

**ART HOUSE  
MAINTENANCE WASH  
BUILDING**

**PROJECT SUMMARY**

ART HOUSE

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## TABLE OF CONTENTS

Table of Contents.....	i
Report Summary.....	ii
1. Background.....	1
2. Site Description.....	1
3. Review of Program.....	2
4. Long Term Site Option.....	7
5. Site Development Analysis.....	7
6. Floor Plans and Elevations.....	9
7. Conclusions and Recommendations.....	9

## PROGRAM EVALUATION REPORT SUMMARY

Atkins and STV were tasked to perform a Program Evaluation Report. This report included revisions to the most recent study, *ART Bus Operation and Maintenance Facility Study* dated September 23, 2010.

The Evaluation Report was undertaken to amend the above study based upon Arlington Transit (ART) operational changes since the study completion. The study consisted of a CNG Fuel Station, Vehicle Wash Building, Vehicle Maintenance Building, and an ART Office Building. Near the end of the site study Arlington County removed the ART Office Building from inclusion in the study. A nearby building became available for ART Office space. During the preparation of the Program Evaluation Report, the Vehicle Wash Building and the Vehicle Maintenance Building were combined into one smaller two story building. With these changes included the requirement for a goal of complying with Silver rating of LEED Green Building Rating System. The project will not be formally submitted for certification.

Advantages and disadvantages of site options and building options were developed and are discussed in the preparation of this document. Many options were reviewed and a combination of these options was selected and included in this report.

## 1 BACKGROUND

Atkins and STV prepared a study, *ART Bus Operation and Maintenance Facility Study* dated September 23, 2010. The study evaluated the two adjacent sites and provided options for transit operation. Subsequently, changes have been made in the program and are included in this report.

## 2 SITE DESCRIPTION

The ART Maintenance Facility will be located on two adjacent sites. Site # 1 (South Site) is approximately 1.23 acres and Site #2 (North Site) is .511 acres. The two sites are separated in the north and south axis by 32<sup>nd</sup> Street.

Site #1 is currently paved and is relatively flat except for a grade drop off at the southeastern corner of the site. Along Jefferson Davis Highway, in the North-South direction, the site drops approximately seven feet and an appreciable amount of earth will have to be moved to level the property sufficient for buses to park and maneuver. The surrounding roadways are relatively flat.

On Site #1, the *Arlington County Transit Vehicle Requirements and Site Analysis* indicates, "It is believed that a manufacturing plant, type unknown, was previously located in this area. Considering the adjacent WMATA site required mediation before construction was allowed, ground mediation may be required here as well before construction can commence. This could affect significantly both schedule and budget issues. In addition, depending on the extent and timeframe in the construction process, ground mediation could limit the usefulness of this location as a temporary site for ART storage and maintenance."

Site #2 is somewhat rectangular shaped, and is very narrow at the north end. This configuration causes significant limitation in the planning of the site taking into account the size of the buses and the need to maneuver them within the site. An existing one-story office building with a large covered canopy is located on the south section of the site and was previously used by a rental car agency (Thrifty, Inc.). Arlington County will demolish the building prior to the new construction on this site. The surrounding roadways are relatively flat. The primary purpose of this site will be bus storage.

It is anticipated that an underground system designed to filter storm water and release will not be needed for the site. All utilities including gas, electric and sanitary are available in South Eads Street.

Entrance for the facility is planned to be located on South Eads Street. While no traffic study has been done, observation indicates that traffic volumes on this portion of South Eads Street are light. It is feasible that buses using South Eads Street could approach and enter the site from both the north and south with minimal difficulty. The entrance to the WMATA facility is several hundred feet to the south and uses South Eads Street, and it is expected there would be no conflict with this facility.

### 3 REVIEW OF PROGRAM

One of the project goals is to comply with the LEED Silver requirements. The project will not be submitted for LEED certification but will be evaluated for sustainability compliance. The Fuel Station and the CNG Compressors do not qualify for LEED 2009 but elements of sustainable design will be provided for these amenities. Potential credits include following areas.

- A. Potential LEED credits:
  - 1. Light pollution reduction
  - 2. Water use reduction
  - 3. Water efficient landscaping
  - 4. Construction waste management
  - 5. Recycle content
  - 6. Low-emitting materials
  - 7. Controllability of lighting
  - 8. Daylight and views
  - 9. Innovation in Design
  - 10. LEED Professional

The project program was initially established by Arlington County in their RFP document. This program was further developed and modified in meetings with Arlington County staff and through the follow-up meetings with ART Operations staff. The program concepts modified in the preparation of this report are as follows:

- B. ART Fleet Inventory
  - 1. The ART fleet as of August 2012 consists of the following bus types. Forty-six (46) of the buses are CNG fueled and four (4) of the Thomas buses are diesel fueled.
  - 2. The fleet make-up is as follows:

6	ARBOC	28' x 96"
2	CUT -02 and -03	25' x 96"
3	DesignLine	35' x 102"
15	NABI 10's and NABI 11's	31' x 102"
20	NABI 7's and 9's	35' x 102"
4	Thomas	30' x 96"
  - 3. Two of the vehicles listed above, CUT-02 and CUT-03 will not be stored at the ART BUS Facility at Edds Street.
  - 4. DesignLine buses require electrical service in the vehicle parking areas to charge the bus batteries. The locations of these services are tentatively shown on the site plans pending input and review by ART staff.

#### Site Amenities and Buildings

The attached Site Plans, indicate the parking layout for the ART fleet and the locations for the support buildings for the two sites.

- C. Site #1 (South Site)
  - 1. Trash Containers: (one recycle and one trash, per LEED requirement)
  - 2. Bicycle Racks, (per LEED requirement)
  - 3. Parking Spaces:
    - a) Transit Vehicles: Twenty-four (24) parking spaces
    - b) Employees: approximately seven (7) spaces

4. An emergency generator will be provided on the south side of the site. The generator will power emergency lights, one entrance gate on each site, and other items to be determined.
5. CNG Compressors will be located in the southwest area of the site along the property line adjoining WMATA. The compressors will be bound on three sides with a masonry wall with no roof covering.
6. Transit buses will be inspected, maintained, and washed in the Maintenance/ Wash Building.
7. East of the Maintenance/ Wash Building will be underground storage tanks for rainwater, waste oil, and anti-freeze.
8. CNG transit buses will be fueled (Fast-Fill) from the Fuel Station service islands. A canopy at the Fuel Station will provide some weather protection during fueling.
9. A future Forklift Storage Building is shown on the southeast section of the site. Electrical conduit will be stubbed up at this location for the future building.
10. A security fence will be provided around the perimeter of the site in accordance with information provided by Arlington County.
11. Lighting and Security: Site and building security will include cameras at building entrances, exits, secure areas, entrance driveways, personnel gate, Fuel Station, CNG Compressor area, and vehicle parking areas. Site lighting shall meet LEED requirements for light pollution reduction.

D. Site #2 (North Site)

1. Trash Containers: (one recycle and one trash, per LEED requirement)
2. Bicycle Racks, (per LEED requirement)
3. Parking Spaces:
  - a) Transit Vehicles: Sixteen (16) spaces and one (3) space for a DesignLine bus
  - b) Employees: approximately five (5) spaces
4. Arlington County will be responsible for removal of the existing building located on the south section of the site.
5. A security fence will be provided around the perimeter of the site in accordance with information provided by Arlington County.
6. Lighting and Security: Site security will include cameras at building entrances, exists, secure areas, personnel gate, entrance driveways, and vehicle parking areas. Site lighting shall meet LEED requirements for light pollution reduction.

E. CNG Compressor Station

CNG compressors are a long lead item contingent upon time to fabricate and prepare for delivery and installation. Early procurement of the CNG compressors prior to building construction would allow an earlier project completion date. Early procurement plan will begin during the Design Development phase of the project.

The CNG Compressors are shown in an area of approximately 18 feet by 40 feet located at the southwest corner of the South Site. Compressor equipment consists of inlet dryers, inlet filters, natural gas compressors, priority sequence panels, ASME ground storage vessels and controls for the CNG fuel dispensers. Sizing of the equipment will be determined by ART's proposed refueling operations and discussion with CNG compressor manufacturers. A brick veneer wall will surround three sides of the station. The north side of the station will be secured with a fence and bollards. Per NFPA 52, the CNG compressors and storage equipment must be a minimum of 10 feet from the property line. We propose an alternate provision to this requirement by providing a

masonry wall with a 2 hour fire resistant rating wall on the south side of the compressors. This will be proposed to the Fire Marshall for review and approval.

F. Fuel Station

The Fuel Station is located on the east side of the South Site (#1). CNG transit buses will be fueled under an open sided canopy covering two Service Station Islands. The canopy is approximately 50 feet wide by 52 feet long. The west service island will have two CNG fast fill dispensers with dual digital displays and one nozzle (NGVI Type 2 fill probe) per dispenser. The east service island will have two CNG fast fill dispensers with dual digital displays, one nozzle (NGVI Type 2 fill probe) per dispenser, and the Smart Trip Vault. Each service island will have a service telephone, two 110-volt duplex electrical outlets, a freeze proof water hydrant with a floor sink for cleaning bus interiors and an emergency shutdown device. The floor sink drains will be tied to a sand trap to reduce silt and sediment in the sanitary drain lines. Lighting levels for the Fuel Station are to be in accordance with the recommended illuminance level guidelines and uniformity ratios established by the Illumination Engineering Society of North America (IESNA) in the most current IESNA Recommended Practice or Design Guide for lighting design.

G. Vehicle Maintenance / Wash Building

The building will be approximately 92' - 8" feet by 55' - 8." The building will have one maintenance bay, one vehicle wash bay, and a two story ancillary space accessible from a stair and an elevator. The entire building will be heated, and the Second floor of the building will be air-conditioned.

During inclement weather, the coiling doors leading to the maintenance bay and wash bay will be closed. LED backlit "Open" and "Closed" signs will be mounted above the entry doors. These signs will inform the approaching bus driver of the bay status.

1. Vehicle Maintenance Bay

The maintenance bay will be used for Daily Vehicle Inspections and Light Vehicle Maintenance. The maintenance bay will have portable and fixed equipment used in the bay. The bay and equipment will meet the requirements for maintenance of CNG vehicles. The wash bay and equipment used in this bay will not meet the requirements for maintenance of CNG vehicles. Convection cooling will be achieved utilizing the motorized coiling doors and motorized exhaust louvers at the roof.

- a) One daily inspection and maintenance bay: (bay, 92' long x 20' wide x 18' clear heights)
- b) A reinforced concrete slab (concrete apron) outside the bus bay on the south side can be used as an Inspection/ Maintenance area during mild weather conditions (15' long x 15' wide).
- c) Two, electrically operated high-speed overhead coiling doors, insulated panels, and with glass vision panels (14' wide x 14' high).
- d) Two, service hose reels: Each with services for motor oil, transmission fluid and anti freeze coolant.
- e) Toilet Room located on the Second Floor. The room will have a water closet, urinal, and commercial hand wash sink.
- f) First Aid Station: Three emergency stations, two in the maintenance bay and one in Bus Wash Equipment Room: Each station will have a combination eyewash and shower with floor drain in the slab.
- g) Parts Storage Room (17' x 11'): Storage shelving for parts and a tire storage rack for new replacement tires with rims and old tires.

- h) Petroleum Storage Room: (8' x 11') storage capacity for bulk oil, grease, and washer fluid will be stored above a spill containment area.
    - 1) Inside the room: Motor oil: 55 gal. (drum)
    - 2) Inside the room: Grease: 55 gal. (drum)
    - 3) Inside the room: Windshield washer fluid, 50 gal. (drum)
    - 4) Brake fluid: None
  - i) Outside the building: Waste Storage, two tanks (Waste Oil and Coolant)
    - 1) Motor oil, 500 gal. (double wall storage tank)
    - 2) Transmission fluid, (mixed with motor oil storage tank)
    - 3) Coolant, 220 gal. (double wall storage tank)
  - j) Communication:
    - 1) Four (4) computer outlets
    - 2) Four (4) telephone outlets
  - k) Fire/ Security Alarm System:
  - l) Location of electric outlets inside and outside of the building will be determined during the Schematic Design Phase. Arlington County Transportation Division will verify type, quantities, and location of these outlets.
2. Daily Inspections in the Maintenance Bay: The following are the daily inspections to be performed on buses in the maintenance bay.
- a) Inspect brakes and air systems
    - 1) Inspection Equipment: Portable light
    - 2) Service Parts: None
  - b) Inspect Tires and Rims
    - 1) Inspection Equipment: tire gauge, two-air hose disconnects
    - 2) Check Engine Compartment: battery, belts, motor oil, brake fluid, power steering fluid, transmission oil, gear oil, and windshield washer fluids
    - 3) Service parts: (See Light Vehicle Maintenance Section 15 below)
    - 4) Check the operational status of the exterior and interior vehicle lights
      - a) Service Equipment: None
      - b) Service Parts: (See Light Vehicle Maintenance Section 15 below)
    - 5) Check windshield wiper blades
      - a) Service Equipment: None.
      - b) Service Parts: (See Light Vehicle Maintenance Section 15 below)
    - 6) Check vehicle exterior and interior for damage
      - a) Service Equipment: None
      - b) Service parts: None
3. HVAC and ventilation systems in the Maintenance Bay:
- a) Two (2) bus (high temperature, 2,000 °F) exhaust hose reels: (roof mounted exhaust fans)
  - b) A gas monitoring system interconnected to trigger alarms, electrical shutdowns, heating and cooling systems, control fans, louvers, and doors to dilute and dispense gas concentrations.
  - c) Ducted heating system and a hydronic radiant floor heating system: gas fired boiler with building exhaust with a heat exchanger.
  - d) A solar water heating system will augment the gas-fired boiler for the building in the winter and the gas-fired boiler for the vehicle wash equipment during the summer.
4. Light Vehicle Maintenance: The following are the light maintenance services to be performed on buses in the building.
- a) Repair brakes and air systems

- 1) Service Equipment: Portable lifts (two lifts: air operated or hydraulic, low rise, portable lifts)
  - 2) Service parts: Brake shoes, brake drums, brake cylinders, brake fluid, and drain pans
  - b) Replace worn tires
    - 1) Service Equipment: Portable lifts, Pneumatic impact wrench (two-air hose disconnects in the bay, One skid mounted Air Compressors located in the Comp Room 105.
    - 2) Service parts: Tires w/ rims ready for exchange. (Tire and or rim maintenance will be provided by outside vendor, Alban Tire.)
    - 3) Storage area for tires w/ rims
    - 4) Storage area for unserviceable tires and rims awaiting vendor pickup
  - c) Replace/ change battery, belts, motor oil, brake fluid, power steering fluid, transmission oil, gear oil, windshield washer fluid
    - 1) Service Equipment: Battery Charger/ tester,
    - 2) Service Parts: Oil Filters
  - d) Replace exterior and interior vehicle lights and windshield wiper blades
    - 1) Service Equipment: None
    - 2) Service Parts: Assortment of bulbs and wiper blades
5. Vehicle Wash Bay
- The wash bay will have a combination of low and high-pressure fluids in conjunction with high volumes of water and cleaning agents. Brushes will be along the sides of the buses.
- With the goal to meet LEED silver, we propose to collect rainwater from the roof drains and store it in an underground storage tank. The rainwater will augment the recycled wash water and reduce the amount of municipal water usage. The bay will have a sloped floor with an under carriage wash system with wastewater storage below the under carriage grating for recycling.
- a) An area of the bay will have a cold water and electrical connections for use by a portable hot water pressure washer
  - b) An area of the bay will have a floor sink with hot and cold water. Mops and buckets will be used to clean the soiled areas of the bus interior. A sediment trap will be provided.

#### H. Solar Roof Panels

A solar water heating system will augment the gas-fired boiler for heating the building. The bays will have a hydronic under floor radiant heating system. During the summer, the solar water heating system will augment the gas-fired boiler for the vehicle wash equipment.

#### I. Site and Building-Mounted Lighting

All luminaries should be a full cut-off design and aimed downward and away from the property line. The average horizontal luminance at grade should not exceed 5 foot-candles and should conform to IESNA recommended uniformity ratios. On sites subject to the Environmentally Sensitive Lands (ESL) overlay, the maintained average horizontal luminance at grade should not exceed 2.5 foot-candles and should conform to IESNA recommended practices.

## 4 LONG TERM SITE OPTION

This option would combine the north and south sites into one site. Joining of the two sites will be accomplished by closing 32<sup>nd</sup> Street and designing a new 31<sup>st</sup> Street as shown on the Site Option study plan. The work would be the construction of underground utilities, soil remediation, bituminous paving, and decorative fencing. The site concepts are shown in the Long Term Site Plan shown in the, *ART Bus Operation and Maintenance Facility Study* dated September 23, 2010. These concepts were not evaluated as a part of this report.

- A. Parking Spaces:
  - 1. Transit Vehicles: approximately 45 spaces
  - 2. Employees: approximately 26 spaces
- B. Vehicle Lighting and Security: Site and building security will include cameras at building entrances, exits, secure areas, entrance drives, and vehicle parking areas.

## 5 SITE DEVELOPMENT ANALYSIS

This report has modified the program as described above due to the sites not meeting the full operational requirements of the earlier study.

The study addressed the following elements:

- Zoning and Permits;
- Site Investigation; and
- Site Development Analysis.

### A. Zoning and Permits

Site #1 (South Site) is zoned M-1, Light Industrial District, upon which motor vehicle storage and repair activities may be permitted by-right under this zoning district. Due to the adjacent location of the WMATA Metrobus facility, use of this site for bus storage and maintenance is consistent with the Transit Master Plan element of the County's Comprehensive Plan. Zoning ordinance restrictions limit height to 75 feet and Floor Area Ratio to 1.5."

Site #2 (North Site) is zoned CM.

The Arlington County zoning code is applicable and the County is the approval authority. There are no anticipated federal or state local permits required for the building construction. The primary codes, standards, and advisories for the project are the 2009 Virginia Uniform Statewide Building Code, NFPA 30A: *Code for Motor Fuel Dispensing Facilities and Repair Garages*, 2012 Edition, NFPA 52: *Vehicle Gaseous Fuel System*, 2010 edition, and NFPA 70: *National Electric Code*, 2011 edition,

A storm and surface runoff water retention system will be required. The plans will be submitted to the Virginia Department of Environmental Quality (VDEQ) for a Virginia Pollution Discharge Elimination System Permit (VPDES) and attain approval of a Storm Water Pollution Prevention Plan (STWPP).

### B. Site Development Analysis

Site development analysis included research of available information on existing utility locations to determine their capacity to service the ART facility (including fire, domestic

water, sanitary sewer, storm drainage, electrical, telephone and gas service). No deficiencies were noted.

Preliminary grading plans were developed and plot lines, setbacks and easements were identified. Preliminary drainage plans were developed in accordance with local codes and requirements.

Lighting requirements for parking areas and walkways require one foot-candle of light at the surface during the hours of darkness.

Two access points are proposed for the both sites from South Eads Street. These access points will not necessarily be located the same place as the existing entrances. Driveway curb cuts will be a maximum of 40' wide. If access via 32nd Street is required, a fire hydrant along 32nd Street that would have to be relocated and the relocation would have to be approved by the Fire Marshall. There are two existing electric easements at the north end of the site and a Public Street Easement at the north end of the site.

It is proposed to include underground storm water management at the SE corner of the site. It appears that no water from the adjacent WMATA site flows onto this site. The ground elevation will be raised in this area and there is a possible need for a retaining wall at the southeast corner of the site.

It is proposed to avoid electric utility easements. There are no other known utility issues that would affect feasibility.

Perimeter landscaping design and construction outside the property lines will be provided by Arlington County.

## **6 FLOOR PLANS AND ELEVATIONS**

The floor plans were changed from the conceptual floor plans in the programming documents. The Site Plans, Floor Plans, and Elevations listed in Appendix A are a culmination of the studies and revisions.

- A. North and South bound buses traveling along South Eads Street can access the both sites with room to queue.
- B. North and South bound buses can exit both sites to South Eads Street.
- C. The Maintenance / Wash Building has a saw tooth roof to take advantage of the solar water heating panels and the building's orientation. The saw tooth roof offers ventilation advantages in summer with passive cooling. Shading overhangs are above the windows on the east side of the building.

## **7 CONCLUSIONS AND RECOMMENDATIONS**

### **A Conclusions and Evaluations**

The Overall Site Plan provides queuing space for returning buses, parking lanes for each type of vehicle, access to and from both directions of South Eads Street, and circulation space on the two sites. Available space allows some larger buses to park in lanes marked for smaller vehicles.

The South Site Plans provides to and from access to the Maintenance / Wash building, however tight turning radii limit movement of larger vehicles on the site. When the fleet expands to larger vehicles, this layout will not provide adequate circulation or parking.

The North Site Plans provide bus parking. A tight turning radius limits the movement of larger vehicles on the site. When the fleet expands to larger vehicles, this layout will not provide adequate circulation or parking.

## B Site Investigation

A geotechnical investigation report was prepared on the south site in July 2007 by GeoConcepts Engineering, Inc. Eight soil borings were taken and the analysis indicates that portions of the south site are contaminated with petroleum hydrocarbons and arsenic.

A geotechnical investigation should be prepared for the north site to provide an evaluation of the subsurface conditions, foundation recommendations, an assessment of the site for flexible/ rigid pavement and earthwork recommendations. The additional testing will be required early during the Schematic Design Phase.

## C Site Development Analysis

Site development analysis included research of available information on existing utility locations to determine their capacity to service the ART facility (including fire, domestic water, sanitary sewer, storm drainage, electrical, telephone and gas service). No deficiencies were noted.

Preliminary grading plans were developed with property lines, setbacks and easements identified. Preliminary drainage plans were developed in accordance with local codes and requirements.

A preliminary site configuration was developed per the program requirements described above. The site configuration includes location of all buildings and functional layout for fleet and employee parking and circulation.

Lighting requirements for parking areas and walkways require one foot-candle of light at the surface during the hours of darkness. Parking areas need not be illuminated when the business is closed.

Two access points are proposed for the south site from South Eads Street. Two access points are proposed for the north site from South Eads Street. These access points will not necessarily be located the same place as the existing entrances. Driveway openings will be a maximum of 40' wide. The vehicle access will be controlled by electrically operated gates. These gates will be a combination of horizontal sliding and swing gates.

There are two existing electric easements at the north end of the site and a Public Street Easement at the north end of the site. We will likely include underground stormwater management at the SE corner of the site. It appears that no water from the adjacent WMATA site flows onto this site. The ground elevation will be raised in this area, and there is a possible need for a retaining wall at the southeast corner of the site.