SCOPE OF WORK
Title-I Services

New FEMS Fleet Maintenance Facility
Blue Plains – D.C. Village Lane SW
Washington, D.C.

DGS, on behalf of the DC FEMS Fleet Apparatus Division, is seeking an Architect-Engineer (A/E) to assist DGS in the production of construction drawings and specifications for the new FEMS Fleet Maintenance Facility. The project documentation production is expected to include the following phases: Schematic Design, Design Development, Construction Documents and Project Specifications, Bid Phase, and Construction Administration. In addition, a full FF&E Schedule for maintenance equipment and service bays will be produced by A/E team. The New FEMS Fleet Maintenance Facility which will be located at the Blue Plains-DC Village Lane site in South West, Washington D.C., adjacent to the WMATA Shepherd Parkway metro bus and D.C. Impound Lot.

DISTRICT OF COLUMBIA DEPARTMENT OF GENERAL SERVICES

PROJECT: NEW DCFEMS FLEET APPARATUS MAINTENANCE FACILITY

TITLE-I SERVICES

1. SERVICES TO BE PERFORMED:

The Architect-Engineer shall provide services to prepare and submit Schematic Design, Design Development, Construction Documents and Project Specifications, Bid Phase, and Construction Administration services. In addition to the standard construction documents and associated project specifications, a full FF&E Schedule for this project requires the services of an industrial equipment consultant to design and specify all mechanical lift and tools necessary for a fully functioning apparatus facility (see Attachment A3, section 5.3.1.7 *Industrial Equipment Design*); the Architect-Engineer will be responsible for this schedule as well as cost estimates to the District of Columbia Government for the construction of the items listed in this Scope of Work (SOW). The Architect-Engineer shall submit a cost estimate during each of these design phases, prior to the development and completion of the construction documents. Upon completion of the construction documents, the Architect-Engineer shall submit a final detailed construction cost estimate to accomplish the work. It will be the responsibility of the Architect-Engineer to review all existing documentation, interview key personnel, and conduct site visits and assessments as required to prepare the final documents.

2. COORDINATION TO BE PERFORMED:

The Architect-Engineer shall meet with all the appropriate regulatory agencies to include, but not be limited to HPO, DCRA, DDOE, NCPC, CFA, DC Water, Pepco, Washington Gas, to ascertain zoning analysis, deed restrictions and requirements, traffic study, and potential environmental considerations for compliance. Upon complying with the aforementioned requirements and satisfactorily addressing all comments in the reviews, the Architect-Engineer shall submit the final permitted documents to the Department of General Services (DGS).

SCOPE OF WORK: The District of Columbia Fire and Emergency Medical Services (DCFEMS) Fleet Apparatus Division desires to construct a new, properly sized and equipped maintenance facility that will allow it to extend the life cycle of its vehicles and wheeled apparatus, ensure efficient maintenance, and keep its fleet in front-line service. The new facility will allow the Fleet Apparatus Division to effectively and efficiently handle the requirements of its fleet.

On behalf of the DCFEMS Fleet Apparatus Division, DGS is seeking an Architect-Engineer to assist DGS in the five project phases of Schematic Design, Design Development, Construction Documents and Project Specifications, Bid Phase, and Construction Administration by developing the Construction Documents and associated project specifications, full FF&E Schedule for Maintenance and Lifts Bay and cost estimates of the New FEMS Fleet Maintenance Facility which will be located at the Blue Plains-DC Village Lane site SW, Washington D.C., adjacent to the WMATA Shepherd Parkway metrobus and D.C. Impound Lot.

The construction of the new FEMS Fleet Maintenance Facility requires the reconfiguration of the

adjacent school bus parking area into a new bus parking, fueling, driver parking and employee waiting lounge structure as further described in Exhibit A. THE ARCHITECT-ENGINEER SHALL TAKE A STRATEGICALLY PHASED APPROACH TO THE COORDINATED CONSTRUCTION OF THE FEMS FLEET MAINTENANCE FACILITY AND THE SCHOOL BUS FACILITY SO AS TO PREVENT ANY DISRUPTION OR HINDRANCE TO THE OSSE'S DAILY OPERATIONS.

A detailed description of the Site Feasibility Report is attached in Exhibit A.1.

Aerial Photo of DC Village Lane SW, 278,784 SF (6.4 acres)

Adjacent to the WMATA Shepherd Parkway Metrobus and D.C. Impound Lot

A detailed and site-specific description of the General Requirements is attached in Exhibit A.2.

Replacement of OSSE's school bus surface parking:

- New structured parking and fueling area for buses on lower level (181,000 SF)
- Precast panel construction on upper-level for bus drivers' personal vehicles parking deck
    - 1 upper-level enclosed structure for employee lounge and administrative office (8,640 SF).
    - The existing site has MPD, DC public school buses and other occupants.
    - THE ARCHITECT-ENGINEER SHALL TAKE A STRATEGICALLY PHASED APPROACH TO THE COORDINATED CONSTRUCTION OF THE FEMS FLEET MAINTENANCE FACILITY AND THE SCHOOL BUS FACILITY SO AS TO PREVENT ANY DISRUPTION OR HINDRANCE TO THE OSSE's DAILY OPERATIONS.

Site works include but are not limited to site demolition, covered fleet parking, site improvement and site utilities. To achieve a minimum LEED Silver v4 rating, site features that facilitate sustainability will include, but are not limited to:

- Bioswale storm water runoff mitigation
- Pervious paving
- Alternative fuel vehicles
- Vehicle Cleaning Station / Wash Bay

A general summary description of the facility includes but is not limited to the following:

The new Fleet Management Facility, approximately 60,000gsf, with design criteria for a minimum LEED Silver v4 rating. The project design will also need to provide for ADA accessibility. The facility will accommodate 47 staff working three shifts, with projected growth to 60 staff (2036). Key facility areas and functions include:

Back Office

- Administrative support
- Fleet Manager and Assistant Fleet Managers' offices
- Conference room

Shop Office Administration

- FEMS staff customer interface, waiting area for vehicle drop-off/pick-up
- Office manager and space(s) for 4-6 service desk writers

Uniformed Operations

- Captain's office
- Workroom with Lieutenant workstation desk space, 6 kiosk type workstations and lockers
- Storage area for appliance / loose equipment storage shelving and cabinets

Shop Floor Administration

- Supervision Office for 4 foremen with direct line-of-sight to maintenance bays
- IT Support staff, server room and work space
- Maintenance Manual Library
- Dividable Training Room with overhead door access to maintenance bay and storage rooms for training aids, table and chair storage; doubles as bunk space in emergency condition

Support Spaces

- Unisex Locker Rooms for mechanic staff (1 locker: 1 staff)
- Combination Shower/Bathroom/Changing rooms immediately off the locker room.
- Uniform Lockers area
- Break Room and Kitchenette
- Exercise Room with gym equipment

Maintenance Bay Area

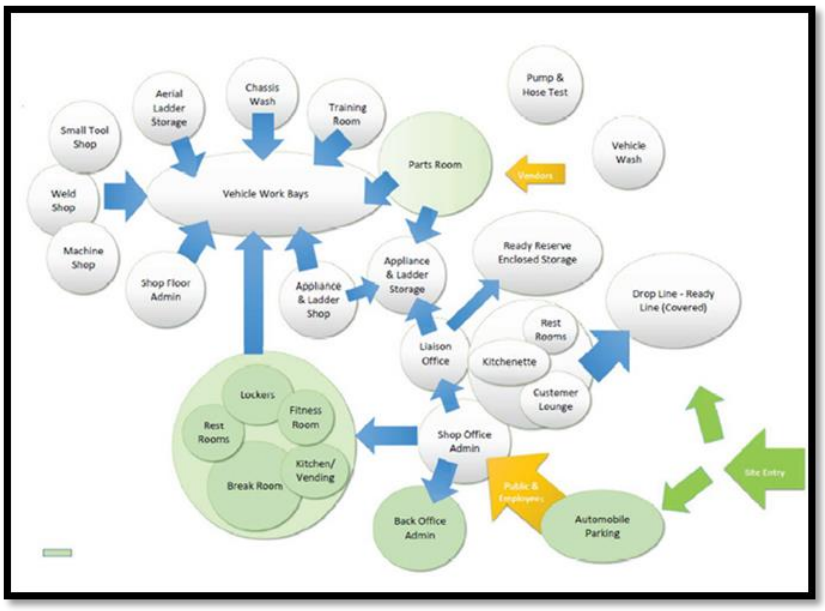
- Appropriately sized maintenance bays to accommodate the proposed fleet
    - Light/Medium Duty Vehicles Fire Apparatus (ladder)
    - Fire Apparatus (pumper) Ambulances
    - Heavy Duty Vehicles
    - Body Shop Bays
    - Preventive Maintenance Bays with below-floor work areas for routine PM work

- Shop Areas
    - Appliance, small tool, machines
    - Welding & Fabrication
    - Tire Shop
- Shop Support
    - Hand wash / Eye wash
    - Lube / Compressor
- Overhead Crane Coverage
- Chassis Wash Bay

Parts Storage Area

- Sufficient space for storing and managing parts distribution with a shipping & receiving area and designated holding area for replacement parts
- Office for Parts Manager and desk space adjacent to parts distribution
- Window for Parts Clerk
- Area for bolt bins near the Repair Bays; utilized for non-inventory parts storage
- Secure tool crib for FEMS-owned tools
- Secure room for file storage
- Utilize vertical storage technologies to minimize storeroom footprint
- Secure storage room for Facilities Maintenance
- Utilize mezzanine space for slow moving parts with a parts lift and stairs

Area Key Adjacencies (green areas on second level if applicable)



See Exhibit A "Program of Requirements Report" for Project Specific Requirements.

Architect-Engineer Team is responsible for all design elements for a complete and comprehensive new facility.

3. It shall be the responsibility of the Architect-Engineer to review all existing design documents for the development of the final construction document.

3.1. Project Summary:

3.1.1. Agency Tenant: District of Columbia Fire and Emergency Medical Services (FEMS) Fleet Apparatus Division

3.1.2. Facility address: Blue Plains- DC Village Lane SW, Washington, D.C.

3.1.3. Construction Costs: Estimated: $45 - $55 MM

3.2. DC Green Building Act: The Project shall be designed to comply with the District of Columbia Green Building Act of 2006 (and any subsequent revisions). The District shall bear all costs for LEED certification and shall reimburse the Architect-Engineer for registration and interpretations/clarifications.

3.3. Project Team: The Architect-Engineer shall provide a narrative response to the SOW in terms of approach. DGS reserves the right to change the team leader if the actions of the team leader become detrimental to the schedule, the cost of the project, or does not meet the needs of the agency clients.

3.4. Cost Estimate: A cost estimate shall be developed per the Attachment-A3 requirement at each submission stage and provided both in hard copy and on electronic file format. The cost estimate will adhere to Construction Specification Institute (CSI) format.

3.5. Project Communications: The Architect-Engineer shall be responsible for developing and implementing a communications plan for the project to include production and distribution of status reports to stakeholders, preparation for agency meetings and presentations, and briefings to District and other government officials. The Architect-Engineer shall develop a computer-generated rendering if applicable. All design-related scheduling shall be completed in Required Scheduling Software as determined appropriate by the Project Manager.

3.6. Bidding and Permitting Stage: The Architect-Engineer shall be responsible for obtaining any such building permits and clearances in accordance with Attachment-A3. The Architect-Engineer shall attend pre-bid meetings to answer questions that may arise regarding the construction documents.

3.7. Document Preparation: The final submission of required drawings shall be provided in Computerized Graphic Software, and Specifications shall be provided electronically in MS Word format.

3.8 Design Submissions: The Architect-Engineer shall make design submissions in accordance with "Attachment-A3, Technical Requirements and Submittal Guide." A design submission will be due at Schematic Design 35%, Design Development 70%, and Construction Documents 90% completion for review and approval to move to the next phase. The 100% Construction

Documents shall be completed no later than one-hundred thirty-five (135) calendar days from the date of the Task Order.

3.9 Services: Title I Services shall be deemed complete once the Architect-Engineer obtains the required building permits (building permit fees are reimbursable) and the construction contract is awarded to the General Contractor.

4. DOCUMENTS AND DATA TO BE FURNISHED BY THE DEPARTMENT OF GENERAL SERVICES:

4.1. The District shall provide readily available documentation for the Project including the Site Feasibility Report, Program of Requirements, and sample FF&E Industrial Mechanical Schedule. The Architect-Engineer shall visit the site and be responsible for performing a visual field verification of the actual existing conditions (see Attachment-A3). Any documents provided by the District that indicate the existing conditions shall be used for information purposes only.

4.2. Attachment-A3, "Technical Requirements and Submittal Guide" is made a part of this Request for Fee Proposal.

5. INSURANCE:

5.1. The Architect-Engineer shall maintain insurance coverage as specified in RFP.

6. PROJECT SPECIFIC REQUIREMENTS:

Exhibit A.1: SITE FEASIBILITY ANALYSIS REPORT

In September 2016 DGS commissioned a Program of Requirements (POR) to determine FEMS' needs for a replacement facility. That POR determined that the new facility required approximately 195,391 SF (4.5 acres) for exterior areas including site access and circulation.

DC Village

Located on DC Village Lane, SW adjacent to the WMATA Shepherd Parkway Metrobus facility and the DC Impound Lot. The site consists of 278,784 SF (6.4 acres). It is currently in use as a bus parking facility for DC Schools.

- This site accommodates the required program with all adjacency and clearance requirements met. Additionally, the site size and shape allow for all vehicle circulation to be internal to the site and on all sides of the facility.
- The shape of the site as roughly square which allows maximum flexibility for programmatic layout and planning.
- School bus parking, fueling, driver parking and employee waiting lounge could be retained on site if reconfigured in a way to allow for the area needed to accommodate the FEMs facility.
- The site is currently owned by the DC government.

The DC Village location was selected as it is the only site that accommodates all program requirements and allows for flexibility in the program layout. Additionally, the location is in close proximity to the Washington DC Fire & EMS Training Academy.

SITE CHARACTERISTICS

- Located on DC Village Lane SW adjacent to the WMATA Shepherd Parkway Metrobus facility and the DC Impound Lot.
- Consists of 278,784 SF (6.4 acres).
- Currently utilized as a bus parking facility for DC Public Schools.

TEST FIT RESULTS

The program areas were laid out in accordance with the recommendations from the Program of Requirements from September 30, 2016. All program areas were given the size, shape and adjacency required. The layout is for a double drive through with a 10'-wide aisle between the work bays. All program areas that could be accommodated at a second level per the POR were located there to maintain the smallest building foot print possible at 59,000 SF.

- This site accommodates the required program with all adjacency and clearance requirements met. Additionally, the site size and shape allow for all vehicle circulation to be internal to the site and on all sides of the facility.

- The shape of the site as roughly square; allows maximum flexibility for programmatic layout and planning.
- School bus parking, fueling, driver parking and employee waiting lounge will be retained on site and reconfigured in a way to allow for the area needed to accommodate the FEMs facility. This could be accomplished by adding a parking deck for driver's vehicles over the existing bus parking. With the area for School Bus parking (163,507 SF, 3.75 acres) subtracted, the site is 278,784 SF (6.4 acres).

Aerial View of DC Village Site

EXHIBIT A.2 - "PROGRAM OF REQUIREMENTS REPORT"

OVERVIEW The District of Columbia Fire and Emergency Medical Services (FEMS) Fleet Apparatus Division is currently working out of an outdated and functionally inefficient facility at 1103 Half Street in Washington, D.C.

PROTECTING THE DISTRICT'S INVESTMENT

For FY15-21 the District has committed approximately $81 million for the purchase of 100 new vehicles and wheeled apparatus. A new, properly sized and equipped maintenance facility will allow FEMS to extend the life cycle of those vehicles and ensure their efficient maintenance and keep them in front-line service. The new facility will allow the Fleet Apparatus Division to effectively and efficiently handle the requirements of the FEMS fleet.

SUMMARY OF SITE REQUIREMENTS

SPACE NEEDS AND SITE REQUIREMENTS

Current Acreage: 1.3 acres
Recommended Acreage: 4.5 acres
Space needed for a new facility is approximately 4.5 acres for approximately 104,049 SF for building areas and 91,342 SF for exterior areas including site access and circulation. Note that other site requirements such as landscaping, stormwater retention, and setbacks are not included in these figures because of their site-specific nature.

Current Service Bays: 14 Recommended Service Bays: 20*
*includes 2 bays for preventative maintenance

Current Ready Reserve: 14
Recommended Ready Reserve: 36

UNDERSTANDING THE DIVSION'S NEEDS

To help inform the selection of a new site and the development of schematic design for the new facility the DGS and FEMS project team developed a set of key planning goals and identified needed program elements based on fleet and personnel projections for the year 2036 (see Chapter 2 for details).

To ensure improvements in the efficiency and effectiveness of the Division as it relates to fleet maintenance and repair, the project team developed the following key planning goals new facility:

- Quality working environment
- Worker and customer friendly facility
- Adequate space (bays) for maintenance and repairs
- Safe, functional, and efficient workspaces
- Apparatus drop-off and pick-up areas
- On-site ready-reserve storage
- On-site fleet and personnel parking
- Employee support amenities

METHODOLOGY

Staff interviews, programing questionnaires, on-site observations, and review and analysis of existing and projected data was used as a basis for developing the requirements of the new facility. The project team visited other municipal emergency fleet facilities in DC metropolitan area and reviewed examples of fleet facilities in other parts of the country to better understand options and best practices.

Based on the program requirements developed during the POR process and benchmark data for similar projects, the team developed design criteria, space needs assumptions, rough cost estimates, and project schedule.

CHAPTER TWO

BASIS FOR DESIGN

INTRODUCTION

The functional and operational needs of the FEMS Fleet Apparatus Division's maintenance and repair program and activities provide the basis for the POR. Data about current and future operations described in this Basis for Design are key to understanding the elements that will influence site selection and building layout and design of a new facility.

Through on-site interviews, observations, and programming questionnaires the project team identified the functions, hours of operation, staffing levels, support vehicles, parking requirements, vehicles maintained, spatial relationships, and key planning issues for each type of space projected for the new facility.

METHODOLOGY

At the initial project kickoff meeting a programming questionnaire relating to fleet maintenance and operations was given to appropriate FEMS staff. The completed questionnaires were used as the basis for discussion for the initial interview sessions. Interviews with key staff identified operational needs and key areas where sufficient space for efficient operations was lacking. Discussions also focused on areas where physical limitations of the existing facility hampered the efficiency and effectiveness of operations.

The Team met with key FEMS staff to understand how the facility currently operates, noted existing deficiencies, space limitations, opportunities for improvement and how the Apparatus Division Maintenance and Repair Facility will need to interact in the future with the fleets assigned to various fire stations. The 2009 report *Comprehensive Facilities Condition Assessment and Space Utilization Survey* was also reviewed and discussed. At the completion of the interviews with the staff and a review of the programming questionnaires, The Team toured the existing maintenance facility and associated shops.

Subsequent to the development of an initial draft program, The Team presented the project team with information on best practices incorporated into similar facilities in other parts of the country. The Team also took the project team on tours of similar fire department and emergency services maintenance facilities in Montgomery County, Maryland, and in Arlington and Fairfax counties in Virginia.

FLEET MAINTENANCE FUNCTIONAL AND OPERATIONAL DATA

FUNCTION

Fleet Maintenance staff are responsible for a full complement of maintenance and repair (including limited fabrication) of all FEMS vehicles and equipment including sedans, ambulances, fire trucks and heavy equipment as well as small, gas-powered equipment.

STAFFING

Projected hours of operation for Division staff at the new facility will be 24 hours a day in three shifts. Table 1.1 presents the existing staffing space needed for the facility and the projected growth of the next 20 years.

Table 2.1 - Existing and Projected Staffing Space Needed

Staffing Area	Existing (2016)	Projected (2036)
Back Office Administration	2	5
Shop Operations Administration	6	6
Uniformed Operations*	4*	6*
Shop Floor Administration	5	5
Parts Room	2	2
Vehicle Maintenance	28	36
Total Staff Space Needed	47	60

*Uniformed Operations personnel need space in the facility but are not Apparatus Division staff.

SUPPORT VEHICLES

FEMS Apparatus Division operations utilize three support vehicles; a tow truck, a lube truck, and a tire truck. There are no plans for any additional vehicles in the next 20 years.

PARKING REQUIREMENTS

To ensure adequate parking for personnel during shifts and during shift turnover periods, the facility needs to provide a minimum number of parking spaces to cover both first and second shift personnel. Given staffing projections for 2036 the minimum number of stalls to cover first and second shifts will need to be 51. In addition, handicapped and visitor spaces will also need to be provided.

FLEET MAINTENANCE FUNCTIONAL AND OPERATIONAL DATA

VEHICLES MAINTAINED

FEMS currently maintains approximately 387 vehicles and other equipment. Table 1.2 presents a list of current vehicles and equipment maintained by DC FEMS and projected growth in 20 years.

Table 2.2 - Existing and Projected Vehicles Maintained

Vehicle Type	Existing (2016)	Projected (2036)
Ambulance	89	100
Sedan	30	31
SUV	57	65
Pick-up Truck	18	19
Apparatus - Engine	64	64
Apparatus - Ladder	30	30
Heavy Truck	24	24
Medium Truck	12	12
Bus	4	4
Van	21	21
Trailer	19	19
Off-road	14	14
Other	5	5
Total Staff	387	408

KEY PLANNING ISSUES

Each of the functional areas in the facility have unique functional and operational needs that impact the amount, type, location, and adjacency of space required. The following issues should be taken into consideration during future planning and design efforts.

BACK OFFICE AREA

- This area provides administrative support for the facility but does not need to be immediately adjacent to any other function.
- The Fleet Manager and Assistant Fleet Managers' office should include a conference room in this office suite.
- Currently Payroll and IT Support are located elsewhere in the facility. If these functions are to be incorporated in the back office area, an administrative assistant will need to be added as well.

SHOP OFFICE ADMINISTRATION

- This area provides FEMS staff customer interface and a waiting area for vehicle drop-off/pick-up.
- It includes an office manager and space(s) for 4-6 service writers at a service desk for customer support needs to be provided.
- This area should have adjacency to the Liaison Office and Drop and Ready parking areas for FEMS vehicles.

UNIFORMED OPERATIONS

- This area provides space for the FEMS uniformed staff and includes storage space for appliances/loose equipment.
- Office space is needed for the Captain and a workstation desk space for a Lieutenant is needed in a workroom which has space for six kiosk type workstations and lockers for assigned uniform personnel.
- An area for appliance / loose equipment storage shelving and cabinets should also be located in this workroom.

SHOP FLOOR ADMINISTRATION

- This area provides administration, supervision and support for the maintenance staff and is located immediately adjacent to the maintenance bays.
- Space for 4 foremen in a single office with direct line of sight to the maintenance bays is required.
- IT Support staff, server room and work space to provide direct support for maintenance laptops.
- Maintenance Manual Library shall be located immediately adjacent to Foremen's Office and maintenance bays for easy access by maintenance staff and oversight by the foreman.
- Dividable Training Room with overhead door access to a maintenance bay and storage rooms for training aids, table and chair storage. Space can double as bunk space in emergency conditions.

KEY PLANNING ISSUES

SUPPORT SPACES

- Plan for Unisex Locker Rooms to accommodate the Mechanic staff. Plan for one full-height locker per staff person.
- Combination Shower/Lavatory/Changing rooms immediately off the locker room.
- Provide an area for uniform lockers. Locate this area near the delivery entrance of the facility and accessible from the Locker Rooms.
- Break Room and Kitchenette sized for the anticipated largest shift.
- Provide a Fitness Room with exercise equipment.

MAINTENANCE BAY AREA

- Appropriately sized maintenance bays to accommodate the proposed Fleet:
  Light/Medium Duty Vehicles Fire
  Apparatus (ladder)
  Fire Apparatus (pumper)
  Ambulances
  Heavy Duty Vehicles
- Preventative Maintenance Bays with below-floor work areas for routine PM work.
- Overhead crane coverage
- Chassis Wash Bay
- Body Shop Bays

PARTS STORAGE AREA

- Sufficient space for storing and managing parts distribution. This will include a shipping and receiving area and designated holding area for replacement parts under warranty.
- Office for Parts Manager and desk space adjacent to parts distribution window for Parts Clerk.
- Plan for an area for bolt bins near the Repair Bays. This will be utilized for non-inventory parts storage.
- Provide a secure tool crib for FEMS-owned tools.
- Secure room for file storage.
- Utilize vertical storage technologies to minimize storeroom footprint.
- Secure storage room for Facilities Maintenance supplies and equipment.
- Utilize mezzanine space for slow moving parts. Provides a parts lift and stairs for access to the mezzanine.

KEY PLANNING ISSUES

SHOP AND SUPPORT SPACES

The following support areas are to be located adjacent to the maintenance bays :

- Machine Shop
- Small Tool Shop
- Appliance Tooling Repair
- Aerial Ladder Storage
- Small Parts Paint Booth
- Common Work Areas equipped with drill press, grinders, and hydraulic press, workbenches and parts washers.
- Portable equipment storage spaces
- Designated tool box storage areas
- Welding/Fabrication Shop with adjacent material storage
- Tire Shop and Tire Storage (vertical tire storage to minimize footprint)
- Battery storage room
- Rest rooms and hand wash areas.
- Lube & Compressor Room with above ground lubrication product storage tanks and waste oil tanks

WASH AREAS

- A new drive-through wash will be provided for washing FEMS vehicles.
- Plan for a touchless drive-through wash designed to clean the variety of profiles of vehicles in the fleet.
- Provide a secure room for wash equipment associated with the drive-through wash. This room will need an overhead door or double-door access from the exterior.
- Provide a secure Electrical Room with exterior access.

PUMP AND HOSE TEST FACILITY

- The area is to be covered, be designed with vehicle access from both directs and be provided with test connections on each side of the bay.
- Provide an appropriately sized cistern with baffles to collect and settle test water.

FLY PAD

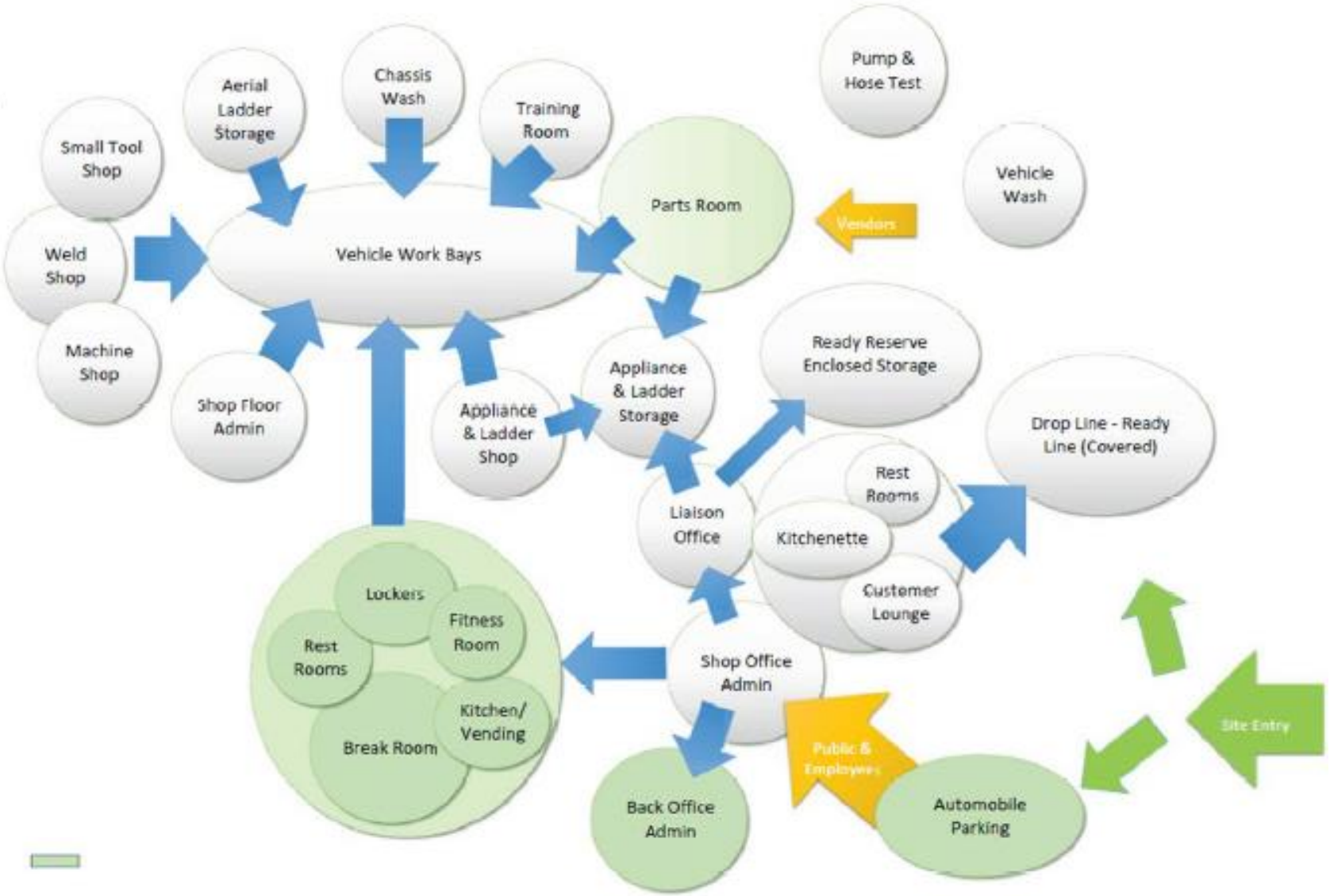
The area required to conduct fly tests of aerial ladders is approximately 1.32 acres (240 ft. x 240 ft.). However, it was determined that given the area required, this testing can be conducted at the training facility to minimize the site area required for the new maintenance facility. Consequently, a fly pad is not included as a requirement in this POR. (This function could, however, be a part of the maintenance facility if a site of sufficient size is chosen.)

KEY PLANNING ISSUES

VEHICLE PARKING

- The intent of the eventual plan is to provide organized, accessible parking for employees, vehicles being dropped off for maintenance, picked up from maintenance and the ready reserve fleet.
- Provide employee parking sized to accommodate first and second shift employees and uniformed personnel who may be temporarily/ permanently assigned to the facility. Employees will enter the facility through the Shop Office Administration area.
- Provide handicap-accessible and visitor parking spaces in the public/staff parking area.
- Provide a drop-off line, adjacent to service writer's desk (Shop Office Administration) and customer lounge for incoming vehicles awaiting maintenance. Spaces sized appropriately for the anticipated fleet mix. Large and extra-large vehicle parking spaces to be covered and provided with station power for each vehicle. Spaces sized appropriately for the anticipated fleet mix.
- Provide a pick-up (Ready) line, adjacent to customer lounge for vehicles that have had maintenance completed. Large and extra-large vehicle parking spaces to be covered and provided with station power for each vehicle. Spaces sized appropriately for the anticipated fleet mix.
- Provide enclosed space with station power for the ready reserve
- fleet. Spaces sized appropriately for the anticipated fleet mix.

KEY ADJACENCIES



Areas shaded green could be on second level.

CHAPTER THREE

SPACE NEEDS PROGRAM

INTRODUCTION

This chapter presents the Space Needs Programs for the new Fleet Apparatus Division Maintenance Facility needs for FEMS projected to year 2036. This Space Needs Program includes the program requirements for the proposed new maintenance facility for maintaining the District's fleet of emergency vehicles and equipment. The program includes office/support areas, storage areas, shop areas, exterior areas, and exterior/enclosed parking areas to meet the future operational needs.

STAFFSPACE NEEDS SUMMARY

An understanding of facility staffing levels is crucial when determining the number of parking spaces, size of support facilities, and developing occupancy levels. Table 3.1 shows a summary of the current and projected staffing levels over the next 20 years. These staffing levels were taken from interview sessions, questionnaires, and organization charts provided by FEMS.

Table 3.1 - Existing and Projected Staffing Space Needed

Staffing Area	Existing (2016)	Projected (2036)
Back Office Administration	2	5
Shop Operations Administration	6	6
Uniformed Operations*	4*	6*
Shop Floor Administration	5	5
Parts Room	2	2
Vehicle Maintenance	28	36
Total Staff Space Needed	47	60

*Uniformed Operations personnel need space in the facility but are not Apparatus Division staff.

Space standards were applied to the Space Needs Program and generally apply to the Office and Vehicle Parking Areas. Area requirements in Shops and Storage Areas were derived from functional requirements and equipment space needs. The space standards listed below were utilized to develop the facility program and overall area requirements. The space standards are based on functional needs and requirements established through the design of other facilities, rules of thumb, and specific requirements of each functional group.

OFFICE AREAS

Fleet Manager	300 SF (15' x 20')
Asst. Fleet Manager	168 SF (12' x 14')
Clerical	64 SF (shared space)
Foreman/Service Writer	48 SF (shared office)
Small Conference Room	120 SF (10' x 12')
Large Conf/Training Room	800 SF (20' x 40')

SPACE STANDARDS

SHOP AREAS

Light Duty Repair Bay	560 SF (16’ x 35’)
Medium Duty Repair Bay	560 SF (16’ x 35’)
HD Ambulance Repair Bay	640 SF (16’ x 40’)
Heavy Duty Repair Bay	1,000 SF (20’ x 50’)
Engine Apparatus Repair Bay	1,100 SF (22’ x 50’)
Aerial Apparatus Repair Bay	1,760 SF (22’ x 80’)
PM/Body Repair Bay	1,760 SF (22’ x 80’)

VEHICLE PARKING

Sedan/SUV	200 SF (10’ x 20’)
Light/Med Truck	200 SF (10’ x 20’)
Employee Parking	162 SF (9’ x 18’)
Visitor Parking	162 SF (9’ x 18’)
Accessible Parking	234 SF (13’ x 18’)
Ambulance*	360 SF (12’ x 30’)
Fire Apparatus (engine)*	480 SF (12’ x 40’)
Fire Apparatus (ladder)*	720 SF(12’ x 60’)

*Requires covered/enclosed with station power

In addition to the net usable area space standards listed above, Circulation Factors were used to account for circulation and other non-usable space factors.

CIRCULATION FACTORS

INTERIOR OR BUILDING CIRCULATION

Accounts for miscellaneous building spaces such as hallways; stairwells; janitor closets; mechanical, plumbing, and electrical rooms; wall thickness; structure (Circ/Mech/Elec/Struc); and access requirements. The following is a list of the approximate factors that have been applied to the program:

- Shop/Maintenance Bay Areas - 20%
- Mezzanine/Storage Areas - 20%
- Office Areas - 35%
- Enclosed/Covered Spaces – 20%
- Exterior Areas (Parking, Exterior Support, etc.) – 100%

PARKING CIRCULATION

A factor of 100 percent of the actual space occupied by a vehicle is added. This additional space must be included in the calculation to account for the drive aisles, walkways, islands, and other areas created by site and access inefficiencies.

SITE NET TO GROSS FACTOR

Site Net to Gross Factor accounts for areas around buildings, site drive aisles, building access, and site access. For new construction, a 100 percent factor is normally applied to account for the variety of site inefficiencies that can be encountered in the site selection process. As such, the better the site conditions, access, easement, etc., the more efficient the site layout can become, reducing this factor to as low as 50 percent.

REPAIR BAY PLANNING RATIOS

Factors governing the number and size of repair and maintenance bays is determined by the number of vehicles and equipment maintained by the Apparatus Division, the age and makeup of its fleet, and the number of shifts expected to be run at the facility. Planning ratios are derived from industry standards and best-practice programming for other similar maintenance facilities around the country. The actual ratios used for this facility are within industry standard ranges and are based on operational factors specific to the DC FEMS Apparatus Division. (See Table 3.2)

Table 3.2 - Repair Bay Program

Vehicle Type	Bay Size & Type	Vehicle Quantity	Planning Ratio (vehicles per bay)	Calculated Need	Bays Needed
Apparatus - Engine	22'x50' HD	64	12	5.3	5
Apparatus - Ladder	22'x80' HD	30	12	2.5	2
Ambulance	16'x40' HD	100	20	5.0	5
Heavy Trucks, Medium Trucks, Bus, Trailers, Other	20'x50' HD	64	50	1.3	1
Heavy Vehicle - Preventative Maint.	22'x80' HD	258	100	2.5	2
Sedans, SUVs, Pick-up Trucks, Vans, Off-Road	16'x35' LD	150	75	2.0	2
Body Shop	22'x80' HD	n/a	n/a	n/a	1
Chassis Wash	25'x80' HD	n/a	n/a	n/a	1
Drive-through Vehicle Wash	22'x85' HD	n/a	n/a	n/a	1
Total Bays Needed					20

HD = Heavy Duty Bay, LD = Light Duty Bay

SPACENEEDS PROGRAM SUMMARY

Table 3.3 - Space Needs Summary SINGLE STORY

Type of Space	Area (SF)
Interior	**104,049**
Office/Support Areas	11,679
Shop Areas	54,616
Enclosed Areas	37,754
Exterior	**26,212**
Fly Pad	**0**
Site Access and Circulation	**65,130**
Setbacks, Landscape, and other Site Requirements	**TBD**
Total Square Footage Needed	**195,391**
Total Acreage Needed	**4.5**

Table 3.4 - Space Needs Summary VERTICAL OPTION

Type of Space	Area (SF)
Interior	**104,049**
Office/Support Areas	11,679
Shop Areas	54,616
Enclosed Areas	37,754
Exterior	**26,212**
Flypad	**0**
Site Access and Circulation	**65,130**
Setbacks, Landscape, and other Site Requirements	**TBD**
Footprint reduction for vertical option	**(23,191)**
Total Square Footage Needed	**172,200**
Total Acreage Needed	**4.0**

Table 3.5 - Space Needs Comparison, Existing vs. Projected

Characteristic	Existing (2016)	Projected (2036)
Ready Reserve Capacity	14 vehicles	36 vehicles
Site Requirement	1.3 acres	4.5/4.0 acres
Service Bays	14	20

Space Needs Program Summary

	Projected Needs 2036 (sq. ft.)
Building Areas	
Office/Support Areas	
Back Office Administration	1,612
Shop Operations Administration	2,008
Uniformed Operations	984
Shop Floor Administration	1,748
Support Areas	2,256
CMES Factor	3,071
Subtotal	**11,679**
Shop Areas	
Bay Areas	22,017
Parts Storage	8,070
Shop and Support Spaces	14,071
Mechanical/Electrical	1,280
CMES Factor	9,178
Subtotal	**54,616**
Enclosed/Covered Areas	
Fire Department Ready Reserve Fleet (Enclosed)	13,368
Drop Line/Pick-up Line	10,646
Covered Fleet Parking	2,400
Automated Vehicle Wash	2,620
Used Tire/Trash/Recycle	600
Pump/Hose Test	1,775
CMES Factor	6,345
Subtotal	**37,754**
Total Building Areas	**104,049**
Exterior Areas	
Fly Pad	-
Building Support Areas	3,700
Vehicle Parking	9,406
CMES Factor	13,106
Subtotal	**26,212**
Total Exterior Areas	**26,212**
Total Areas	
Total Building Areas	104,049
Total Exterior Areas **(NOT including Fly Pad)**	26,212
Site Access/Circulation/Water Detention/Landscaping/Setbacks @50%	65,130
Landscaping @ 25%	TBD
Storm Water Quality @ 3,000 sf per acre	TBD
Total Site Requirements	**195,391**
Total Acreage	**4.5**
Vertical Construction Option	
Reduction in footprint with following: Structured employee parking; Back Office Administration and Employee Facilities on 2nd level; vertical/high density storage options in Parts Storage (See highlighted areas in Program Detail)	(23,191)
Total Site Requirements	**172,200**
Total Acreage	**4.0**

Space Needs Program

Space Standard	QTY	Area (SF)	Remarks
Back Office Administration			Could be 2nd level
Fleet Manager	15 x 20	1 300	Office
Assistant Fleet Manager	12 x 14	1 168	Office
Administrative Assistant	8 x 8	1 64	Workstation
IT Support	16 x 20	1 320	Office, workspace and secure storage
IT Server Room	10 x 20	1 200	
Payroll Support	8 x 10	1 80	Workstation
Conference Room (small)	10 x 12	1 120	4 to 6 person
File/Copy/Mail	8 x 10	1 80	Could be shared
Office Supply	10 x 12	1 120	
Restroom (unisex)	8 x 10	2 160	
Shop Operations Administration			
Service Desk	8 x 16	1 128	
Service Writers	20 x 20	1 400	Workstations
Office Manager	12 x 14	1 168	Office
File/Copy	10 x 12	1 120	Could be shared
Customer Lounge	20 x 20	1 400	Sound isolated
Large Conference Room	20 x 24	1 480	16-20 person
Kitchenette	6 x 12	1 72	In Customer Lounge
Rest Rooms	8 x 10	2 160	
Janitor's Closet	8 x 10	1 80	
Uniformed Operations			
Liaison Workroom	20 x 24	1 480	6 Kiosks + 8 lockers
Captain's Office	10 x 12	1 120	Office
Lieutenant's Office	8 x 8	1 64	Workstation
Appliance/Loose Equipment Storage	16 x 20	1 320	In Liaison Workroom

Space Needs Program

Space Standard			QTY	Area (SF)	Remarks
Shop Floor Administration					
General Foreman	12	x 12	1	144	Office
Foremen's Office	20	x 20	1	400	4 Workstations in Shared Office
Manual Library	12	x 12	1	144	
File/Copy	6	x 10	1	60	Could be shared
Training Room					Adjacent to Vehicle Work Bay (Sm OH Door
Meeting Room	15	x 20	2	600	Training Modules - Partition Dividable
Visual Aid Storage	10	x 10	1	100	
General Storage (Chairs, Bunks, etc.)	10	x 20	1	200	
Training Officer/Materials	10	x 10	1	100	Training Officer may not be full time assignment
Support Areas					Could be 2nd level
Rest Rooms /Shower/Lav Unit	8	x 10	4	320	Adj to Locker Alcove
Janitor's Closet	6	x 10	1	60	
Locker Alcove			1	648	Unisex Locker Area
Break Room & Kitchenette	20	x 35	1	700	
Uniform Vendor Pick-up/Delivery Room	8	x 16	1	128	
Fitness Room	20	x 20	1	400	
Entry Vestibule	8	x 10	1	80	At Shop Operations Administration main entry
Subtotal **CMES Factor**	**35%**			**8,688** **3,071**	
Total Office and Support Areas				**11,759**	

Space Needs Program

Space Standard	QTY	Area (SF)	Remarks
Bay Areas			
Light/Medium Duty Vehicle Equipment Repair Bay	16 x 35	2 1,150	
Fire Apparatus Engine Repair Bays	22 x 50	5 5,867	
Fire Apparatus Ladder Repair Bays	22 x 80	2 3,520	Bridge Crane @ 2 bays & adj aerial ladder stor.
Apparatus/Heavy Vehicle PM Bays	20 x 80	2 3,200	W/ lower level work area
Ambulance Bays	16 x 40	5 3,200	
Heavy Vehicle Bays	20 x 50	1 1,320	
Body Shop Bays	22 x 80	1 1,760	Fits largest vehicle
Chassis Wash Bay	25 x 80	1 2,000	Fits largest vehicle
Total Maintenance Bays		19	Not Including Chassis Wash
Parts Storage			Footprint has been reduced 35% utilizing vertical/high density storage
Parts Window	8 x 16	1 128	
Parts Clerk	8 x 10	1 80	
Parts Manager	12 x 16	1 192	
Parts Room			
Parts Storage (Small)	75 x 50	1 3,750	
Large Parts Storage	60 x 60	1 3,600	
Shipping and Receiving Area	24 x 30		Included in above
Tire Storage	20 x 30		Include above. (Vertical Tire Carousels?)
Secure Storage (Tool Room)	12 x 12		Included in above
File Storage	10 x 12		Included in above
Warranty Storage	12 x 12		Included in above
Mezzanine Storage	x	1	tbd
Facility Maintenance Storage Room	16 x 20	1 320	

Space Needs Program

	Space Standard	QTY	Area (SF)	Remarks
Shop and Support Spaces				
Machine Shop	40 x 50	1	2,000	
Small Tool Shop	30 x 30	1	900	
Appliance Tooling Repair	30 x 70	1	2,100	
Appliance Storage	20 x 70	1	1,400	
Aerial Ladder Storage	12 x 70	1	840	Adjacent to Apparatus Ladder Bays
Paint Booth	8 x 12	1	96	Open face - shop floor
Common Work Areas	15 x 20	2	600	
Portable Equipment Storage Area	15 x 20	2	600	
Tool Box Storage	20 x 20	1	400	
Chassis Wash Equipment Room	12 x 18	1	216	
Weld/Fabrication	40 x 60	1	2,400	
Welding Material Storage	15 x 25	1	375	
Tire Shop	20 x 20	1	400	
Tire Storage	20 x 30	1	600	
Large/Small Tire Storage				Floor racks, Tires on rims
Battery Room	12 x 12	1	144	With Charging
Lubrication/Compressor Room	20 x 40	1	800	
Rest Rooms/Hand Wash	10 x 10	2	200	
Mechanical/Boiler Room	20 x 40	1	800	Ground Level, for radiant heated floors
Electrical Room	16 x 30	1	480	Ground Level, including emergency switchgear
Subtotal **CMES Factor**	**20%**		**45,438** **9,178**	
Total Bays, Storage and Shop Areas			**54,616**	

Space Needs Program

	Space Standard	QTY	Area (SF)	Remarks
Enclosed/Covered Areas				
Fire Department Ready Reserve Fleet (Enclosed)				Does not include Reserve Fleet
Small (auto)	9 x 18	4	648	
Medium (SUV/truck)	10 x 20	6	1,200	
Large (Ambulance)	12 x 30	16	5,760	w/ station power
Extra Large (Pumper)	12 x 40	6	2,880	w/ station power
Extra Large (Ladder)	12 x 60	4	2,880	w/ station power
Drop & Pick-up Line (Covered)				
Small (auto)	9 x 18	3	486	
Medium (SUV/truck)	10 x 20	4	800	
Large (Ambulance)	12 x 30	16	5,760	w/ station power
Extra Large (Pumper)	12 x 40	3	1,440	w/ station power
Extra Large (Ladder)	12 x 60	3	2,160	w/ station power
Fleet Parking (covered)				
Large (Service Trucks)	12 x 30	4	1,440	
Extra Large (Tow Trucks)	12 x 40	2	960	
Vehicle Wash Bay	22 x 85	1	1,870	Automated, touchless. May be remote from shop
Wash Equipment Room	15 x 50	1	750	With Recycle water system
Used Tire Storage	10 x 20	1	200	Covered, with walls three sides
Trash/Recycling	10 x 40	1	400	Covered, with walls three sides
Pump/Hose/Foam Test	25 x 50	1	1,250	Includes vehicle pad & canopy
Cistern	15 x 35	1	525	Cistern/Capture pit
Subtotal			**31,409**	
CMES Factor	**20%**		**6,345**	
Total Enclosed / Covered Areas			**37,754**	

Space Needs Program

	Space Standard	QTY	Area (SF)	Remarks
Exterior Areas				
Fly Pad	240 x 240	1		**Excluded from project. 57,600 SF required.**
Building Support Areas				
Outdoor Break Area	20 x 40	1	800	
Emergency Generator	20 x 40	1	800	
Transformer Pad	20 x 20	1	400	
Loading/Delivery Area	20 x 85	1	1,700	At Grade Loading/Unloading
Vehicle Parking				
Fleet Parking (uncovered)				
Small (auto)	10 x 20	2	400	
Medium (SUV/Pick-up)	10 x 20	3	600	
Personnel Parking				
Visitor Parking	9 x 18	4	648	
Disabled parking	13 x 18	2	468	
Employee Parking	9 x 18	45	7,290	Could be structured parking
Subtotal			**13,106**	
CMES Factor	**100%**		**13,106**	
Total Exterior Areas			**26,212**	

CHAPTER FOUR

DESIGN CRITERIA

FLEET MAINTENANCE FACILITY DESIGN CRITERIA

DC FEMS APPARATUS DIVISION- FLEET MAINTENANCE SHOP

Washington, DC

District of Columbia Fire and EMS and Department of General Services

Maintenance Design Group

INTRODUCTION

Introduction

This document presents Design Criteria for the proposed Fleet Maintenance Shop facility, by providing both micro and macro level design requirements. Functional relationship information for these spaces can be found in Chapter Two - Basis of Design. The Design Criteria consists of Functional Area Modules which provide a detailed description of specific design issues for each of the areas listed in the Space Needs Program. All Modules and related equipment are for representation purposes only and do not necessarily depict strict design conformance.

Sustainable Design

There are several sustainable design opportunities which can be approached at the new Fleet Maintenance Shop facility. Regardless of whether DC FEMS chooses to achieve LEED rating or not, these are good design practices. The Sustainable Design section outlines potential sustainable design opportunities appropriate for this type of facility. These options are broken into Building Design and Materials, Mechanical Systems, Plumbing Systems, and Electrical Systems.

Utilities Design

The utilities for the maintenance facility are numerous and require close attention to detail. The coordination of the HVAC, electrical, and plumbing systems are critical to the proper function of the Shop and the heart of the facility. Providing an organized installation and design of these systems will make them easier to maintain in the future.

Modules

Each of the building space modules contains information regarding the function of the space, affinities, critical dimension (if any), equipment, furnishings, and finishes related to this operation. Technical considerations for architectural, structural, mechanical, plumbing, and electrical systems are delineated on the facing page. Specific layouts of each area will be developed during detailed design. Note that the equipment and furnishings listed are not intended to be all-inclusive. A detailed equipment list will be developed during the design phases which provides the all-inclusive list of equipment. They will be separated into groups based upon function. A listing of the abbreviations utilized in the text is listed herein.

Abbreviations

A	=	Amperes
AFF	=	Above Finished Floor
ATF	=	Automatic Transmission Fluid
CA	=	Compressed Air
CG	=	Chassis Grease
CNG	=	Compressed Natural Gas
fc	=	Foot Candles
GFI	=	Ground Fault Interrupter
EC	=	Engine Coolant
EO	=	Engine Oil
GO	=	Gear Oil
HO	=	Hydraulic Oil
NG	=	Natural Gas
SF	=	Square Feet
UC	=	Used Coolant
UO	=	Used Oil
VAC	=	Volts AC
VOC	=	Volatile Organic Compound
VCT	=	Vinyl composite tile
W	=	Water
WWF	=	Windshield Washer Fluid
K	=	1,000 Pounds
lb	=	Pound
PSI	=	Pounds per Square Inch

Maintenance Facility Modules

Office / Office Support

Repair Bays

Shop Areas

Shop Support Areas

Storage Areas

Wash Areas

Miscellaneous Exterior Areas

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FLEET MAINTENANCE SHOP

OFFICE / OFFICE SUPPORT

UNIFORM OPERATIONS

FUNCTIONAL CHARACTERISTICS

Function: Secure area for the long term storage of archived files and records, general supplies, equipment, and miscellaneous materials

Office Spaces
- Enclosed Captain's Office (120 sf)
- Lieutenant's Office (64 sf cube/workspace)

Relationship to Other Areas
- Access to all Administration areas
- Access to Appliance Storage
- Proximate to Service Desk and Customer Lounge

Critical Dimensions
- 9'-0" vertical clearance

Equipment/Furnishings
- Steel shelving and racks
- Lockable storage cabinets

Design Features
- Floor: VCT or Carpet
- Walls: Enamel painted masonry
- Acoustical Tile Ceiling: Painted exposed structure ceiling
- Secured entry
- Electrical:
  - Fluorescent or LED lighting, 30 fc average
  - General purpose duplex receptacles, 120 VAC, 20 A as required by code
  - As required by equipment

Sustainable Design Criteria
- Lighting controls: Occupancy sensors
- Lighting designed to meet targeted LEED points

FLEET MAINTENANCE SHOP

REPAIR BAYS

Maintenance Design Group

PM INSPECTION BAY

FUNCTIONAL CHARACTERISTICS

Function: Bay to perform periodic inspections and preventative maintenance on DC Fire and EMS fleet vehicles

Relationship to Other Areas

- Access to Common Work Area, Rebuild Area, Parts Room, Portage Equipment Storage Areas, and Bus Staging

Critical Dimensions

- 19'-0" vertical clearance
- 20'-0" wide by 80'-0" long

Equipment/Furnishings

- Severe use workbench with vise (1 per bay)
- Parts cleaning tank (shared), parts cleaning tank - hot (shared)
- Lubrication reel bank with ATF, EC, and EO at end of bay (shared, 1 each per 2 bays); lower level with CG, GO (at each bay)
- Pit safety covers: Cover entire pit opening
- Air/electric trapeze (shared, 3 per 2 bays)
- Vehicle exhaust (1 per bay)
- Tool box lift from main level to lower level
- Lower level: Severe use workbench with vise, rolling drain pans for used oil and used coolant, manlift, storage shelving, used fluid storage tanks, pneumatic pumps for used fluid, and filter storage rack

Design Features

- Drive through configuration or pull-in/back-out configuration
- Open area in lower level
- Provide two exit stairs from lower level

Sustainable Design Criteria

- Utilize daylighting strategies
- Provide user-adjustable comfort and lighting controls
- Lighting designed to meet targeted LEED points
- In-floor radiant heat

TECHNICAL CONSIDERATIONS

Architectural

- Finishes:
  - Floor: Soil, grease, water, slip resistant concrete with integral non-metallic light reflective hardener, and chemical bonded concrete sealer
  - Walls: Soil and grease resistant, light colored finish
  - Ceiling: Painted exposed structure, light colored finish
- Doors:
  - Personnel door with view panel to meet applicable code exit requirements
  - Exterior overhead doors: High lifting sectional, steel, insulated, 14'-0" x 14'-0" with view panels, automatic operator, interior and exterior push button controls with lockout on exterior
- Bollards on exterior at jambs of overhead door (2 each)

Structural

- Control joints in floor slab at adequate spacing
- Structure as needed to support equipment
- Structural slab over lower lever to support larger vehicles
- Structure as needed to support lubrication reels

Mechanical

- Wall mounted or overhead vehicle exhaust system with exhaust hose on a motorized reel with integral exhaust fan and automatic fan switch
- As required by equipment
- Radiant heating system (each bay)
- General ventilation with sufficient ventilation in lower level areas and as required by codes to prevent accumulation of explosive mixtures

Plumbing

- Trench drain with removable cover to sediment and oil interceptor (1 each)
- Trench drain in lower level to sediment and oil inceptor
- Lube reel banks with ATF, EC, and EO at end of bay(shared, 1 each per 2 bays), CG, GO at lower level in pits (2 each per bay)
- 3/4" water hose bibb with standard faucet at rear of bay 2'-0" AFF (1 per 3 bays)
- Compressed air:
  - Main line looped
  - Compressed air drops with cut-off valve, union separator, regulator with gauge, lubricator, and quick disconnects on 4'-0" AFF
  - Provide disconnects for 1/2" and 1" impact tools at locations to be determined during detailed design
  - As required by equipment
- As required by equipment

Electrical

- Lighting:
  - Fluorescent or LED lighting, 50 fc average fixtures located to illuminate work spaces and around the vehicles.
  - Explosion proof fluorescent, along ceiling in pit area, 70 fc
- Power:
  - All receptacles and outlets at 3'-6" AFF
  - General-purpose duplex receptacles, 120 VAC, 20 A, GFI protected on walls, columns, and between OH doors
  - Air/electric drop "trapeze" mounted double duplex receptacles, 120 VAC, 20 A GFI protected, between bays (at mid bay)
  - Dedicated computer receptacle, 120 VAC, 20 A adjacent to data conduit
  - As required by equipment
- Communications:
  - Paging/intercom system speakers

REPAIR BAY, LIGHT DUTY

FUNCTIONAL CHARACTERISTICS

Function: Perform general repair and maintenance on vehicles less than 1 ton. Includes SUVs, Pick-up Trucks, Vans, and Off-Road vehicles.

Relationship to Other Areas

- Access to Common Work Area, Rebuild Area, Parts Room, Portable Equipment Storage Areas, Vehicle Staging, Maintenance Office areas, and Manuals Library

Critical Dimensions

- 18'-0" vertical clearance to structure and light fixtures
- 16'-0" wide by 35'-0" long

Equipment/Furnishings

- Severe use workbench with vise (1 per bay)
- Parts cleaning tank (shared)
- Lubrication reel bank with ATF, CG, EC, EO, GO at end of bay (shared 1 per 2 bays)
- Vehicle exhaust (1 per bay)
- Above-ground 2-post or in-ground lift (1 per bay)

Design Features

- Drive-through configuration or pull-in/back-out configuration

Sustainable Design Criteria

- Utilize day lighting strategies
- Provide user-adjustable comfort and lighting controls
- Lighting designed to meet targeted LEED points

TECHNICAL CONSIDERATIONS

Architectural

- Finishes:
  - Floor: Soil, grease, water, slip resistant concrete with integral non-metallic light reflective hardener, and chemical bonded concrete sealer
  - Walls: Soil and grease resistant, light colored finish
  - Ceiling: Painted exposed structure, light colored finish
- Doors:
  - Personnel door with view panel to meet applicable code exit requirements
  - Exterior overhead doors: High-lifting sectional, steel, insulated, 12'-0" x 12'-0" feet with view panels, automatic operator, interior and exterior push button controls with lockout on exterior
  - Bollards on exterior at jambs of overhead door (2 each)

Structural

- Control joints in floor slab at adequate spacing
- Structure as needed to support equipment
- Structure as needed to support lubrication reels, exhaust reels
- Structure to support in-ground lift OR surface mounted lift

Mechanical

- Wall mounted or overhead vehicle exhaust system with exhaust hose on a motorized reel with integral exhaust fan and automatic fan switch
- As required by equipment
- Radiant heating system (each bay)
- General ventilation with sufficient ventilation in lower areas and as required by codes to prevent accumulation of explosive mixtures

Plumbing

- Trench drain at overhead door with removable cover to sediment and oil interceptor (1 each)
- Lubrication reel bank with ATF, CG, EC, EO, and GO at end of bay (shared 1 per two bays bay)
- 3/4" water hose bib with standard faucet at rear of bay 2'-0" AFF (1 per 3 bays)
- Compressed air:
  - Main line looped
  - Compressed air drops with cut-off valve, union separator, regulator with gauge, lubricator, and quick disconnects on 4'-0" AFF
  - Provide disconnects for 1/2" and 1" impact tools at locations to be determined during detailed design
  - As required by equipment
- As required by equipment

Electrical

- Lighting: Fluorescent or LED lighting, 50 fc average, fixtures located to illuminate work spaces and around the vehicles
- Power:
  - All receptacles and outlets at 3'-6" AFF
  - General-purpose duplex receptacles, 120 VAC, 20 A, GFI protected, on walls, columns, and between overhead doors
  - Welding outlet centrally located 208 VAC, 1 phase, 50 A and 480 VAC, 3 phase, 30 A (shared 1 per 3 bays)
  - Dedicated computer receptacle, 120 VAC, 20 A, adjacent to computer conduit
  - As required by equipment
- Communications:
  - Paging/intercom system speakers
- Computer conduit on columns at each bay

REPAIR BAY, HEAVY DUTY

FUNCTIONAL CHARACTERISTICS

Function: Perform general repair and maintenance on DC FEMS heavy vehicle fleet. Includes Heavy Trucks, Medium Trucks, Buses, and Trailers.

Relationship to Other Areas
- Access to Common Work Area, Rebuild Area, Parts Room, Portable Equipment Storage Areas, Vehicle Parking/ Storage, Maintenance Office areas, and Manuals Library

Critical Dimensions
- 19'-0" vertical clearance to structure and fixtures
- 20'-0" wide by 50'-0" long

Equipment/Furnishings
- Severe use workbench with vise (1 per bay)
- Parts cleaning tank (shared)
- Lubrication reel bank with ATF, HO, EC, and EO at end of bay and CG, GO at mid bay (shared, 1 per 2 bays)
- Air/electric trapeze (shared, 3 per 2 bays)
- Vehicle exhaust (1 per bay)
- 2-post in-ground lift, mobile column lifts, parallelogram lift (1 type per bay)
- Bridge crane

Design Features
- Drive-through configuration or pull-in/back-out configuration

Sustainable Design Criteria
- Utilize day lighting strategies
- Provide user-adjustable comfort and lighting controls
- Lighting designed to meet targeted LEED points

TECHNICAL CONSIDERATIONS

Architectural
- Finishes:
  - Floor: Soil, grease, water, slip resistant concrete with integral non-metallic light reflective hardener, and chemical bonded concrete sealer
  - Walls: Soil and grease resistant, light colored finish
  - Ceiling: Painted exposed structure, light colored finish
- Doors:
  - Personnel door with view panel to meet applicable code exit requirements
  - Exterior overhead doors: High-lifting sectional, steel, insulated, 14'-0" x 14'-0" with view panels, automatic operator, interior and exterior push button controls with lockout on exterior
  - Bollards on exterior at jambs of overhead door (2 each)

Structural
- Control joints in floor slab at adequate spacing
- Structure as needed to support equipment
- Structure as needed to support lubrication reels, exhaust reels, bridge crane, and air/electric trapeze

Mechanical
- Wall mounted or overhead vehicle exhaust system with exhaust hose on a motorized reel with integral exhaust fan and automatic fan switch
- As required by equipment
- Radiant heating system (each bay)
- General ventilation with sufficient ventilation in lower level areas and as required by codes to prevent accumulation of explosive mixtures

Plumbing
- Trench drain at overhead door with removable cover to sediment and oil interceptor (1 each)
- Lubrication reel bank with ATF, EC, HO and EO at end of bay and CG, GO at mid bay (shared, 1 per 2 bays)
- 3/4" water hose bibb with standard faucet at rear of bay 2'-0" AFF (1 per 3 bays)
- Compressed air:
  - Main line looped
  - Compressed air drops with cut-off valve, union separator, regulator with gauge, lubricator, and quick disconnects on 4'-0" AFF
  - Provide disconnects for 1/2" and 1" impact tools at locations to be determined during detailed design
  - As required by equipment
- As required by equipment

Electrical
- Lighting: Fluorescent or LED lighting, 50 fc average, fixtures located to illuminate work spaces and around the vehicles
- Power:
  - All receptacles and outlets at 3'-6" AFF
  - General-purpose duplex receptacles, 120 VAC, 20 A, GFI protected on walls, columns, and between overhead doors
  - Welding outlet centrally located 208 VAC, 1 phase, 50 A and 480 VAC, 3 phase, 30 A (shared 1 per 3 bays)
  - Air/electric drop "trapeze" mounted double duplex receptacles, 120 VAC, 20 A, GFI protected, between bays (at mid bay)
  - Dedicated computer receptacle, 120 VAC, 20 A, adjacent to data conduit
  - As required by equipment
- Communications:
  - Paging/intercom system speakers
  - Data conduit on columns at each bay

REPAIR BAY, AMBULANCE

FUNCTIONAL CHARACTERISTICS

Function: Perform general repair and maintenance on DC FEMS ambulance fleet.

Relationship to Other Areas
- Access to Common Work Area, Rebuild Area, Parts Room, Portable Equipment Storage Areas, Vehicle Staging, Maintenance office areas, and Manuals Library

Critical Dimensions
- 19'-0" vertical clearance
- 16'-0" wide by 40'-0" long (Ambulance bays)

Equipment/Furnishings
- Severe use workbench with vise (1 per bay)
- Parts cleaning tank (shared)
- Lubrication reel bank with ATF, EC, and EO at end of bay and CG, GO at mid bay (shared, 1 per 2 bays)
- Air/electric trapeze (shared, 3 per 2 bays)
- Vehicle exhaust (1 per bay)
- Mix of axle engaging scissor lifts, portable lifts and parallelogram lifts for maximum flexibility
- Three-ton overhead bridge crane at apparatus ladder bays

Design Features
- Drive-through configuration or pull-in/back-out configuration

Sustainable Design Criteria
- Utilize day lighting strategies
- Provide user-adjustable comfort and lighting controls
- Lighting designed to meet targeted LEED points
- In-floor radiant heat

TECHNICAL CONSIDERATIONS

Architectural
- Finishes:
  - Floor: Soil, grease, water, slip resistant concrete with integral non-metallic light reflective hardener, and chemical bonded concrete sealer
  - Walls: Soil and grease resistant, light colored finish
  - Ceiling: Painted exposed structure, light colored finish
- Doors:
  - Personnel door with view panel to meet applicable code exit requirements
  - Exterior overhead doors: High lifting sectional, steel, insulated, 14'-0" x 14'-0" with view panels, automatic operator, interior and exterior push button controls with lockout on exterior
  - Bollards on exterior at jambs of overhead door (2 each)

Structural
- Control joints in floor slab at adequate spacing
- Structure as needed to support equipment
- Structure as needed to support lubrication reels, exhaust reels, and air/electric trapeze

Mechanical
- Wall mounted or overhead vehicle exhaust system with exhaust hose on a motorized reel with integral exhaust fan and automatic fan switch
- As required by equipment
- Radiant heating system (each bay)
- General ventilation with sufficient ventilation in lower level areas and as required by codes to prevent accumulation of explosive mixtures

Plumbing
- Trench drain at overhead door with removable cover to sediment and oil interceptor (1 each)
- Lubrication reel bank with ATF, EC, HO and EO at end ofbay and CG, GO at mid bay (shared, 1 per 2 bays)
- 3/4" water hose bib with standard faucet at rear of bay 2'-0" AFF (1 per 3 bays)
- Compressed air:
  - Main line looped
  - Compressed air drops with cut-off valve, union separator, regulator with gauge, lubricator, and quick disconnects on 4'-0" AFF
  - Provide disconnects for 1/2" and 1" impact tools at locations to be determined during detailed design
  - As required by equipment
- As required by equipment

Electrical
- Lighting: Fluorescent or LED lighting, 50 fc average fixtures located to illuminate work spaces and around vehicles
- Power:
  - All receptacles and outlets at 3'-6" AFF
  - General-purpose duplex receptacles, 120 VAC, 20 A, GFI protected on walls, columns, and between overhead doors
  - Welding outlet centrally located 208 VAC, 1 phase, 50 A and 480 VAC, 3 phase, 30 A (shared 1 per 3 bays)
  - Air/electric drop "trapeze" mounted double duplex receptacles, 120 VAC, 20 A, GFI protected, between bays (at mid bay)
  - Dedicated computer receptacle, 120 VAC, 20 A, adjacent to data conduit
  - As required by equipment
- Communications:
  - Paging/intercom system speakers
  - Data conduit on columns at each bay

REPAIR BAY, HEAVY DUTY, FIRE APPARATUS

FUNCTIONAL CHARACTERISTICS

Function: Perform general repair and maintenance on DC FEMS fire apparatus vehicle fleet

Relationship to Other Areas
- Access to Common Work Area, Rebuild Area, Parts Room, Portable Equipment Storage Areas, Vehicle Parking/ Storage, Maintenance Office areas, and Manuals Library

Critical Dimensions
- 19'-0" vertical clearance to structure and fixtures OR hook of bridge crane above
- 22'-0" wide by 50'-0" long (engine bays)
- 22'-0" wide by 80'-0" long (ladder bays)

Equipment/Furnishings
- Severe use workbench with vise (1 per bay)
- Parts cleaning tank (shared)
- Lubrication reel bank with ATF, EC, HO and EO at end of bay and CG, GO at mid bay (shared, 1 per 2 bays)
- Air/electric trapeze (shared, 3 per 2 bays)
- Vehicle exhaust (1 per bay)
- 2-post in-ground lift, mobile column lift, 4 or 6 post (1 per bay)
- Bridge crane; 3 ton at ladder bays

Design Features
- Drive-through configuration or pull-in/back-out configuration

Sustainable Design Criteria
- Utilize day lighting strategies
- Provide user-adjustable comfort and lighting controls
- Lighting designed to meet targeted LEED points
- Radiant heat

TECHNICAL CONSIDERATIONS

Architectural
- Finishes:
  - Floor: Soil, grease, water, slip resistant concrete with integral non-metallic light reflective hardener, and chemical bonded concrete sealer
  - Walls: Soil and grease resistant, light colored finish
  - Ceiling: Painted exposed structure, light colored finish
- Doors:
  - Personnel door with view panel to meet applicable code exit requirements
  - Exterior overhead doors: High-lifting sectional, steel-insulated, 14'-0" x 14'-0" with view panels, automatic operator, interior and exterior push button controls with lockout on exterior
  - Bollards on exterior at jambs of overhead door (2 each)

Structural
- Control joints in floor slab at adequate spacing
- Structure as needed to support equipment
- Structure as needed to support lubrication reels, exhaust reels, bridge crane, and air/electric trapeze

Mechanical
- Wall mounted or overhead vehicle exhaust system with exhaust hose on a motorized reel with integral exhaust fan and automatic fan switch
- As required by equipment

Plumbing
- Trench drain at overhead door with removable cover to sediment and oil interceptor (1 each)
- Lubrication reel bank with ATF, EC, HO and EO at end of bay and CG, GO at mid bay (shared, 1 per 2 bays)
- 3/4" water hose bib with standard faucet at rear of bay 2'-0" AFF (1 per 3 bays)
- Compressed air:
  - Compressed air drops with cut-off valve, union separator, regulator with gauge, lubricator, and quick disconnects on 4'-0" AFF
  - Provide disconnects for 1/2" and 1" impact tools at locations to be determined during detailed design
  - As required by equipment

Electrical
- Lighting: Fluorescent or LED lighting, 70 fc average, fixtures located to illuminate work spaces and around the vehicles
- Power:
  - All receptacles and outlets at 3'-6" AFF
  - General-purpose duplex receptacles, 120 VAC, 20 A, GFI protected on walls, columns, and between overhead doors
  - Welding outlet centrally located 230 VAC, 1 phase, 50 A (shared 1 per 3 bays)
  - Air/electric drop "trapeze" mounted double duplex receptacles, 120 VAC, 20 A, GFI protected, between bays (at mid bay)
  - Dedicated computer receptacle, 120 VAC, 20 A, adjacent to data conduit
  - As required by equipment
- Communications:
  - Paging/intercom system speakers

REPAIR BAY, BODY BAY

FUNCTIONAL CHARACTERISTICS

Function: Perform body and paint repair work on DC FEMS vehicle fleet

Relationship to Other Areas
- Access to Parts Room and other Repair Bays and Shops

Critical Dimensions
- 22'-0" wide by 80'-0" long

Equipment/Furnishings
- Severe use workbench with vise (1 per bay)
- Portable Lifts
- Open Face Paint Booth
- Portable Dust Collection System
- A/E trapeze with vacuum/dust collection attachments

Design Features
- Drive-through configuration/pull-in/back-out configuration
- Physically separated from other areas to prevent migration of noise, dirt and fumes, if possible

Sustainable Design Criteria
- Utilize day lighting strategies
- Provide user-adjustable comfort and lighting controls
- Lighting designed to meet targeted LEED points

TECHNICAL CONSIDERATIONS

Architectural
- Finishes
  - Floor: Soil, grease, water, slip resistant concrete with integral non-metallic light reflective hardener and chemical bonded concrete sealer
  - Walls: Soil and grease resistant, light colored finish
  - Ceiling: Painted exposed structure, light colored finish
- Doors
  - Personnel door with view panel to meet applicable code exit requirements.
  - Exterior overhead doors: high lifting sectional, steel, insulated, 14'-0" x 14'-0" feet with view panels, automatic operator, interior and exterior push button controls with lockout on exterior
  - Bollards on exterior at jambs of overhead door (2 each)

Structural
- Control joints in floor slab at adequate spacing
- Structure as needed to support equipment

Mechanical
- As required by equipment

Plumbing
- Trench drain with removable cover to sediment and oil interceptor (1 each)
- 3/4" water hose bibb with standard faucet at rear of bay 2'-0" AFF (1 per 3 bays)
- Compressed air
  - Main line looped
  - Compressed air drops with cut-off valve, union separator, regulator with gauge, lubricator, and quick disconnects on 4'-0" AFF
  - Provide disconnects for 1/2" and 1" impact tools at locations to be determined during detailed design
  - As required by equipment
- As required by equipment

Electrical
- Lighting: Fluorescent or LED lighting, 50 fc average, fixtures located to illuminate work spaces and around the vehicles
- Power
  - All receptacles and outlets at 3'-6" AFF
  - General-purpose duplex receptacles, 120 VAC, 20 A, GFI protected on walls, columns, and between overhead doors
  - Air/electric drop "trapeze" mounted double duplex receptacles, 120 VAC, 20 A GFI protected between bays (at mid bay)
  - Welding outlets, 208 VAC, 1 phase, 50 A and 480 VAC, 3 phase, 30 A at 3'-6" AFF
  - Dedicated computer receptacle, 120 VAC, 20 A adjacent to data conduit
  - As required by equipment
- Communications
  - Paging/intercom system speakers
  - Data conduit on columns at each bay

FLEET MAINTENANCE SHOP

SHOP AREAS

Maintenance Design Group

COMMON WORK AREA

FUNCTIONAL CHARACTERISTICS

Function: Designated area for common fixed shop which supports all repair bays and associated shop areas

Relationship to Other Areas
- Access from Maintenance office areas
- Adjacent to Repair and PM/Inspection Bays, Parts Storeroom, Welding Shop/Storage, and Portable Equipment Storage

Critical Dimensions
- 14'-0" to any obstruction

Equipment/Furnishings
- Severe use workbench(es) with vise and parts washer
- Buffer grinder with dust collector
- Hydraulic press
- Drill press
- Abrasive blast cabinet
- Horizontal bandsaw
- Cut-off saw

Design Features
- Half-height 54" walls on 3 sides for utilities and to prevent blocking vision of shop from office areas
- Forklift access

Sustainable Design Criteria
- Utilize daylighting strategies
- Provide user-adjustable comfort and lighting controls
- Natural ventilation
- Lighting designed to meet targeted LEED points

TECHNICAL CONSIDERATIONS

Architectural
- Finishes
  - Floor: Soil, grease, water, slip resistant concrete with integral non-metallic, light reflective hardener, and chemical bonded sealer
  - Walls: Soil and grease resistant, light colored finish
  - Ceiling: Painted exposed structure, light colored finish
- Doors: None

Structural
- Control joints in floor slab at adequate spacing
- Structure as needed to support equipment

Mechanical
- General ventilation
- As required by equipment

Plumbing
- Compressed air drop:
  - Cut-off valve, union, filter, regulator with gauge, lubricator, and quick disconnect at 4'-0" AFF
  - Provide disconnects for 1/2" and 1" impact tools
- Water: 3/4" water hose bibb with standard hose bibb at 24" AFF
- As required by equipment

Electrical
- Lighting: Fluorescent or LED lighting, 50 fc average, local switching, fixture located to illuminate work spaces
- Power:
  - General purpose duplex receptacles, 120 VAC, 20 A, GFI protected on walls at 3'-6" AFF as required by code
  - As required by equipment
- Communications:
- Paging/intercom system speakers

GENERAL SHOPS (APPLIANCE, SMALL TOOL, MACHINE)

FUNCTIONAL CHARACTERISTICS

Function: Enclosed secure shop and materials storage

Relationship to Other Areas
- Access to all Restroom/Showers, Break Room, Administrative office areas

Critical Dimensions
- 14'-0" vertical clearance

Equipment/Furnishings
- Severe use workbench with vise
- Storage shelving and racks
- Arm racks

Design Features
- Forklift access
- Secure entry
- Access to exterior for deliveries

Sustainable Design Criteria
- Utilize day lighting strategies
- Provide user-adjustable comfort and lighting controls
- Lighting designed to meet targeted LEED points

TECHNICAL CONSIDERATIONS

Architectural
- Finishes:
  - Floor: Soil, grease, water, slip resistant concrete with integral non-metallic light reflective hardener, and chemical bonded concrete sealer
  - Walls: Soil and grease resistant, light colored finish
  - Ceiling: Painted exposed structure, light colored finish
- Doors:
  - Personnel door with view panel to meet applicable code exit requirements
  - Exterior overhead doors: High speed roll up, 10'-0" x 10'-0", automatic operator, interior and exterior push button controls with lockout on exterior.
  - Bollards on exterior at jambs of overhead door (2 each)

Structural
- Control joints in floor slab at adequate spacing
- Structure as needed to support equipment

Mechanical
- As required by equipment

Plumbing
- Water hose bib, 3/4" with standard faucet, 2'-0" AFF
- Compressed air:
  - Main line looped
  - Compressed air drops; cut off valve, union, separator, regulator with gauge, lubricator, and quick disconnect, 4'-0" AFF
  - Provide 1/2" and 1" impact tools at locations to be determined during detailed design
- As required by equipment

Electrical
- Lighting: Fluorescent or LED lighting, 30 fc average, fixtures located to illuminate work spaces and storage area
- Power:
  - All receptacles and outlets at 3'-6" AFF
  - General-purpose duplex receptacles, 120 VAC, 20 A, GFI protected on walls, columns, and between OH doors as required by code
  - As required by equipment
- Communications: Paging/intercom system speakers

WELDING AND FABRICATION SHOP

FUNCTIONAL CHARACTERISTICS

Function: Designated shop area for maintaining and welding components used on vehicles (including storage of welding materials)

Relationship to Other Areas
- Adjacent to Repair Positions
- Access to Common Work Area and other shop spaces

Critical Dimensions
- 19'-0" vertical clearance

Equipment/Furnishings
- Severe use workbench with vise
- Layout table
- Steel storage
- Welding table
- Welders
- Welding screens
- Buffer/grinder
- Drill press
- Lathe
- Bandsaw
- Welding fume extractor
- Gas storage cages

Design Features
- Forklift access

Sustainable Design Criteria
- Utilize daylighting strategies
- Natural ventilation
- Lighting designed to meet targeted LEED points

TECHNICAL CONSIDERATIONS

Architectural
- Finishes:
  Floor: Soil, grease, water, slip resistant concrete with integral non-metallic, light reflective hardener, and chemical bonded sealer
  Walls: Soil and grease resistant, light colored finish
  Ceiling: Painted exposed structure, light colored finish
- Doors:

Personnel door with view panel to meet applicable code exit requirements
Double 3'-0" metal door
Exterior overhead door: High-lifting sectional, steel, insulated, 12'-0" x 12'-0" with view panels, automatic operator, interior and exterior push button controls, and lockout on exterior
Interior overhead door: Coiling steel, 10'-0" x 12'-0" door, automatic opener, push button controls

Structural
- Control joints in floor slab at adequate spacing
- Structure as needed to support equipment
- Structure to support welding fume extraction system

Mechanical
- Special ventilation as required by welding equipment, welding fume extraction arm
- As required by equipment

Plumbing
- 3/4" water hose bib with standard faucet at rear of bay 2'-0" AFF
- Compressed air line with cut-off valve, separator, regulator with gauge, lubricator, and quick disconnect at 4'-0" AFF
- Provide disconnects for 1/2" and 1" impact tools at locations to be determined during detailed design
- As required by equipment

Electrical
- Lighting:

Fluorescent lighting, 70 fc average, local switching controlled by natural light
Lighting design to meet targeted LEED points to minimize need for task lighting
- Power:

Welding outlets, 208 VAC, 1 phase, 50 A and 480 VAC, 3 phase, 30 A at 3'-6" AFF
General purpose duplex receptacles, 120 VAC, 20 A, GFI protected, on walls at 3'-6" AFF
As required by equipment
Communications: Paging/intercom system speakers

TIRE SHOP

FUNCTIONAL CHARACTERISTICS

Function: Repair, changing, and balancing of tires

Relationship to Other Areas
- Access to Parts Storage
- Adjacent to Repair Bays and Tire Storage Areas

Critical Dimensions
- 14'-0" vertical clearance

Equipment/Furnishings
- Severe-use workbench with vise
- Air/hydraulic floorjack
- Inflation cage
- Truck tire changer
- Auto tire changer
- Tire balancer
- Tire spreader

Design Features
- Forklift access
- Secure entry
- Access to exterior for deliveries
- Physically separated from other areas to prevent migration of noise, dirt, and fumes, if possible

Sustainable Design Criteria
- Utilize day lighting strategies
- Provide user-adjustable comfort and lighting controls
- Lighting designed to meet targeted LEED points

TECHNICAL CONSIDERATIONS

Architectural
- Finishes:
  - Floor: Soil, grease, water, slip resistant concrete with integral non-metallic light reflective hardener, and chemical bonded concrete sealer
  - Walls: Soil and grease resistant
  - Ceiling: Painted exposed structure
- Doors: None

Structural
- Structure as needed to support equipment

Mechanical
- As required by equipment

Plumbing
- Compressed air:
  - Main line looped
  - Compressed air drops with cut-off valve, union separator, regulator with gauge, lubricator, and quick disconnects on 4'-0" AFF
  - Provide disconnects for 1/2" and 1" impact tools at locations to be determined during detailed design
  - As required by equipment
- As required by equipment

Electrical
- Lighting: Sealed metal halide lighting fixtures with no external reset device, 70 fc OR fluorescent or LED lighting, 50 fc average, local switching, fixtures to illuminate workspace
- Power:
  - All receptacles and outlets at 3'-6" AFF
  - General-purpose duplex receptacles, 120 VAC, 20 A, GFI protected, on walls at 3'-6" AFF
  - Dedicated computer receptacle, 120 VAC, 20 A, adjacent to data conduit
  - As required by equipment
- Communications:
  - Paging/intercom system speakers

FLEET MAINTENANCE SHOP

SHOP SUPPORT AREAS

Maintenance Design Group

HAND WASH / EYE WASH / DRINKING FOUNTAIN

FUNCTIONAL CHARACTERISTICS

Function: Dedicated area for hand wash sink, eye wash and shower station, and a drinking fountain

Relationship to Other Areas
- Accessible from all Repair and Shop areas

Critical Dimensions
- 12'-0" vertical clearance

Equipment/Furnishings
- Deep stainless steel sink
- Eye wash and shower station
- Drinking foundation

Design Features
- Floor: Exposed concrete floor
- Walls: Enamel painted masonry
- Ceiling: Painted exposed structure ceiling
- Plumbing:
  - Floor drain
  - As required by code and equipment
- Electrical:
  - Fluorescent or LED lighting
  - Route conduit from above
  - General purpose duplex receptacles, 120 VAC, 20 A, GFI protected on walls at 3'-6" AFF as required by equipment and code
  - As required by equipment, receptacles/disconnects on walls

Sustainable Design Criteria
- Utilize day lighting strategies
- Provide user-adjustable comfort and lighting controls
- Lighting designed to meet targeted LEED points

LUBE / COMPRESSOR ROOM

FUNCTIONAL CHARACTERISTICS

Function: Enclosed room for storage and central distribution of lubricants, including, automatic transmission fluid (ATF), chassis grease (CG), diesel exhaust fluid (DEF), engine oil (EO), gear oil (GO), hydraulic oil (HO), used oil (UC), used oil (UO), and Windshield Washer Fluid (WWF); Space shall include a compressor(s) and refrigerated air dryer(s).

Relationship to Other Areas
- Access to exterior for deliveries
- Acoustically and physically separated from other areas to prevent migration of noise, dirt, and fumes

Critical Dimensions
- 14'-0" to any obstruction

Equipment/Furnishings
- Above grade fluid storage tanks, air piston and diaphragm pumps; ATF, DEF, EC, EO, GO, HO, UC, and UO stored in above double wall ground tanks, CG stored in drums, and WWF stored in a poly tank
- Duplex air compressor
- Refrigerated air dryer
- Water deionization station

Design Features
- Exterior access for deliveries

Sustainable Design Criteria
- Provide user-adjustable comfort and lighting controls
- Lighting controls: Occupancy sensors
- Lighting designed to meet targeted LEED points

TECHNICAL CONSIDERATIONS

Architectural
- Finishes:
  Floor: Soil, grease, water, slip resistant concrete with integral non-metallic light reflective hardener, and chemical bonded concrete sealer
  Walls: Soil and grease resistant, light colored finish
  Ceiling: Painted exposed structure, light colored finish
- Doors:
  Personnel door to meet applicable code exit requirements
  Double 3'-0" wide hollow metal door with interior exit device
  No thresholds

Structural
- Control joints in floor slab at adequate spacing
- Housekeeping pad for both the air compressor and refrigerated air dryer
- Structure as needed to support equipment

Mechanical
- Maintain temperature range at 60 to 80 degrees F
- As required by equipment

Plumbing
- 3/4" water hose bib with standard faucet 2'-0" AFF
- Compressed air line with cut-off valve, separator, regulator with gauge, lubricator, and quick disconnect on wall at 4'-0" AFF for each lubricant pump
- Tank mount all piston lubricant pump(s)
- Wall mount all diaphragm pump(s)
- CG pump mounted to an air operated hoist
- Water tank with float valve for water to EC diaphragm pump
- Plumb ATF, CG, DEF, EC, EO, GO, HO, and WWF tanks to corresponding lube reel banks located in the Repair Bays; Size for 2 reels to be used at the same time
- Plumb UO and UC tanks to corresponding pumps located in the Repair Bays
- Fill ports on the exterior of the building plumbed to each tank

Electrical
- Lighting: Fluorescent or LED lighting, 50 fc average, local switching
- Power:
  - General purpose duplex receptacles, 120 VAC, 20A, GFI protected on walls at 3'-6" AFF as required by code
    As required by equipment

FLEET MAINTENANCE SHOP

STORAGE AREAS

Maintenance Design Group

TIRE STORAGE, ENCLOSED

FUNCTIONAL CHARACTERISTICS

Function: Secure area dedicated to storage of new tires

Relationship to Other Areas
- Adjacent to the Tire Shop
- Adjacent to the Tire Bay or Repair Bays

Critical Dimensions
- 22'-0" vertical clearance for tire storage carousel, 19'-0" (without)

Equipment/Furnishings
- Tire racks
- Tire storage carousel

Design Features
- Floor: Exposed sealed concrete slab
- Walls: Soil and grease resistant, enamel painted masonry walls
- Secure area, wire mesh enclosure (if required to secure)
- Electrical:
  - Fluorescent lighting, 30 fc average
  - General purpose duplex receptacles, 120 VAC, 20 A, GFI protected as required by code and for charging equipment.
- Exterior access for deliveries, 10'-0" x 10'-0" high lift overhead door

Sustainable Design Criteria
- Utilize day lighting strategies
- Provide user-adjustable comfort and lighting controls
- Lighting designed to meet targeted LEED points

USED TIRE STORAGE, COVERED

FUNCTIONAL CHARACTERISTICS

Function: Covered area dedicated to storage of used tires.

Relationship to Other Areas
- Adjacent to the Tire Shop
- Adjacent to the Tire Bay or Repair Bays

Critical Dimensions
- 14'-0" vertical clearance

Equipment/Furnishings
- Tire racks

Design Features
- Floor: Exposed concrete slab
- Walls: Soil and grease resistant, enamel painted masonry walls
- Secure area, wire mesh enclosure (if required to secure)
- Electrical:
  - Fluorescent lighting, 30 fc average
  - General purpose duplex receptacles, 120 VAC, 20 A, GFI protected as required by code and for charging equipment.

Sustainable Design Criteria
- Lighting designed to meet targeted LEED points

PORTABLE EQUIPMENT STORAGE

FUNCTIONAL CHARACTERISTICS

Function: A dedicated area for storage of portable shop equipment

Relationship to Other Areas
- Access to PM/Inspection Bays and all shop areas
- Adjacent to Repair Bays

Critical Dimensions
- 12'-0" vertical clearance

Equipment/Furnishings
- Portable equipment including but no limited to: Service jacks, bottle jacks, jacks stands, ladders, diagnostic equipment, used fluid drain pans, battery chargers, work platforms, welders, welding screens, etc.

Design Features
- Floor: Soil, grease, water, slip resistant concrete with integral non-metallic light reflective hardener, and chemical bonded concrete sealer
- Electrical:
  - Mounted at 3'-6" AFF
  - Route conduit from above
  - General purpose duplex receptacles, 120 VAC, 20 A, GFI protected on walls as required by code

Sustainable Design Criteria
- Utilize day lighting strategies
- Provide user-adjustable comfort and lighting controls
- Lighting designed to meet targeted LEED points

AERIAL LADDER STORAGE

FUNCTIONAL CHARACTERISTICS

Function: Area for storage of aerial ladders

Relationship to Other Areas
- Access to the Repair Bays and Shops
- Adjacent to the Apparatus- Ladder Repair Bay

Critical Dimensions
- 9'-0" vertical clearance

Equipment/Furnishings
- Cantilever Racks
- Overhead Crane

Design Features
- Floor: Soil, grease, water, slip resistant concrete with integral non-metallic light reflective hardener, and chemical bonded concrete sealer
- Walls: Enamel painted masonry
- Ceiling: Painted exposed structure ceiling
- Electrical:
  - Fluorescent or LED lighting, 30 fc average
  - As required by equipment

Sustainable Design Criteria
- Lighting controls: Occupancy sensors
- Lighting designed to meet targeted LEED points

APPLIANCE STORAGE

FUNCTIONAL CHARACTERISTICS

Function: Covered secure area for FD appliances including: Hose (Multiple diameters & section lengths), Hard Sleeve Hose/ Strainers, Humat (Hydrant) Valves, Hydrant/Spanner Wrenches, Adapters/Reducers, Nozzles (Multiple Styles/GPM's), Extension Ladders (Multiple lengths/sections), Step Ladders, Assorted Small Hand Tools, Haligan Bars, Ax (Flat & Pick Head), Pike Poles & Hooks, Fans, Portable Generators, Portable Lights, Cord Reels, Thermal Imaging Cameras, and Safety Vests.

Relationship to Other Areas
- Adjacent to Shop areas
- Adjacent to Uniform Operations

Critical Dimensions
- 16'-0" vertical clearance

Equipment/Furnishings
- Metal shelving and racks
- Metal pallet racks
- Lockable Storage Cabinets
- Cantilever Racks (ladders)

Design Features
- Floor: Exposed concrete slab
- Walls: Soil and grease resistant, wire mesh, or chain link.
- Ceiling: Painted exposed structure
- Doors: 10'-0" wide lockable gate
- Secure area
- Electrical:
  - Fluorescent or LED lighting, 30 fc average
  - General purpose duplex receptacles, 120 VAC, 20 A, GFI protected as required by Electrical Code and required for charging equipment.

Sustainable Design Criteria
- Lighting designed to meet targeted LEED points

TOOLBOX STORAGE

FUNCTIONAL CHARACTERISTICS

Function: Dedicated area for the storage of each Mechanic's personal toolbox

Relationship to Other Areas
- Case specific
- Access to Component Change Out (CCO) Bays. And all repair and shop areas

Critical Dimensions
- 12'-0" vertical clearance

Design Features
- Floor: Soil, grease, water, slip resistant concrete with integral non-metallic light reflective hardener, and chemical bonded concrete sealer
- Walls: Enamel painted masonry,
- Ceiling: Painted exposed structure ceiling
- Electrical:
  - Mounted at 3'-6" AFF
  - Route conduit from above
  - General purpose duplex receptacles, 120 VAC, 20 A, GFI protected, on walls as required by code

Sustainable Design Criteria
- Utilize day lighting strategies
- Provide user-adjustable comfort and lighting controls
- Lighting designed to meet targeted LEED points

UNIFORM STORAGE

FUNCTIONAL CHARACTERISTICS

Function: Secure area for storage and change-out of uniforms

Relationship to Other Areas
- Access to Locker Alcove

Critical Dimensions
- 9'-0" vertical clearance

Equipment/Furnishings
- Secure uniform racks and cabinets

Design Features
- Floors: Carpet or VCT floor covering
- Walls: Acrylic latex-painted masonry and/or metal stud/ gypsum board walls
- Ceiling: Suspended tile ceiling
- Doors:
  Secured entry; single 3'-0" door
- Electrical:
  Fluorescent or LED lighting
  General purpose duplex receptacles, 120 VAC, 20 A, GFI protected as required by code

Sustainable Design Criteria
- Lighting controls: Occupancy sensors
- Lighting designed to meet targeted LEED points

HEATED VEHICLE STORAGE

FUNCTIONAL CHARACTERISTICS

Function: Enclosed secure vehicle storage area for Ambulances and Fire Apparatus

Relationship to Other Areas
- Access to Customer Waiting Room and exterior

Critical Dimensions
- 14'-0" vertical clearance

Equipment/Furnishings
- None

Design Features
- Access to exterior

Sustainable Design Criteria
- Utilize day lighting strategies
- Provide user-adjustable comfort and lighting controls
- Lighting designed to meet targeted LEED points

TECHNICAL CONSIDERATIONS

Architectural
- Finishes:
  Floor: Soil, grease, water, slip resistant concrete with integral non-metallic light reflective hardener, and chemical bonded concrete sealer
  Walls: Soil and grease resistant, light colored finish
  Ceiling: Painted exposed structure, light colored finish
- Doors:
  Personnel door with view panel to meet applicable code exit requirements
  Exterior overhead doors: High-speed roll up, 14'-0" x 14'-0", automatic operator, interior and exterior push button controls with lockout on exterior
- Bollards on exterior at jambs of overhead door (2 each)

Structural
- Control joints in floor slab at adequate spacing
- Floor sloped to trench drain
- Structure as needed to support equipment

Mechanical
- As required by equipment

Plumbing
- Trench drains:
  Run to sediment and oil interceptor
  Parallel with vehicle parking with removable covers
- Water hose bibb, 3/4" with standard faucet, 2'-0" AFF
- Compressed air:
  Main line looped
  Compressed air drops with cut-off valve, union separator, regulator with gauge, lubricator, and quick disconnects on 4'-0" AFF
  Provide disconnects for 1/2" and 1" impact tools at locations to be determined during detailed design
  As required by equipment
- As required by equipment

Electrical
- Lighting: Fluorescent or LED lighting, 30 fc average, fixtures located to illuminate work spaces and storage area
- Power:
  All receptacles and outlets at 3'-6" AFF
  General-purpose duplex receptacles, 120 VAC, 20 A, GFI protected, on walls, columns, and between overhead doors as required by code
  As required by equipment
- Communications: Paging/intercom system speakers

BATTERY ROOM

FUNCTIONAL CHARACTERISTICS

Function: Enclosed and secure area for storage and charging of vehicle batteries

Relationship to Other Areas
- Adjacent to Parts Storage
- Adjacent to Repair Bays

Critical Dimensions
- 12'-0" vertical clearance

Equipment/Furnishings
- Hardwood battery bench
- Battery charger with bar for batteries
- Storage shelving

Design Features
- Provide charging and storage area for batteries
- Sustainable Design Criteria
- Utilize day lighting strategies, occupancy sensors
- Provide user-adjustable comfort and lighting controls
- Lighting designed to meet targeted LEED points

TECHNICAL CONSIDERATIONS

Architectural
- Finishes
  - Floor: Smooth finish concrete with acid resistant epoxy paint
  - Walls: Smooth finish masonry with acid resistant epoxy paint
  - Ceiling: Painted exposed structure, light colored finish
- Doors: Sliding wire mesh or 3'-0" door

Structural
- As required to support equipment

Mechanical
- Adequate ventilation (15 air changes per hour minimum)
- Ductwork and fans to be stainless steel

Plumbing
- Water connection to emergency eye wash/shower
- Combination emergency shower/eye wash with flow switch activated audible alarm
- Acid resistant floor drain and piping to acid dilution tank (if required)

Electrical
- Lighting: LED lighting, 50 fc local switching, fixtures to illuminate workspace
- Power:
  - Weatherproof duplex receptacle, 120 VAC, GFI protected at 3'-6" AFF
  - As required by equipment

PARTS ROOM

FUNCTIONAL CHARACTERISTICS

Function: Dedicated secure area for receiving, storage, and issuing of parts, materials, and specialized tools

Relationship to Other Areas
- Adjacent to the Repair Bays and Shops
- Access to the exterior for deliveries/distribution

Critical Dimensions
- 12'-0" vertical clearance below mezzanine
- 10'-0" vertical clearance on mezzanine
- 20'-0" clear for high bay (pallet storage)

Equipment/Furnishings
- Layout table and desk at receiving
- Storage shelving, racks, and cabinets
- Storage cabinets
- Marker board (at Parts Issue Counter)
- Parts lift, 3,000 lb. capacity
- Forklift access to mezzanine
- Vertical Lift Modules or Stack System

Design Features
- Provide issue counter with stainless steel top and locking slide window
- Provide staging area for shipping/receiving with an overhead door to the exterior of the building
- Forklift access
- Oxygen and acetylene tank storage and battery storage must be provided

Sustainable Design Criteria
- Utilize day lighting strategies
- Provide user-adjustable comfort and lighting controls
- Lighting designed to meet targeted LEED points

TECHNICAL CONSIDERATIONS

Architectural
- Finishes:
  - Sealed and hardened concrete floor
  - Walls: Soil and grease resistant, light colored finish
  - Ceiling: Painted exposed structure, light colored finish
- Removable gate at mezzanine for forklift access
- Doors:
  - Personnel door with view panel to meet applicable code exit requirements
  - Exterior overhead door: High-lifting sectional, steel, insulated, 12'-0" x 12'-0", with view panels, automatic operator, interior and exterior push button controls, and lockout on exterior
  - Interior overhead door, coiling steel, 10'-0" x 12'-0", automatic operator, push button controls

Structural
- Control joints in floor slab at adequate spacing
- Structure as needed to support equipment

Mechanical
- Heat 70 degrees F and air conditioned
- As required by equipment and code

Plumbing
- None

Electrical
- Lighting: Fluorescent or LED lighting, 50 fc average, local switching, fixture located to illuminate work spaces
- Power:
  - General-purpose duplex receptacles, 120 VAC, 20 A, GFI protected, on walls at 3'-6" AFF as required by code
  - Dedicated computer receptacle, 120 VAC, 20 A, adjacent to data cable conduit at parts window and receiving door
  - As required by equipment
- Communications:
  - Paging/intercom system speakers
  - Data outlet and conduit for computer at parts window and receiving door
  - Buzzer at parts window and shipping/receiving door

FLEET MAINTENANCE SHOP

WASH AREAS

Maintenance Design Group

CHASSIS WASH

FUNCTIONAL CHARACTERISTICS

Function: Enclosed bay for washing of DC FEMS vehicle fleet including ambulances and fire apparatus

Relationship to Other Areas
- Access to all other Maintenance areas
- Adjacent to Repair Bays

Critical Dimensions
- 19'-0" vertical clearance
- 25'-0" wide by 80'-0" long

Equipment/Furnishings
- Wash system with hand lances
- Emergency safety shower/eyewash
- Parallelogram lift
- High pressure washer and soap

Design Features
- Drive-through or back-in pull-out configuration
- Recessed are for parallelogram lift
- Physically separated from other areas to prevent migration of noise, dirt, and fumes if possible
- Over sized sump pit for collection of sediment and oil

Sustainable Design Criteria
- Utilize day lighting strategies
- Provide user-adjustable comfort and lighting controls
- Lighting designed to meet targeted LEED points
- Water reclamation system
- Use of rain water for vehicle washing

TECHNICAL CONSIDERATIONS

Architectural
- Finishes:
  - Floor: Soil, grease, water, slip resistant concrete with chemical bonded concrete sealer
  - Walls: Soil and grease resistant, light colored finish
  - Ceiling: Painted exposed structure, light colored finish
- Doors:
  - Personnel doors with view panels to meet applicable code exit requirements
  - Exterior overhead door: Air operated, high lifting sectional, polycarbonate, 14'-0" x 14'-0" with view panels, automatic operator, interior and exterior push button controls and lockout on exterior
  - Double 3'-0" wide hollow metal doors with interior exit device
  - Bollards on exterior jambs of overhead door (2 each)

Structural
- Control joints in floor slab at adequate spacing
- Recessed slab for parallelogram lift
- Structural grating over sump pit to accommodate H-20 loading
- Large 10'-0" x 12'-0" grated sump with side drain box for overflow
- Slop floor to trench drain and sump pit
- Structure as needed to support equipment

Mechanical
- Special ventilation to remove moisture, low air supply to eliminate steam
- Water resistant heating system
- As required by equipment

Plumbing
- Compressed air line with cut-off valve, regulator with gauge and quick disconnect at 4'-0" AFF
- Wash connections to hand lance on both sides of bay
- Water connection to emergency eye wash/shower
- Trench drain area (with removable cover) to sediment and oil inceptor
- Trench drains to overhead doors
- Large 10'-0" x 12'-0" grated sump with side drain overflow to sediment and oil inceptor
- As required by equipment

Electrical
- Lighting:
  - Sealed metal halide water tight lighting fixtures with no external reset device on walls, 50 fc average, local switching OR fluorescent or LED water tight lighting, 50 fc average, local switching, fixtures to illuminate workspaces around vehicle
  - Metal halide task lighting located as low level to illuminate underside of vehicles, 20 fc average, local switching
  - Power: Waterproof duplex receptacles,120 VAC, 20 A, GFI protected, on walls at 3'-6" AFF
- Communications:
  - Paging/intercom system speakers

WASH BAY AND RECLAIM ROOM

FUNCTIONAL CHARACTERISTICS

Function: Designated bay for automatic washing of sides, top, front, back, and undercarriage of vehicles.

Relationship to Other Areas
- Adjacent Wash Equipment Room

Critical Dimensions
- 20'-0" vertical clearance
- Wash Bay: 20'-0" x 85'-0" (sized to all for wash equipment and to allow adequate dwell time for detergent after application by the detergent arch)

Equipment/Furnishings
- Vehicle automatic wash equipment
- Equipment should recycle as much water as possible
- High volume air blow off is optional, but aids in reducing pavement icing on exit

Design Features
- Includes room for wash equipment controls, pumps, and reclaim equipment
- Bay should be physically isolated from other repair positions

and maintenance areas

Sustainable Design Criteria
- Utilize day lighting strategies
- Provide user-adjustable comfort and lighting controls
- Lighting designed to meet targeted LEED points
- Water reclamation system
- Use of rain water for vehicle washing

TECHNICAL CONSIDERATIONS

Architectural
- Finishes:

  Floor: Soil, grease, water, slip resistant concrete with integral non-metallic light reflective hardener, and chemical bonded concrete sealer

  Walls: Soil and grease resistant, light colored finish

  Ceiling: Painted exposed structure, light colored finish
- Doors:

  Personnel door with view panel to meet applicable code exit requirements

  Wash Bay: Exterior overhead doors, poly carbonate,14'-0"x 14'-0", automatic operator, interior and exterior push button controls with lockout on exterior; Sensors on exterior and interior for automatic roll up and roll down

  Wash Equipment Room: Exterior high lift overhead door: 10'-0" x 10'-0", automatic operator, interior and exterior push button controls with lockout on exterior

Structural
- Control joints in floor slab at adequate spacing
- Control joints to have metal water stops
- Structure as needed to support equipment
- Wash bay:

  Integrated trench drain and sump pit with removable covers

  Trench drain with removable cover at overhead door(s)
- Wash Equipment Room: Sump pits with removable covers

Mechanical
- Special ventilation to remove moisture
- Low air supply to eliminate mist and steam
- Water resistant equipment
- As required by equipment

Plumbing
- Trench drains:

  Integrated trench drain and sump pit with removable covers; Sump pit overflow to sump pits in Wash and Reclaim Equipment Room
- Wash equipment room: Sump with removable covers and an overflow to sediment and oil interceptor
- Water and compressed air connections to wash and reclamation equipment
- As required by equipment

Electrical
- Lighting: Water tight fluorescent or LED light fixtures, 50 fc average, located to illuminate workspace
- Power:

  All conduit and electrical boxes sealed for a wet environment

  All receptacles and outlets at 3'-6" AFF

  As required by equipment
- Communications:
- Paging/intercom system speaker

FLEET MAINTENANCE SHOP

MISCELLANEOUS EXTERIOR AREAS

Maintenance Design Group

PUMP / HOSE TEST AREA

FUNCTIONAL CHARACTERISTICS

Function: Covered test pad with hose connections and water storage sump pit

Relationship to Other Areas

- Located at edge of maintenance facility apron, opposite apparatus repair bays

Critical Dimensions

- 16'-0" vertical clearance

Equipment/Furnishings

- Hose test connections (1 each side)

Design Features

- Covered Structure (open on 4 sides)
- 20,000 gallon sump pit with screened weir design and baffles

TECHNICAL CONSIDERATIONS

Architectural

- Finishes:

  Floor: Soil, grease, water, slip resistant concrete with integral non-metallic light reflective hardener, and chemical bonded concrete sealer

  Ceiling: Painted exposed structure, light colored finish
- Bollards on exterior at columns

Structural

- Control joints in floor slab at adequate spacing
- Structure as needed to support equipment

Plumbing

- Water hose bib, 3/4" with standard faucet, 2'-0" AFF
- As required by equipment

Electrical

- Lighting: Fluorescent or LED lighting, 30 fc average, fixtures located to illuminate work spaces and storage area
- Power:

  All receptacles and outlets at 3'-6" AFF

  General-purpose duplex receptacles, 120 VAC, 20 A, GFI protected on interior, columns, doors as required by code

  As required by equipment
- Communications: Paging/intercom system speakers

FLEET MAINTENANCE SHOP

SUSTAINABILITY

Maintenance Design Group

SUSTAINABLE DESIGN

LEED Certification

The Fleet Maintenance Shop project will pursue a minimum of a LEED Silver rating. This rating can be met in many different ways with varying degrees of cost implications. For the purpose of this POR, the cost estimate was prepared based on a LEED Silver rating, as a result, the sustainability options detailed in this section may not be included in estimates. They are presented here merely as a sampling of sustainability options available.

(LEED, or Leadership in Energy & Environmental Design, is a green building certification program that recognizes best-in-class building strategies and practices. To receive LEED certification, building projects satisfy prerequisites and earn points to achieve different levels of certification.
Prerequisites and credits differ for each rating system, and teams choose the best fit for their project. Each rating system groups requirements that address the unique needs of building and project types on their path towards LEED certification.
Once a project team chooses a rating system, they'll use the appropriate credits to guide design and operational decisions.)

Creating Sustainable Facilities

Sustainability is an essential and fundamental component of the facility. The key sustainability issues that should be explored in the planning and development of the facility include, but are not limited to, the following key points.

Balance between Economic and Environmental Needs

To balance both economic and environmental needs that minimize environmental impacts, the facility design should maximize employee health, safety, and operation efficiencies. This priority objective should be considered at all stages of development of the facility.

Efficient Use of Resource Material

Material resources are valuable and an efficient use should be encouraged in the development and operations of the facility. This can be implemented through the use of reusable, recyclable, and biodegradable materials as well as mandating the use of products that are extracted, harvested, and manufactured locally.

Construction Methods

Methods of construction of the facility play a significant role in sustaining the environment. Utilizing strategies that minimize transportation costs by utilizing local resources and recycling procedures during construction to divert material from landfills will conserve energy and minimize pollution.

Sustainable Criteria

The following is a list of potential strategies to achieve sustainable building design.

- Operable windows/natural ventilation
- Lighting controls: Occupancy sensors
- Lighting designed to meet targeted LEED points
- Utilize daylighting strategies
- Provide user-adjustable comfort and lighting controls
- In-floor ventilation
- In-floor radiant heat
- Water reclamation system
- Use of reclaimed water for vehicle washing

Efficient Use of Water Resources

The facility plan should encourage efficient use of water resources by sustaining habitats and ecosystems through resourceful planning. Examples could include the implementation of an effective storm water management plan and the use of environmentally compliant wash bays to service all vehicles.

Energy Efficiency/Renewable Energy Systems

Explore and promote opportunities to increase energy savings at the facility through the use of high-performance systems combined with utilizing renewable energy sources like solar and wind.

SUSTAINABLE DESIGN

Photovoltaic shade structure

Parking bioswale

Site features that facilitate sustainability include, but are not limited to:

- Transit stop
- Bike racks
- Bioswale storm water runoff mitigation
- Pervious paving
- Alternative fuel vehicles

Bicycle rack

CNG fueling for buses and non-revenue vehicles

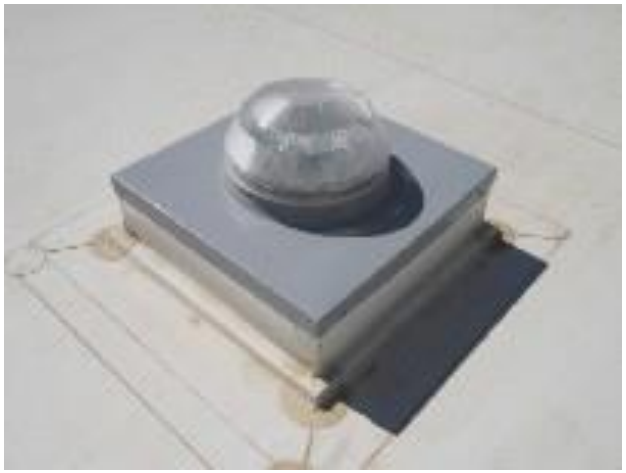
SUSTAINABLE DESIGN

Translucent clerestory windows natural light

Insulated translucent sectional door

Design and materials that facilitate sustainability include, but are not limited to:

- Use durable long lasting building materials
- Natural light
  - Skylights
  - Clerestory
  - Roof monitors
  - Windows in bay doors
- Operable windows for natural ventilation
- Low Volatile Organic Compound (VOC) finish materials
- Use of local building products
- Use of recycled content of materials
- High R-Value roof and wall insulation
- Insulated value bay doors
- In floor ventilation/heating systems
- Light colored reflective floors, walls, and ceilings



Solar tube day lighting strategy

Light reflective floor

SUSTAINABLE DESIGN

Heat recovery piping


Destratification fan


Radiant floor system


Underfloor air distribution vent

Mechanical Systems

Mechanical systems that facilitate sustainability include, but are not limited to:

- Additional cost alternative: Radiant floor slab heating
- Variable air volume air handling units
- Variable frequency drive motors
- High efficiency motors for air handling units and DX compressors
- Economizers for free cooling with 100% outside air at air handling units
- Demand control ventilation with CO_2 and occupancy sensors for reducing ventilation requirements during unoccupied periods
- Additional Cost Alternative: Thermal solar heating for domestic water heater
- Additional Cost Alternative: High efficiency boiler for hydronic heating loop

SUSTAINABLE DESIGN

E

LED lighting

Photovoltaic panels on roof

Electrical systems that facilitate sustainability include, but are not limited to:

- Provision for photovoltaic panels to be installed on the roof
- Provision for future photovoltaic panels to be installed on shade structures located in the parking lot
- Maximize lighting controls with daylighting and occupancy sensors
- LED lighting systems
- Task lighting in Repair Bays
- Efficient process equipment

Dual flush toilet

Wash water reclaim system

Plumbing systems that facilitate sustainability include, but are not limited to:

- Capture rainwater for use in other plumbing systems
- Recrecycle vehicle wash water
- Low flow and automatic plumbing fixtures

Low-flow and automatic fixtures

Rainwater harvesting

UTILITIES DESIGN

Architectural/Structural

- Coordinate routing, support systems, and clearances for mechanical ductwork, plumbing piping and electrical conduit
- Routing shall run above forklift and walk aisles
- Group wherever possible

Mechanical Systems

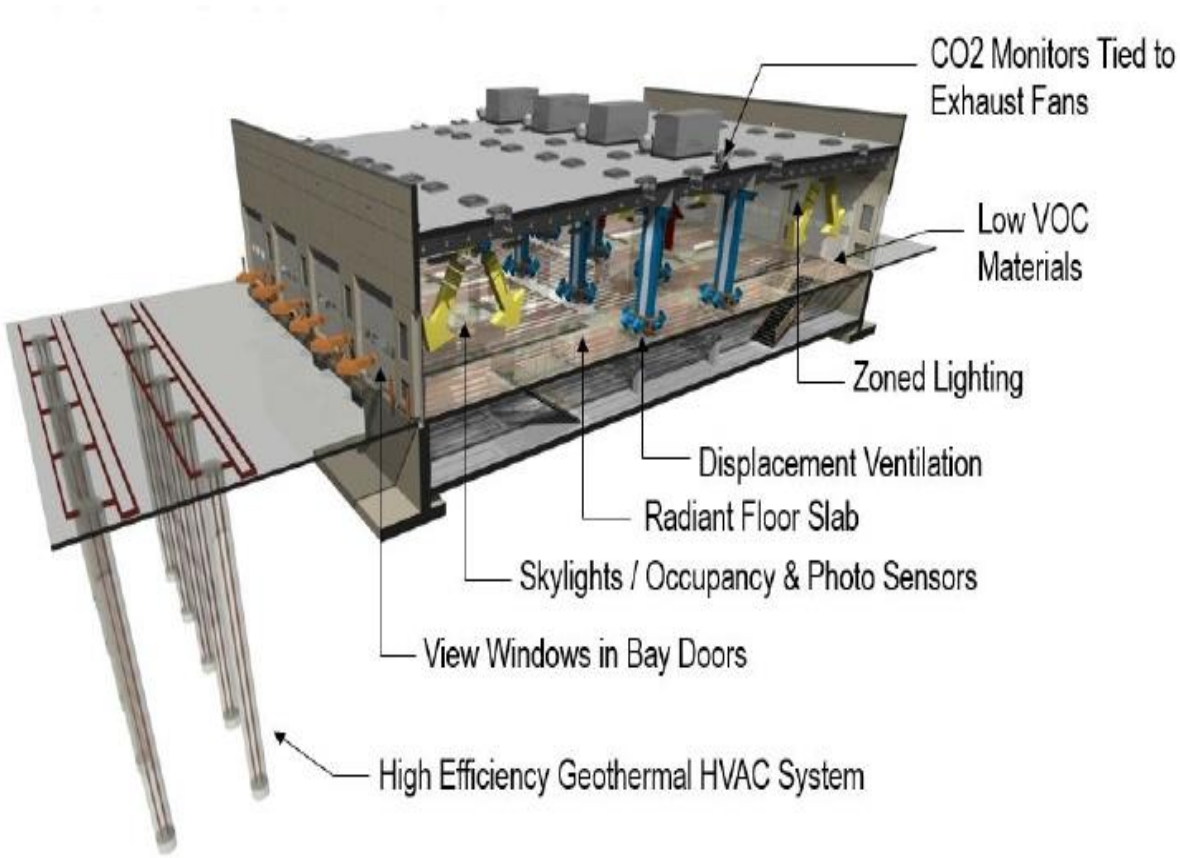
- Route main ventilation ductwork above walk/forklift aisles
- Use mezzanines for mechanical units

Plumbing Systems

- Route incoming water, gas, service equipment piping above ground and above walk/forklift aisles

Electrical Systems

- Route main conduit runs above ground and above walk/forklift aisles.
- Communication systems


CO2 Monitors Tied to Exhaust Fans
Low VOC Materials
Zoned Lighting
Displacement Ventilation
Radiant Floor Slab
Skylights / Occupancy & Photo Sensors
View Windows in Bay Doors
High Efficiency Geothermal HVAC System