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# SCHEMATIC DESIGN NARRATIVE

## SITE IMPROVEMENTS

Five Rivers Environmental Education Center  
56 Game Farm Road  
Delmar, New York

Project No. 43153

*prepared for*

Department of Environmental Conservation

*prepared by*

Lewis Engineering, P.C.

October 6, 2006



JOHN J. SPANO  
*Commissioner*

ROBERT J. FLEURY  
*First Deputy Commissioner*

JAMES M. DAVIES, AIA  
*Acting Deputy Commissioner  
Design and Construction*

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**EXECUTIVE DEPARTMENT - OFFICE OF GENERAL SERVICES  
DESIGN AND CONSTRUCTION - DIVISION OF DESIGN**

**SCHEMATIC DESIGN NARRATIVE**

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**Project Number 43153**

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Site Improvements  
Five Rivers Environmental Education Center  
56 Game Farm Road  
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**PROJECT INTENT**

Intent of the project is to replace three existing buildings - 7, 7A and 2, which have reached their useful life, with a new energy efficient 8,000 sf Visitor Center Building. Overhead Shelter/Canopies are also to be provided. Visitor parking is to be expanded and separated from bus traffic. Relocated front entrance, new site appurtenances such as pedestrian/parking lot lighting signage kiosks, welcoming area and walkways are also to be provided.

All work related to this project must comply with Executive Order 111 and be designed to incorporate Green Building design with LEED certification. It is important that new work should fit within the architectural and site context of the surrounding community. Site and design vocabulary developed for this phase will be utilized for all future phases.

**EXECUTIVE SUMMARY**

The following report outlines the existing site conditions, required site work and description of the proposed HVAC, Electric, Plumbing and Fire Protection systems for the Visitor Center. Review of the existing site conditions includes required modifications necessary to accommodate building construction. System descriptions include system types and capacities.

## HVAC

### **Existing Conditions**

The existing building HVAC systems are comprised of No. 2 fuel oil fired furnaces and electric heating systems. The majority of the systems have either reached their serviceable life expectancy, do not meet current building code, or are not sufficient in performance or function to be reused in the new program. The recently built restroom building, Building No. 7B, is intended to be integrated into the new program for the facility and coincidentally the associated HVAC system is to be upgraded accordingly. In conjunction with the demolition of the existing buildings on site, the associated HVAC systems are to be disconnected and removed accordingly as buildings are phased out.

### **Site Work**

A geothermal bore field is to be installed in the location of the parking loop area in close relation to the mechanical room. A closed loop vertical bore type geothermal heat exchanger is recommended as the area required to meet the building load makes use of a horizontal heat exchanger impractical. Initial calculations indicate approximately 20 bores at 350 to 400 feet deep subdivided into 5 circuits of 4 parallel bores/loops will be required to provide sufficient heat exchange to meet building load. This would require a field area of approximately 80 feet by 100 feet.

### **System Description**

The new HVAC system will be selected to be highly energy efficient and incorporate required materials and methods to provide a LEED Accredited building. Ground source geothermal heating and cooling technologies will be designed to provide for space conditioning and ventilation. All refrigeration systems shall incorporate HFC refrigerants in concordance with LEED ozone depletion requirements.

The ground source loop pumping system will be variable speed primary flow with pump speed to vary based on system pressure. The potential for below freezing temperatures in the ground loop will require use of antifreeze. A 20% ethylene glycol or methanol solution will provide the antifreeze protection required while having less pump energy impact than other alternatives. Pumps shall utilize premium efficiency motors. The geothermal system might offer educational opportunities through use of signage and system description literature. Through use of appropriate tagging and signage, students would be able to tour the mechanical system and understand the ecological impact of utilizing the ground source heat exchanger versus traditional fossil fuel based HVAC systems.

The building air side HVAC systems will consist of ground source heat pumps zoned to provide comfortable conditions for all occupants. Ventilation air is to be provided to the spaces via a dedicated energy recovery heat pump air handler. The ventilation is to be ducted to the return air intake of the heat pumps to provide appropriate distribution of fresh air. For locations requiring cabinet heaters or finned tube radiation water to water heat pumps can be utilized to produce heating hot water for this service. All heat pumps will use HFC refrigerants.

The building systems will be monitored and controlled by a state of the art Direct Digital Control system (DDC) to maximize control, scheduling, and optimization capabilities. The DDC will allow monitoring and changing of system setpoints, scheduled maintenance and failure alarm capabilities, trending of system variables, and remote access. The system shall be comprised of interoperable, stand alone digital

controllers communicating on an open protocol communication network. Information resident on the DDC shall be available to local computers as needed via local access network or remotely via the internet. The DDC shall communicate with other building systems such as lighting, energy metering, power management, clock displays, fire-life safety systems and other interoperable devices with communication capabilities.

## **ELECTRIC**

### **Existing Conditions**

The electric service for the site has been recently upgraded and is sufficient for the proposed improvements. The service originates from pad mounted, metal enclosed switchgear, SW-1, located on the south side of Game Farm Road and is distributed at 7620V. The existing primary distribution up to and including pad mounted switch SW-2 will remain. Existing transformer T-2, serving buildings No. 3, and 7a will need to be relocated. Existing primary distribution serving buildings No. 4, 4a, 5 and 6 will need to be relocated to avoid building footprint..

The existing telecommunication service for the site consists of overhead and underground lines and service pedestal all of which will remain. Existing telecommunication service for buildings No. 3, 4 and 4a will need to be relocated.

The existing bathrooms are served by a solar array which will need to be relocated.

### **Site Work**

Existing transformer T-2 will be relocated and reconnected to maintain electric service to buildings 3, 4 and 4a. A new primary feeder will be extended from SW-2 and reconnected to existing underground distribution for buildings No. 4, 4a, 5 and 6.

The existing telecommunication service for buildings No. 3, 4, and 4a will be replaced with new conductors and reconnected to existing service pedestal.

Relocate existing solar array and reconnect to bathrooms. The solar array might offer educational opportunities through use of a display and watt and amp meters. Students would be able to monitor the system and understand the possibilities of the technology.

Electric Service for the Visitor Center building will consist of a new 150 KVA, 7620:208/120V, 3 phase pad mounted transformer, located north east of the building. The transformer will be fed underground from existing manhole HH#2. The existing site distribution will be spliced into at the manhole and extended. Due to the site modifications HH#2 will need to be modified to accommodate elevation changes and traffic loading.

Site lighting will consist of building mounted, bollards and pole mounted HID type fixtures. Fixtures will be provided with shielding and specified to minimize light pollution. Fixtures will be switched to allow for levels of lighting with DDC and photocell controls incorporated.

Telecommunication service for the Visitor Center will consist of new conductors (copper and Fiber) extended from the existing service pedestal to the building Telecom Closet.

### **System Description**

The building will be served by a 400A, 120/208, 3 phase main distribution panel. Additional panels will be located in the building to serve local lighting and power needs. General purpose receptacles will be located throughout the building, including exterior mounted, controlled, receptacles.

Lighting will consist of several types of fluorescent fixtures. General office space and classroom lighting will be recessed, parabolic type. Architectural lighting will be used in public spaces and exhibit/viewing area. All lighting will be controlled via multiple switches, occupancy sensors and day lighting controls to provide variable lighting levels. Footcandle levels, and watts per square foot criteria will be as per LEED requirements.

A zoned, ADA compliant fire alarm system will serve the building. Notification of authorities will be via digital communicator and phone line.

Telephone and data cabling will be installed throughout the building.

## **PLUMBING**

### **Existing Conditions**

The existing toilet facility, building 7b was constructed in 2004. This facility is approximately 770 sq. ft. and is functioning as intended. The existing plumbing fixtures are adequate and meet ADA and Water Conservation requirements. The sanitary sewer discharge is handled by a grinder pump system.

### **Site Work**

The existing grinder pump system is located immediately to the west of the building 7b. This system shall be maintained and incorporated into the proposed project scope. The proposed project should not affect the capacity or function of the existing systems. Coordination with the foundation design will need to be done to incorporate the existing piping mains with the foundation plan. A new 4" combination domestic water and fire service shall be provided. The existing domestic water shall be reconnected to the new service.

### **System Description**

The proposed plumbing systems are to incorporate technologies in agreement with achieving LEED Certification. Materials using low and no flow capabilities are to be incorporated into the design, as deemed appropriate.

The proposed project program incorporates two unisex toilet rooms, kitchenette and janitors closet. All plumbing fixtures shall be ADA compliant as well as water conserving type fixtures. Each sink and lavatory faucet shall be provided with low flow, 0.5 gpm aerators. Lavatories shall be provided with

adjustable, automatic shut off infrared sensor type faucets. Each water closet is to be water conserving 1 gal per flush manual flush valves. Each flush valve is to incorporate "dual Flush" technology.

The domestic hot water system will be replaced in total. A tankless liquid propane hot water heating system shall be provided to serve the existing toilet facility and Visitor Center. Hot water recirculation and timer system will also be provided.

A 1" domestic water main shall be extended from the existing service located in the chase space between toilet rooms of Building 7B. A new 4" sanitary service is to exit the proposed building addition to the west and run due north to the location of the existing grinder pump system. The new gravity line is to connect to the gravity side of the existing sanitary system to the east of the grinder system.

In keeping with the environmentally conscious design of the building as a whole, it is advisable to retrofit all existing plumbing fixtures in Building 7B with the accessories listed above. In addition, the existing

urinals might be replaced with "Waterless Urinals" to provide a more eco friendly system and add benefit toward LEED Certification.

The proposed building addition and existing toilet facilities shall be fully sprinklered. The fire protection system shall be designed as an Ordinary Group 1 hazard utilizing a typical wet pipe system.

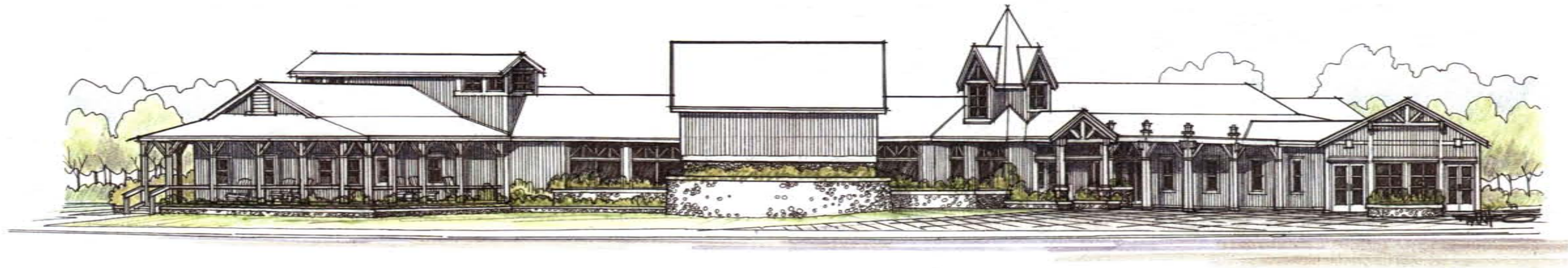
### **ESTIMATE**

The attached Project Estimate dated October 6, 2006, indicates an estimated bid amount of \$4,238,000. Please note the "Valid Until" date indicated on the Project Estimate. Beyond that date, the estimate will be subject to escalation and the possibility of further deterioration of existing conditions.

### **DRAWINGS**

A-001 Schematic Floor Plan and East Elevation

C-001 Schematic Site Plan



PROPOSED EAST ELEVATION - Option 01

SCALE: APPROX. 1/16"=1'-0"

FIVE RIVERS ENVIRONMENTAL EDUCATION CENTER

NYS DEC, Delmar, New York

DATE: October 31, 2006

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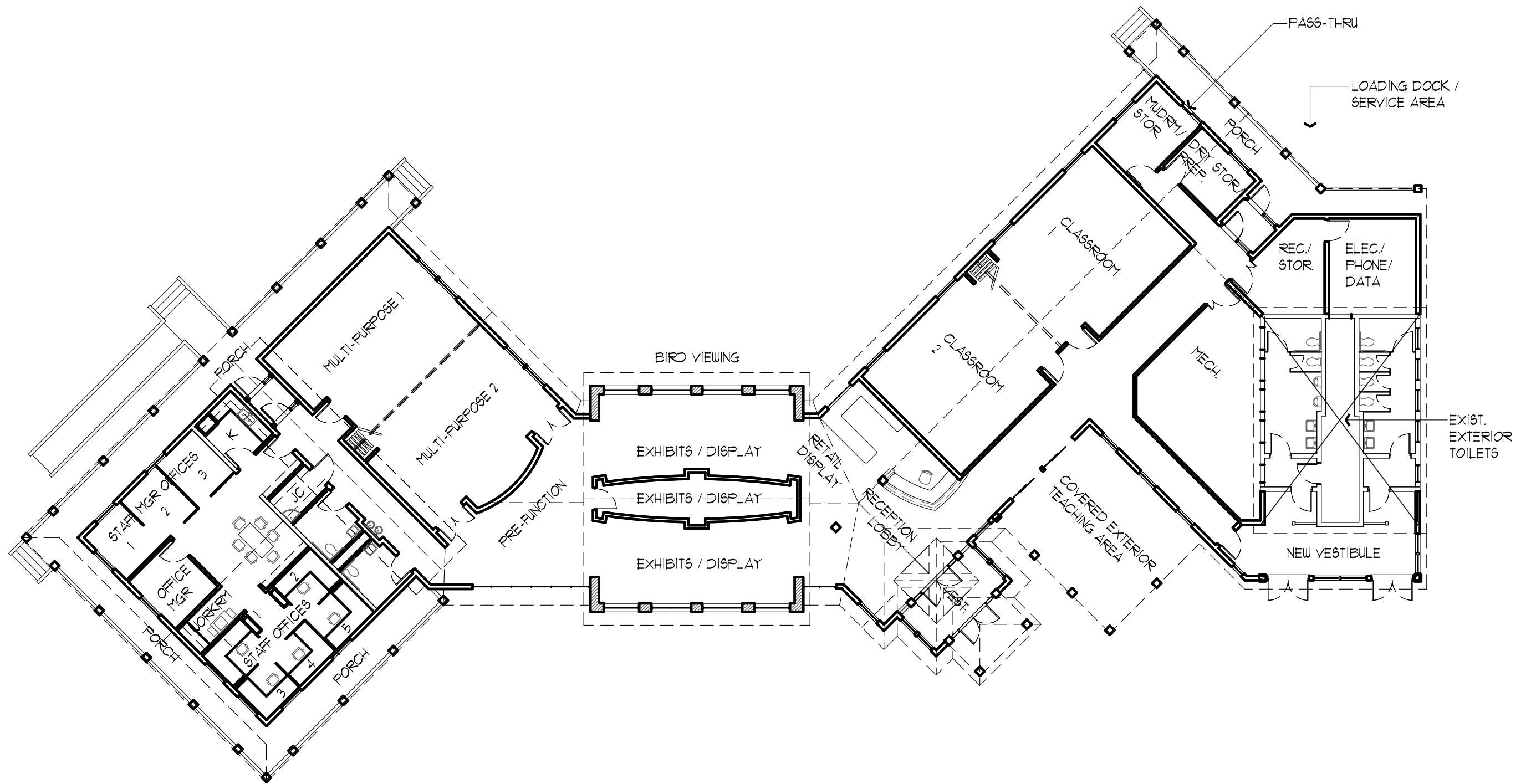


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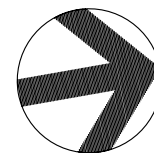
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PROPOSED FLOOR PLAN - Option 01

SCALE: APPROX. 1/16"=1'-0"



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NYS DEC, Delmar, New York

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