | July | August | September | October | November | December | January | February | March | April | May   | June  | Total | (%) of Total |       |        |      |
| 1             | 1068        | 10017001  | EMERGENCY POWER GENERATOR  | ~ | MONTHLY   | 07/07/23      | 1.71    | 73   | 73     | 73        | 73      | 73       | 73       | 73      | 73       | 73    | 73    | 73    | 73    | 876   | 3.38%        |       |        |      |
| 2             | 1088        | 10023348  | INTERIOR EMERGENCY LIGHTING  | ~ | MONTHLY   | 07/10/23      | 0.21    | 283  | 283    | 283       | 283     | 284      | 284      | 284     | 284      | 284   | 284   | 284   | 284   | 3,404 | 13.14%       |       |        |      |
| 3             | 1089        | 10019801  | FIRE EXTINGUISHERS   | ~ | MONTHLY   | 07/10/23      | 0.15    | 126  | 126    | 126       | 126     | 126      | 126      | 126     | 126      | 126   | 126   | 126   | 126   | 1,512 | 5.84%        |       |        |      |
| 4             | 1100        | 10010085  | CONTROL AIR COMPRESSOR   | ~ | MONTHLY   | 07/07/23      | 0.20    | 41   | 41     | 41        | 41      | 41       | 41       | 41      | 41       | 41    | 41    | 41    | 41    | 492   | 1.90%        |       |        |      |
| 5             | 1215        | 10027788  | SEPTIC TANK SYSTEM   | ~ | MONTHLY   | 07/07/23      | 0.33    | 1    | 1      | 1         | 1       | 1        | 1        | 1       | 1        | 1     | 1     | 1     | 1     | 12    | 0.05%        |       |        |      |
| 6             | 1626        | 10058932  | MONTHLY SPILL PREVENTION COUNTERMEASURES AND CONTROL (SPCC) INSPECTION | ~ | MONTHLY   | 07/07/23      | 0.67    | 11   | 11     | 11        | 11      | 11       | 11       | 11      | 11       | 11    | 11    | 11    | 11    | 132   | 0.51%        |       |        |      |
| 7             | 1944        | 10071841  | MONTHLY CARBON MONOXIDE DETECTOR INSPECTION                            | ~ | MONTHLY   | 03/11/24      | 1.03    | 8    | 9      | 9         | 9       | 9        | 9        | 9       | 9        | 141   | 175   | 141   | 141   | 669   | 2.58%        |       |        |      |
| 8             | 1965        | 10023196  | INTERIOR EMERGENCY LIGHTING  | ~ | MONTHLY   | 07/07/23      | 0.21    | 1    | 1      | 1         | 1       | 1        | 1        | 1       | 1        | 1     | 1     | 1     | 1     | 12    | 0.05%        |       |        |      |
| 9             | 2046        | 10073100  | AIR-DIRT SEPARATOR FLUSHING  | ~ | MONTHLY   | 12/05/23      | 0.21    | 0    | 0      | 0         | 0       | 0        | 1        | 0       | 1        | 1     | 1     | 1     | 1     | 6     | 0.02%        |       |        |      |
| 10            | 1011        | 10012464  | AIR HANDLING UNIT-AHU  | ~ | QUARTERLY | 07/05/23      | 3.37    | 134  | 129    | 133       | 135     | 129      | 133      | 135     | 130      | 133   | 135   | 130   | 133   | 1,589 | 6.13%        |       |        |      |
| 11            | 1054        | 10024528  | DOMESTIC WATER PUMP  | ~ | QUARTERLY | 07/05/23      | 0.58    | 8    | 7      | 9         | 8       | 7        | 9        | 8       | 7        | 9     | 8     | 7     | 9     | 96    | 0.37%        |       |        |      |
| 12            | 1058        | 10017487  | FAN  | ~ | QUARTERLY | 07/05/23      | 0.56    | 11   | 8      | 11        | 11      | 8        | 11       | 11      | 8        | 11    | 11    | 8     | 11    | 120   | 0.46%        |       |        |      |
| 13            | 1061        | 10071862  | FORCED AIR HEATER  | ~ | QUARTERLY | 08/07/23      |         |      |        |           |         |          |          |         |          |       |       |       | 4     | 26    | 0.10%        |       |        |      |
| 14            | 1105        | 10010296  | AIR CONDITIONER - COMPUTER ROOM  | ~ | QUARTERLY | 07/05/23      |         |      |        |           |         |          |          |         |          |       |       |       | 11    | 140   | 0.54%        |       |        |      |
| 15            | 1138        | 10027192  | AIR FILTER - SECONDARY AIR COMPRESSOR -                                | ~ | QUARTERLY | 08/07/23      |         |      |        |           |         |          |          |         |          |       |       |       | 1     | 16    | 0.06%        |       |        |      |
| 16            | 1540        | 10062265  | MEDICAL/LABORATORY PCKG (=10 HP), WITH DRYER                           | ~ | QUARTERLY | 08/07/23      |         |      |        |           |         |          |          |         |          |       |       |       | 1     | 8     | 0.03%        |       |        |      |
| 17            | 1546        | 10056960  | EVAPORATOR UNIT NO HEAT (<=1.5 TON)                                    | ~ | QUARTERLY | 07/05/23      |         |      |        |           |         |          |          |         |          |       |       |       | 6     | 74    | 0.29%        |       |        |      |
| 18            | 1726        | 10060036  | HYDRATION STATIONS- BOTTLE FILLING STATION AND WATER COOLER            | ~ | QUARTERLY | 08/07/23      |         |      |        |           |         |          |          |         |          |       |       |       | 68    | 760   | 2.93%        |       |        |      |
| 19            | 1823        | 10062086  | AIR HANDLING UNIT - OUTDOOR AIR COMPRESSOR -                           | ~ | QUARTERLY | 09/08/23      | 4.04    | 1    | 3      | 1         | 1       | 3        | 1        | 1       | 3        | 1     | 1     | 3     | 1     | 20    | 0.08%        |       |        |      |
| 20            | 1918        | 10062065  | MEDICAL/LABORATORY PCKG (=10 HP), WITH DRYER                           | ~ | QUARTERLY | 08/07/23      | 3.00    | 1    | 1      | 1         | 1       | 1        | 1        | 1       | 1        | 1     | 1     | 1     | 1     | 12    | 0.05%        |       |        |      |
| <b>Total</b>  |             |           |  |   |           |               | ~       | ~    | ~      | 129.81    | 2,102   | 2,084    | 1,995    | 2,227   | 1,954    | 2,128 | 2,124 | 2,103 | 2,324 | 2,302 | 2,177        | 2,382 | 25,902 | 100% |

Source: AiM, IWMS

## Frequencies

Weekly – Critical equipment (Water softener, distilled water, RO)

Monthly – Regulatory (EPG, IEL, CO2)

Quarterly – Larger MEP equipment (AHUs)

Semi-annual – Large quantities (FCUs)

Yearly – Generation equipment (Heat exchangers, domestic hot water heaters)

| Frequency    | Schedule Date | Time in hours | July         | August       | September    | October      | November     | December     | January      | February     | March        | April        | May          | June         | Total         | (%) of Total |
|--------------|---------------|---------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|---------------|--------------|
| MONTHLY      | ~             | ~             | 544          | 545          | 545          | 545          | 546          | 547          | 546          | 547          | 679          | 713          | 679          | 679          | 7,115         | 27.47%       |
| QUARTERLY    | ~             | ~             | 239          | 228          | 242          | 241          | 229          | 244          | 243          | 232          | 246          | 245          | 232          | 248          | 2,869         | 11.08%       |
| SEMI-YEARLY  | ~             | ~             | 1,155        | 1,139        | 1,055        | 1,197        | 1,017        | 1,174        | 1,163        | 1,167        | 1,050        | 1,209        | 1,077        | 1,196        | 13,599        | 52.50%       |
| WEEKLY       | ~             | ~             | 0            | 0            | 0            | 2            | 4            | 4            | 5            | 4            | 4            | 5            | 4            | 4            | 36            | 0.14%        |
| YEARLY       | ~             | ~             | 164          | 172          | 153          | 242          | 158          | 159          | 167          | 153          | 345          | 130          | 185          | 255          | 2,283         | 8.81%        |
| <b>Total</b> | ~             | ~             | <b>2,102</b> | <b>2,084</b> | <b>1,995</b> | <b>2,227</b> | <b>1,954</b> | <b>2,128</b> | <b>2,124</b> | <b>2,103</b> | <b>2,324</b> | <b>2,302</b> | <b>2,177</b> | <b>2,382</b> | <b>25,902</b> | <b>100%</b>  |

# Asset Schedule Time in Hours

| Line item    | Template ID | Asset Tag | Asset Description  | Frequency | Schedule Date | Time in | July  | August | September | October | November | December | January | February | March | April | May   | June  | Total   | (%) of Total |      |
|--------------|-------------|-----------|--|-----------|---------------|---------|-------|--------|-----------|---------|----------|----------|---------|----------|-------|-------|-------|-------|---------|--------------|------|
| 1            | 1068        | 10017001  | EMERGENCY POWER GENERATOR  | MONTHLY   | 07/07/23      | 1.7     | 124.5 | 124.5  | 124.5     | 124.5   | 124.5    | 124.5    | 124.5   | 124.5    | 124.5 | 124.5 | 124.5 | 124.5 | 1,493.6 | 5.28%        |      |
| 2            | 1088        | 10023348  | INTERIOR EMERGENCY LIGHTING  | MONTHLY   | 07/10/23      | 0.2     | 59.4  | 59.4   | 59.4      | 59.4    | 59.6     | 59.6     | 59.6    | 59.6     | 59.6  | 59.6  | 59.6  | 59.6  | 714.8   | 2.53%        |      |
| 3            | 1089        | 10019801  | FIRE EXTINGUISHERS   | MONTHLY   | 07/10/23      | 0.2     | 18.9  | 18.9   | 18.9      | 18.9    | 18.9     | 18.9     | 18.9    | 18.9     | 18.9  | 18.9  | 18.9  | 18.9  | 226.8   | 0.80%        |      |
| 4            | 1100        | 10010085  | CONTROL AIR COMPRESSOR   | MONTHLY   | 07/07/23      | 0.2     | 8.2   | 8.2    | 8.2       | 8.2     | 8.2      | 8.2      | 8.2     | 8.2      | 8.2   | 8.2   | 8.2   | 8.2   | 98.4    | 0.35%        |      |
| 5            | 1215        | 10027788  | SEPTIC TANK SYSTEM   | MONTHLY   | 07/07/23      | 0.3     | 0.3   | 0.3    | 0.3       | 0.3     | 0.3      | 0.3      | 0.3     | 0.3      | 0.3   | 0.3   | 0.3   | 0.3   | 3.9     | 0.01%        |      |
| 6            | 1626        | 10058932  | MONTHLY SPILL PREVENTION COUNTERMEASURES AND CONTROL (SPCC) INSPECTION | MONTHLY   | 07/07/23      | 0.7     | 7.4   | 7.4    | 7.4       | 7.4     | 7.4      | 7.4      | 7.4     | 7.4      | 7.4   | 7.4   | 7.4   | 7.4   | 88.4    | 0.31%        |      |
| 7            | 1944        | 10071841  | MONTHLY CARBON MONOXIDE DETECTOR INSPECTION                            | MONTHLY   | 03/11/24      | 1.0     | 8.2   | 9.3    | 9.3       | 9.3     | 9.3      | 9.3      | 9.3     | 9.3      | 145.2 | 180.3 | 145.2 | 145.2 | 689.1   | 2.44%        |      |
| 8            | 1965        | 10023196  | INTERIOR EMERGENCY LIGHTING  | MONTHLY   | 07/07/23      | 0.2     | 0.2   | 0.2    | 0.2       | 0.2     | 0.2      | 0.2      | 0.2     | 0.2      | 0.2   | 0.2   | 0.2   | 0.2   | 2.5     | 0.01%        |      |
| 9            | 2046        | 10073100  | AIR-DIRT SEPARATOR FLUSHING  | MONTHLY   | 12/05/23      | 0.2     | 0.0   | 0.0    | 0.0       | 0.0     | 0.0      | 0.2      | 0.0     | 0.2      | 0.2   | 0.2   | 0.2   | 0.2   | 1.3     | 0.00%        |      |
| 10           | 1011        | 10012464  | AIR HANDLING UNIT-AHU  | QUARTERLY | 07/05/23      | 3.4     | 451.6 | 434.7  | 448.2     | 455.0   | 434.7    | 448.2    | 455.0   | 438.1    | 448.2 | 455.0 | 438.1 | 448.2 | 5,354.9 | 18.93%       |      |
| 11           | 1054        | 10024528  | DOMESTIC WATER PUMP  | QUARTERLY | 07/05/23      | 0.6     | 4.6   | 4.1    | 5.2       | 4.6     | 4.1      | 5.2      | 4.6     | 4.1      | 5.2   | 4.6   | 4.1   | 5.2   | 55.7    | 0.20%        |      |
| 12           | 1058        | 10017487  | FAN  | QUARTERLY | 07/05/23      |         |       |        |           |         |          |          |         |          |       |       |       |       | 6.1     | 0.24%        |      |
| 13           | 1061        | 10071862  | FORCED AIR HEATER  | QUARTERLY | 08/07/23      |         |       |        |           |         |          |          |         |          |       |       |       |       | 6.9     | 0.16%        |      |
| 14           | 1105        | 10010296  | AIR CONDITIONER - COMPUTER ROOM  | QUARTERLY | 07/05/23      |         |       |        |           |         |          |          |         |          |       |       |       |       | 9.5     | 0.43%        |      |
| 15           | 1138        | 10027192  | AIR FILTER - SECONDARY AIR COMPRESSOR -                                | QUARTERLY | 08/07/23      |         |       |        |           |         |          |          |         |          |       |       |       |       | 0.5     | 0.03%        |      |
| 16           | 1540        | 10062265  | MEDICAL/LABORATORY PCKG (=10 HP), WITH DRYER                           | QUARTERLY | 08/07/23      |         |       |        |           |         |          |          |         |          |       |       |       |       | 3.0     | 0.08%        |      |
| 17           | 1546        | 10056960  | EVAPORATOR UNIT NO HEAT (<=1.5 TON)                                    | QUARTERLY | 07/05/23      |         |       |        |           |         |          |          |         |          |       |       |       |       | 4.0     | 0.18%        |      |
| 18           | 1726        | 10060036  | HYDRATION STATIONS- BOTTLE FILLING STATION AND WATER COOLER            | QUARTERLY | 08/07/23      | 0.4     | 25.4  | 25.0   | 26.2      | 25.8    | 25.0     | 27.1     | 25.8    | 25.0     | 27.1  | 26.2  | 25.0  | 27.9  | 311.6   | 1.10%        |      |
| 19           | 1823        | 10062086  | AIR HANDLING UNIT - OUTDOOR AIR COMPRESSOR -                           | QUARTERLY | 09/08/23      | 4.0     | 4.0   | 12.1   | 4.0       | 4.0     | 12.1     | 4.0      | 4.0     | 12.1     | 4.0   | 4.0   | 12.1  | 4.0   | 80.7    | 0.29%        |      |
| 20           | 1918        | 10062065  | MEDICAL/LABORATORY PCKG (=10 HP), WITH DRYER                           | QUARTERLY | 08/07/23      | 3.0     | 3.0   | 3.0    | 3.0       | 3.0     | 3.0      | 3.0      | 3.0     | 3.0      | 3.0   | 3.0   | 3.0   | 3.0   | 36.0    | 0.13%        |      |
| <b>Total</b> |             |           |  |           |               | ~       | ~     | ~      | ~         | ~       | ~        | ~        | ~       | ~        | ~     | ~     | ~     | ~     | ~       | ~            | 100% |

## Frequencies

Weekly – Critical equipment (Water softener, distilled water, RO)

Monthly – Regulatory (EPG, IEL, CO2)

Quarterly – Larger MEP equipment (AHUs)

Semi-annual – Large quantities (FCUs)

Yearly – Generation equipment (Heat exchangers, domestic hot water heaters)

| Frequency    | Schedule Date | Time in hours | July            | August          | September       | October         | November        | December        | January         | February        | March           | April           | May             | June            | Total            | (%) of Total |
|--------------|---------------|---------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|------------------|--------------|
| MONTHLY      | ~             | ~             | 227.14          | 228.17          | 228.17          | 228.17          | 228.38          | 228.59          | 228.38          | 228.59          | 364.55          | 399.57          | 364.55          | 364.55          | 3,318.81         | 11.73%       |
| QUARTERLY    | ~             | ~             | 513.12          | 501.06          | 516.67          | 516.90          | 501.73          | 517.49          | 519.29          | 507.49          | 519.88          | 520.37          | 507.49          | 520.70          | 6,162.18         | 21.78%       |
| SEMI-YEARLY  | ~             | ~             | 1,342.84        | 1,348.37        | 1,196.22        | 1,417.84        | 1,150.38        | 1,353.78        | 1,350.71        | 1,387.35        | 1,194.88        | 1,433.27        | 1,237.28        | 1,376.96        | 15,789.88        | 55.81%       |
| WEEKLY       | ~             | ~             | 0.00            | 0.00            | 0.00            | 4.00            | 8.00            | 8.00            | 10.00           | 8.00            | 8.00            | 10.00           | 8.00            | 8.00            | 72.00            | 0.25%        |
| YEARLY       | ~             | ~             | 194.14          | 201.55          | 175.95          | 279.88          | 187.48          | 184.36          | 187.98          | 177.73          | 700.12          | 166.40          | 218.43          | 276.29          | 2,950.31         | 10.43%       |
| <b>Total</b> | ~             | ~             | <b>2,277.24</b> | <b>2,279.14</b> | <b>2,117.02</b> | <b>2,446.79</b> | <b>2,075.96</b> | <b>2,292.22</b> | <b>2,296.36</b> | <b>2,309.16</b> | <b>2,787.44</b> | <b>2,529.61</b> | <b>2,335.74</b> | <b>2,546.51</b> | <b>28,293.19</b> | <b>100%</b>  |

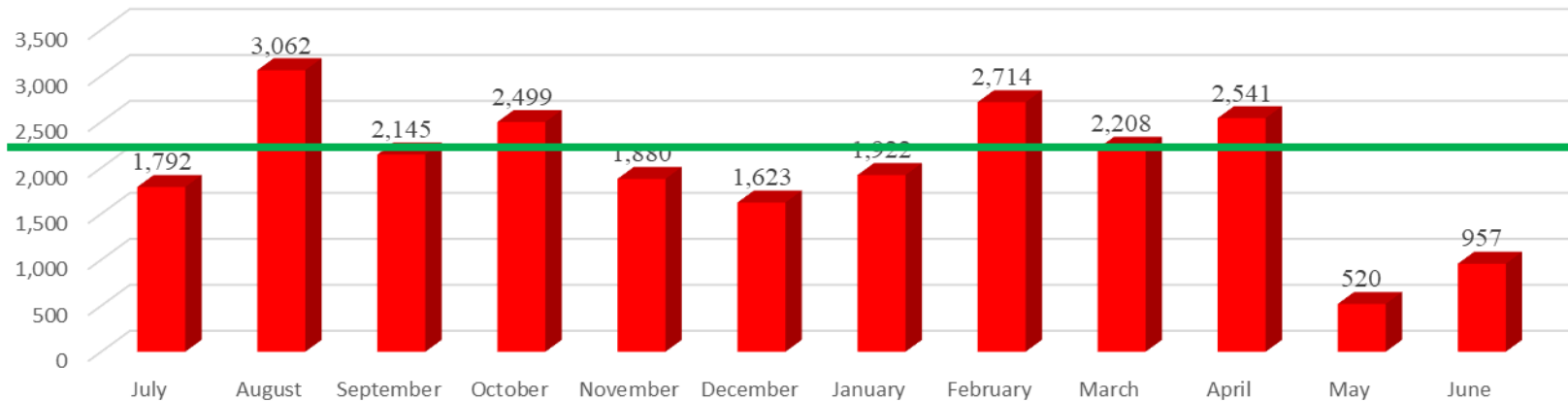
Source: AiM, IWMS

Source: AiM, IWMS

# Preventive Maintenance Schedule Detail

Monthly Preventive Maintenance Schedules  
FY 2020

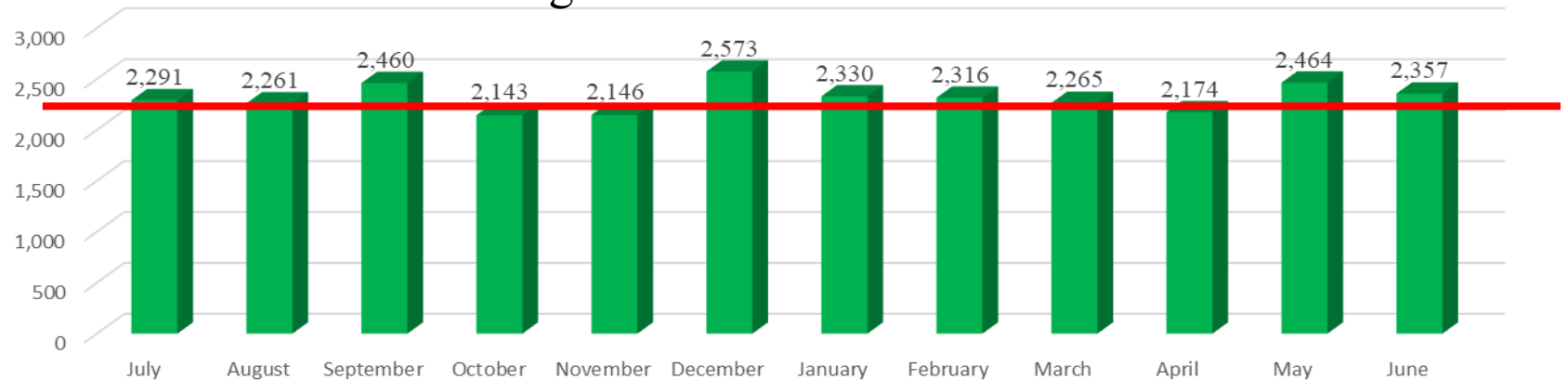
## Before Load Leveling



Source: AiM, IWMS

Monthly Preventive Maintenance Schedules  
FY 2022

## After Load Leveling

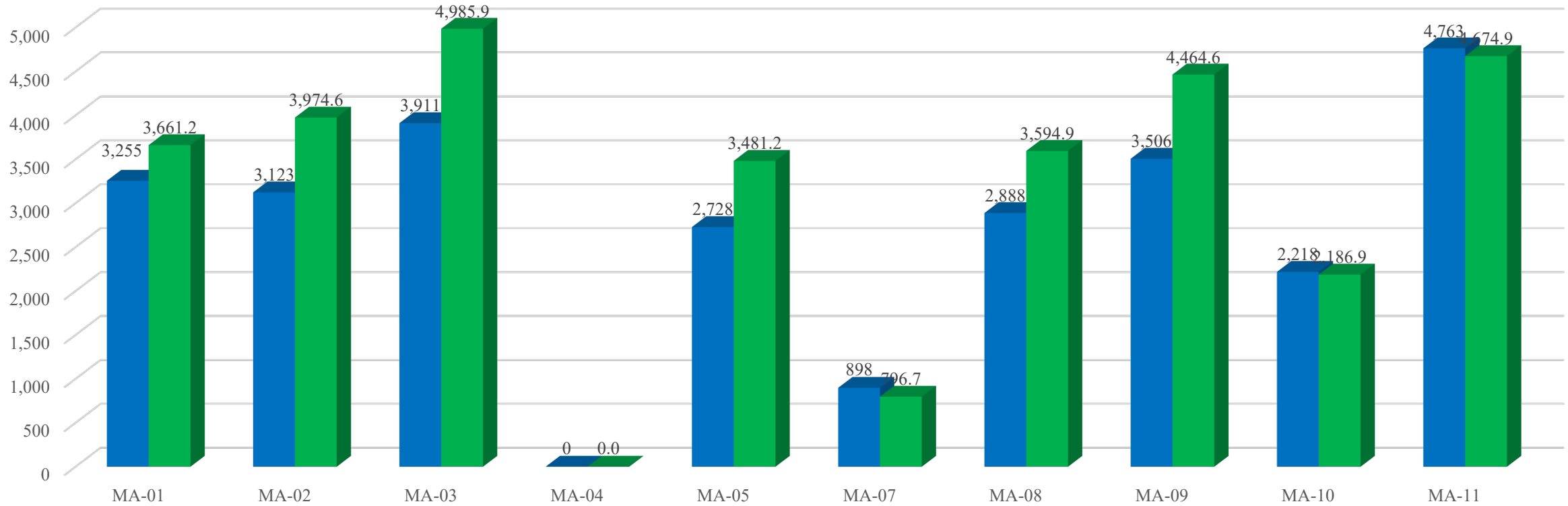


Source: AiM, IWMS

# Asset Count and Time in Hours

## Preventive Maintenance Schedule Asset Count and Time in Hours

■ PM Template Count    ■ PM Asset Time (hrs)

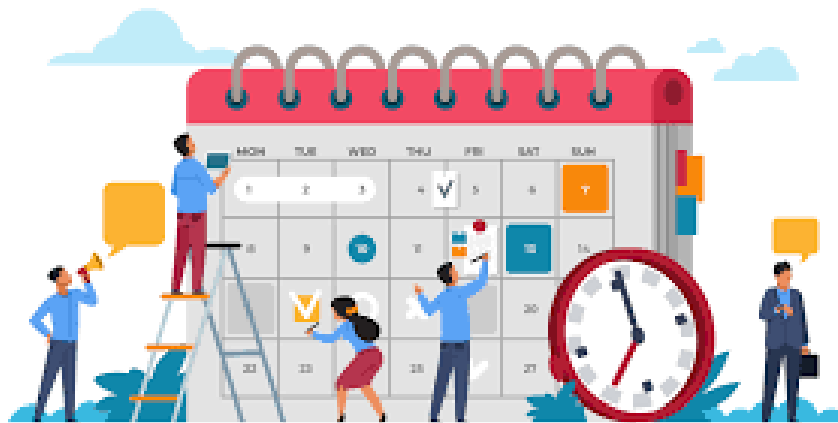


Source: AiM, IWMS

# Work Request Detail Summary



Source: Google Images



Source: Google Images

- Work Request Hierarchy
  - Reactive, Service (S)
  - Planned, Maintenance (M)
  - Proactive, Preventive Maintenance (PM)
  - Summary

## Business Cycle

- Monthly Work Request Volume
- Shop Detail
- Planning and Scheduling
- Work Request Composition
- Trade Composition
- Benchmarks



# Work Request Type Monthly Count

| Fiscal Year    | Request Type Count | July         | August       | September    | October      | November     | December     | January      | February     | March        | April        | May          | June         | Total         | (%) of Total |
|----------------|--------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|---------------|--------------|
| <b>FY 2022</b> |                    |              |              |              |              |              |              |              |              |              |              |              |              |               |              |
|                | Reactive           | 877          | 948          | 1,017        | 841          | 1,023        | 533          | 819          | 1,078        | 988          | 962          | 900          | 841          | 10,827        | 20.73%       |
|                | Planned            | 955          | 1,101        | 1,122        | 1,368        | 1,353        | 729          | 1,187        | 1,177        | 1,387        | 1,224        | 1,137        | 917          | 13,657        | 26.15%       |
|                | Proactive          | 2,279        | 2,244        | 2,457        | 2,142        | 2,144        | 2,573        | 2,330        | 2,316        | 2,265        | 2,174        | 2,464        | 2,357        | 27,745        | 53.12%       |
|                | <b>Total</b>       | <b>4,111</b> | <b>4,293</b> | <b>4,596</b> | <b>4,351</b> | <b>4,520</b> | <b>3,835</b> | <b>4,336</b> | <b>4,571</b> | <b>4,640</b> | <b>4,360</b> | <b>4,501</b> | <b>4,115</b> | <b>52,229</b> | <b>100%</b>  |
| <b>FY 2023</b> |                    |              |              |              |              |              |              |              |              |              |              |              |              |               |              |
|                | Reactive           | 998          | 979          | 1,032        | 1,124        | 975          | 591          | 786          | 780          | 807          | 742          | 671          | 783          | 10,268        | 19.51%       |
|                | Planned            | 869          | 1,226        | 1,159        | 1,083        | 1,191        | 1,008        | 1,283        | 1,455        | 1,486        | 1,440        | 1,315        | 1,080        | 14,595        | 27.73%       |
|                | Proactive          | 2,339        | 2,358        | 2,510        | 2,198        | 2,415        | 2,423        | 2,383        | 2,420        | 2,166        | 1,840        | 2,518        | 2,200        | 27,770        | 52.76%       |
|                | <b>Total</b>       | <b>4,206</b> | <b>4,563</b> | <b>4,701</b> | <b>4,405</b> | <b>4,581</b> | <b>4,022</b> | <b>4,452</b> | <b>4,655</b> | <b>4,459</b> | <b>4,022</b> | <b>4,504</b> | <b>4,063</b> | <b>52,633</b> | <b>100%</b>  |
| <b>FY 2024</b> |                    |              |              |              |              |              |              |              |              |              |              |              |              |               |              |
|                | Reactive           | 1,187        | 1,105        | 1,670        | 1,345        | 1,188        | 924          | 1,280        | 1,119        | 1,001        | 1,295        | 861          | 0            | 12,975        | 26.43%       |
|                | Planned            | 1,161        | 1,294        | 1,037        | 1,118        | 1,276        | 743          | 996          | 1,065        | 1,005        | 1,184        | 867          | 0            | 11,746        | 23.93%       |
|                | Proactive          | 2,103        | 2,152        | 2,315        | 1,995        | 2,218        | 2,163        | 2,117        | 2,193        | 2,422        | 2,156        | 2,540        | 0            | 24,374        | 49.65%       |
|                | <b>Total</b>       | <b>4,451</b> | <b>4,551</b> | <b>5,022</b> | <b>4,458</b> | <b>4,682</b> | <b>3,830</b> | <b>4,393</b> | <b>4,377</b> | <b>4,428</b> | <b>4,635</b> | <b>4,268</b> | <b>0</b>     | <b>49,095</b> | <b>100%</b>  |

## Legend

- Reactive – Daily service requests
- Planned – Repairs and projects
- Proactive – Preventive maintenance schedules

## Observations

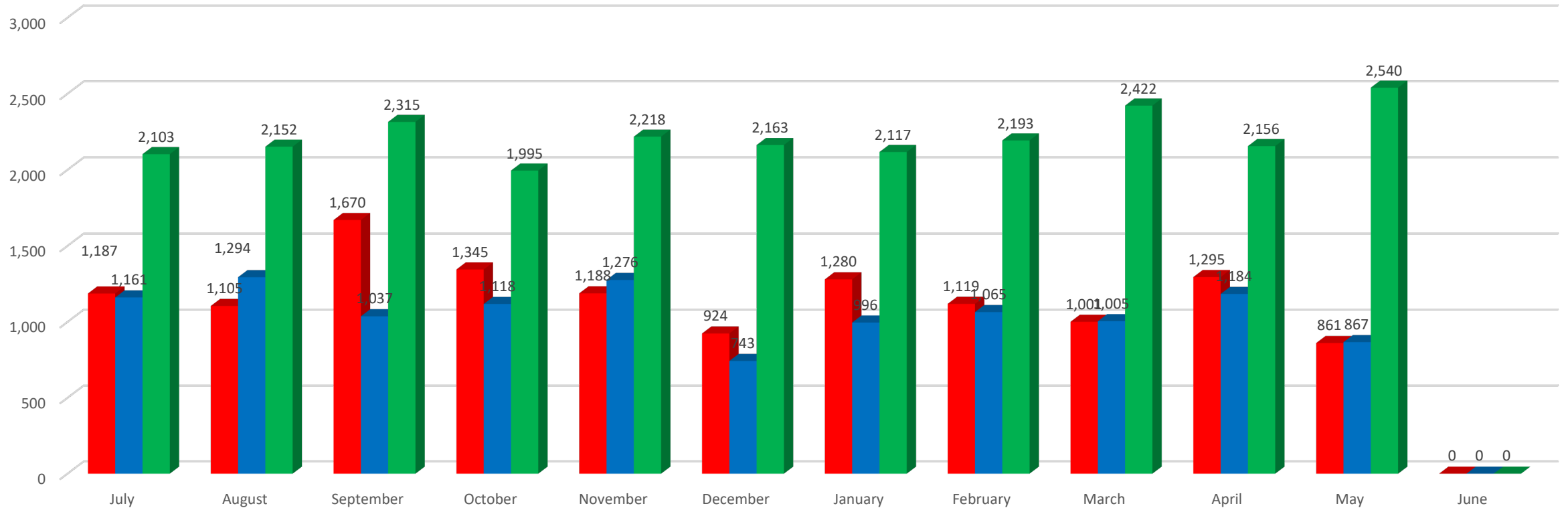
- 1.) Reactive are trending upward increasing percent of composition
- 2.) Planned are decreasing in count
- 3.) Proactive are forecasted to increase slightly

Source: AiM, IWMS

# Work Request Type Monthly Count

## Mechanical Maintenance & Planning Work Request Type by Month

■ Reactive ■ Planned ■ Proactive



Source: AiM, IWMS

# Work Request Type Monthly Expense (\$) USD

| Fiscal Year    | Request Type (\$ USD) | July               | August             | September          | October            | November           | December           | January            | February           | March              | April              | May                 | June                | Total                | (%) of Total |
|----------------|-----------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|---------------------|---------------------|----------------------|--------------|
| <b>FY 2022</b> |                       |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                     |                     |                      |              |
|                | Reactive              | \$ 60,085          | \$ 86,711          | \$ 87,939          | \$ 59,300          | \$ 65,170          | \$ 107,921         | \$ 58,908          | \$ 152,929         | \$ 144,263         | \$ 101,600         | \$ 162,712          | \$ 242,111          | \$ 1,329,649         | 9.00%        |
|                | Planned               | \$ 818,826         | \$ 678,583         | \$ 605,378         | \$ 599,921         | \$ 794,406         | \$ 687,521         | \$ 822,043         | \$ 941,439         | \$1,271,520        | \$ 921,232         | \$ 1,080,626        | \$ 1,832,475        | \$ 11,053,972        | 74.85%       |
|                | Proactive             | \$ 182,860         | \$ 188,405         | \$ 210,674         | \$ 177,440         | \$ 179,533         | \$ 208,426         | \$ 194,372         | \$ 214,464         | \$ 206,541         | \$ 171,748         | \$ 240,548          | \$ 208,928          | \$ 2,383,938         | 16.14%       |
|                | <b>Total (\$)</b>     | <b>\$1,061,771</b> | <b>\$ 953,699</b>  | <b>\$ 903,991</b>  | <b>\$ 836,661</b>  | <b>\$1,039,109</b> | <b>\$1,003,868</b> | <b>\$1,075,324</b> | <b>\$1,308,832</b> | <b>\$1,622,324</b> | <b>\$1,194,580</b> | <b>\$ 1,483,886</b> | <b>\$ 2,283,514</b> | <b>\$ 14,767,558</b> | <b>100%</b>  |
| <b>FY 2023</b> |                       |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                     |                     |                      |              |
|                | Reactive              | \$ 81,909          | \$ 159,103         | \$ 211,178         | \$ 105,078         | \$ 138,425         | \$ 202,082         | \$ 118,877         | \$ 115,613         | \$ 181,856         | \$ 151,607         | \$ 85,750           | \$ 63,317           | \$ 1,614,794         | 9.58%        |
|                | Planned               | \$ 737,821         | \$ 896,806         | \$ 881,385         | \$1,019,763        | \$ 893,276         | \$1,143,617        | \$ 943,133         | \$1,186,089        | \$1,239,544        | \$1,420,009        | \$ 1,124,798        | \$ 1,189,783        | \$ 12,676,024        | 75.20%       |
|                | Proactive             | \$ 179,233         | \$ 237,797         | \$ 220,261         | \$ 189,210         | \$ 204,887         | \$ 218,111         | \$ 251,276         | \$ 238,189         | \$ 217,140         | \$ 181,690         | \$ 242,049          | \$ 185,588          | \$ 2,565,431         | 15.22%       |
|                | <b>Total (\$)</b>     | <b>\$ 998,963</b>  | <b>\$1,293,705</b> | <b>\$1,312,824</b> | <b>\$1,314,051</b> | <b>\$1,236,588</b> | <b>\$1,563,810</b> | <b>\$1,313,286</b> | <b>\$1,539,891</b> | <b>\$1,638,539</b> | <b>\$1,753,307</b> | <b>\$ 1,452,596</b> | <b>\$ 1,438,688</b> | <b>\$ 16,856,249</b> | <b>100%</b>  |
| <b>FY 2024</b> |                       |                    |                    |                    |                    |                    |                    |                    |                    |                    |                    |                     |                     |                      |              |
|                | Reactive              | \$ 202,028         | \$ 204,053         | \$ 186,356         | \$ 231,161         | \$ 207,613         | \$ 154,183         | \$ 265,710         | \$ 310,747         | \$ 358,740         | \$ 285,347         | \$ 240,637          | \$ -                | \$ 2,646,575         | 17.47%       |
|                | Planned               | \$1,071,983        | \$ 853,571         | \$ 769,900         | \$1,079,322        | \$ 861,690         | \$ 683,812         | \$1,109,211        | \$1,044,894        | \$ 886,378         | \$1,222,881        | \$ 746,627          | \$ -                | \$ 10,330,269        | 68.18%       |
|                | Proactive             | \$ 158,142         | \$ 183,118         | \$ 210,812         | \$ 188,390         | \$ 183,414         | \$ 165,617         | \$ 174,136         | \$ 254,372         | \$ 207,896         | \$ 174,596         | \$ 273,723          | \$ -                | \$ 2,174,215         | 14.35%       |
|                | <b>Total (\$)</b>     | <b>\$1,432,153</b> | <b>\$1,240,742</b> | <b>\$1,167,067</b> | <b>\$1,498,872</b> | <b>\$1,252,717</b> | <b>\$1,003,612</b> | <b>\$1,549,057</b> | <b>\$1,610,013</b> | <b>\$1,453,014</b> | <b>\$1,682,825</b> | <b>\$ 1,260,987</b> | <b>\$ -</b>         | <b>\$ 15,151,059</b> | <b>100%</b>  |

Source: AiM, IWMS

## Legend

Reactive – Daily service requests

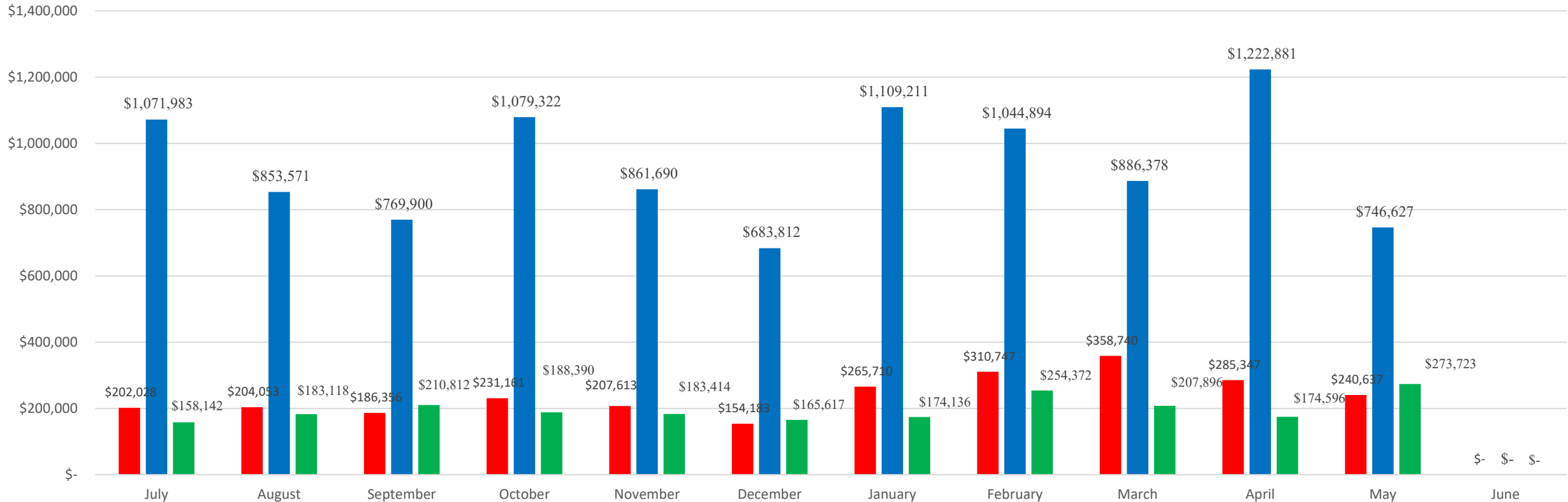
Planned – Repairs and projects

Proactive – Preventive maintenance schedules

# Work Request Type Monthly Resource

Mechanical Maintenance & Planning  
Work Request Type Resource Unitization

■ Reactive ■ Planned ■ Proactive



# Work Request Unit Cost (\$) USD

| Fiscal Year    | Unit Cost (\$) USD | July             | August           | September        | October          | November         | December         | January          | February         | March            | April            | May              | June             | Unit Cost (\$) USD | (%) of Total |
|----------------|--------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|--------------------|--------------|
| <b>FY 2022</b> |                    |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                    |              |
|                | Reactive           | \$ 68.51         | \$ 91.47         | \$ 86.47         | \$ 70.51         | \$ 63.71         | \$ 202.48        | \$ 71.93         | \$ 141.86        | \$ 146.02        | \$ 105.61        | \$ 180.79        | \$ 287.88        | \$ 122.81          | ~            |
|                | Planned            | \$ 857.41        | \$ 616.33        | \$ 539.55        | \$ 438.54        | \$ 587.14        | \$ 943.10        | \$ 692.54        | \$ 799.86        | \$ 916.74        | \$ 752.64        | \$ 950.42        | \$ 1,998.34      | \$ 809.40          | ~            |
|                | Proactive          | \$ 80.24         | \$ 83.96         | \$ 85.74         | \$ 82.84         | \$ 83.74         | \$ 81.01         | \$ 83.42         | \$ 92.60         | \$ 91.19         | \$ 79.00         | \$ 97.63         | \$ 88.64         | \$ 85.92           | ~            |
|                | <b>Total (\$)</b>  | <b>\$ 258.28</b> | <b>\$ 222.15</b> | <b>\$ 196.69</b> | <b>\$ 192.29</b> | <b>\$ 229.89</b> | <b>\$ 261.76</b> | <b>\$ 248.00</b> | <b>\$ 286.33</b> | <b>\$ 349.64</b> | <b>\$ 273.99</b> | <b>\$ 329.68</b> | <b>\$ 554.92</b> | <b>\$ 282.75</b>   | <b>0%</b>    |
| <b>FY 2023</b> |                    |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                    |              |
|                | Reactive           | \$ 82.07         | \$ 162.52        | \$ 204.63        | \$ 93.49         | \$ 141.97        | \$ 341.93        | \$ 151.24        | \$ 148.22        | \$ 225.35        | \$ 204.32        | \$ 127.79        | \$ 80.86         | \$ 157.26          | ~            |
|                | Planned            | \$ 849.05        | \$ 731.49        | \$ 760.47        | \$ 941.61        | \$ 750.02        | \$ 1,134.54      | \$ 735.10        | \$ 815.18        | \$ 834.15        | \$ 986.12        | \$ 855.36        | \$ 1,101.65      | \$ 868.52          | ~            |
|                | Proactive          | \$ 76.63         | \$ 100.85        | \$ 87.75         | \$ 86.08         | \$ 84.84         | \$ 90.02         | \$ 105.45        | \$ 98.43         | \$ 100.25        | \$ 98.74         | \$ 96.13         | \$ 84.36         | \$ 92.38           | ~            |
|                | <b>Total (\$)</b>  | <b>\$ 237.51</b> | <b>\$ 283.52</b> | <b>\$ 279.26</b> | <b>\$ 298.31</b> | <b>\$ 269.94</b> | <b>\$ 388.81</b> | <b>\$ 294.99</b> | <b>\$ 330.80</b> | <b>\$ 367.47</b> | <b>\$ 435.93</b> | <b>\$ 322.51</b> | <b>\$ 354.09</b> | <b>\$ 320.26</b>   | <b>0%</b>    |
| <b>FY 2024</b> |                    |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                    |              |
|                | Reactive           | \$ 170.20        | \$ 184.66        | \$ 111.59        | \$ 171.87        | \$ 174.76        | \$ 166.86        | \$ 207.59        | \$ 277.70        | \$ 358.38        | \$ 220.35        | \$ 279.49        | ~                | \$ 203.97          | ~            |
|                | Planned            | \$ 923.33        | \$ 659.64        | \$ 742.43        | \$ 965.40        | \$ 675.31        | \$ 920.34        | \$ 1,113.67      | \$ 981.12        | \$ 881.97        | \$ 1,032.84      | \$ 861.16        | ~                | \$ 879.47          | ~            |
|                | Proactive          | \$ 75.20         | \$ 85.09         | \$ 91.06         | \$ 94.43         | \$ 82.69         | \$ 76.57         | \$ 82.26         | \$ 115.99        | \$ 85.84         | \$ 80.98         | \$ 107.76        | ~                | \$ 89.20           | ~            |
|                | <b>Total (\$)</b>  | <b>\$ 321.76</b> | <b>\$ 272.63</b> | <b>\$ 232.39</b> | <b>\$ 336.22</b> | <b>\$ 267.56</b> | <b>\$ 262.04</b> | <b>\$ 352.62</b> | <b>\$ 367.83</b> | <b>\$ 328.14</b> | <b>\$ 363.07</b> | <b>\$ 295.45</b> | <b>~</b>         | <b>\$ 308.61</b>   | <b>0%</b>    |

Source: AiM, IWMS

## Legend

Reactive – Daily service requests

Planned – Repairs and projects

Proactive – Preventive maintenance schedules

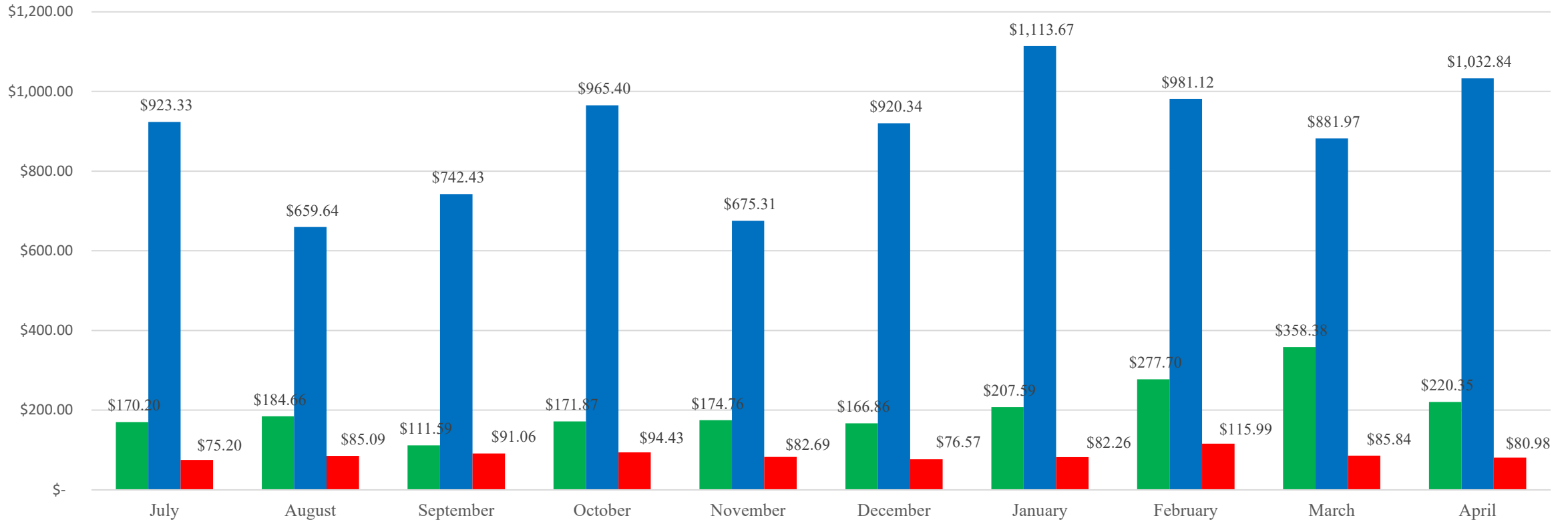
## Unit Cost

- 1.) Reactive increased to \$203.97
- 2.) Planned increased to \$879.47
- 3.) Proactive decreased to \$89.20 from the year before

# Work Request Type Resource Unit Cost (\$) USD

Mechanical Maintenance & Planning  
Resource Unitization Detail

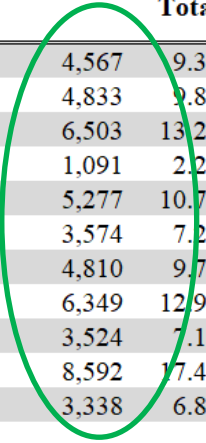
■ Reactive ■ Planned ■ Proactive



Source: AiM, IWMS

# Work Request by Shop

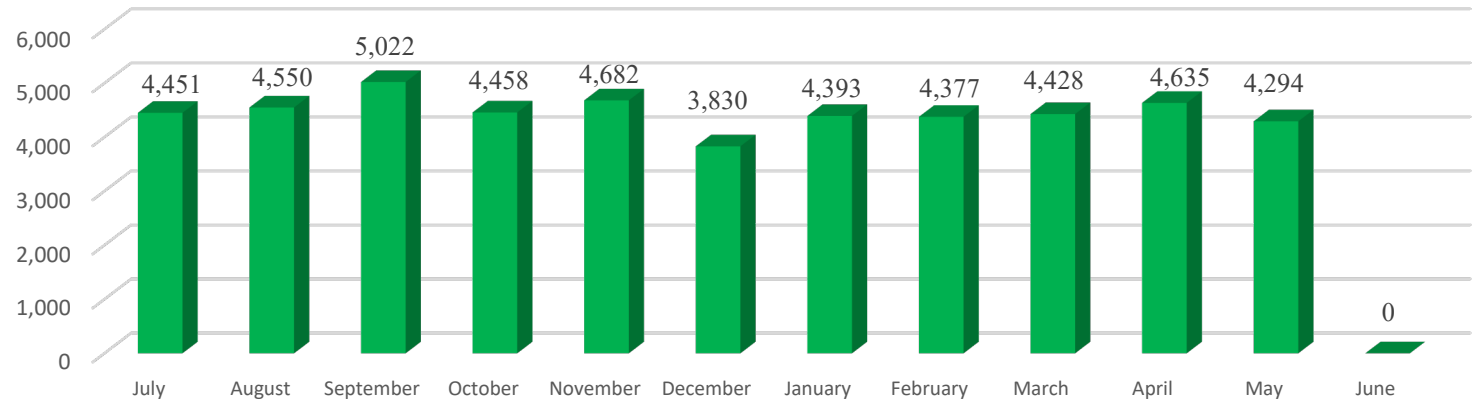
| Line item    | Shop  | July         | August       | September    | October      | November     | December     | January      | February     | March        | April        | May          | June     | Total         | (%) of Total |
|--------------|-------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|----------|---------------|--------------|
| 1            | MA-01 | 425          | 389          | 487          | 439          | 414          | 418          | 396          | 429          | 365          | 426          | 379          | 0        | 4,567         | 9.30%        |
| 2            | MA-02 | 427          | 439          | 503          | 485          | 448          | 410          | 422          | 372          | 449          | 464          | 414          | 0        | 4,833         | 9.84%        |
| 3            | MA-03 | 550          | 598          | 642          | 618          | 663          | 499          | 555          | 537          | 597          | 640          | 604          | 0        | 6,503         | 13.24%       |
| 4            | MA-04 | 98           | 99           | 70           | 80           | 88           | 122          | 98           | 103          | 121          | 119          | 93           | 0        | 1,091         | 2.22%        |
| 5            | MA-05 | 498          | 530          | 521          | 462          | 504          | 357          | 473          | 508          | 446          | 479          | 499          | 0        | 5,277         | 10.74%       |
| 6            | MA-07 | 343          | 310          | 329          | 398          | 372          | 248          | 284          | 259          | 309          | 308          | 414          | 0        | 3,574         | 7.28%        |
| 7            | MA-08 | 493          | 484          | 508          | 388          | 459          | 353          | 431          | 461          | 423          | 440          | 370          | 0        | 4,810         | 9.79%        |
| 8            | MA-09 | 538          | 598          | 710          | 568          | 587          | 478          | 604          | 611          | 581          | 544          | 530          | 0        | 6,349         | 12.93%       |
| 9            | MA-10 | 292          | 308          | 392          | 307          | 318          | 270          | 342          | 340          | 326          | 337          | 292          | 0        | 3,524         | 7.17%        |
| 10           | MA-11 | 787          | 795          | 860          | 713          | 829          | 675          | 788          | 757          | 811          | 878          | 699          | 0        | 8,592         | 17.49%       |
| 11           | UT-06 | 226          | 517          | 241          | 396          | 307          | 208          | 293          | 273          | 355          | 328          | 194          | 0        | 3,338         | 6.80%        |
| <b>Total</b> |       | <b>4,451</b> | <b>4,550</b> | <b>5,022</b> | <b>4,458</b> | <b>4,682</b> | <b>3,830</b> | <b>4,393</b> | <b>4,377</b> | <b>4,428</b> | <b>4,635</b> | <b>4,294</b> | <b>0</b> | <b>49,120</b> | <b>100%</b>  |



Upper limit – 8,592  
 Lower limit – 3,524  
 Probable – 4,769

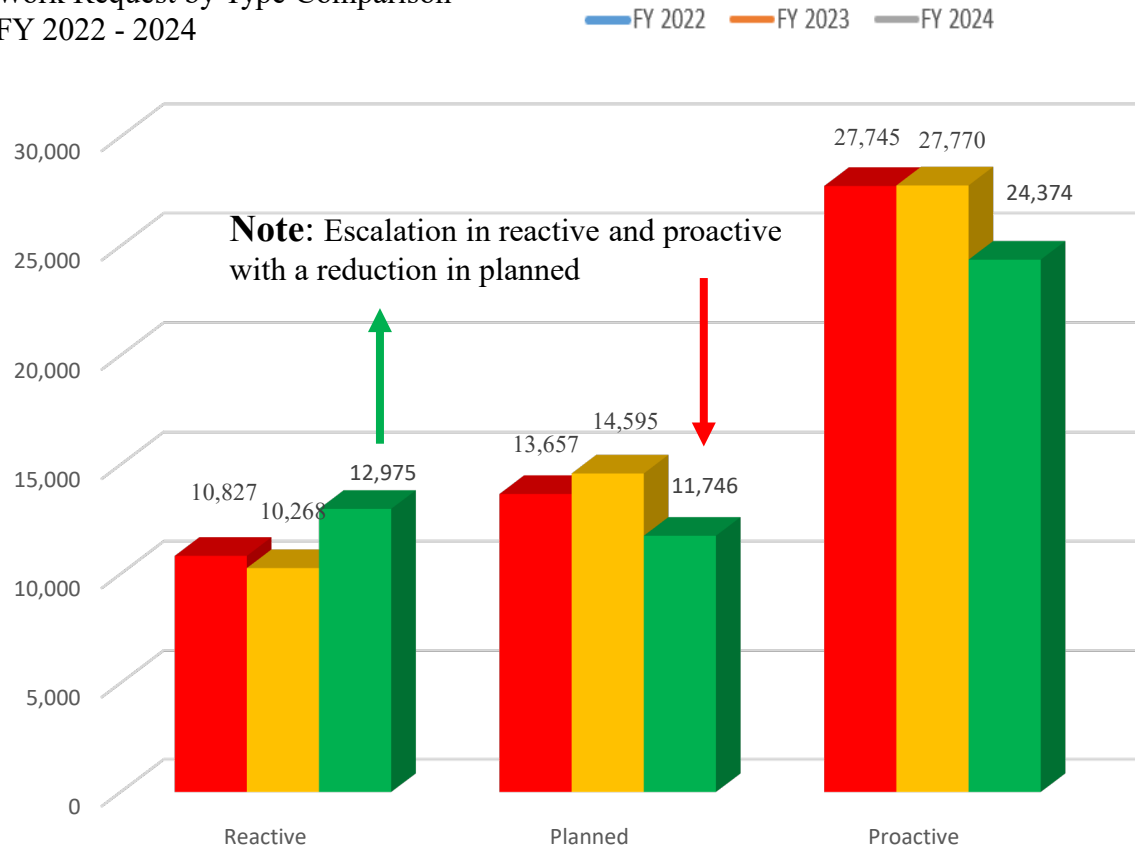
Source: AiM, IWMS

Mechanical Maintenance & Planning  
 Total Request by Month  
 FY 2024

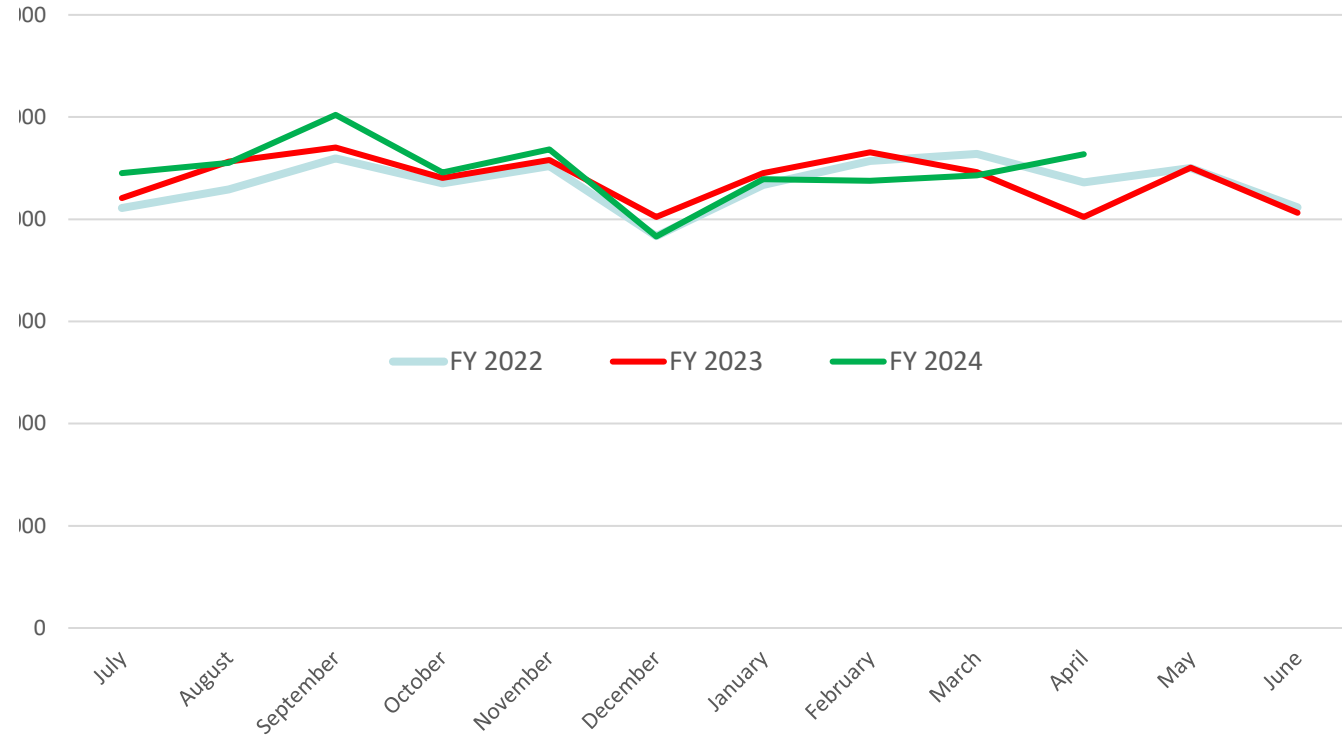


# Business Cycle

Mechanical Maintenance & Planning  
Work Request by Type Comparison  
FY 2022 - 2024



Mechanical Maintenance & Planning  
Work Requests by Month  
FY 2022 - 2024



Source: AiM, IWMS

- Legend**
- Reactive – Daily service requests
  - Planned – Repairs and projects
  - Proactive – Preventive maintenance schedules



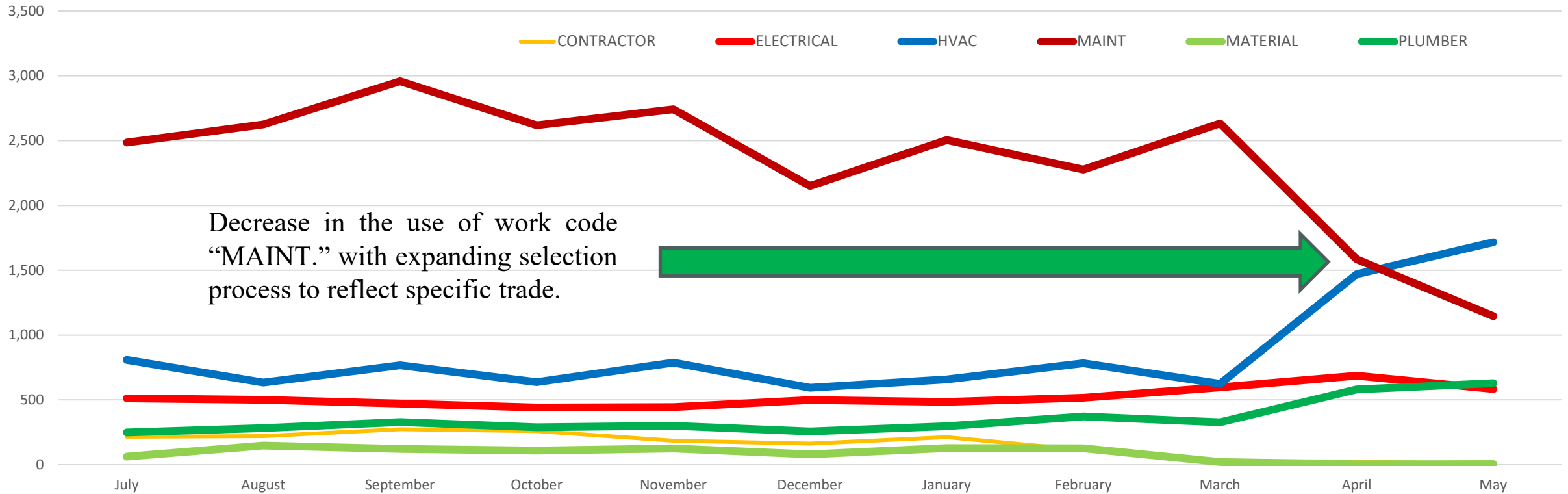
# Work Code Utilization by Month

| Line item    | Work Code       | July         | August       | September    | October      | November     | December     | January      | February     | March        | April        | May          | June     | Total         | (%) of Total |
|--------------|-----------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|----------|---------------|--------------|
| 7            | CARPENTER       | 26           | 37           | 41           | 26           | 24           | 17           | 28           | 40           | 53           | 80           | 41           | 0        | 413           | 0.84%        |
| 13           | CONTRACTOR      | 215          | 220          | 273          | 258          | 185          | 163          | 212          | 112          | 27           | 24           | 5            | 0        | 1,694         | 3.45%        |
| 16           | ELECTRICAL      | 511          | 500          | 471          | 441          | 444          | 499          | 484          | 516          | 597          | 687          | 583          | 0        | 5,733         | 11.68%       |
| 21           | ESTIMATING      | 47           | 52           | 34           | 40           | 33           | 34           | 31           | 47           | 42           | 47           | 35           | 0        | 442           | 0.90%        |
| 24           | FLOORING        | 1            | 0            | 0            | 1            | 0            | 0            | 3            | 17           | 9            | 8            | 12           | 0        | 51            | 0.10%        |
| 25           | GRNDS           | 21           | 4            | 1            | 0            | 0            | 1            | 1            | 3            | 1            | 5            | 4            | 0        | 41            | 0.08%        |
| 26           | HVAC            | 808          | 634          | 767          | 637          | 788          | 593          | 657          | 782          | 624          | 1,470        | 1,716        | 0        | 9,476         | 19.30%       |
| 29           | INSPECTION      | 0            | 0            | 0            | 1            | 0            | 0            | 1            | 0            | 4            | 2            | 7            | 0        | 15            | 0.03%        |
| 30           | INSULATION      | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 3            | 1            | 0        | 4             | 0.01%        |
| 31           | INTERIOR DESIGN | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0        | 0             | 0.00%        |
| 36           | MAINT           | 2,486        | 2,625        | 2,959        | 2,619        | 2,742        | 2,150        | 2,505        | 2,277        | 2,634        | 1,585        | 1,146        | 0        | 25,728        | 52.40%       |
| 37           | MARK-OUT        | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0        | 0             | 0.00%        |
| 38           | MASON           | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 8            | 8            | 13           | 2            | 0        | 31            | 0.06%        |
| 39           | MAT             | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0        | 0             | 0.00%        |
| 40           | MATERIAL        | 62           | 147          | 121          | 109          | 124          | 80           | 128          | 126          | 21           | 2            | 4            | 0        | 924           | 1.88%        |
| 42           | MOVE            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 1            | 2            | 0            | 0            | 0        | 3             | 0.01%        |
| 45           | PAINTER         | 20           | 32           | 5            | 30           | 22           | 22           | 22           | 39           | 34           | 45           | 31           | 0        | 302           | 0.62%        |
| 46           | PERMIT          | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0        | 0             | 0.00%        |
| 47           | PLUMBER         | 248          | 282          | 329          | 289          | 300          | 256          | 297          | 372          | 327          | 581          | 629          | 0        | 3,910         | 7.96%        |
| 49           | ROOF            | 0            | 1            | 0            | 0            | 0            | 6            | 8            | 15           | 35           | 51           | 21           | 0        | 137           | 0.28%        |
| 50           | SECURITY        | 0            | 1            | 0            | 0            | 0            | 1            | 0            | 1            | 1            | 3            | 2            | 0        | 9             | 0.02%        |
| 58           | TRAINING        | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0        | 0             | 0.00%        |
| 59           | UHT             | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0        | 0             | 0.00%        |
| 60           | VEHICLE         | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0        | 0             | 0.00%        |
| <b>Total</b> |                 | <b>4,453</b> | <b>4,551</b> | <b>5,021</b> | <b>4,458</b> | <b>4,682</b> | <b>3,830</b> | <b>4,393</b> | <b>4,377</b> | <b>4,428</b> | <b>4,635</b> | <b>4,269</b> | <b>0</b> | <b>49,097</b> | <b>100%</b>  |

Source: AiM, IWMS

# Work Code Utilization Trending

Mechanical Maintenance & Planning  
 Work Code Utilization  
 FY 2024



Decrease in the use of work code  
 “MAINT.” with expanding selection  
 process to reflect specific trade.

Source: AiM, IWMS

# Monthly Timecards by Shop

| FY 2024 Time Cards |       |            |               | 1            | 2            | 3            | 4            | 5            | 6            | 7            | 8            | 9            | 10           | 11       | 12       | Total         | (% of Total) |
|--------------------|-------|------------|---------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|----------|----------|---------------|--------------|
| Line item          | Shop  | FTE KRONOS | FTE Time Card | July         | August       | September    | October      | November     | December     | January      | February     | March        | April        | May      | June     |               |              |
| 1                  | MA-01 | ~          | ~             | 89           | 108          | 84           | 96           | 78           | 63           | 84           | 83           | 71           | 100          |          |          | 856           | 6.14%        |
| 2                  | MA-02 | ~          | ~             | 85           | 106          | 86           | 100          | 103          | 81           | 109          | 87           | 119          | 122          |          |          | 998           | 7.16%        |
| 3                  | MA-03 | ~          | ~             | 118          | 180          | 185          | 200          | 183          | 154          | 208          | 200          | 184          | 184          |          |          | 1,796         | 12.89%       |
| 4                  | MA-04 | ~          | ~             | 109          | 160          | 143          | 165          | 144          | 105          | 155          | 148          | 142          | 144          |          |          | 1,415         | 10.15%       |
| 5                  | MA-05 | ~          | ~             | 124          | 133          | 109          | 140          | 107          | 66           | 117          | 114          | 115          | 125          |          |          | 1,150         | 8.25%        |
| 6                  | MA-07 | ~          | ~             | 91           | 94           | 103          | 142          | 129          | 96           | 110          | 90           | 87           | 86           |          |          | 1,028         | 7.38%        |
| 7                  | MA-08 | ~          | ~             | 142          | 181          | 147          | 161          | 148          | 126          | 135          | 137          | 144          | 150          |          |          | 1,471         | 10.55%       |
| 8                  | MA-09 | ~          | ~             | 147          | 193          | 140          | 175          | 166          | 136          | 175          | 186          | 165          | 191          |          |          | 1,674         | 12.01%       |
| 9                  | MA-10 | ~          | ~             | 97           | 88           | 84           | 80           | 57           | 68           | 86           | 82           | 77           | 119          |          |          | 838           | 6.01%        |
| 10                 | MA-11 | ~          | ~             | 168          | 198          | 197          | 198          | 166          | 143          | 180          | 178          | 183          | 190          |          |          | 1,801         | 12.92%       |
| 11                 | UT-06 | ~          | ~             | 118          | 172          | 140          | 181          | 149          | 0            | 0            | 0            | 0            | 150          |          |          | 910           | 6.53%        |
| <b>Total</b>       |       | ~          | ~             | <b>1,288</b> | <b>1,613</b> | <b>1,418</b> | <b>1,638</b> | <b>1,430</b> | <b>1,038</b> | <b>1,359</b> | <b>1,305</b> | <b>1,287</b> | <b>1,561</b> | <b>0</b> | <b>0</b> | <b>13,937</b> | <b>100%</b>  |

Source: AiM, IWMS

Monthly Productive Days – Sum of daily timecards

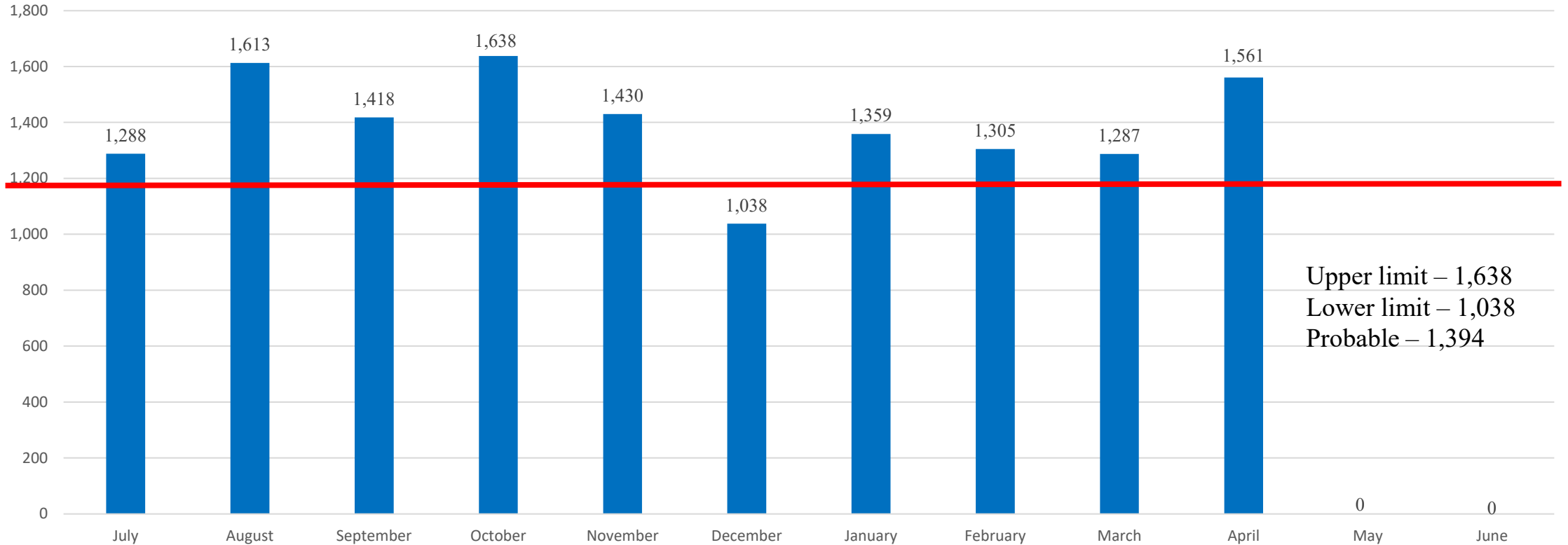
Timecard – Productive day

RPD=WRT/PDA



# Timecards Trends by Month

## Mechanical Maintenance & Planning Time Cards by Month FY 2024



Upper limit – 1,638  
Lower limit – 1,038  
Probable – 1,394

Source: AiM, IWMS

# Calculating Positions

| Line item    | Shop  | Campus         | P         | (%) of Total | WRT           | (%) of Total | PDT           | PDA           | RPDA        | KA            | Extra Description  |
|--------------|-------|----------------|-----------|--------------|---------------|--------------|---------------|---------------|-------------|---------------|--------------------|
| 1            | MA-01 | Livingston     | 8         | 8.33%        | 5,313         | 10.09%       | 1,560         | 1,075         | 4.94        | 134.38        |                    |
| 2            | MA-02 | Busch          | 8         | 8.33%        | 5,110         | 9.71%        | 1,560         | 1,285         | 3.98        | 160.63        |                    |
| 3            | MA-03 | Busch          | 13        | 13.54%       | 7,154         | 13.59%       | 2,535         | 2,029         | 3.53        | 156.08        | two craft trainees |
| 4            | MA-04 | All            | 12        | 12.50%       | 1,277         | 2.43%        | 2,340         | 1,674         | 0.76        | 139.50        |                    |
| 5            | MA-05 | Busch          | 8         | 8.33%        | 6,168         | 11.72%       | 1,560         | 1,335         | 4.62        | 166.88        | one craft trainee  |
| 6            | MA-07 | Off Site       | 9         | 9.38%        | 3,552         | 6.75%        | 1,755         | 1,037         | 3.43        | 115.22        |                    |
| 7            | MA-08 | College Avenue | 9         | 9.38%        | 4,799         | 9.12%        | 1,755         | 1,429         | 3.36        | 158.78        | one craft trainee  |
| 8            | MA-09 | Douglass       | 12        | 12.50%       | 7,139         | 13.56%       | 2,340         | 1,670         | 4.27        | 139.17        | two craft trainees |
| 9            | MA-10 | College Avenue | 6         | 6.25%        | 3,795         | 7.21%        | 1,170         | 1,058         | 3.59        | 176.33        | one craft trainee  |
| 10           | MA-11 | Cook           | 11        | 11.46%       | 8,326         | 15.82%       | 2,145         | 1,914         | 4.35        | 174.00        | one craft trainee  |
| <b>Total</b> |       |                | <b>96</b> | <b>100%</b>  | <b>52,633</b> | <b>100%</b>  | <b>18,720</b> | <b>14,506</b> | <b>3.63</b> | <b>151.10</b> |                    |

Source: AiM, IWMS

## Legend

- P - Positions
- WRT - Work Request Total
- PDA - Product Day Actual, timecards
- RPD - Requests per productive day
- PDT - Productive Day, Theoretical (195\*P)
- KA - Constant Actual

$$RPD = WRT / PDA$$

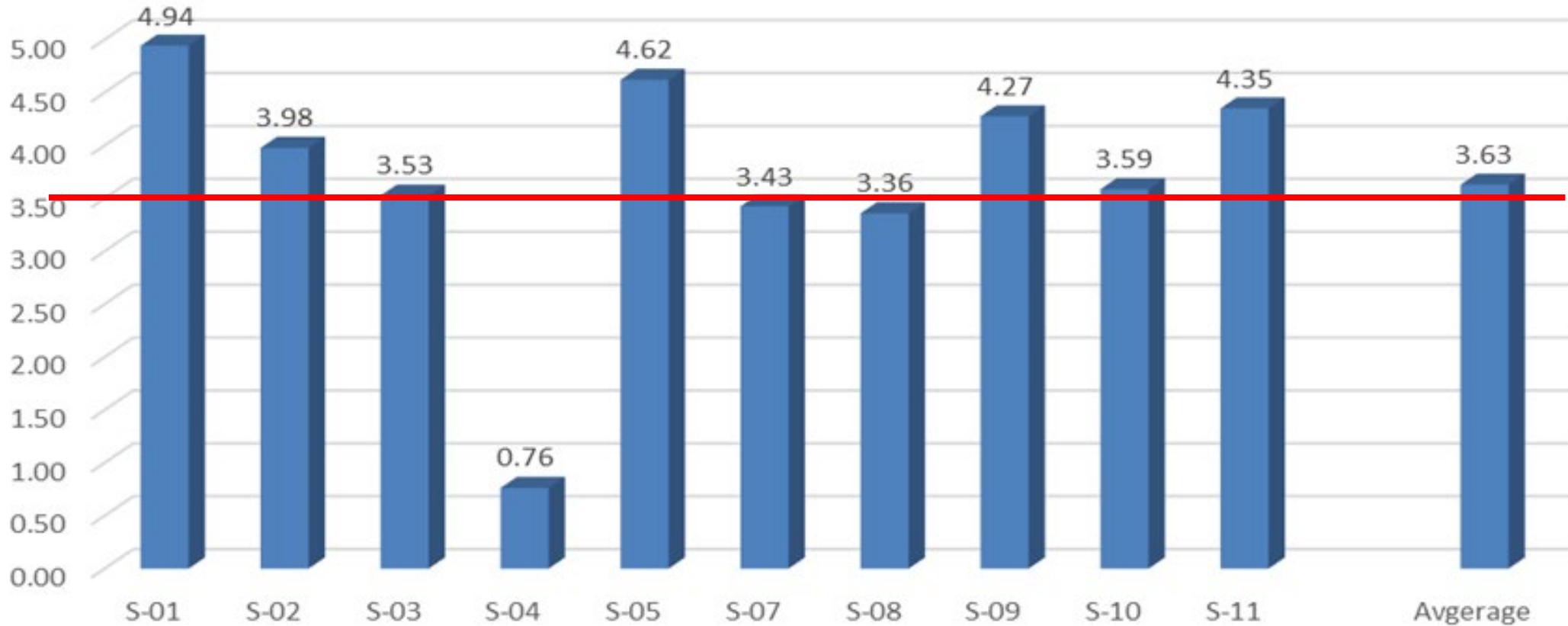
**Example:**  
 $P = 52,633 / (3.63 * 151)$   
 $P = 96.02$

Upper limit – 4.94  
 Lower limit – 3.36  
 Gap Variance – 1.58

# Work Request per Productive Day (WPD)

Work Requests/Productive Day

Upper limit – 4.94  
Lower limit – 3.36  
Gap Variance – 1.58



Source: AiM, IWMS

# Calculating Maintenance Mechanic Positions

- Calculating Maintenance Mechanics
  - Service Type Work Request – 14,424
  - Calculated Requests per Productive Day – 5.00
  - Annual Productive Days – 195
  - Positions =  $14,424 / (5.00 * 195)$
  - Positions =  $14,424 / 975$
  - Positions = 14.79
  - Positions Existing = 21.00
  - Position Variance = 6.21

*Positions = Work Request Total / (Request per productive Day \* Annual Productive Days)*



Source: Google Images



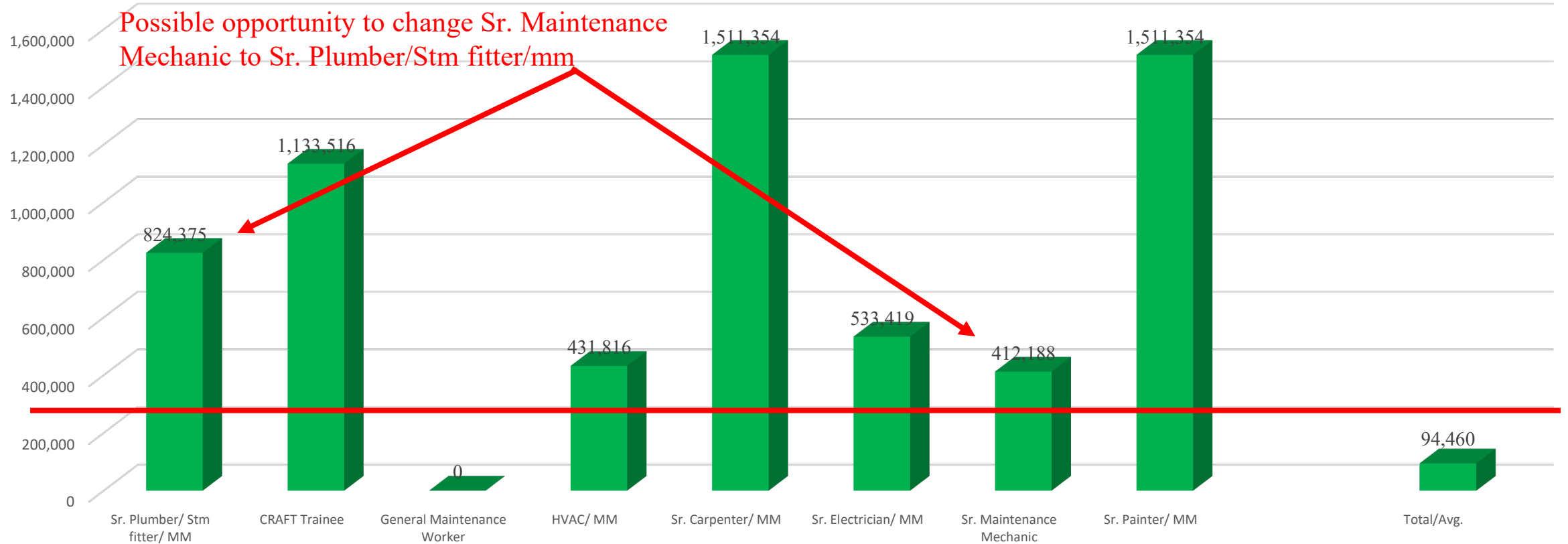
# GSF by Trade (KPI)

| Role Description            | Organization | Bldg. Count | Gross Square Feet (GSF) | P         | (%) of Total | GSF/FTE       |
|-----------------------------|--------------|-------------|-------------------------|-----------|--------------|---------------|
| Sr. Plumber/ Stm fitter/ MM | 5532         | 485         | 9,068,127               | 11        | 11.46%       | 824,375       |
| CRAFT Trainee               | 5532         | 485         | 9,068,127               | 8         | 8.33%        | 1,133,516     |
| General Maintenance Worker  | 5532         | 485         | 9,068,127               | 3         | 3.13%        | 3,022,709     |
| HVAC/ MM                    | 5532         | 485         | 9,068,127               | 21        | 21.88%       | 431,816       |
| Sr. Carpenter/ MM           | 5532         | 485         | 9,068,127               | 6         | 6.25%        | 1,511,354     |
| Sr. Electrician/ MM         | 5532         | 485         | 9,068,127               | 17        | 17.71%       | 533,419       |
| Sr. Maintenance Mechanic    | 5532         | 485         | 9,068,127               | 22        | 22.92%       | 412,188       |
| Sr. Painter/ MM             | 5532         | 485         | 9,068,127               | 6         | 6.25%        | 1,511,354     |
| <b>Total/Avg.</b>           | ~            | <b>485</b>  | <b>9,068,127</b>        | <b>96</b> | <b>100%</b>  | <b>94,460</b> |



# Gross Square Feet by Trade (KPI)

## Mechanical Maintenance & Planning Gross Square Feet by Trade



Source: AiM, IWMS

# Work Requests per Thousand GSF (KPI)

| Line item    | Shop  | Campus         | Bldg. count | (%) of Total | GSF              | (%) of Total | Reactive      | Planned       | Proactive     | Total         | Phases/ KGSF | Extra Description  |
|--------------|-------|----------------|-------------|--------------|------------------|--------------|---------------|---------------|---------------|---------------|--------------|--------------------|
| 1            | MA-01 | Livingston     | 48          | 9.68%        | 1,101,187        | 11.78%       | 1,322         | 473           | 2,548         | 4,343         | 3.94         | K = 31.6' by 31.6' |
| 2            | MA-02 | Busch          | 20          | 4.03%        | 1,096,657        | 11.73%       | 1,332         | 1,091         | 2,770         | 5,193         | 4.74         |                    |
| 3            | MA-03 | Busch          | 26          | 5.24%        | 1,054,969        | 11.28%       | 1,526         | 1,674         | 3,002         | 6,202         | 5.88         |                    |
| 4            | MA-04 | All            | 0           | 0.00%        | 0                | 0.00%        | 0             | 0             | 0             | 0             | ~            |                    |
| 5            | MA-05 | Busch          | 18          | 3.63%        | 1,009,173        | 10.79%       | 1,596         | 1,014         | 2,454         | 5,064         | 5.02         |                    |
| 6            | MA-07 | Off Site       | 124         | 25.00%       | 473,091          | 5.06%        | 807           | 970           | 1,354         | 3,131         | 6.62         |                    |
| 7            | MA-08 | College Avenue | 39          | 7.86%        | 909,730          | 9.73%        | 1,221         | 1,584         | 2,256         | 5,061         | 5.56         |                    |
| 8            | MA-09 | Douglass       | 58          | 11.69%       | 1,126,833        | 12.05%       | 1,519         | 1,260         | 2,972         | 5,751         | 5.10         |                    |
| 9            | MA-10 | College Avenue | 50          | 10.08%       | 1,273,292        | 13.62%       | 904           | 907           | 1,620         | 3,431         | 2.69         |                    |
| 10           | MA-11 | Cook           | 113         | 22.78%       | 1,304,222        | 13.95%       | 2,349         | 1,376         | 4,003         | 7,728         | 5.93         |                    |
| 11           | UT-06 | All            | 0           | 0.00%        | 0                | 0.00%        | 0             | 0             | 0             | 0             | ~            |                    |
| <b>Total</b> |       |                | <b>496</b>  | <b>100%</b>  | <b>9,349,153</b> | <b>100%</b>  | <b>12,576</b> | <b>10,349</b> | <b>22,979</b> | <b>45,904</b> | <b>4.91</b>  |                    |

Source: Archibus

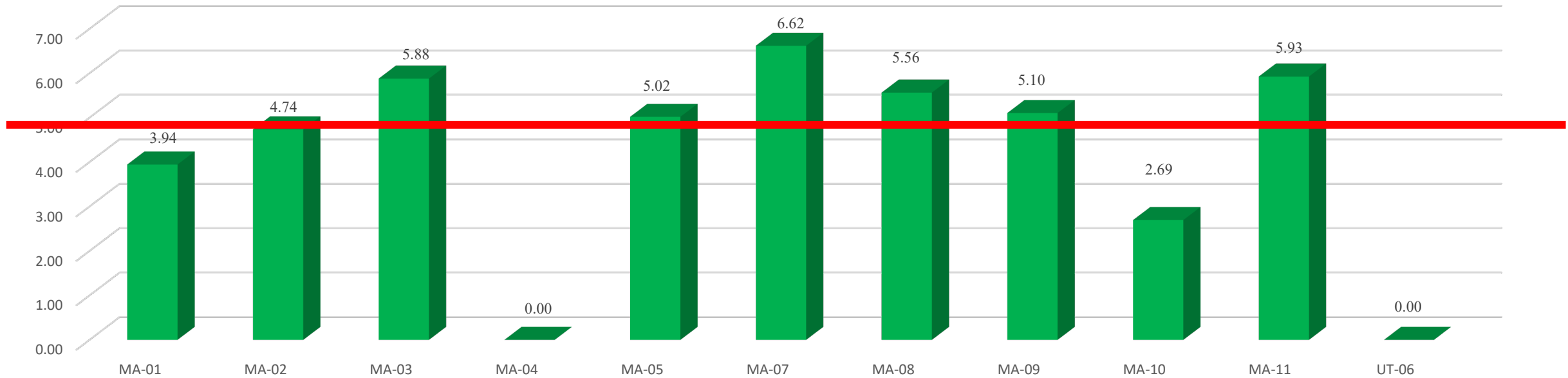
Source: AiM, IWMS

Upper limit – 5.93  
 Lower limit – 2.69  
 Gap Variance – 3.24

# Work Request per Thousand GSF by Shop (KPI)

Mechanical Maintenance & Planning  
Phase per KGSF by Shop  
FY 2024

Upper limit – 5.93  
Lower limit – 2.69  
Gap Variance – 3.24



Source: AiM, IWMS

Source: Archibus

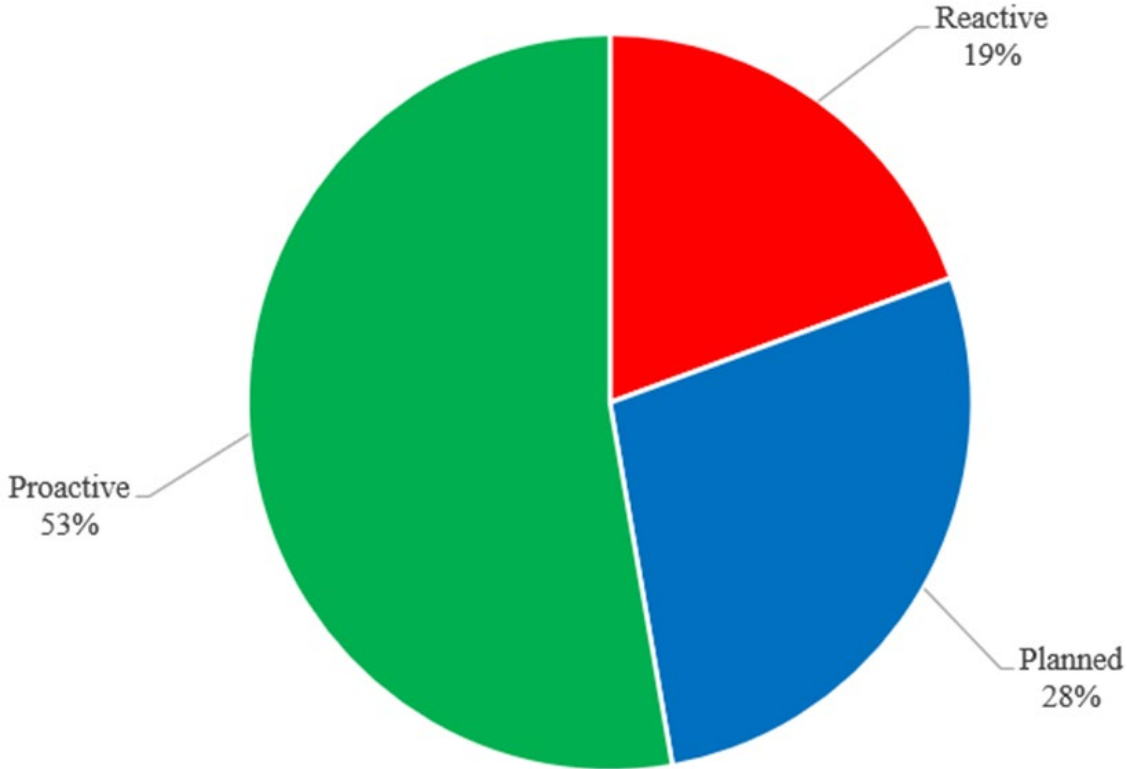
# Service Requests by Location (KPI)

| S<br>Line<br>item   | Reactive Requests |                    |   |                |               |               |              |              |              |              |              |              | Total         | (%<br>of<br>Total |
|---------------------|-------------------|--------------------|---|----------------|---------------|---------------|--------------|--------------|--------------|--------------|--------------|--------------|---------------|-------------------|
|                     | Shop              | Building<br>Number | Building Name   | Campus         | MAINT         | HVAC          | PLUMBER      | CONTRACTOR   | ELECTRICAL   | MATERIAL     | EMS          | CARPENTER    |               |                   |
| 1                   | MA-03             | 3559               | NELSON BIOLOGY<br>LABORATORIES                                    | Busch          | 351           | 119           | 16           | 14           | 17           | 4            | 18           | 1            | 540           | 4.36%             |
| 2                   | MA-05             | 3757               | PSYCHOLOGY BUILDING<br>3558/ENGINEERING                           | Busch          | 248           | 89            | 28           | 28           | 13           | 4            | 10           | 1            | 422           | 3.41%             |
| 3                   | MA-02             | 3558               | BUILDING -- "A/B/C/D/"<br>WINGS                                   | Busch          | 215           | 80            | 3            | 11           | 11           | 5            | 16           | 0            | 341           | 2.75%             |
| 4                   | MA-11             | 6347               | FORAN HALL  | Cook           | 93            | 104           | 12           | 19           | 30           | 2            | 44           | 0            | 304           | 2.45%             |
| 5                   | MA-03             | 3556               | WRIGHT CHEMISTRY<br>BUILDING                                      | Busch          | 127           | 80            | 11           | 9            | 7            | 1            | 11           | 0            | 246           | 1.99%             |
| 6                   | MA-01             | 4181               | 4181/BUSINESS SCHOOL -<br>ROCKEFELLER ROAD                        | Livingston     | 138           | 70            | 11           | 5            | 7            | 2            | 6            | 4            | 243           | 1.96%             |
| 7                   | MA-05             | 3573               | WAKSMAN INSTITUTE OF<br>MICROBIOLOGY                              | Busch          | 122           | 53            | 10           | 10           | 19           | 14           | 11           | 3            | 242           | 1.95%             |
| 8                   | MA-10             | 3198               | RUTGERS ACADEMIC<br>BUILDING                                      | College Avenue | 121           | 63            | 5            | 15           | 25           | 5            | 2            | 3            | 239           | 1.93%             |
| 9                   | MA-05             | 3912               | 33 KNIGHTSBRIDGE  | Off Site       | 127           | 53            | 14           | 16           | 8            | 6            | 8            | 6            | 239           | 1.93%             |
| 10                  | MA-11             | 6024               | BARTLETT HALL   | Cook           | 64            | 86            | 16           | 15           | 15           | 4            | 19           | 1            | 220           | 1.78%             |
| 11                  | MA-08             | 3158               | CIVIC SQUARE - BLOUSTEIN  | College Avenue | 136           | 43            | 4            | 5            | 3            | 5            | 0            | 1            | 197           | 1.59%             |
| 12                  | MA-05             | 3750               | PHARMACY - WILLIAM<br>LEVINE HALL-ERNEST<br>MARIO SCHOOL OF PHARM | Busch          | 75            | 59            | 11           | 13           | 14           | 9            | 9            | 2            | 192           | 1.55%             |
| <b>Total</b>        |                   |                    |   |                | <b>6,755</b>  | <b>3,126</b>  | <b>547</b>   | <b>641</b>   | <b>617</b>   | <b>222</b>   | <b>373</b>   | <b>86</b>    | <b>12,388</b> | <b>100%</b>       |
| <b>(%) of Total</b> |                   |                    |   |                | <b>54.53%</b> | <b>25.23%</b> | <b>4.42%</b> | <b>5.17%</b> | <b>4.98%</b> | <b>1.79%</b> | <b>3.01%</b> | <b>0.69%</b> | <b>100%</b>   | <b>~</b>          |

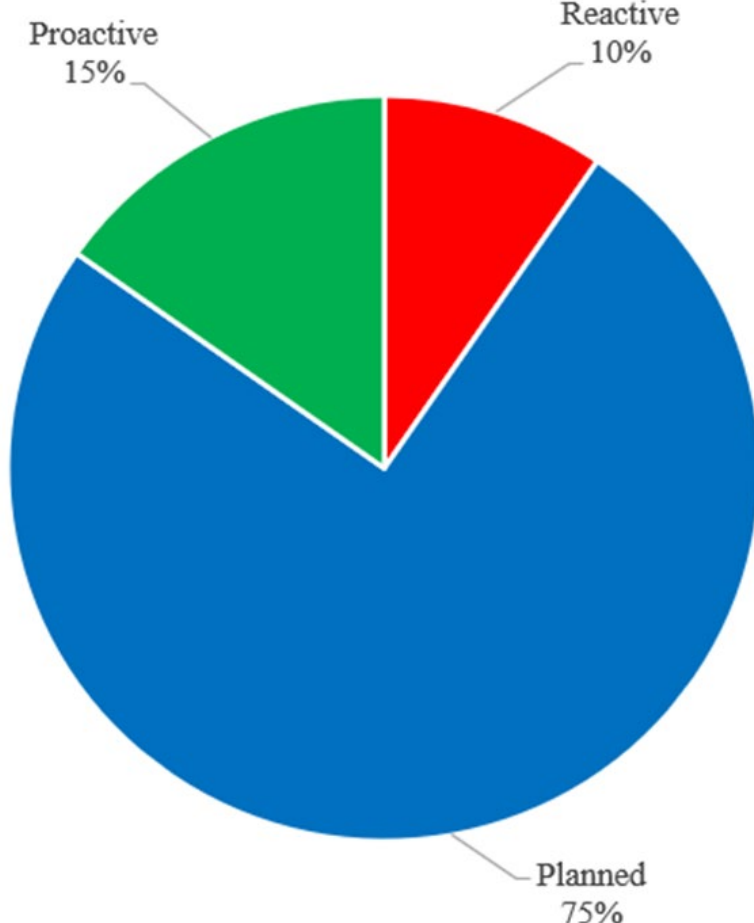
Source: AiM, IWMS

# Work Request Comparison

Work Request Composition



Work Request Cost USD (\$)

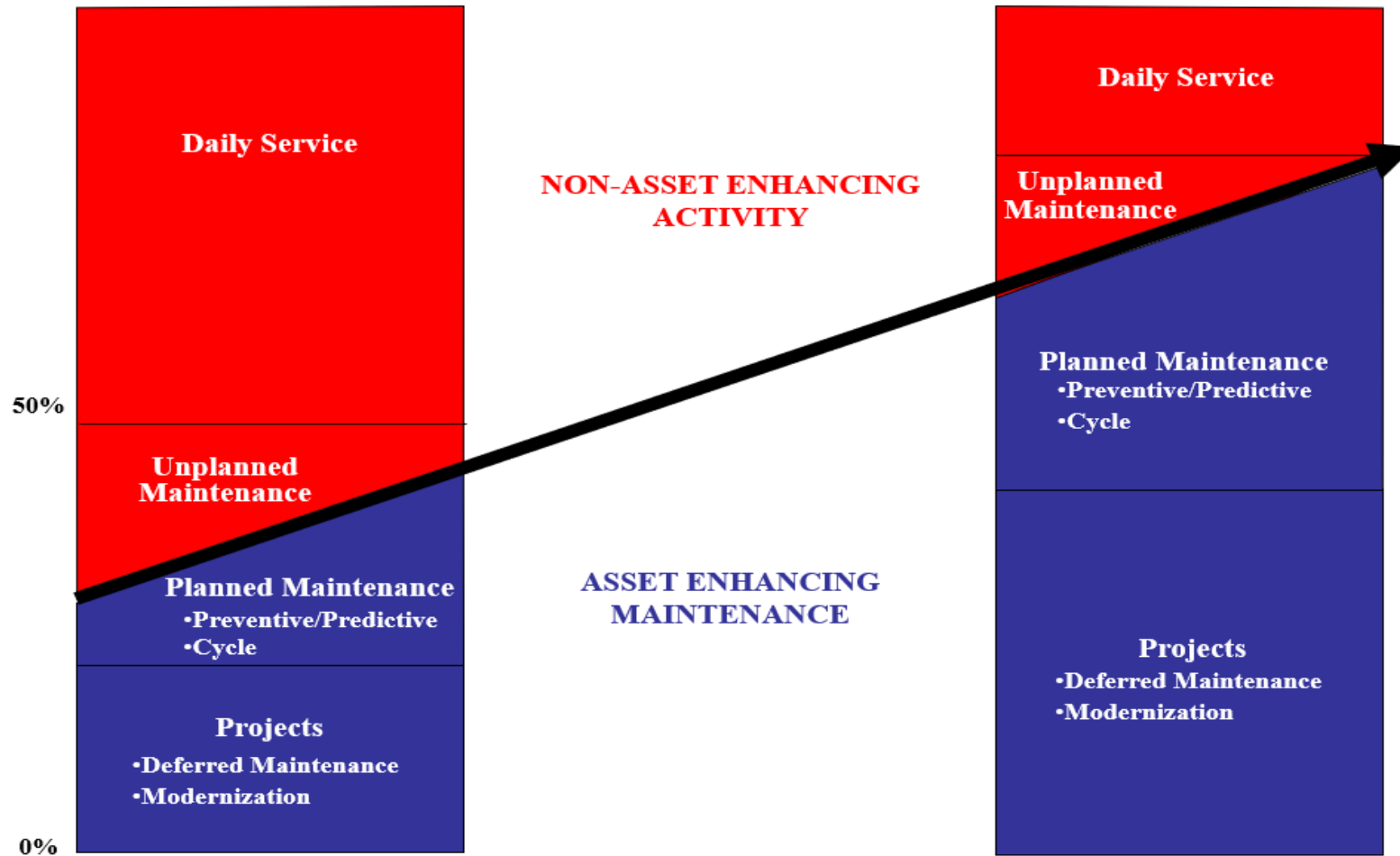


Source: AiM, IWMS



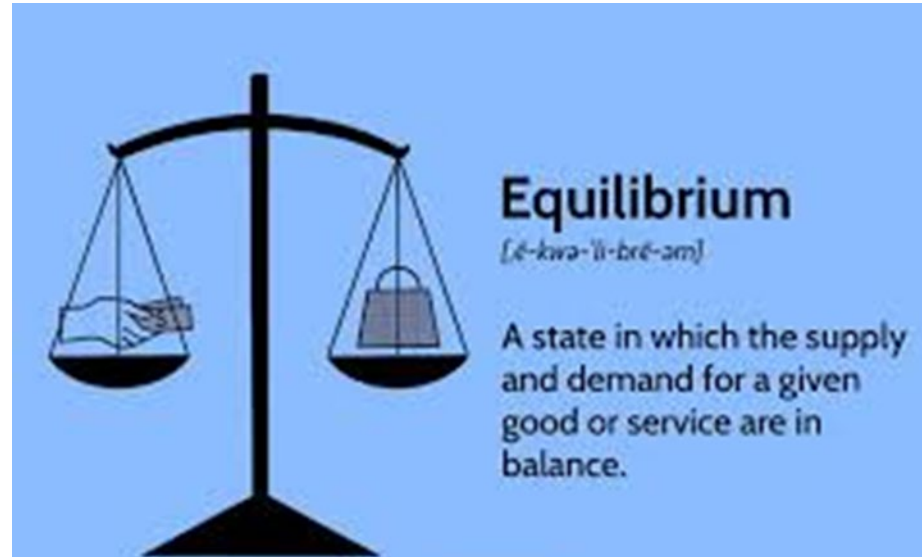
# Business Model Shift

## Typical Asset Improving Strategic Plan for Facilities Department

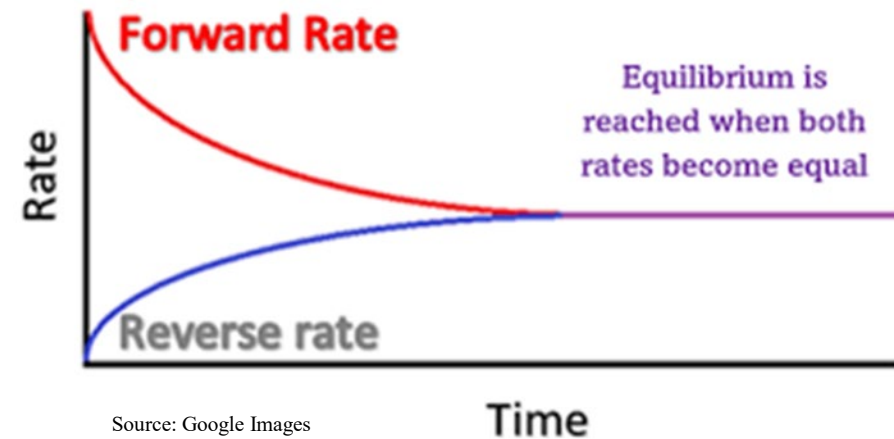


# State of Equilibrium

- Asset management
- R<sub>PD</sub> value calculation
- Pulse management theory
- Resource support management
- Continuous communication for improvement
- Data driven adjustment
- And Everything Else



Source: Google Images



Source: Google Images

# This concludes The American Institute of Architects Continuing Education Systems Course

*Spring General Membership Meeting  
June 13, 2024*



Approved  
Continuing  
Education

New Jersey Chapter of APPA



# Questions?



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# THANK YOU!



# References

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- Archibus
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