# Audit of Fleet Maintenance Operations

**Project #21-10**

**Prepared by**
Office of the Inspector General

**J. Timothy Beirnes, CPA, Inspector General**
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# SOUTH FLORIDA WATER MANAGEMENT DISTRICT

April 13, 2023

Governing Board Members

Re: Audit of Fleet Maintenance Operations - *Project No. 21-10*

This audit was performed pursuant to the Inspector General's authority set forth in Chapter 20.055, F.S. Our audit objective primarily focused on determining whether there is an adequate process in place to ensure that fleet maintenance operations are performed effectively and efficiently. Jankie Bhagudas and I prepared this report.

Sincerely,

J. Timothy Beirnes, CPA
Inspector General

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## BACKGROUND

In accordance with the Office of Inspector General's Audit Plan, we conducted an Audit of Fleet Maintenance Operations. As of September 30, 2021, the District's fleet was comprised of 624 on-road and 453 off-road vehicles/equipment.

| District's Fleet Composition, as of September 30, 2021 | | | |
|---|---|---|---|
| **Type** | **Class** | **Examples of Vehicle/Equipment** | **Total** |
| **On-Road** | ***Light Trucks*** | ➢ ½ ton, ¾ ton, and 1-ton pickups - closed and extended cabs, utility body<br>➢ Compact and mid-size SUVs<br>➢ Cargo vans | 476 |
| | ***Medium Trucks*** | ➢ 1.5 ton and 1.75 ton trucks - utility body, utility body with crane, and flatbed | 82 |
| | ***Heavy Trucks*** | ➢ Dump trucks - 12, 14, 18, and 20 cubic yards<br>➢ 2.5 ton bucket, flatbed, and boom trucks<br>➢ Semi-tractor trucks | 66 |
| | | **Total On-Road** | **624** |
| **Off-Road** | ***Construction / Heavy Equipment*** | ➢ Bulldozers, frontloaders, graders, and forklifts<br>➢ Excavators – trackhoe<br>➢ Cranes – truck mounted ranging from 25 tons to 150 tons, hydraulic ranging from 40 tons to 80 tons | 97 |
| | ***Marine*** | ➢ Boats, airboats, towboats, and outboard motors | 135 |
| | ***Tractors*** | ➢ Tractors, tractors with boom mowers | 23 |
| | ***Trailers*** | ➢ Utility, cargo, flatbed trailers | 198 |
| | | **Total Off-Road** | **453** |
| | | **Total** | **1,077** |

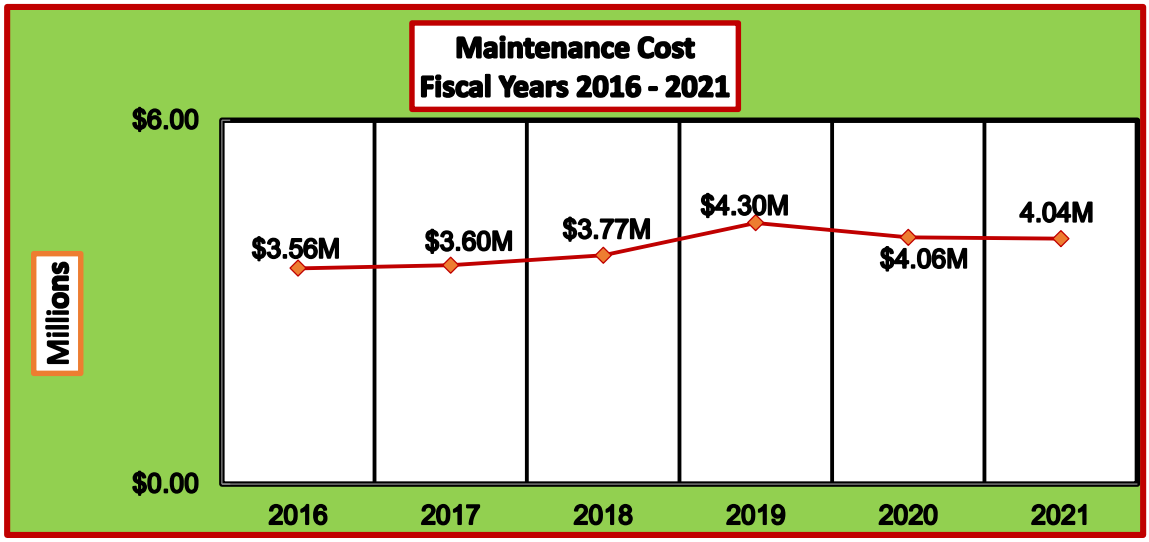
In addition, the District owns the following: 78 pumps, 19 generators, and 204 pieces of miscellaneous equipment (e.g., woodchippers, ATVs, lawn mowers, pressure washers, and golf carts).

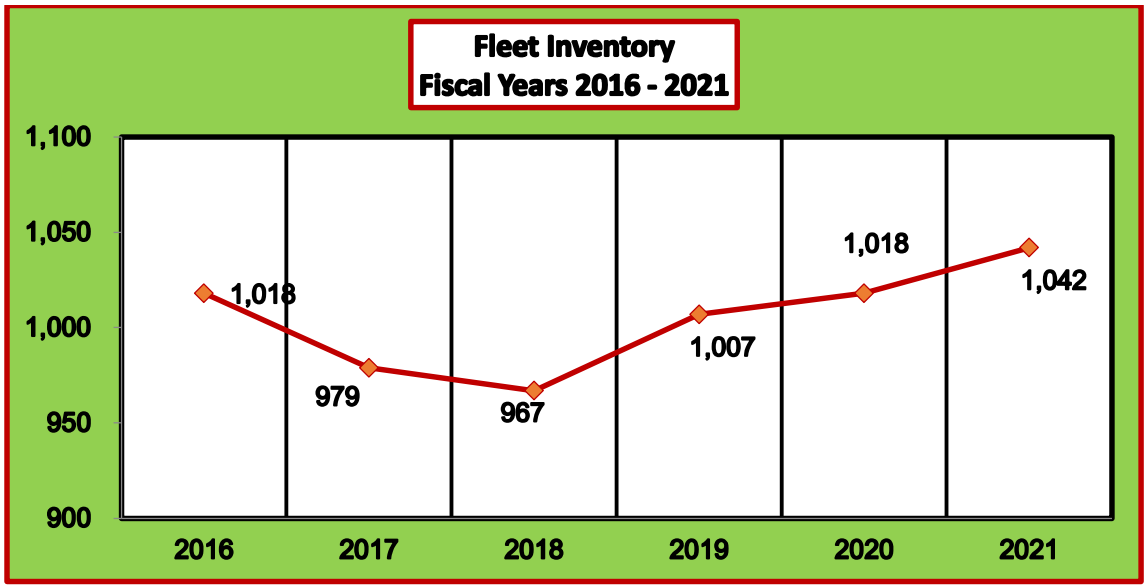
Fleet equipment data such as description, equipment number, location, area assignment, maintenance plans, fuel usage, and mileage, are maintained in the District's SAP Plant Maintenance module. The SAP Plant Maintenance module maintains all plant maintenance activities, for example, for fleet activities it is programed to automatically schedule preventive maintenance, track planned and unplanned maintenance and repair activities via a work order system that contains details on resources and captures costs. A work order is created for each maintenance or repair activity in SAP Plant Maintenance module and is used as a notification, planning, scheduling, and executing tool by fleet maintenance staff. Following are common types of fleet work orders:

- *PM01* – Repairs found and performed outside of a preventive maintenance work order. These are unplanned repairs, for example, unscheduled work and breakdowns.
- *PM02* – Routine maintenance not related to breakdowns, malfunctions, vandalisms or identified during the preventive maintenance cycle, for example, cleaning and detailing a vehicle, and installing new equipment/parts on a vehicle/equipment.
- *PMPL* – Scheduled and automatically created in SAP based on preventive maintenance plans; for example, semi-annual/annual inspections and maintenance at specific mileage/hour usage intervals.
- *PMPR* – Planned repairs resulting from deficiencies identified during a preventive maintenance cycle, i.e., during inspection/preventive maintenance work order tasks.

The District expended over $23.3 million to maintain 967 to 1,042 light, medium, and heavy trucks, construction and marine equipment, and trailers during Fiscal Years 2016 – 2021. This $23.3 million represented SAP costs charged to vehicle/equipment, for example, costs for repairs, parts, supplies, and employee salaries including fringe benefits.

The following graphs illustrate the maintenance cost and fleet inventory for Fiscal Years 2016 – 2021.




*We obtained data presented in these graphs by the Administrative Services Division's Process and Project Controls Section. Data was extracted from SAP.*

It should be noted that maintenance costs are affected by several factors including the age and usage of the District's fleet and funding allocated for the replacement of fleet that meet certain replacement criteria. Specifically, our Office conducted a fleet utilization and replacement audit in Fiscal Year 2021 (*Audit of Fleet Utilization and Replacement - Audit #21-09*), our conclusion included the following:

> Due to limited funding and other District priorities over the past several years, the District has not been able to replace its fleet that met certain replacement criteria. Consequently, the number of vehicle/equipment meeting the replacement criteria increases each year along with repair costs for the aging fleet. Specifically, during Fiscal Year 2016 to Fiscal Year 2021 (August 2021) about $16.6 million has been spent on replacing existing vehicle/equipment (an average of $2.8 million annually); however, this amount has been insufficient to have any impact on the amount needed for replacements, which keeps increasing each year. Specifically, in Fiscal Year 2021, an estimated $24.4 million was needed just to replace vehicles and equipment meeting replacement criteria; however, only $3.1 million was allocated.

As part of our audit, we reconciled SAP fleet maintenance work order data to Business Warehouse data to determine actual costs incurred and posted to District fleet expenditures for Fiscal Years 2020 and 2021. As part of our reconciliation, we excluded certain work orders if some SAP work order costs were posted to FM in fiscal years that were outside our scope, for example, we excluded work orders if work order costs were posted to SAP financial module in Fiscal Years 2019 and 2020. Our analysis of work orders completed during the period Fiscal Years 2020 and 2021, disclosed that the District spent almost $7 million in labor, fringe benefit costs, and external costs for repairs and parts to maintain its light, medium, and heavy trucks, heavy /construction equipment, marine equipment, tractors, and trailers.

The table below summarizes the cost composition of the 10,852 fleet maintenance work orders in our analysis.

| Fleet Maintenance Work Order Cost Composition Fiscal Years 2020 and 2021 | | | | | | |
|---|---|---|---|---|---|---|
| Work Order Cost Classification | Work Orders Count and Percentages | | Work Order Costs | | | |
| | | | Internal Labor (*Excludes Fringe Benefits*) | Contracted Services, Parts, and Supplies | Totals / Percentages | |
| **Internal Labor Only** | **3,457** | ***32%*** | **$ 421,559** | | **$ 421,559** | ***7%*** |
| **Internal Labor, Contracted Services, Parts, & Supplies** | **6,503** | ***60%*** | **$ 1,573,425** | **$ 3,720,133** | **$5,293,558** | ***88%*** |
| **Contracted Services, Parts, & Supplies - No Internal Labor** | **892** | ***8%*** | | **$ 289,801** | **$ 289,801** | ***5%*** |
| **Totals** | **10,852** | ***100%*** | **$ 1,994,984** | **$ 4,009,934** | **$6,004,918** | ***100%*** |
| | | ***Percentages*** | ***33%*** | ***67%*** | ***100%*** | |
| **Fringe Benefit Costs** | | | | | | |
| **Salary Charged to Work Orders = $1,994,983; Fringe Benefit Costs (*FY 20 = 44.78%, FY 21 = 47.31%*) (*Note 1*)** | | | **$ 919,349** | | **$ 919,349** | |
| **TOTAL** | | | **$ 2,914,333** | **$ 4,009,934** | **$ 6,924,267** | |
| | | ***Percentages*** | ***42%*** | ***58%*** | ***100%*** | |

Further, our analysis disclosed that 33% of maintenance costs were salary expenses field station maintenance fleet staff who perform vehicle maintenance and 67% of maintenance costs were for contracted services, parts, and supplies.

The detail maintenance costs and work orders for each field station are shown in the following table

| Fleet Work Order Cost Composition by Field Station Fiscal Years 2020 and 2021 | | | | |
|---|---|---|---|---|
| **Field Station / Expense Classification** | **# of Work Orders** | **Expense Amounts and % (*Excludes Fringe*)** | | |
| **West Palm Beach** | **3,469** | **$** | **1,737,792** | ***100%*** |
| Labor Only | 1,209 | $ | 123,019 | *7 %* |
| Labor + External Cost | 1,528 | $ | 1,550,116 | *89%* |
| External Cost Only | 732 | $ | 64,657 | *4%* |
| **Okeechobee** | **2,271** | **$** | **1,489,148** | ***100%*** |
| Labor Only | 590 | $ | 54,302 | *4%* |
| Labor + External Cost | 1,672 | $ | 1,339,765 | *90%* |
| External Cost Only | 9 | $ | 95,081 | *6%* |
| **Clewiston** | **1,430** | **$** | **756,463** | ***100%*** |
| Labor Only | 396 | $ | 47,876 | *6%* |
| Labor + External Cost | 979 | $ | 613,853 | *81%* |
| External Cost Only | 55 | $ | 94,734 | *13%* |
| **Miami** | **880** | **$** | **740,857** | ***100%*** |
| Labor Only | 255 | $ | 46,277 | *6%* |
| Labor + External Cost | 615 | $ | 691,871 | *94%* |
| External Cost Only | 10 | $ | 2,709 | *<1%* |
| **Homestead** | **815** | **$** | **431,732** | ***100%*** |
| Labor Only | 200 | $ | 22,067 | *5%* |
| Labor + External Cost | 605 | $ | 408,131 | *95%* |
| External Cost Only | 10 | $ | 1,534 | *<1%* |
| **Fort Lauderdale** | **821** | **$** | **389,124** | ***100%*** |
| Labor Only | 342 | $ | 54,813 | *14%* |
| Labor + External Cost | 472 | $ | 331,030 | *85%* |
| External Cost Only | 7 | $ | 3,281 | *1%* |
| **St. Cloud** | **713** | **$** | **303,081** | ***100%*** |
| Labor Only | 336 | $ | 54,187 | *18%* |
| Labor + External Cost | 371 | $ | 244,702 | *81%* |
| External Cost Only | 6 | $ | 4,192 | *1%* |
| **Big Cypress Basin** | **453** | **$** | **156,721** | ***100%*** |
| Labor Only | 129 | $ | 19,019 | *12%* |
| Labor + External Cost | 261 | $ | 114,089 | *73%* |
| External Cost Only | 63 | $ | 23,613 | *15%* |
| **Total** | **10,852** | **$** | **6,004,918** | ***100%*** |

## OBJECTIVE, SCOPE, AND METHODOLOGY

Our audit objective primarily focused on determining whether there is an adequate process in place to ensure that fleet maintenance operations are performed effectively and efficiently.

To accomplish our objectives, we performed the following:

- Obtained an understanding of fleet maintenance operations by interviewing the field station fleet maintenance staff and other relevant staff responsible for fleet maintenance operations.
- Analyzed fleet expenditures for Fiscal Years 2020 and 2021, ranked purchase orders and procurement card purchases vendors, and obtained reasons from relevant fleet maintenance staff for using the top ranked vendors. Upon our request, the Administrative Services Division's Process and Project Controls Section generated the SAP and BW fleet maintenance data used in our analyses. We verified the accuracy of the data provided.
- Selected a judgmental sample of purchase orders and determined whether procurement rules were followed. Judgmental sampling was considered the preferred methodology based on consideration of the audit population's size and characteristics, as well as audit efficiency and professional judgment. Although the sample cannot be statistically projected to the population, we believe the sample, along with the results of the audit tests, provide reasonable assurance for us to determine whether there are adequate controls in place.
- Determined whether planned preventive maintenance scheduled for completion during Fiscal Years 2020 and 2021, were completed in a timely manner. We also determined whether maintenance goal for fleet work orders (80% for planned work orders and 20% for unplanned work orders) was being achieved. Further, we determined whether routine maintenance work orders were correctly classified.

- Analyzed fleet technicians' time charges at each of the eight field stations for Fiscal Years 2021 and 2021 to determine whether time charges reflected job responsibilities.

We conducted this performance audit in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

# AUDIT RESULTS

## Executive Summary

Overall, the District has an adequate process in place to ensure that fleet maintenance operations are performed effectively and efficiently; however, we noted that improvements can be made in certain areas. Our audit disclosed that purchases totaling $3,828,891 were made from approximately 514 vendors with purchase amounts ranging from $317,493 to $5.29. Most field stations use the same vendors for certain types of repairs and parts. We concluded that the vendor selections appear justified. Specifically, we found that $1,893,991 of the $3,828,891 in total purchases (50%) were made from 15 vendors and total purchases ranged from $57,573 to $317,493; vendors included original equipment manufacturer (OEM) retailers, vehicle/equipment dealers, aftermarket parts retailers, state contracted tire vendors, and auto collision vendors. Further, we judgmentally selected a sample of 50 purchase orders totaling $560,094 from the eight field stations and concluded that the vendor selections were adequately justified, and purchases were substantiated by adequate documentation.

The District has a process in place to ensure that preventive maintenance is performed on its vehicle/equipment via PMPL work orders; however, there are no written policies outlining the timeframe within which PMPL preventive maintenance and inspections work orders should be completed. We concluded that most District's vehicle/equipment inspections and preventive maintenance were performed within 40 days of the planned work order date (date work order automatically generated by SAP). Specifically, we concluded that 3,292 of the 4,289 (77%) PMPL work orders in our population were completed within 40 days from the planned date and 997 (23%) were completed 41 or more days after the planned date. Further, completion timeframes for PMPL work order vary by field station; for example, only 2% of the Okeechobee Field Station's PMPL worker orders were completed beyond 41 days or more from the planned date; while 73% of the Miami Field Station's PMPL work orders took more 41 days or more to complete. Our discussions with field station staff disclosed various reasons why PMPL work orders were completed beyond the 40 days or more days of the planned date.

Examples of reasons included staff vacancies, COVID pandemic, parts delays, and oversights by staff.

The Field Operations Division's maintenance goal for fleet work orders is for 80% to be planned and 20% to be unplanned. However, we concluded that the Division is not achieving this goal since 58% of all repairs were planned and 42% repairs were unplanned. The Clewiston, Homestead and Miami Field Stations have highest percentages of unplanned repairs; unplanned repairs ranged from 46% to 55% total work orders. There are several reasons for unplanned repairs, for example, older vehicles/equipment with high mileage/hours that result in more breakdowns.

Our review of routine work orders by field station disclosed that routine work orders ranged from less than 1% to 16% of total work orders. There were instances routine work orders were incorrectly classified as unplanned work orders (PM01). Most notably, 51 of the 55 West Palm Beach Field Station's work orders described as "put in service" were incorrectly classified unplanned work orders and only 4 of the 55 were correctly classified as routine. The West Palm Beach Field Station's Operations and Maintenance Supervisor has taken steps to address this issue. Incorrect work order classifications can distort planned and unplanned work order costs.

Employees performing fleet related activities are required to primarily charge time worked to fleet work orders. Overall, fleet technicians are charging time worked on fleet maintenance to fleet work orders. Fleet technicians charged anywhere from 77% to 99% of time worked to work order related activities which means that anywhere from 1% to 23% of time worked was charged to cost centers. Specifically, 13 of the 23 technicians (57%) analyzed charged more than 90% of time work to work order activities. Fleet maintenance staff provided several reasons for charges to cost centers.

We made 12 recommendations to improve fleet maintenance operations. Management concurred with all the recommendations.

## Adequate Justifications for Vendors Selected for Fleet Maintenance Purchases and Services

We analyzed $3,828,891 in expenditures charged to fleet work orders that were procured via purchase orders (78%) and procurement card (22%) purchases during Fiscal Years 2020 and 2021 for maintenance of the District's light, medium, and heavy trucks, construction equipment, marine equipment, tractors, and trailers. Purchase orders are primarily for vendor repairs, price agreements, services, parts, and purchases outside procurement card usage restrictions. Procurement cards are limited to single purchases totaling up to $1,500, a 30-day limit of up to $15,000, and are usually for small purchases; such as parts and supplies. Fleet related purchases were made from approximately 514 vendors with purchase amounts ranging from $5.29 to $317,493.

Our vendor purchase and field station purchase analyses are summarized in the following two tables.

| **Fleet Maintenance Vendor Purchases Fiscal Years 2020 and 2021** | | | | |
|---|---|---|---|---|
| **Range of Purchases** | **# of Vendors / Percentages** | | **Total Purchase Amounts** | |
| Greater than $100,000 | 8 | *2%* | $ 1,401,492 | *37%* |
| $50,000 to $100,000 | 9 | *2%* | $ 605,336 | *16%* |
| $25,000 to $49,999 | 13 | *3%* | $ 478,023 | *12%* |
| $5,000 to $24,999 | 83 | *16%* | $ 961,978 | *25%* |
| $1,000 to $4,999 | 118 | *23%* | $ 290,399 | *8%* |
| $500 to $999 | 63 | *11%* | $ 47,041 | *1%* |
| Less than $500 | 220 | *43%* | $ 44,622 | *1%* |
| **Total** | **514** | ***100%*** | **$3,828,891** | ***100%*** |

It should be noted that based on the table above, 65% of all purchases were made from 30 of the 514 vendors (6%) and 35% of all purchases were made from 484 of the 514 vendors (94%).

| Purchase Order and Procurement Card Purchases by Field Station Fiscal Years 2020 and 2021 | | | | | | |
|---|---|---|---|---|---|---|
| **Field Station** | **Purchase Order Purchases** | | **Procurement Card Purchases** | | **Total Amounts** | |
| Okeechobee | $ 973,891 | *87%* | $ 148,492 | *13%* | $ 1,122,383 | *29%* |
| West Palm Beach | $ 822,732 | *77%* | $ 244,310 | *23%* | $ 1,067,042 | *28%* |
| Clewiston | $ 470,961 | *88%* | $ 64,608 | *12%* | $ 535,569 | *14%* |
| Miami | $ 219,398 | *54%* | $ 187,945 | *46%* | $ 407,343 | *11%* |
| Homestead | $ 184,433 | *72%* | $ 71,977 | *28%* | $ 256,410 | *7%* |
| Fort Lauderdale | $ 125,398 | *66%* | $ 63,533 | *34%* | $ 188,931 | *5%* |
| St. Cloud | $ 122,734 | *75%* | $ 41,863 | *25%* | $ 164,597 | *4%* |
| Big Cypress Basin | $ 53,524 | *62%* | $ 33,092 | *38%* | $ 86,616 | *2%* |
| **Total / %** | **$ 2,973,071** | ***78%*** | **$ 855,820** | ***22%*** | **$ 3,828,891** | ***100%*** |

As part of our audit, for each field station we ranked total vendor purchases by purchase order and procurement card purchases and obtained reasons from fleet maintenance staff at each field station for using the top ranked vendors. Based on our analysis and discussions with fleet maintenance staff, we concluded that the use of top ranked vendors appeared justified. Specifically, we concluded that most fleet units used the same vendors for certain types of repairs and parts purchases. Specifically, we found that $1,893,991 of the $3,828,891 in total purchases (50%) were made from 15 vendors. Total purchases from these 15 vendors ranged from $57,573 to $317,493; vendors included OEM retailers, vehicle/equipment dealers, aftermarket parts retailers, tire vendors, and auto collision vendors.

The following table summarizes purchases from the top 10 vendors, purchase amounts, and reasons provided by fleet maintenance staff for vendor selections.

| Top 10 Ranked Vendor Details for Fiscal Years 2020 and 2021 | | | |
|---|---|---|---|
| **Vendor** | **Expenditure Amounts / %** | | **Primary Field Stations / Examples of Reasons for Vendor Selections** |
| Kelly Tractor Company | $ 317,493 | *8%* | ***Okeechobee, Clewiston, and WPB*** - Original equipment manufacturer (OEM) authorized dealer for all models of Caterpillar equipment - repairs and parts |
| Ring Power Corporation | $ 264,412 | *7%* | ***Okeechobee and WPB*** - OEM factory authorized dealer for crane and dragline - repairs and parts. District does not have equipment to perform certain specialized repairs |
| Glades Part Company / Original Equipment Company | $ 180,680 | *5%* | ***WPB, Clewiston, and Okeechobee*** - ACDelco, Motorcraft, and GM OEM parts, aftermarket parts, local vendor, and priority delivery to fleet shop |
| Dobbs Equipment | $ 175,226 | *4%* | ***Okeechobee, WPB, and Miami*** - OEM factory authorized dealer for John Deere construction equipment - repairs & parts |
| Gilbert Ford / Chevrolet | $ 151,326 | *4%* | ***Okeechobee*** - OEM factory authorized dealer for service, repairs, and parts |
| Tiresoles of Broward / Miami | $ 109,190 | *3%* | ***Miami, WPB, Okeechobee, Homestead, Fort Lauderdale*** - Primary vendor for tire purchases and installation, state contracted dealer, mobile tire for replacement off-road heavy equipment |
| Total Roadside Services | $ 102,715 | *3%* | ***Okeechobee*** - Price agreement with District for oil and filter changes, state contracted dealer for Goodyear and Bridgestone tires |
| Everglades Farm Equipment | $ 100,452 | *3%* | ***WPB and Okeechobee*** - OEM factory authorized dealer for John Deere farm equipment (tractors), repairs, and closest dealer |
| Al Packer Ford West | $ 96,151 | *2%* | ***WPB and Clewiston*** - OEM factory authorized dealer for service, repairs, and parts |
| Advance Auto Parts | $ 75,704 | *2%* | ***Most Field Stations*** - Aftermarket parts, District contracted with vendor to provide filters via an automatic reorder system via SAP. Some field stations have issues with this vendor's services and product quality |
| **Total** | **$1,573,349** | ***41%*** | |

According to fleet staff, authorized manufacturer dealers are used for several reasons; for example, they provide specialized services and original equipment manufacturer parts (OEM parts) that are not available elsewhere. Staff also explained that based on their knowledge and experience OEM parts are usually better than aftermarket parts, while in other instances aftermarket equivalents are comparable. In addition, fleet staff explained that certain repairs are performed by dealers because the District does not have the specialized tools required to perform repairs. Further, some vendors are used for various reasons; for example, in some instances they are used to reduce repair backlog, pricing, customer service, proximity to field station (local), free/priority delivery, parts availability, limited availability of vendor due to field station's location, and repairs are performed at field stations and/or field location vehicle/equipment.

As part of our audit, we selected a judgmental sample of 50 purchase orders totaling $560,094 from the eight different field stations and determined the following:

- Whether there were adequate justifications for selecting the vendors, compliance with District procurement policies, and
- Whether there was adequate documentation to substantiate purchases.

Overall, we concluded that vendor selections were adequately justified, and purchases were substantiated by adequate documentation. It should be noted that based on the District's procurement competition thresholds competition is not required for commodities and contractual services less than or equal to $50,000. We found that none of the purchase orders in our population met this threshold.

## Some Improvements Needed for More Timely Completion of Preventive Maintenance Work Orders

The District has a process in place to ensure that preventive maintenance is performed on its vehicle/equipment via PMPL work orders; however, there are no written policies outlining the timeframe within which PMPL preventive maintenance and inspections work orders should be completed. Fleet vehicle/equipment require oil and filter changes, and inspections that have been incorporated in the SAP Plant Maintenance module. Maintenance service intervals are based on mileage/hours usages, time, or manufacturer's recommendations. Inspections are usually required to be completed semi-annually or annually depending on the condition of the vehicle. Different classes of vehicle/equipment require different types of preventive maintenance services, for example:

- *Automobiles and Light Trucks (Up to 14,000 lbs. Gross Vehicle Weight (GVW)*
  - Oil and filter change and a 23-point inspection is required to be performed every 5,000 miles or based on manufacturer's recommendation.
  - An inspection shall be performed every six months or every year depending on the condition in which the vehicle operates.
- *Heavy Duty Trucks (26,001 – 80,000 lbs. Gross Vehicle Weight (GVW)*
  - Oil and filter change and a 162-point inspection shall be performed every 12,000 miles or annually or based on the manufacturer's recommendation.
  - An inspection is performed every six months or every year depending on the condition in which the vehicle operates.
- *Heavy Construction Equipment*
  - Oil and filter change and a 45-point inspection shall be performed every 250 hours or annual fleet preventive maintenance.

See APPENDIX 1 for sampled inspection forms.

The SAP Plant Maintenance module automatically generates PMPL work orders when certain time or usage criteria have been met. Field station fleet staff are required to ensure that maintenance and/or inspections are completed. Preventive maintenance services (oil changes) for light trucks assigned to the West Palm Beach, Okeechobee, Clewiston, and Miami Field Stations are outsourced. In addition, annual truck crane inspections are outsourced, and some field stations may outsource other maintenance to reduce backlog.

We determined that there are no written requirements regarding the number the days or range of days for completing preventive maintenance inspections and maintenance. As a result, field station fleet maintenance staff have no written guidance, but field station staff stated that they try to use a 30-day completion guideline from planned date to completion date. They acknowledged, and our audit disclosed, that all PMPL work orders are not completed within 30 days from the planned date due to various reasons, which will be discussed in further details. It should be noted that one field station uses a 30-day guideline for completing PMPL maintenance work orders, up to 90 days for semi-annual inspection work orders, and up to 190 days for annual inspection work orders. The Field Station staff explained that this criterion allows them to prioritize work and take advantage of available resources.

The only written District reference staff could identify is a February 2015 email sent to relevant fleet staff detailing an SAP transaction (*PM Maintenance Plan Completion Performance Report*) to monitor the status of preventive maintenance work orders. It should be noted that this is not the District's criteria for completion but a monitoring guidance. Work order status on the report is indicated as follows:

- **Green** – Work order completed within 30 days from the planned start date
- **Yellow** – Work order is incomplete
- **Red** – Work order completed more than 30 days after the planned date. The email noted that a red indicator may not necessarily be an issue since some work orders take longer than others due to the nature of the repair. Nevertheless, attention to red work orders is warranted.

As part of our tests, we analyzed 4,289 PMPL work orders that were started and completed during Fiscal Years 2020 and 2021, to determine whether the preventive maintenance was completed in a timely manner and the reasons why PMPL work orders were not completed within specific timeframe used in our analysis. We concluded that most District vehicle/equipment inspections and preventive maintenance were completed within 30 days of the planned work order date (date work order generated by SAP). However, we used a completion of over 40 days from planned work order date as a conservative guideline for timely completion. Further, we found that only 277 of the 4,289 work orders were completed between 31-40 days from the SAP planned completion date.

As part of our analysis, we compared the planned and completion dates and considered work orders completed within 40 days from the planned date as completed timely. For work orders completed beyond 40 days from the planned dates, we obtained common reasons for delays from fleet maintenance staff. We concluded that 3,292 of the 4,289 PMPL work orders (77%) in our population were completed within 40 days from the planned date and 997 (23%) were completed 41 days or more after the planned date.

The following table summarizes the results of our analysis.

| PMPL Work Orders Planned and Completed in Fiscal Years 2020 and 2021 | | |
|---|---|---|
| **Work Orders Completed Timely** | | |
| ***Range of Days Within 40 Days*** | **# of Work Orders** | **Percent** |
| Completed Within 30 Days of Planned Date | 2,178 | *51%* |
| Completed Within 31 to 40 Days After Planned Date | 277 | *6%* |
| Completed Up to 30 Days Prior to Planned Date | 837 | *20%* |
| **Total** | **3,292** | *77%* |
| **Work Orders Completed More than 40 Days after Planned Start Date** | | |
| ***Range of Days Beyond 40 Days*** | **# of Work Orders** | **Percent** |
| 1 – 10 Days (*41 – 50 days after planned date*) | 220 | *5%* |
| 11 – 20 Days (*51 – 60 days after planned date)* | 181 | *4%* |
| 21 – 50 Days (*61– 90 days after planned date)* | 272 | *6%* |
| 51 – 90 Days (*91 – 130 days after planned date)* | 171 | *4%* |
| > 91 Days *(more than 130 days after planned date)* | 153 | *4%* |
| **Total** | **997** | ***23%*** |
| **TOTAL** | **4,289** | ***100%*** |

We also analyzed PMPL work orders by field station and found that completion timeframe for PMPL work order vary by field station; for example, the Okeechobee Field Station completed 98% of its PMPL work orders within 40 days from the planned date, while the Miami Field Station completed only 27% within 40 days. Completion results of our analysis are summarized in the following table.

| PMPL Work Orders Completion by Field Station Fiscal Years 2020 and 2021 | | | | | | |
|---|---|---|---|---|---|---|
| **Field Station** | **Work Orders Completed Within 40 Days from Planned Date** | | **Work Orders Completed More than 40 Days after Planned Start Date** | | **Total Work Orders** | **Percent of All Work Orders** |
| Okeechobee | 860 | *98 %* | 17 | *2%* | **877** | **20%** |
| St. Cloud | 223 | *92%* | 19 | *8%* | **242** | **6%** |
| Big Cypress Basin | 179 | *83%* | 36 | *17%* | **215** | **5%** |
| Clewiston | 405 | *79%* | 108 | *21%* | **513** | **12%** |
| West Palm Beach | 1,191 | *77%* | 354 | *23%* | **1,545** | **36%** |
| Fort Lauderdale | 184 | *66%* | 96 | *34%* | **280** | **7%** |
| Homestead | 153 | *59%* | 108 | *41%* | **261** | **6%** |
| Miami | 97 | *27%* | 259 | *73%* | **356** | **8%** |
| **Total** | **3,292** | ***77%*** | **997** | ***23%*** | **4,289** | ***100%*** |

Based on discussions with field station fleet maintenance staff, the objective is to complete all PMPL work orders as timely as possible. However, in some instances timely completion is beyond their control due to various reasons. Further, we noted some instances where PMPL work orders may have been completed earlier than the completion date reflected in SAP plant maintenance. According to the West Palm Beach Field Station's Field Operations and Maintenance Supervisor, some completion dates in SAP are incorrect. Specifically, due to the large quantity of fleet work orders completed by West Palm Beach Field Station, staff usually input completed work order data in SAP at the end of each week; however, due to staff oversight the input dates were reflected as completed dates. As a result, some work orders may have been completed up to a week earlier than the completion dates reflected in SAP. Staff responsible for closing the work orders should have ensured that the completion date reflected the actual date the work was completed and not the date SAP was updated.

Further, although the St. Cloud Field Station completed 92% of its PMPL work orders within 40 days of the planned work order dates, it appears this completion percentage would have been even higher. The Field Operations and Maintenance Supervisor stated that there were issues with obtaining vehicles for maintenance that are assigned to different areas and staff vacancies. In addition, some maintenance work orders were mostly completed and closed; however, small parts/supplies were needed to totally complete the maintenance. As a result, the work orders were subsequently re-opened to reflect goods movement and completion, which changed the completion date reflected in SAP.

Our discussions with field station staff disclosed various reasons why PMPL maintenance and inspection work orders were completed beyond the 40 days or more days of the planned date. Some of the reasons provided by field station fleet maintenance staff are as follows:

***West Palm Beach Field Station*:** Has the most PMPL work orders. 354 of its 1,545 PMPL work orders (23%) were completed more than 40 days after the planned date, for example,

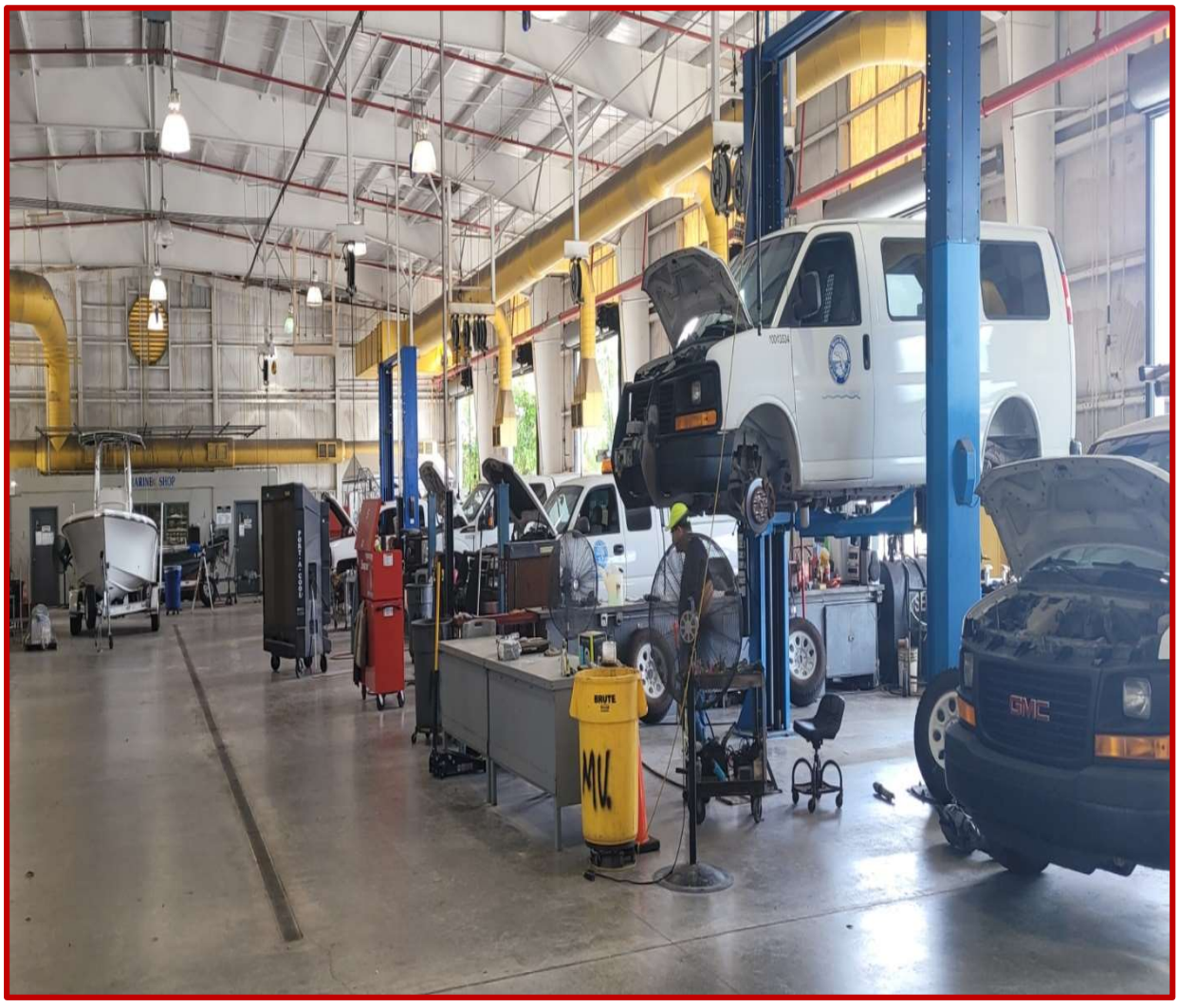
- 106 of the 354 work orders were completed 21 to 50 days after the 40-day allowance (61 to 90 days after the planned date).
- 61 of the 354 work orders were completed 51 to 90 days after the 40-day allowance (91 to 130 days after the planned date).

The Field Operations and Maintenance Supervisor stated that several reasons contributed to the backlog, for example,

- Parts shortages extended the timeframe of work order completion.
- Staff vacancies and completion delays due to the COVID pandemic.
- Maintenance scheduling issues with various bureaus/sections also resulted in delays.

- Multiple work orders are generated at the beginning of each month that may impact the dates the fleet shop can start required maintenance. As a result, completion dates are delayed. Further, start and completion dates were further delayed due to other issues, for example, parts and staff shortages.
- Age and milage of many of the vehicles. Many of the fleet are older with high mileage/hours usages and require more frequent maintenance.

**West Palm Beach Field Station's Fleet Maintenance Shop, June 2022**



***Fort Lauderdale Field Station*:** 96 of its 280 PMPL work orders (34%) were completed more than 40 days after the planned date; for example,

- 20 of the 96 work orders were completed 51 to 90 days after the 40-day allowance (91 to 130 days after the planned date).
- 22 of the 96 work orders were completed more than 90 days after the 40-day allowance (more than 130 days after the planned date).

The planner/scheduler for the Fort Lauderdale Field Station's Levee, Vegetation and Fleet Maintenance Section provided several reasons why the 96 work orders were completed more than 40 days after the planned date, for example,

- Delays were attributed to fleet shop backlog due to staff vacancies and the COVID pandemic.
- Annual crane inspections for medium and heavy trucks with utility cranes are mostly performed in January; however, the planned dates for the PMPL work orders are usually October 1st of the previous year, which is at least 90 days from the planned inspection start date. Work order may have been planned at the beginning of the fiscal year based on new budget amounts; however, annual inspection may not have been due until the following January. As a result, it may appear that crane inspections are not performed in a timely manner. To address this issue, the Fort Lauderdale Field Station should consider changing the planned dates for annual crane inspection to January of each year or take other appropriate steps deemed necessary to address this issue.
- As previously stated, PMPL work orders for light, medium, and heavy trucks are classified as either inspection or maintenance work orders. Inspections are either performed semi-annually or annually and maintenance are performed after specific usage intervals; for example, depending on the type of equipment maintenance is performed at 5,000 miles, 6,000 miles, 12,000 miles, or 250 hours. Further, in some instances, maintenance is performed when one of two conditions are met: for example, 250 hours or annually. We found that in some cases, if an inspection work order was due before a maintenance work order staff delayed the inspection work order and performed both the inspection and maintenance work

orders at the same time. Delaying the inspection work orders resulted in late completion. More importantly, delayed inspections could result in worsening of underlying issues and increase repair costs. Staff stated that this issue has been corrected and work orders will be scheduled based on planned dates.

***Homestead Field Station*:** 108 of its 261 PMPL work orders (41%) were completed more than 40 days after the planned date; for example,

- 42 work orders were completed 21 to 50 days after the 40-day allowance (61 to 90 days after the planned date).
- 20 work orders were completed 51 to 90 days after the 40-day allowance (91 to 130 days after the planned date).

The planner/scheduler for Homestead Field Station's Fleet, Canal, and Levee Maintenance Section provided examples of reasons why the 108 work orders were completed more than 40 days after the planned date, for example,

- Issues with purchasing filters using the SAP Material Requirements Planning (MRP) ordering system. MRP is designed to automatically reorder filters from a contracted vendor (Advance Auto Parts) when a field station's inventory levels reach a predetermined minimum level. However, there were several issues with the vendor and orders were not received timely, which resulted in maintenance completion delays. As a result, the Homestead Field Station is not using the MRP ordering system and filters are purchased from NAPA Auto Parts. Staff stated that NAPA Auto Parts' prices are competitive with the contracted vendor. It should be noted that discussions with the West Palm Beach Field Station fleet maintenance staff also disclosed ordering issues but continue to use the MRP ordering system. They have concerns regarding the filter quality compared to other manufacturers. Staff believe NAPA's filters are better even though they are a bit more costly. Miami Field Station staff also stated that they do not use the MRP ordering system because of issues with the vendor. Instead, most filters are procured from NAPA.

- Some vehicles/equipment loaned to the Homestead Field Station from other field station were due for maintenance. However, the Homestead Field Station did not monitor PMPL maintenance since the vehicle/equipment was loaned and not assigned to the Homestead Field Station. Staff stated that the vehicles/equipment loan policy has been revised. Specifically, any vehicle/equipment loaned to a field station for more than two weeks must be "transferred/assigned' to that field station in SAP. As a result, fleet staff would be aware of all planned maintenance. It should be noted that the Okeechobee Field Station also could not complete preventive maintenance on a few vehicles because the vehicles were loaned to other field stations.
- Delays due to the COVID pandemic.
- Vendor delays in completing contracted maintenance services.

***Miami Field Station*:** 259 of its 356 PMPL work orders (73%) were completed more than 40 days after the planned date; for example,

- 65 of the 259 work orders were completed orders were completed 21 to 50 days after the 40-day allowance (61 to 90 days after the planned date).
- 47 pf the 259 work orders were completed 51 to 90 days after the 40-day allowance (91 to 130 days after the planned date).
- 70 of the 259 work orders were completed more than 90 days after the 40-day allowance (more than 130 days after the planned date).

The planner/scheduler for Miami Field Station's Fleet, Canal, and Levee Maintenance section provided examples of reasons why the 259 work orders were completed more than 40 days after the planned date, for example,

- Staff vacancies.
- Vendor delays due to the COVID pandemic in completing contracted maintenance services.
- In Fiscal Year 2019, there was a huge preventive maintenance work order backlog. As a result, maintenance inspections took longer to complete in Fiscal Years 2020 and 2021, for example, an inspection that would usually be completed in an hour took two to three hours. Further, preventive maintenance was also more extensive due to the backlog.

In addition, for PMPL work orders completed more than 40 days after the planned completion dates by the West Palm Beach, Fort Lauderdale, Homestead, and Miami Field Stations, we determined whether the work orders were classified as preventative maintenance or inspections. We concluded there were 364 preventative maintenance work orders and or 453 inspection work orders and we further analyzed the completion timeframes. Overall, 284 of the 364 (78%) preventive maintenance work orders and 305 of the 453 (67%) inspection work orders were completed between 1 to 60 days after the 40-day allowance from the planned date. Further, 9% of preventive maintenance work orders were completed over 90 days from the planned date compared to 22% of the inspection work orders. Overall, it appears that preventive maintenance work orders are completed earlier than inspection work orders. Detailed results of our analysis are presented in the following table.

| Analysis of PMPL Work Orders (Maintenance vs. Inspection) Completed Beyond 40 Days After Planned Date for Sampled Field Stations Fiscal Years 2020 and 2021 | | | | | | |
|---|---|---|---|---|---|---|
| **Field Station** | **Range of Completion Beyond 40 Days After Planned Date (*Note 1*)** | **Total PM Work Orders** | **# of PM Work Orders** | **Total Insp. Work Orders** | **# of Inspection Work Orders** | **Total Work Orders** |
| West Palm Beach | 1-60 days | 127 (*36%*) | 106 | 227 (*64%*) | 185 | **354** ***(100%)*** |
| | 61-90 days | | 16 | | 19 | |
| | Over 90 days | | 5 | | 23 | |
| Fort Lauderdale | 1-60 days | 43 (*45%*) | 37 | 53 (*55%*) | 22 | **96** ***(100%)*** |
| | 61-90 days | | 6 | | 9 | |
| | Over 90 days | | | | 22 | |
| Homestead | 1-60 days | 52 (*48%*) | 42 | 56 (*52%*) | 42 | **108** ***(100%)*** |
| | 61-90 days | | 7 | | 6 | |
| | Over 90 days | | 3 | | 8 | |
| Miami | 1-60 days | 142 (*55%*) | 99 | 117 (*45%*) | 56 | **259** ***(100%)*** |
| | 61-90 days | | 18 | | 16 | |
| | Over 90 days | | 25 | | 45 | |
| **Total** | | **364** | **364** | **453** | **453** | **817** |
| **Percent** | | ***45%*** | | ***55%*** | | ***100%*** |

*Note 1 – Range of completion beyond 40 days after planned date compared to range of completion from planned date are as follows: 1 to 60 days = 41 to 100 days from planned date; 61 to 90 days = 101 to 130 days from planned date; over 91 days = over 131 days from planned date.*

As discussed, several factors affect most field station's completion of PMPL work orders. However, it is important that there are written preventive maintenance work order completion guidelines. Further, PMPL work orders should be completed in a timely manner since planned maintenance delays can lead to breakdowns, unplanned repairs, increased repairs costs, unsafe conditions, and increased vehicle downtime. In sum, effective preventive maintenance minimizes repair costs, extends the useful life of vehicles and heavy equipment, and can result in lower repair costs. In addition, increased staffing and supervisory oversight may also improve the completion timeframes. Further, since it appears that some field stations have better completion timeframes compared to others, it may be beneficial to consider requiring relevant field station fleet

maintenance staff to meet and discuss their processes/practices regarding managing, monitoring, and completing PMPL fleet maintenance work orders. The sharing of lessons learned, and best practices may be beneficial.

## Goals for Planned and Unplanned Fleet Maintenance Work Orders Not Achieved

The Field Operations Division's maintenance goal for fleet work orders is for 80% to be planned and 20% to be unplanned. To determine whether this goal is being achieved, we analyzed fleet work orders that were classified as completed in SAP for Fiscal Years 2020 and 2021. We concluded that the Division is not achieving this goal since 58% of all repairs were planned and 42% repairs were unplanned.

Unplanned work orders are due to several reasons; for example, frequent repairs to vehicles/equipment that have exceed the District's replacement age and mileage/hour criteria have not been replaced due to limited funding and other District priorities. Specifically, we determined that 20% of the District's fleet needed replacement in Fiscal Year 2021.[1] In addition, the nature of work and work location of certain types of vehicles/equipment may result in unplanned repairs; for example, we noted that towboats require frequent repairs. The number of District infrastructure is increasing; thus, certain vehicles/equipment are utilized more and could results in more frequent repairs. Further, late completions of PMPL work orders (discussed in detail in the previous section) could result in unplanned repairs since routine repairs may not be discovered and completed in a time timely manner.

[1] Based on our *Audit of Fleet Utilization and Replacement* (Audit #21-09).

The results of our planned and unplanned work order analysis are detailed in the following table.

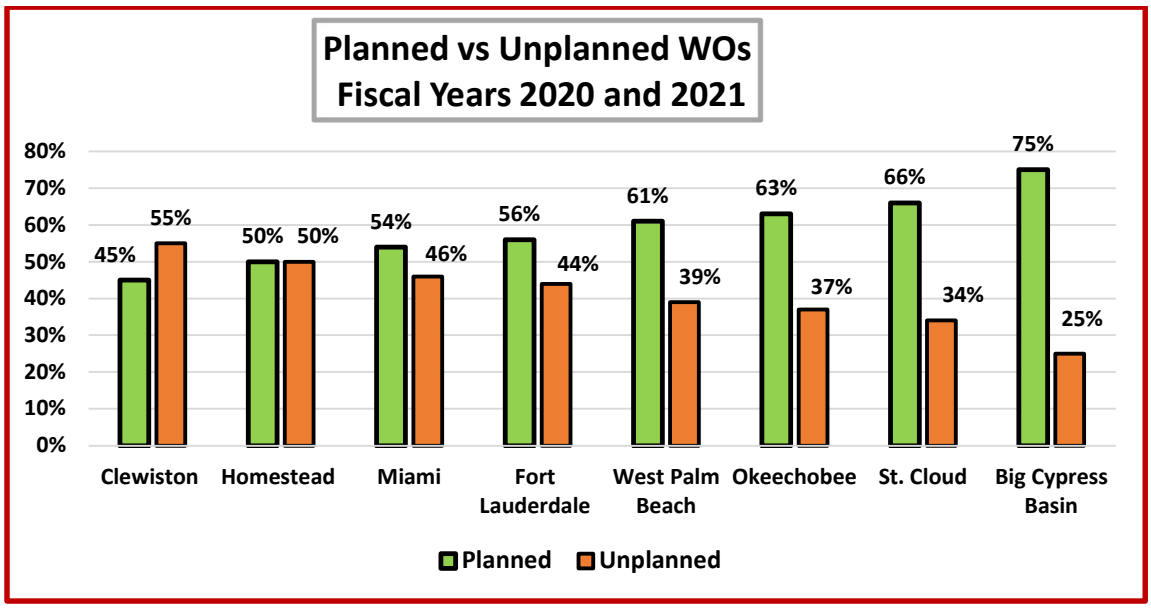
| Analysis of Planned vs Unplanned Work Orders Fiscal Years 2020 and 2021 | | | | | |
|---|---|---|---|---|---|
| **Type of Fleet Maintenance Work Orders** | | **Work Order Costs (*Excludes Fringe Benefit Costs*) and Percentages** | | **Number of Work Orders and Percentages** | |
| **Planned Work Orders** | | | | | |
| Preventive | PMPL | $ 600,374 | *10%* | 4,228 | *39%* |
| Planned Repair from PM | PMPR | $ 1,640,528 | *27%* | 1,601 | *15%* |
| Routine | PM02 | $ 486,420 | *8%* | 508 | *4%* |
| **Total Planned Work Orders** | | **$ 2,727,322** | ***45%*** | **6,337** | ***58%*** |
| **Unplanned Work Orders** | | | | | |
| Unplanned | PM01 | $ 3,277,596 | *55%* | 4,515 | *42%* |
| **Total Unplanned Work Orders** | | **$ 3,277,596** | ***55%*** | **4,515** | ***42%*** |
| **Total** | | **$ 6,004,918** | ***100%*** | **10,852** | **100%** |

In addition, we analyzed planned and unplanned fleet work orders for 1,081 vehicles/equipment by field station and concluded that unplanned work orders by field station ranged from 25% to 55%. Thus, unplanned work orders ranged from 5% to 35% over the 20% threshold. The results of our field station analysis are shown in the following table and graph.

| Planned vs. Unplanned Fleet Maintenance Work Orders by Field Station During Fiscal Years 2020 and 2021 | | | | | | |
|---|---|---|---|---|---|---|
| **Field Station** | **# of Vehicles / Equipment Analyzed** | **# of Planned Work Orders / Percentages** | | **# of Unplanned Work Order / Percentages** | | **Total Work Orders** |
| **Clewiston** | 119 | 645 | *45%* | 785 | *55%* | 1,430 |
| **Homestead** | 71 | 407 | *50%* | 408 | *50%* | 815 |
| **Miami** | 85 | 472 | *54%* | 408 | *46%* | 880 |
| **Fort Lauderdale** | 81 | 459 | *56%* | 362 | *44%* | 821 |
| **West Palm Beach** | 352 | 2,118 | *61%* | 1,351 | *39%* | 3,469 |
| **Okeechobee** | 243 | 1,427 | *63%* | 844 | *37%* | 2,271 |
| **St. Cloud** | 68 | 471 | *66%* | 242 | *34%* | 713 |
| **Big Cypress Basin** | 62 | 338 | *75%* | 115 | *25%* | 453 |
| **Total** | **1,081** | **6,337** | | **4,515** | | **10,852** |
| **Average Percentages** | | | ***58%*** | | ***42%*** | |

*Note that planned fleet work orders are classified as PM02, PMPL, and PMPR, and unplanned fleet work orders are classified as PM01.*

The following graph illustrates the planned and unplanned work order percentages by field stations.




It should be noted that in February 2022 we performed an *Analysis of the Big Cypress Basin Fleet Utilization and Replacement*. We concluded that the Big Cypress Basin Field Station's fleet is relatively new and none of the vehicles/equipment met the District's Fiscal Year 2022 replacement criteria. This is one of the factors that is attributed to the 25% in unplanned work order.

We judgmentally selected the four field stations with the highest percentages of unplanned work orders and analyzed the number of assigned vehicles/equipment and unplanned work orders. We concluded that 57 of the 311 units (18%) assigned to the four field stations had anywhere from 11 to 32 work orders. The results of our analysis are summarized in the following table.

| Analysis of Unplanned Fleet Maintenance Work Orders for Sample Field Stations During Fiscal Years 2020 and 2021 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Field Station** | **# of Vehicles / Equipment Analyzed** | **# of Vehicles/Equipment and Range of Unplanned Work Orders** | | | | | | | |
| | | **1 to 5 Work Orders** | | **6 to 10 Work Orders** | | **11 to 15 Work Orders** | | **More than 16 Work Orders** | |
| **Clewiston** | 105 | 43 | *41%* | 36 | *34%* | 19 | *18%* | 7 | *7%* |
| **Homestead** | 66 | 35 | *53%* | 19 | *29%* | 6 | *9%* | 6 | *9%* |
| **Miami** | 78 | 51 | *65%* | 18 | *23%* | 6 | *8%* | 3 | *4%* |
| **Ft. Lauderdale** | 62 | 34 | *55%* | 18 | *29%* | 7 | *11%* | 3 | *5%* |
| **Total** | **311** | **163** | | **91** | | **38** | | **19** | |
| **Average Percentages** | | ***52%*** | | ***29%*** | | ***12%*** | | ***6%*** | |

Further, for the above four field stations we performed a more detailed analysis of vehicles/equipment with six or more work orders each and took the age of the units into consideration. Our analysis disclosed that older vehicles/equipment has a wider range of unplanned work orders. Again, this may be attributed to limited funding allocated for replacement of fleet that meet certain replacement criteria. The results of our analysis are summarized in the following two tables.

| Analysis of Vehicle/Equipment Age and Unplanned Fleet Maintenance Work Orders for Sampled Field Stations Fiscal Years 2020 and 2021 | | | | |
|---|---|---|---|---|
| **Vehicle / Equipment Age Range** | **# of Vehicles / Equipment Analyzed** | **Work Order Ranges / Totals** | | **Observations** |
| ***Clewiston – 62 Vehicles/Equipment – Average of 11 Unplanned Work Orders per Unit*** | | | | |
| 1-5 Years | 16 | 6-16 WOs | 147 WOs | 7 units with 10 to16 unplanned work orders each; a five-year road grader had 16 work orders |
| 6-11 Years | 16 | 6-19 WOs | 158 WOs | 6 units with 10 to 19 unplanned work orders each; a 11-year pickup truck had 19 work orders |
| 12-23 Years | 30 | 6-32 WOs | 359 WOs | 22 units with 10 to 32 unplanned work orders each; a 12-year boom mower tractor had 32 work orders |
| **Totals** | **62** | | **664** | |
| ***Homestead – 31 Vehicles/Equipment – Average of 10 Unplanned Work Orders per Unit*** | | | | |
| 1-5 Years | 3 | 6-9 WOs | 24 WOs | 2 units with 9 unplanned work orders each |
| 6-11 Years | 7 | 6-13 WOs | 59 WOs | 2 units with 11and 13 unplanned work orders each |
| 12-21 Years | 21 | 6-18 WOs | 227 WOs | 10 units with 11 to 18 unplanned work orders for a total of 148 work orders |
| **Totals** | **31** | | **310** | |

| Analysis of Vehicle/Equipment Age and Unplanned Fleet Maintenance Work Orders for Sampled Field Stations Fiscal Years 2020 and 2021 | | | | |
|---|---|---|---|---|
| **Vehicle / Equipment Age Range** | **# of Vehicles / Equipment Analyzed** | **Work Order Ranges / Totals** | | **Observations** |
| ***Miami – 27 Vehicles/Equipment – Average of 10 Unplanned Work Orders per Unit*** | | | | |
| 1-5 Years | 2 | 10-16 WOs | 26 WOs | 2 units with 10 and 16 unplanned work orders each; both units are 20-feet inboard towboats |
| 6-11 Years | 3 | 7-12 WOs | 29 WOs | 1 unit - 60-ton hydraulic crane with 12 work orders |
| 12-22 Years | 22 | 6-18 WOs | 212 WOs | 9 units with 10 to 18 unplanned work orders for a total of 116 work orders |
| **Totals** | **27** | | **267** | |
| ***Fort Lauderdale – 28 Vehicles/Equipment – Average of 10 Unplanned Work Orders per Unit*** | | | | |
| 1-5 Years | 2 | 8-14 WOs | 22 WOs | 2 units with 22 unplanned work orders each |
| 6-11 Years | 4 | 6-19 WOs | 40 WOs | 1 unit – a 10-year-old inboard towboat with 19 work orders |
| 12-32 Years | 22 | 6-17 WOs | 209 WOs | 9 units with 10 to 17 unplanned work orders for a total of 116 work orders |
| **Totals** | **28** | | **271** | |

Field Station fleet staff acknowledged that planned and unplanned goals will not be achieved in the future due to lack of funding to replace the District's aging fleet, which will continue to result in unplanned work order repairs and increased maintenance costs. Further, our Fiscal Year 2021 *Audit of Fleet Utilization and Replacement (Audit #21-09)*, also concluded that high maintenance costs may be due to several factors including the age of the District's fleet and limited funding allocated for the replacement of fleet that meet certain replacement criteria. Failure to replace vehicles/equipment that meet the District's replacement criteria directly results in the large number unplanned work orders.

## Routine Fleet Work Orders Not Always Classified Correctly

Routine fleet maintenance work orders (PM02) include maintenance activities such as cleaning and detailing a vehicle, putting a vehicle in service, and installing new equipment on a vehicle. These activities are unique to routine work orders. Descriptions for some routine work orders are the same as descriptions used for unplanned repairs (PM01) and planned repairs from preventive maintenance (PMPR), for example, tires, wipers, batteries, and accessories. Our review of routine work orders by field station disclosed that routine work orders ranged from less than 1% to 16% of total work orders. In addition, the percentage of routine work order costs compared to each field station's total maintenance work order costs ranged from less than 1% to 23% and is comprised of 8% of total work order costs.

Details of the routine work order analysis are shown in the following table.

**Routine Maintenance (PM02) Work Order Analysis by Field Station**
**Fiscal Years 2020 and 2021**

| Field Station | # of Equipment with Routine Work Orders | # and % of Routine Work Orders Compared to Total Fleet Maintenance Work Orders | | Amount and % of Routine Work Orders Compared to Total Fleet Work Order Amounts | |
|---|---|---|---|---|---|
| **Big Cypress Basin** | 36 *of* 62 | 74 *of* 453 | *16%* | $36,522 *of* $156,721 | *23%* |
| **Fort Lauderdale** | 56 *of* 81 | 120 *of* 821 | *15%* | $45,283 *of* $389,123 | *12%* |
| **Homestead** | 43 *of* 71 | 82 *of* 815 | *10%* | $61,129 *of* $431,732 | *14%* |
| **St. Cloud** | 23 *of* 68 | 40 *of* 713 | *6%* | $22,420 *of* $303,081 | *7%* |
| **Miami** | 37 *of* 85 | 50 *of* 880 | *6%* | $91,416 *of* $740,857 | *12%* |
| **Okeechobee** | 69 *of* 243 | 94 *of* 2,271 | *4%* | $184,292 *of* $1,489,148 | *12%* |
| **Clewiston** | 24 *of* 119 | 26 *of* 1,430 | *2%* | $40,878 *of* $756,463 | *5%* |
| **West Palm Beach** | 19 *of* 352 | 22 *of* 3,469 | *<1%* | $4,480 *of* $1,737,792 | *<1%* |
| **Total** | **307 *of* 1,081** | **508 *of* 10,852** | ***5%*** | **$486,420 *of* $6,004,917** | ***8%*** |

As stated above, putting a vehicle/equipment in service should be classified by each field station as a routine work order. As part of our tests, we determined whether work orders described as "put in service" were classified as routine work orders. Overall, we found that these activities are classified correctly as routine work orders; however, there were instances routine work orders were incorrectly classified as unplanned work

orders (PM01). Most notably, 51 of the 55 West Palm Beach Field Station's work orders analyzed, described as "put in service" were incorrectly classified unplanned work orders and only four of the 55 were correctly classified as routine work orders. The West Palm Beach Field Station's Operations and Maintenance Supervisor explained that during a work order review he became aware of this issue and has taken steps to address this issue. In addition, our review of the West Palm Beach Field Station's 22 work orders classified as routine work orders disclosed that five of the 22 work orders appear to be preventive maintained work orders (PMPL) since they were described as 50 hours PM, 5,000-mile fleet PM, and semi-annual inspection. Thus, only 17 of the West Palm Beach Field Station's 3,469 work orders appear to be routine work orders. Incorrect work order classifications can distort planned and unplanned work order costs.

## Time Charged to Fleet Work Orders Appear Reasonable

Overall, fleet technicians are charging time worked on fleet maintenance to work orders (activities). Specifically, fleet technicians are required to primarily charge time worked on fleet maintenance to fleet work orders (activities); time worked but not specifically related to maintenance work order activities are charged to relevant cost centers. As part of our tests, we analyzed time worked by 23 fleet technicians (including senior technicians) during Fiscal Years 2020 and 2021 to determine whether time worked were adequately charged to work orders. It should be noted that we analyzed only time worked and excluded all leave time, for example, vacation, sick, holiday, and disability leave.

Fleet technicians charged anywhere from 77% to 99% of time worked to work order related activities which means that anywhere from 1% to 23% of time worked was charged to cost centers. Specifically, 13 of the 23 technicians (57%) charged more than 90% of time work to work order activities. Fleet maintenance staff provided several reasons for charges to cost centers; for example:

- *Big Cypress Basin Field Station:* There is only one technician and time charged to work order activities was 86%. The technician has several fleet related tasks that were not work order related.
- *West Palm Beach Field Station:* Two of the field station's seven technicians charged more than 91% of time worked to work orders while five of the seven technicians charged 84% to 87%. According to Fleet Operations and Maintenance Supervisor, reasons for time charged to cost centers include working time spent attending shop meetings, training, breaks, and procurement card related activities. It does not appear that all field stations are using a consistent guideline when charging time worked since 8 of the 23 technicians charged more than 95% of time worked to work orders. The Field Operations Division should consider addressing this issue.
- *Miami Field Station:* The senior fleet technician charged 79% of time worked to work order activities and 21% to a cost center. According to Operations and Maintenance Supervisor, there was no planner to plan and schedule fleet maintenance activities, thus, the senior technician was responsible various fleet maintenance tasks, for example, obtaining price quotes for parts and services.

It should be noted that we conducted a fleet maintenance operations audit in Fiscal Year 2013 (*Audit of Fleet Maintenance Operations, Audit #13-20*). Our analysis of time charges by fleet technicians during the period October 1, 2011 to June 30, 2013, disclosed fleet technicians at some field stations charged anywhere from 92% to 98% of time worked to work orders. However, there were areas of inconsistencies at other field stations and some fleet technicians' time charges to work orders were as low as 57% and 77%. Our current audit disclosed an improvement in time charges to work order activities. It does not appear that all field stations are using a consistent guideline when charging time worked since 8 of the 23 technicians charged more than 95% of time worked to work orders. The Field Operations Division should consider addressing this issue.

It is important that fleet technicians' time charges continue to reflect actual internal labor costs spent on vehicle maintenance, which in turn can impact budgeted costs and future resource allocations. Accurate labor charges also allow management to monitor staff's productivity; for example, how long does it take to perform a maintenance inspection on a light truck. Correct time charges also indicate adequate controls over time and that supervisors responsible for approving time are aware of their staff's activities. Further, time incorrectly charged to cost centers cannot be used to assess maintenance costs.

## RECOMMENDATIONS

1. **Develop written policies and procedures regarding the completion timeframe for preventive maintenance and inspection work orders (PMPL work orders).**

   **Management Response:** Fleet Management to work with Fleet STAN to develop written processes which will be stored on the STAN Team's SharePoint site.
   **Responsible Division:** Field Operations
   **Estimated Completion:** 9-30-2023

2. **Ensure that all field station fleet staff responsible for closing fleet work orders accurately reflect the work order completion date in SAP Plant Maintenance.**

   **Management Response:** Fleet management will ensure responsible staff are educated on the need to change the default date to the actual date the work was completed when closing the work order in SAP. This will become a recurring reminder with the team being established as part of item 9 below.
   **Responsible Division:** Field Operations
   **Estimated Completion:** 6-30-2023

3. **Take steps to ensure that vehicles assigned to District areas other than field stations (for example, other bureaus and sections) are available for maintenance in a timely manner.**

   **Management Response:** Fleet management will reiterate to all other District Divisions the importance of dropping off vehicles when PM schedules come due. Fleet management has the option to shut off fueling capability for any units that are grossly past due.
   **Responsible Division:** All District Divisions.
   **Estimated Completion:** 3-31-2023

4. **The West Palm Beach Field Station should consider whether it would be beneficial to stagger PMPL work order planned dates throughout the month rather than having planned dates at the beginning of the month.**

   **Management Response:** West Palm Beach Field Station to stagger start dates to 50% at the first of the month and 50% at the end of the month.
   **Responsible Division:** Field Operations.
   **Estimated Completion:** 6-30-2023

5. **The Fort Lauderdale Field Station should consider taking appropriate steps so that PMPL crane inspections planned for October are not performed in January of the following year (i.e., at least 90 days after the planned date).**

   **Management Response:** Ft. Lauderdale Field Station will reset the PMPL crane inspections for October starting the beginning of FY 2024 following the completion of the FY 2023 in January.
   **Responsible Division:** Field Operations
   **Estimated Completion:** 6-30-2023

6. **Ensure that fleet maintenance staff responsible for scheduling PMPL work orders schedule maintenance and inspection work orders for the same vehicle/equipment based on the planned dates per the SAP Plant Maintenance module and not delay work orders to perform both tasks at the same time.**

   **Management Response:** Fleet Management will direct staff responsible for this task to not delay any scheduled work orders. Also, Fleet management will work with those same staff to arrive at a reasonable timeframe in which to perform scheduled tasks early if the vehicle is already in the shop for work.
   **Responsible Division:** Field Operations
   **Estimated Completion:** 6-30-2023

7. **Consider addressing fleet maintenance staff's concerns about the level of service and quality of filters procured from the current contracted vendor via the MRP ordering system.**

**Management Response:** Fleet management has had initial conversations with the fleet STAN Team to gather more information. Changes are needed to move away for the current Vendor and move towards OEM (Original Equipment Manufacturer) and/or limited aftermarket manufacturers that provide quality filters. Fleet management will work with procurement to explore the possibility of the changes through the MRP system, if quality filters will have to be ordered outside of the MRP process. The fleet STAN will work on establishing a list of acceptable aftermarket manufacturers.

**Responsible Division:** Field Operations and Procurement

**Estimated Completion:** 12-31-2023

8. **Implement steps to ensure that planned maintenance scheduled for vehicles/equipment assigned to other field stations are not overlooked so that preventive maintenance is performed in a timely manner.**

   **Management Response:** There is an existing SAP rule that addresses this. Managers and supervisors will revisit with all relevant planners to ensure the process is followed.
   **Responsible Division:** Field Operations
   **Estimated Completion:** 6-30-2023

9. **Consider requiring relevant field station fleet maintenance staff to meet and discuss their processes/practices regarding managing, monitoring, and completing PMPL fleet maintenance work orders to share lessons learned and best practices.**

   **Management Response:** Senior Planners to conduct regularly scheduled meeting with fleet planners and parts coordinators for lessons learned and housekeeping.
   **Responsible Division:** Field Operations
   **Estimated Completion:** 6-30-2023

10. **Increase efforts to ensure improvement in the maintenance goal for planned and unplanned work orders.**

    **Management Response:** While small improvements can be made through improving the proper coding of work order types, the current hurdle rate of 80/20 is not realistic or attainable for the following reasons.

    **1)** Large amount of fleet units overdue for replacement. Vehicles being kept beyond the established replacement criteria is leading to more unplanned breakdown work orders.

**2)** Several years ago, the district moved away from semi-annual to annual preventative maintenance plans. This significantly reduced the number of work orders contributing to the planned side of the equation as the hurdle rate remained unchanged at 80% planned to 20% unplanned.

**Responsible Division:** Field Operations

**Estimated Completion:** Complete

**11. Ensure that field station fleet maintenance staff accurately classify all preventive maintenance work orders.**

**Management Response:** Senior Planners will incorporate retraining and reinforcement of already established criteria for correct type of work orders into the recurring meetings.

**Responsible Division:** Field Operations

**Estimated Completion:** 6-30-2023

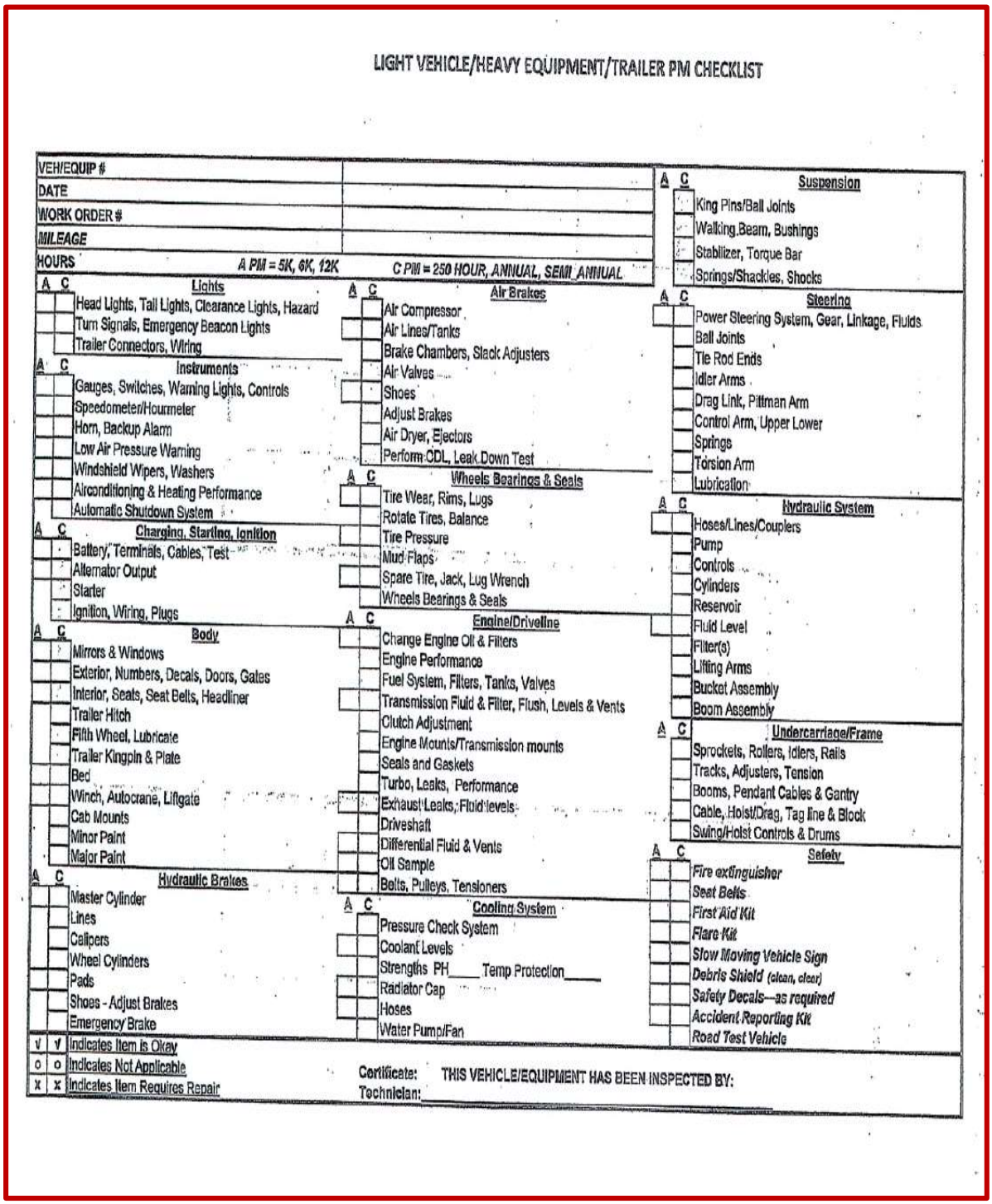
**12. District management should continue considering increasing funding allocated to fleet replacement.**

**Management Response:** This same item was identified on the Audit of Fleet replacement and utilization in 2021. Since that time fleet management has used that report as additional justification to request additional funding for fleet replacements and has received and additional $3M in both 2022 and 2023 fiscal years for a total of $6M to date. Fleet management will continue to request additional funding in future years.

**Responsible Division:** Budget

**Estimated Completion:** Complete

## APPENDIX I – Light Vehicle/Heavy Equipment/ Trailer PM Checklist



LIGHT VEHICLE/HEAVY EQUIPMENT/TRAILER PM CHECKLIST

VEH/EQUIP #

DATE

WORK ORDER #

MILEAGE

HOURS  A PM = 5K, 6K, 12K  C PM = 250 HOUR, ANNUAL, SEMI ANNUAL

| A | C | Lights |
|---|---|---|
| | | Head Lights, Tail Lights, Clearance Lights, Hazard |
| | | Turn Signals, Emergency Beacon Lights |
| | | Trailer Connectors, Wiring |

| A | C | Instruments |
|---|---|---|
| | | Gauges, Switches, Warning Lights, Controls |
| | | Speedometer/Hourmeter |
| | | Horn, Backup Alarm |
| | | Low Air Pressure Warning |
| | | Windshield Wipers, Washers |
| | | Airconditioning & Heating Performance |
| | | Automatic Shutdown System |

| A | C | Charging, Starting, Ignition |
|---|---|---|
| | | Battery, Terminals, Cables, Test |
| | | Alternator Output |
| | | Starter |
| | | Ignition, Wiring, Plugs |

| A | C | Body |
|---|---|---|
| | | Mirrors & Windows |
| | | Exterior, Numbers, Decals, Doors, Gates |
| | | Interior, Seats, Seat Belts, Headliner |
| | | Trailer Hitch |
| | | Fifth Wheel, Lubricate |
| | | Trailer Kingpin & Plate |
| | | Bed |
| | | Winch, Autocrane, Liftgate |
| | | Cab Mounts |
| | | Minor Paint |
| | | Major Paint |

| A | C | Hydraulic Brakes |
|---|---|---|
| | | Master Cylinder |
| | | Lines |
| | | Calipers |
| | | Wheel Cylinders |
| | | Pads |
| | | Shoes - Adjust Brakes |
| | | Emergency Brake |

| A | C | Air Brakes |
|---|---|---|
| | | Air Compressor |
| | | Air Lines/Tanks |
| | | Brake Chambers, Slack Adjusters |
| | | Air Valves |
| | | Shoes |
| | | Adjust Brakes |
| | | Air Dryer, Ejectors |
| | | Perform CDL, Leak Down Test |

| A | C | Wheels Bearings & Seals |
|---|---|---|
| | | Tire Wear, Rims, Lugs |
| | | Rotate Tires, Balance |
| | | Tire Pressure |
| | | Mud Flaps |
| | | Spare Tire, Jack, Lug Wrench |
| | | Wheels Bearings & Seals |

| A | C | Engine/Driveline |
|---|---|---|
| | | Change Engine Oil & Filters |
| | | Engine Performance |
| | | Fuel System, Filters, Tanks, Valves |
| | | Transmission Fluid & Filter, Flush, Levels & Vents |
| | | Clutch Adjustment |
| | | Engine Mounts/Transmission mounts |
| | | Seals and Gaskets |
| | | Turbo, Leaks, Performance |
| | | Exhaust Leaks, Fluid levels |
| | | Driveshaft |
| | | Differential Fluid & Vents |
| | | Oil Sample |
| | | Belts, Pulleys, Tensioners |

| A | C | Cooling System |
|---|---|---|
| | | Pressure Check System |
| | | Coolant Levels |
| | | Strengths PH____ Temp Protection____ |
| | | Radiator Cap |
| | | Hoses |
| | | Water Pump/Fan |

| A | C | Suspension |
|---|---|---|
| | | King Pins/Ball Joints |
| | | Walking Beam, Bushings |
| | | Stabilizer, Torque Bar |
| | | Springs/Shackles, Shocks |

| A | C | Steering |
|---|---|---|
| | | Power Steering System, Gear, Linkage, Fluids |
| | | Ball Joints |
| | | Tie Rod Ends |
| | | Idler Arms |
| | | Drag Link, Pittman Arm |
| | | Control Arm, Upper Lower |
| | | Springs |
| | | Torsion Arm |
| | | Lubrication |

| A | C | Hydraulic System |
|---|---|---|
| | | Hoses/Lines/Couplers |
| | | Pump |
| | | Controls |
| | | Cylinders |
| | | Reservoir |
| | | Fluid Level |
| | | Filter(s) |
| | | Lifting Arms |
| | | Bucket Assembly |
| | | Boom Assembly |

| A | C | Undercarriage/Frame |
|---|---|---|
| | | Sprockets, Rollers, Idlers, Rails |
| | | Tracks, Adjusters, Tension |
| | | Booms, Pendant Cables & Gantry |
| | | Cable, Hoist/Drag, Tag line & Block |
| | | Swing/Hoist Controls & Drums |

| A | C | Safety |
|---|---|---|
| | | *Fire extinguisher* |
| | | *Seat Belts* |
| | | *First Aid Kit* |
| | | *Flare Kit* |
| | | *Slow Moving Vehicle Sign* |
| | | *Debris Shield (clean, clear)* |
| | | *Safety Decals—as required* |
| | | *Accident Reporting Kit* |
| | | *Road Test Vehicle* |

| | | |
|---|---|---|
| √ | √ | Indicates Item is Okay |
| o | o | Indicates Not Applicable |
| x | x | Indicates Item Requires Repair |

Certificate: THIS VEHICLE/EQUIPMENT HAS BEEN INSPECTED BY:

Technician:_____

## APPENDIX I – Marine / Trailer PM Checklist

| VESSEL/EQUIP # | OUTBOARD # | TRAILER # |
|---|---|---|
| DATE | DATE | DATE |
| WORK ORDER # | WORK ORDER # | WORK ORDER # |
| HOURS | HOURS | |
| | | |

**Lights**
- ☐ Boat Lights, Bow, Stern, Strobe
- ☐ Trailer Lights, Stop, Taillight, Clearance
- ☐ Wiring, Connectors, Plug

**Instruments**
- ☐ Gauges, Switches, Warning Lights, Controls
- ☐ Speedometer/Tach/Hourmeter
- ☐ Horn, Buzzer, Warning, Alarm
- ☐ Kill Switch Operational
- ☐ Windshield Wipers, Washers
- ☐ Automatic Shutdown System

**Charging, Starting, Ignition**
- ☐ Battery, Terminals, Cables, Switch
- ☐ Alternator Charging
- ☐ Starter
- ☐ Ignition, Plugs, Wiring

**Hull**
- ☐ Exterior, Numbers, Decals, Doors, Gates
- ☐ Seats, Seat belts, Cover
- ☐ Hull, Deck, Polymer
- ☐ Basket, Grass Rake
- ☐ Cage, Tubing, Welds
- ☐ Check "all" Lines, Cables and Tie-Downs
- ☐ Minor Paint
- ☐ Major Paint
- ☐ Cleats
- ☐ Bilge Pump
- ☐ Trim Tabs

**Brakes**
- ☐ Master Cylinder, Fluid level
- ☐ Hose, Lines, Fittings
- ☐ Calipers, Wheel Cylinder
- ☐ Breakaway, Cable, Hook
- ☐ Rotors, Drums
- ☐ Shoes, Pads, Adjust
- ☐ License Plate

**Trailer**
- ☐ Frame
- ☐ Axles, Spindles Looseness or Bending
- ☐ Fenders
- ☐ Bunks & Guides
- ☐ Winch, Cables/Strap
- ☐ Tongue Jack
- ☐ Springs/Shackles, Ubolts, Suspension
- ☐ Trailer Hitch
- ☐ Suspension
- ☐ Hitch Pin

**Wheels**
- ☐ Tires, Rims, Lugs, Studs
- ☐ Tire Pressure, Inflation
- ☐ Spare Tire, Jack, Lug Wrench
- ☐ Wheels Bearings & Seals
- ☐ Fender Decals (tire pressure)

**Engine**
- ☐ Change Engine Oil & Filter
- ☐ Engine Performance
- ☐ Fuel System, Filters, Tanks, Valves
- ☐ Filters, Air, Fuel, Water Seperator
- ☐ Fuel Pump Operation
- ☐ Engine Mounts/Bolts (replace every 300 hrs or annual)
- ☐ Oil Leaks
- ☐ Exhaust, Muffler & Bolts, Tube
- ☐ Cowling, Latches
- ☐ Belts, Pulleys, Tensioners
- ☐ Outboard Diagnostics, Ficht, Etec, Yamaha
- ☐ Propeller, Torque, Guard (airboat & outboard)

**Cooling System**
- ☐ Radiator, Reservoir
- ☐ Coolant Levels
- ☐ Strengths PH____ Temp Protection_____
- ☐ Radiator Cap
- ☐ Hoses
- ☐ Water Pump/Fan

**Steering**
- ☐ Steering, Cable, Joints
- ☐ Hoses, Lines, Couplers
- ☐ Fluid Level
- ☐ Rudders, Wheel, Handle, Bushing
- ☐ Check Steering Condition
- ☐ Lubrication, Grease, Oil
- ☐ Fasteners, Bolts, Clamps, Nuts
- ☐ Belt Drive
- ☐ Gearbox

**Hydraulic System**
- ☐ Hoses/Lines/Couplers
- ☐ Pump
- ☐ Controls
- ☐ Cylinders
- ☐ Reservoir
- ☐ Fluid level
- ☐ Filter(s)
- ☐ Lifting Arms
- ☐ Bucket Assembly
- ☐ Boom Assembly

**Transmission/Gear Case**
- ☐ Differential Fluid, Vent
- ☐ Change Fluids
- ☐ Filter(s)
- ☐ Driveshaft, U-Joints, Coupler
- ☐ Prop Shaft, Splines, Key, Torque

**Safety**
- ☐ *Fire extinguisher*
- ☐ *First Aid Kit*
- ☐ *Flare Kit*
- ☐ *Rope*
- ☐ *Anchor*
- ☐ *Registration Numbers & Decal*
- ☐ *Safety Decals—as required*
- ☐ *Accident Reporting Kit*
- ☐ *Debris*

| | |
|---|---|
| √ | Indicates Item is Okay |
| o | Indicates Not Applicable |
| x | Indicates Item Repairs Required |

Certificate: THIS EQUIPMENT HAS BEEN INSPECTED BY:
Technician:_____