



# Evanston Ecology Center

Existing Conditions Report

March 22, 2023

**HPZS**



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# 1.0

## **Executive Summary**



# Executive Summary

## The Evanston Ecology Center Project

### *About the Ecology Center*

The Ecology Center building was originally built in 1974 and contained a lecture room, a laboratory, storage and public restrooms. In 2001, a major addition and renovation was completed which added a multipurpose room, corridor, and vestibule to the building. Additionally, the laboratory was converted to a classroom, and the classroom was converted to offices. An extension to the classroom was completed in 2015 along with some improvements to the classroom floor. The building is now 6,200 square feet.

### *A Series of Additions*

The building is primarily masonry and wood construction with load bearing masonry walls and structural wood roof and floor. It has a crawl space throughout the building and building systems routed through this crawl space. The original building has a 1 ½ to 2 feet clear space with a dirt floor. The 2001 addition has a 4' clear crawl space and gravel floor. The 2015 classroom extension has a slab on grade floor construction.

### *Immediate Needs for the Facility*

The City of Evanston identified a number of concerns to be addressed as a coordinated renovation for the Center. The wood flooring in the original building is showing significant signs of deterioration. Areas of the sub-floor in a storage room, the mechanical room, and the office is warped, and a small area of the mechanical room became rotten and required a patch. The duct work in the crawlspace of the original building has significant corrosion. The dirt floor of this crawlspace occasionally has groundwater puddles and provides a habitat for rodents. The space does not

have adequate access or clearance for appropriate maintenance of building systems located therein. Additionally, the main water service has a history of freezing, thus shutting down the Ecology Center until water service can be restored. Additionally, a Reduced Pressure Zone backflow prevention device is located in the crawlspace. The required annual testing for this device is very challenging.

### *Space Updates to Facilitate Growth and Meet CARP Goals*

As the operations located at the Ecology Center have evolved, the needs of the building have changed. There is a substantial need for a customer service desk at the center which is currently provided through an interior window. Additionally a public seating area outside of the classroom and office would be desirable. Lastly, the open office area is arranged in a manner that inhibits phone conversations. A new layout with acoustics considerations must be included in the project.

The City of Evanston has passed a Climate Action and Resilience Plan. This plan commits the city to achieving carbon neutrality for municipal operations by 2035. In order to achieve this goal, the HVAC system needs to be updated with a system that has net zero on-site carbon emissions. The building's systems are to be all electric. The lighting system needs to be modernized to realize the power saving features of new fixtures and controls and to meet the current energy code requirements. And finally, the waterproofing of the building's foundation structure needs to be remediated so that the structure itself can be resilient in the face of what will be increasingly large storm events.

### *Scope of the Project*

HPZS was selected as AOR in the fall of 2022 along with Silman (Structural), CCJM (MEP/FP) and Bulley Andrews (Cost Consultant) to provide integrated services including program verification, existing conditions verification, site investigation, code analysis, schematic design, design development, construction documentation, bidding assistance, and construction administration. The following list is the scope of work defined by the City of Evanston for this contract:

1. Identify extent of structural deterioration to the floor system.
2. Mitigate crawlspace moisture.
3. Mitigate crawlspace freezing.
4. Repair flooring structure.
5. Renovate washrooms.
6. Renovate office.
7. Renovate HVAC system to meet CARP goals.
8. Renovate HVAC distribution system.
9. Renovate lighting system.
10. Renovate entry sequence to provide for customer service desk.
11. Relocate RPZ Valve.
12. Work with City's procured furniture distributor to select and order furniture.

### *Purpose of this Report*

HPZS and the entire consulting team identified a need to observe, catalog and recommend an early pricing exercise in order to confirm the project scope identified by the City, and provide the diligence necessary in order to outline possible other near- and long-term needs the facility may want to consider, given its propensity to grow the facility as the programming success requires it.

HPZS, Silman, CCJM and Bulley Andrews have used the month of January 2023 to investigate and catalog the existing conditions of the building. Running in parallel, the design team has also proposed an early concept design to meet the scope of work needs and allow Bulley Andrews to perform a conceptual pricing exercise.

The purpose of this chronology of events is to identify if the proposed scope of work by the City of Evanston fits within the economic goals of the project, which is a stated construction budget of approximately \$1.3M. As an outgrowth of this exercise the team was able to identify and prioritize the scope of work to meet as many current and anticipated needs of the Center as possible with this project.

### *Recommendations*

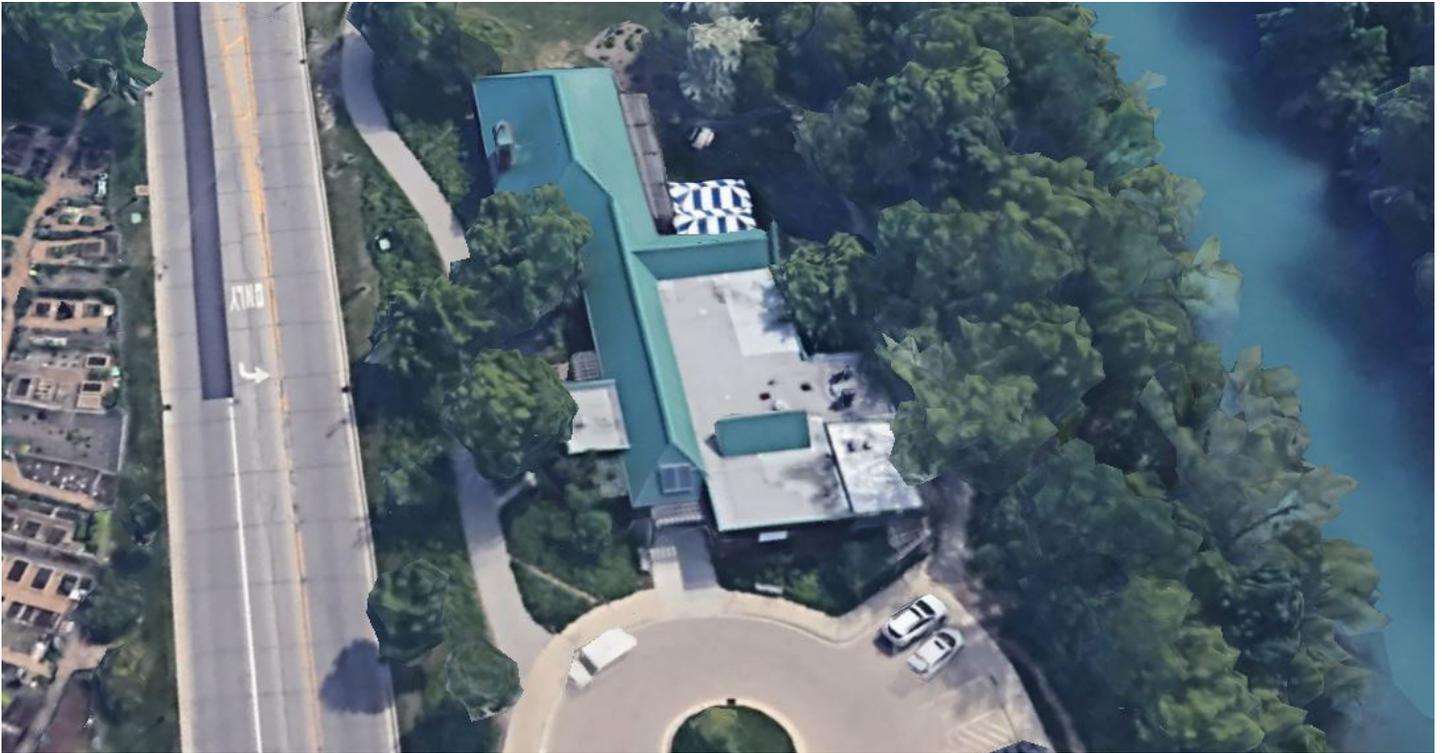
In summation, our discipline-specific recommendations are included in the "7.0 Recommendations" section of the report. In general, the following has come to the surface during the programming and investigation phase of the project as the big picture begins to come into focus:

- Waterproofing of the crawl spaces is of top concern. Pricing currently includes the most effective and climate resilient option, which includes removing sub-floors to provide access to dig out crawl spaces and install vapor barrier, foundation waterproofing and a continuous drain tile system, a significant cost that is ultimately the basis for the project.
- A heat pump HVAC system is the likely best solution to meet the EEC's needs for comfort as well as energy efficiency and compliance with COE CARP goals. It will require air distribution through soffited locations.
- There are opportunities to repair other items currently outside the scope of this effort, such as providing bird friendly glazing solutions, and those will be need to be considered by COE as we move forward.

Our entire team welcomes the challenge and opportunity to make this project a success to ensure the future of the Evanston Ecology Center such that Chicagoland citizens will be able to continue to enjoy its sustainably focused programs and offerings as a beacon of resilience in the face of climate change.

# 2.0

## **Code Analyses**



## Code Analysis

### Governing Building Codes

Generally speaking, the following building codes are relevant to any work that EEC plans to do with an architect in order to move forward from the concept stage to construction and permit drawings:

1. 2021 International Building Code
2. City of Evanston Adopted Building Codes & Regulations
  - a. Green Building Ordinance
  - b. Bird Friendly Building Design Ordinance
3. Illinois Accessibility Code
4. International Energy Conservation Code (IECC)
5. 2012 NFPA Life Safety Code

### Existing Zoning Analysis

Located at the North East corner of N McCormick Boulevard and Bridge Street, the Evanston Ecology Center is situated in an Open Space District which is governed by Zoning Ordinance 6-15-9. Governing requirements for this zone in the Municipal Code of Evanston, Illinois indicate that it is currently in compliance per the below:

### Governing MEP Codes

HVAC systems comply with all applicable building codes and regulations including:

1. 2021 International Building Code
2. 2021 International Mechanical Code
3. City of Evanston Adopted Building Codes & Regulations
4. International Energy Conservation Code (IECC)

## Preliminary Code Matrix

IBC 2021 ( Code Section)	Y/N	Allowable	Current Actual	Proposed, Final	Notes
Occupancy Group Classification	-	-	A-3 Assembly	A-3 Assembly	No change
Type of Construction	-	-	Type III	Type III	No change
Fire Sprinklers	N	-	-	-	-
Fire Alarm	Y	-	-	-	-
Bldg. Height	-	-	12'-0"	12'-0"	No change
No. Stories	-	-	1 story	1 story	No change
Mezzanine	-	-	-	-	No change
Building Area	-	-	6,220 sf	6,220 sf	No change
Occupant Load per Floor	-	-	415 (15/sfpp)	415 (15/sfpp)	
Number of Exits	-	-	7	6	No change
Fire Resistance Rating of Bldg Elements	-	-	1 hr	1 hr	No change
Fire Resist. Protect. Exterior Walls	-	-	4 hr	4 hr	No change
Required Plumbing Fixtures (Bathrooms)	-	-	2 per + 1 urinal	2 per + 1 urinal	No change

Figure 1. Code Matrix

## EVANSTON ECOLOGY CENTER PLUMBING FIXTURE COUNT

### FRACTIONAL CALCULATION METHOD

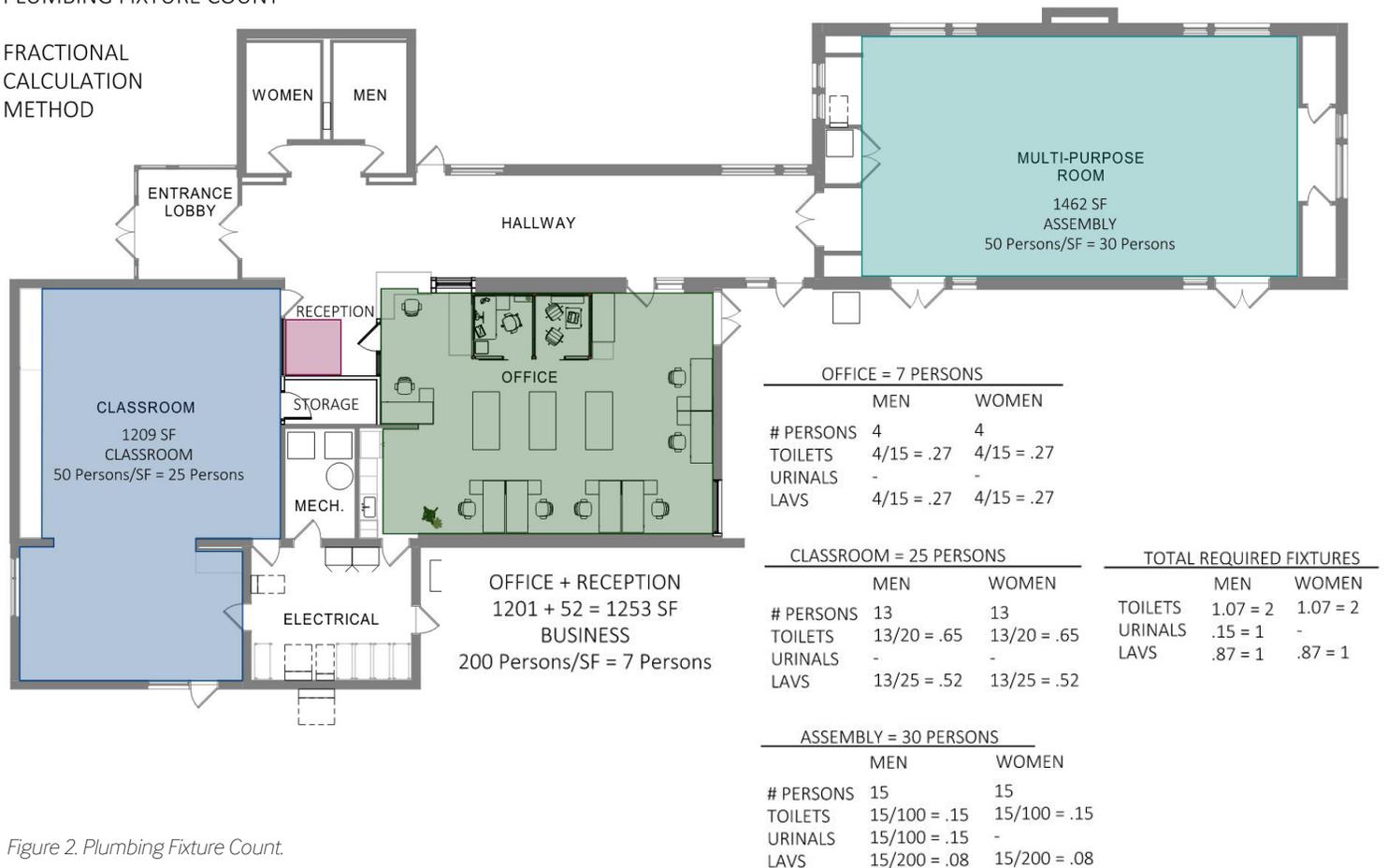


Figure 2. Plumbing Fixture Count.

Electrical systems comply with all applicable building codes and regulations including:

1. 2021 International Building Code
2. 2020 National Electrical Code
3. City of Evanston Adopted Building Codes & Regulations
4. International Energy Conservation Code (IECC)

Plumbing systems comply with all applicable building codes and regulations including:

1. 2021 International Building Code
2. 2014 Illinois Plumbing Code
3. City of Evanston Adopted Building Codes & Regulations
4. International Energy Conservation Code (IECC)

### **CARP Interface and Requirements for MEP**

City of Evanston has created a Climate Action and Resilience Plan (CARP) which identifies goals related to municipal services within the city. According to the City's CARP schedule, city must achieve 100% renewable electricity by 2030 and Carbon Neutrality by 2050. Carbon neutrality is when there is a balance between carbon emitted and carbon absorbed. To achieve the goal of carbon neutrality, the facility needs to absorb as much carbon as it emits, which can be achieved by eliminating all sources of carbon or by offsetting the carbon emitted by purchasing credits from a source that absorbs carbon. The primary way to reach carbon neutrality for the facility will be to eliminate sources that use fossil fuels and replace them with systems that run on electricity generated through clean and renewable energy.

For the purpose to meet the city's CARP goal, CCJM recommends electrical heat pump system to replace aged and insufficient existing gas fired units along with electrical high-efficient water heater system to replace existing domestic water heater. New energy efficient LED light fixtures and control system will be recommended for the scope areas. The recommended system shall meet the requirements of current energy codes and code adopted by City of Evanston.

### **Governing Structural Codes**

The project will be governed by the following codes:

- 2022 City of Evanston Building Codes
- 2021 International Building Code (IBC)
- 2021 International Existing Building Code (IEBC)
- 2021 International Residential Code (IRC)

The following standards will be followed as specified by the governing codes:

- ASCE 7-16 Minimum Design Loads (and Associated Criteria) for Buildings and Other Structures
- ACI 318-19 Building Code Requirements for Structural Concrete
- TMS 402-2016 Building Code Requirements for Masonry Structures
- NDS-2018 National Design Specification (NDS) for Wood Construction with 2018

Supplement

- AISC 360-16 Specification for Structural Steel Buildings
- ASCE 41-16 Seismic Evaluation and Retrofit of Existing Buildings

# 3.0

**Existing  
Conditions**



# Existing Conditions

## Introduction

The Evanston Ecology Center is a single-story concrete masonry unit structure with a wood-framed roof. The building is organized around three primary rooms, a classroom, office, and multi-purpose room, connected by a corridor. The center regularly hosts educational and community events as well as provides resources and organization for Evanston's outdoor activities. Representatives from HPZS, Silman, CCJM, Bulley & Andrews and the Ecology Center were present on site on January 10th, 2023 to make site observations and take measurements, with the HPZS team returning on January 12th to finish measurements.

## Architectural Site Observations

**Main entry.** The main entry for the Ecology Center is located on the west face of the building, facing Bridge Street. It consists of a pair of double doors with a conditioned vestibule between. The entry vestibule houses a recycling drop off for the city.

**Parking Lot.** The parking lot for the center is across Bridge Street from the building. It is composed of two aisles of double-sided angled parking separated by a planted median. In front of the main entry there is a circular drive with handicap parking along with two other spaces.

**Sidewalks.** Extending West from the parking lot is a sidewalk connecting to additional green space. There is an additional sidewalk running parallel to the lot on its North side that connects it to the Ecology Center via a crosswalk on Bridge Street. This sidewalk follows the perimeter of the circular drive on its North and East sides before splitting. One of these two sidewalks runs parallel to the Ecology Center on its North side, and the second runs between the center and channel to the South.

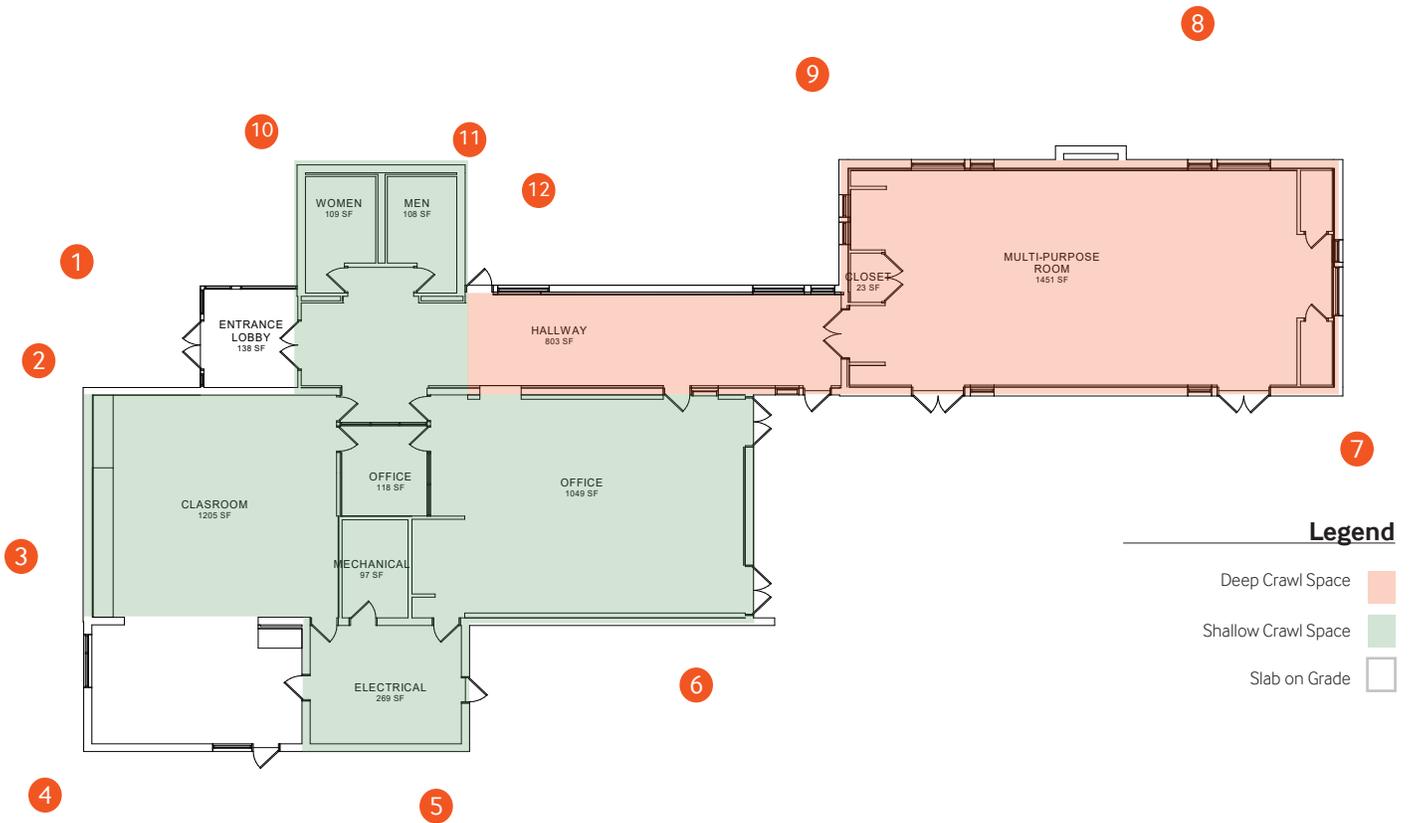


Figure 3. Existing Overall Plan

### Architectural Envelope Observations

There are two types of crawl spaces under the building. (See Figure 3. Existing Overall Plan) For reference purposes in this section of the report, these are designated as shallow and deep. The shallow crawl spaces occur under the original portions of the building. These are not truly crawl spaces, but are more appropriately referenced as pipe chases. They have dirt floors. The chase under the toilet rooms contained approximately 2" of water. There does not appear to be any insulation either on the foundation walls or between the joist spaces.

The deep crawl spaces are located under the Hallway and Multi-Purpose rooms. They have gravel floors. No vapor barrier was observed under the gravel. Batt insulation has been installed between the floor joists. The foundations were covered with a rigid insulation board (+/- 1") although the installation leaves many gaps between the pieces of insulation. Where the foundations are exposed, moisture (likely condensation) can be seen coating the walls. It is unclear why both the foundation and the floor joists were insulated.

There is a sump pump located near the access hatch in the Multi-Purpose Room suggesting that the newer construction has footing drain tiles. The pump discharges to the exterior on the west side and immediately adjacent to the foundation. No sump pump was found at the shallow crawl space areas, suggesting that those footings have no drain tile. None of the crawl space areas are ventilated.

**Exterior Observations.** There is a drinking fountain located on the exterior at the



1 Main Entry



2 Entryway Exterior



3 West Elevation



4 West Elevation - Trellis



5 South Elevation



6 Office Exterior Patio



7 Exterior Patio/Trellis



8 North Elevation, Multi-Purpose Room



9 Multi-Purpose Room, Exterior



10 Water Fountain, Exterior



11 Secondary Entry/Exit



12 Secondary Entryway/Exit Doorway

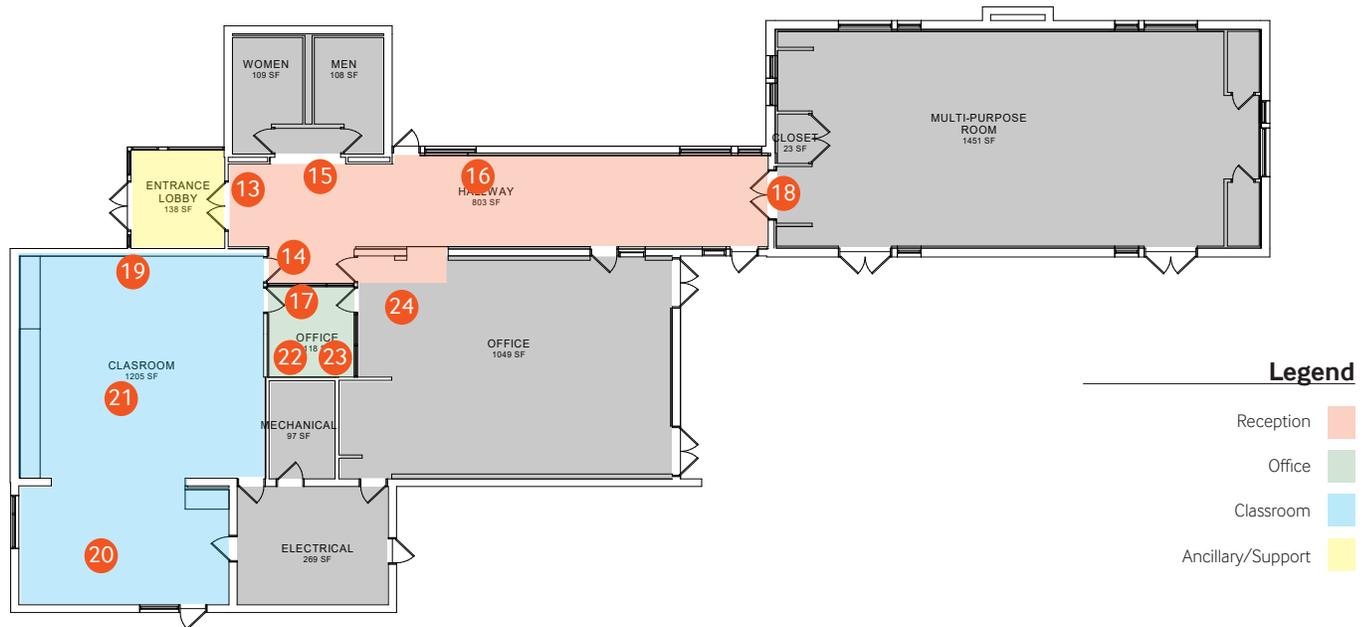


Figure 4A. Existing Overall Plan: Interior Spaces

north side of the toilet room wing. The drain pipe runs through the masonry wall and presumably connects to the toilet room drain line. The brick at the pipe penetration is broken, and may be a source of water infiltration. The downspouts around the building typically discharge into a hub buried in the ground. There is a gap between the downspout and the leader that may permit water to escape. Several downspouts discharge directly on the ground. The exterior at the south side of the Multi-Purpose Room and the east side of the Office has a brick paved patio. The pavers are uneven, and several areas pitch back toward the building.

### Interior Observations

**Entry Sequence.** The current entry sequence takes a visitor to the Ecology Center through the Entry Vestibule and into the hallway connecting its different programmatic areas. (See Figure 4A. Existing Overall Plan: Interior Spaces) The reception desk is located inside of the office, but connected to the hallway via an internal window. The North wall is covered in a wood cladding that matches the wood ceiling and trusses above.

**West Entrance.** The West Entrance is typically utilized by those who park their bikes just outside the doors, and will come in to the building to fill water bottles or use restrooms.

**Restrooms.** The restrooms each contain two stalls, one being accessible, a lavatory, and a changing station. The men's restroom additionally contains a urinal. The restrooms' exterior walls are painted CMU, and their interior walls are painted gypsum with a tile wainscot. The floor is tile and the ceiling is painted gypsum with surface mounted fluorescent lights.

**Classroom.** The classroom currently houses the animals of the Ecology Center and provides space for the center's educational goals as well as hosting community events.



13 Entry Vestibule, View West



14 Entry Vestibule, Classroom



15 Entry Vestibule, View East



16 Corridor, looking East



17 View into Office Area



18 Corridor, looking West



19 Classroom



20 Classroom, looking West



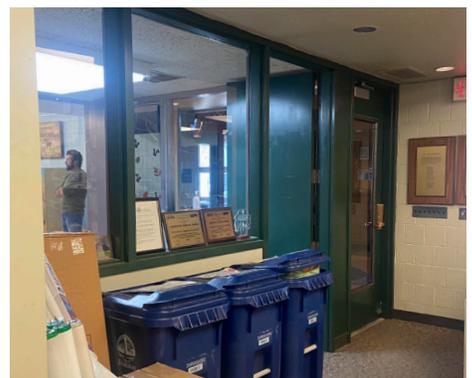
21 Classroom, casework



22 Office Area



23 Office Area



24 Office Connection Area



Figure 4B. Existing Overall Plan: Interior Spaces

The classroom consists of two primary spaces, the larger one to the North and a smaller addition to the South. A majority of the walls are painted CMU, with the exception of the East wall of the larger room being clad in wood. The West wall of the room is occupied by cabinets, a two-height counter that runs the full length of the room, and two sinks. There is a higher portion of the ceiling in the classroom that angles upward to an east-facing skylight. The classroom addition houses a large artificial tree that holds animal habitats. There are large windows in this addition and a door to the exterior.

**Office.** The office consists of a large open office with five desks and a private office connecting the office and classroom. (See Figure 4B. Existing Overall Plan: Interior Spaces) There are two exterior doors on the East wall of the office, two interior doors on the East wall, and one interior door on both the North and South walls. Additionally, there is a kitchenette with a refrigerator, oven, dishwasher, and microwave on the West wall of the room and a coat nook next to it.

**Circulation.** Circulation for the Ecology Center primarily occurs through a single primary hallway running East to West that connects all of the public-facing programmatic areas.

**Multipurpose Room.** The multipurpose room is the newest addition to the center. It consists of a large open flex space with ancillary storage and mechanical closets on the East and West walls. Large wood trusses support the roof above. A tall stone fireplace is situated at the midpoint of the North wall, and there are two exterior double doors on the South wall.

**Storage.** Storage is of utmost concern to EEC staff in order to support program facilitation both at the Center and other areas remote. A significant amount of physical program material, along with cleaning and building material are located in the same room as the Electrical Panels. There are additional materials that have been housed in a lean to outdoor structure on the South side of the building.



25 Office Area, Kitchen



26 Office Area, Workspace



27 Office Area, looking East



28 Mechanical Room



29 Electrical Room



30 Mechanical Room



31 Multi-Purpose Room



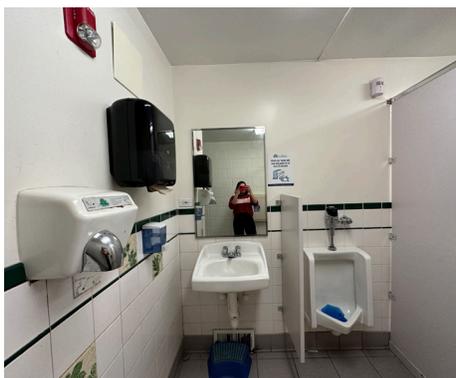
32 Multi-Purpose Room, looking West



33 Multi-Purpose Room, looking East



34 Women's Bathroom



35 Men's Bathroom



36 Bathroom Entrance Area

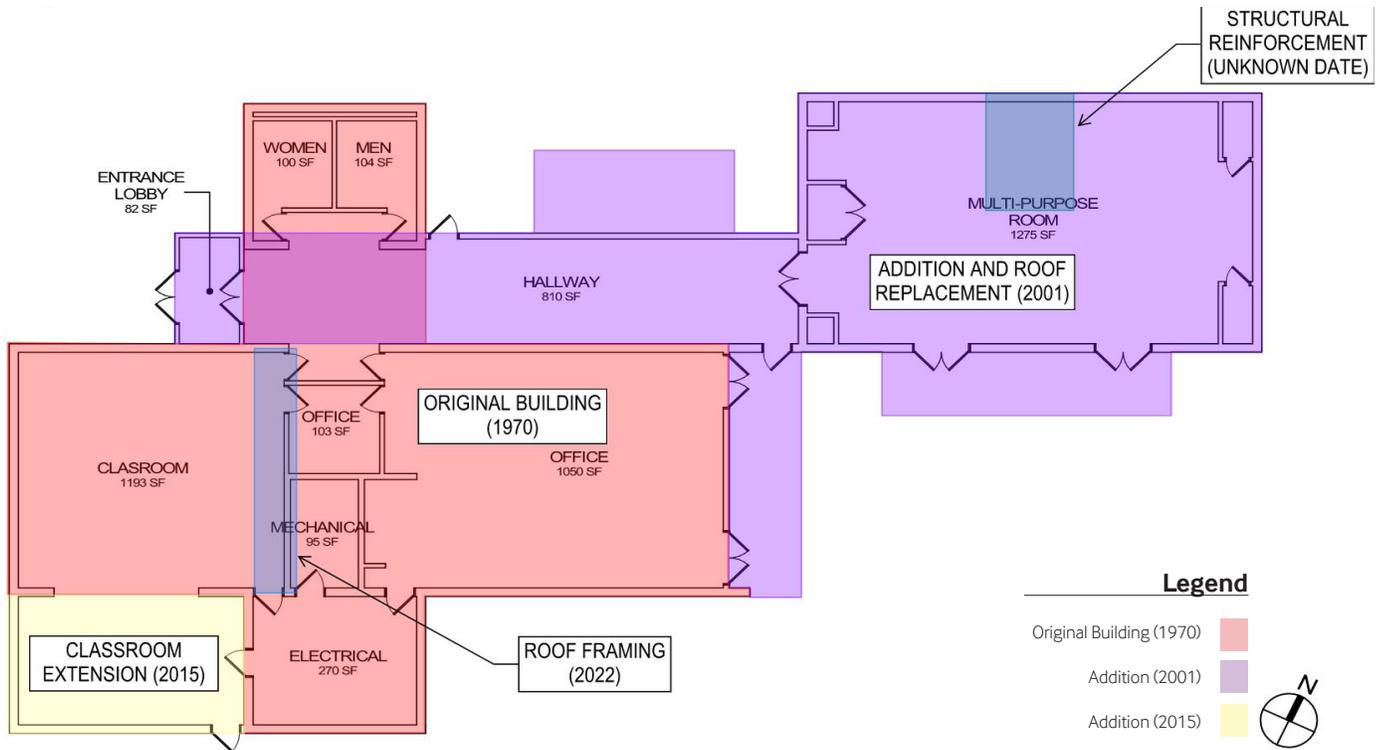


Figure 5. Existing Overall Phasing Plan

## Structural

The following shall serve as the Investigation and Program Validation structural design narrative, which includes a basis of design and existing conditions survey, for Evanston Ecology Center. Evanston Ecology Center is an existing single-story building located at 2024 McCormick Blvd in Evanston, Illinois and is owned and operated by the City of Evanston. The original building was built in 1973, with additions completed in 2001 and 2015. (See Figure 5. Existing Overall Phasing Plan)

The scope and information presented in this narrative are based on the Request for Proposal for the Ecology Center Renovation issued by the City of Evanston on July 7, 2022 and documentation and information provided by HPZS. Additionally, Silman completed a site visit with HPZS on January 10, 2023. The intention in releasing this narrative to the team is to be used by the City of Evanston to determine the scope of the project.

**Structural Loads.** The structural loads presented on the facing page assume the structure is Risk Category II (ASCE 7-16, Table 1.5-1). For both Live and Snow Loads, the following values are specified by the applicable codes and standards, see Figure 6 Live Loads and Figure 7. Snow Loads.



25 Existing Joists



26 Crack in a Corner



27 Exterior Brick Deterioration



28 Existing Foundation Wall



29 Existing Foundation Pier



30 Existing Foundation and Wood Structural Members

Occupancy or Use	Live Load	
	Uniform (psf)	Concentrated (lbs)
Office Use	50	2000
Lobby Use	100	
Classrooms	40	1000
Other Assembly Areas	100	
Mechanical	75	
Unoccupied Roof	20	

Figure 6. Live Loads

Snow Loads	
Ground Snow Load (ASCE 7-16, Figure 7.2-1)	$p_g = 25$ psf
Surface Roughness Category (ASCE 7-16, §26.7)	B
Exposure Factor (ASCE 7-16, Table 7.3-1)	$C_e = 1$
Thermal Factor (ASCE 7-16, Table 7.3-2)	$C_t = 1$
Importance Factor (ASCE 7-16, Table 1.5-2)	$I_s = 1$
Flat Roof Snow Load (ASCE 7-16, Eqn. 7.3-1)	$p_f = 18$ psf

Figure 7. Snow Loads

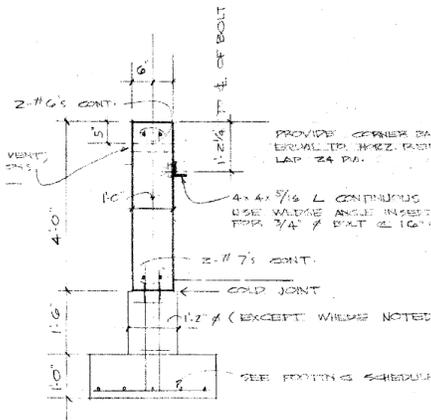


Figure 8. Section through Grade Beam, Pier and Footing from 1973 Construction Documents



Figure 9. Connection of Concrete Pier and Steel Beam Below to Classroom Area



Figure 10. Existing Conditions of Joists Below Mechanical Room

**Serviceability.** The serviceability criteria shall be the most restrictive of either those in applicable code reference, or those presented below:

**Gravity Deflections.** For roof members live/snow load deflection shall not exceed  $l/240$ , and the dead + live load deflection shall not exceed  $l/180$ .

For floor members the live load deflection shall not exceed  $l/360$ , and the dead + live load deflection shall not exceed  $l/240$ .

For members supporting plaster ceilings the live load deflection shall not exceed  $l/480$ , and the dead + live load deflection shall not exceed  $l/360$ .

For members supporting masonry walls the dead + live load deflection shall not exceed  $l/600$ .

**Vibrations.** No criteria have been provided to limit vibrations for sensitive equipment or sensitive historic fabric. Where human comfort is the criteria for limiting pedestrian induced motion, floor framing vibration due to footfall vibrations will be verified. Where vibrations are caused by running machinery, they should be isolated by damping devices or by the use of independent foundations.

**Structural Materials Specifications.** For new structural elements, it is assumed the provided materials will meet the following specifications:

**Concrete**

- Compressive Strength  $f_c = 4000$  psi typical, 3000 psi at slab on deck, 5000 psi and higher if required for design
- Concrete Density  $\gamma = 150$  pcf normalweight, 115 pcf lightweight
- Reinforcing Bars ASTM A615 Grade 60
- Welded Wire Fabric ASTM A1064 (65 ksi min. yield)

**Steel**

- Wide Flange ASTM A992
- Hollow Structural Sections ASTM A500, Grade B
- Structural Pipe Sections ASTM A53, Grade B
- Channels, Angles & Plates ASTM A36
- High Strength Bolts ASTM A325
- Welding Electrodes AWS 5.1, Class E70xx

**Masonry**

Concrete block shall be of lightweight aggregate and conform to the following standards: solid/hollow block: ASTM C90, Grade N1. Unless otherwise noted on plans and/or elevations, concrete block unit strength shall be 1900 psi min. Mortar shall be ASTM C270, Type S. Grout shall be ASTM C476 with a 2000 psi minimum compressive strength. (See Figure 11. Compressive Strengths)

**Wood**

- Rafters & Joists Doug Fir-Larch or Hem Fir #2
- Beams, Girders & Headers Doug Fir-Larch or Hem Fir #1
- Studs & Plates Doug Fir-Larch or Hem Fir Stud Grade

### Existing Building Structural Description

The Evanston Ecology Center was originally constructed in 1973, which included the areas that are now restrooms, classroom, offices, mechanical, and electrical rooms (see Figure 5. Existing Overall Phasing Plan). Based on the existing construction drawings, 1'-0" thick, 4'-0" tall concrete grade beams extend along the entire perimeter of the building, as well as at intersecting walls (see Figure 8. Section through Grade Beam, Pier and Footing from 1973 Construction Documents). Openings were created in the grade

Net area compressive strength of concrete masonry unit, psi	Net area compressive strength of masonry assembly, $f'_m$ , psi (using Type S mortar)
1900	1500
2800	2000
3750	2500
4800	3000

Figure 11. Compressive strengths

beams to allow for mechanical and plumbing to run through. Concrete piers located at corners, wall intersection, and mid-points between provide a transfer point between the frost walls and the isolated footings below. The piers are typically 1'-6" tall. Isolated concrete footings, 1'-0" in thickness, range from 4'-0" x 4'-0" to 6'-6" x 6'-6", depending on the loading supported. Based on the existing drawings, it is assumed the isolated footings are located approximately 6'-6" below the exterior grade.

The exterior grade of the building was set to match approximately the interior finished floor level. The grade on the interior face of the concrete grade beams varies slightly, but was backfilled with fill to create an approximately 2'-0" crawl space. The concrete grade beams, as well as some of their openings, were visible on site. The piers were observed at the location of probes (see Figure 9. Connection of Concrete Pier and Steel Beam Below to Classroom Area). All footings were located below grade and were therefore not visible. Sitting water was observed at the access point in the hallway near the restroom. Dampness was observed below the classroom, but no moisture related deterioration of structural members was observed.

At the mid-span of the classroom/office space, the existing construction documents indicate 10" deep wide flange beams spanning in the east/west direction. This area was not accessible from the access points, so Silman was unable to confirm the condition of these members. Spanning between the steel beams and the perimeter walls are 2x12 joists spaced at 16" on center. Where accessible, these joists were observed to typically be in good condition. However, a member of the EEC staff informed us that a piece of mechanical equipment in the mechanical room had been leaked, and joists below this area were observed to be deteriorating (see Figure 10. Existing Conditions of Joists Below Mechanical Room.) Temporary wood shoring posts were also observed in this area, along with rusting to the mechanical and electrical equipment.

Around the perimeter, 6" thick CMU block walls were provided. At the mechanical room and bathrooms, a 4" thick CMU block wall was provided. The block wall is always the interior facing wall, while the exterior comprised of 8"x8"x4" brick (see Figure 12. Wall Section from Existing Construction Documents) It is assumed that these walls not only act as the gravity-supporting system of the building, but also the lateral resisting system.

Typically, the interior and exterior masonry was observed to be in good condition. In the electrical room, some cracks were observed at the west wall interface (see Figure 14. Crack observed at Northwest Corner of the Electrical Room) At the exterior, the brick was observed to be deteriorating in a few ways on the southeast corner of the larger office space (see Figure 15. Deterioration of the exterior brick at the northeast corner of the larger office). This wall follows the upward include of the roof and extends beyond the interior space to the east. This deterioration included cracking, crazing, and open joints.

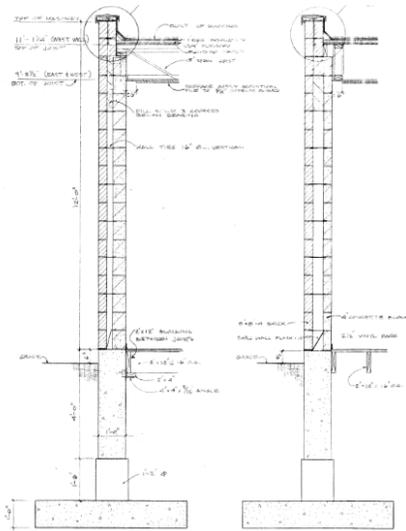


Figure 12. Wall Section from Existing Construction Documents



Figure 13. Exterior of Evanston Ecology Center at Entrance



Figure 14. Crack observed at Northwest Corner of the Electrical Room

There were past repairs at some cracks were observed, but many of the past repairs were observed to have failed. A probe was completed on the interior face of the wall and no deterioration of the CMU block was observed.

Based on the existing construction drawings, the roof above the classroom/office spaces are typically supported by 15" deep span joists at 2'-0" on center. At the inclined portion of the larger office, the roof shifts to be supported by 21" deep span joists. At the inclined portion of the classroom, the roof is supported by 2x6 joists at 16" on center. The roof about the bathrooms and electrical rooms are supported by 2x10 joists at 16" on center. All of the roof joists were covered by existing finishes and not observed while on site.

In 2001, a large addition was added to the northwest end of the building, including the entrance lobby, hallway, multi-purpose room, and exterior trellises. Based on the existing addition drawings, concrete foundation walls were added around the perimeter of the new structure (see Figure 16. Existing Foundation Wall in the Hallway). The walls are 10" thick at the hallway and entry and 12" thick at the multi-purpose room. These footings extend down at 1'-0" thick footings that extend 4" on each side of the wall. At the center of the multi-purpose room, 18"x18" concrete piers were located at mid-points (see Figure 18. Existing foundation Pier at Multi-Purpose Room). Based on the existing addition drawings, each pier is supported by a 3'-6"x3'-6" isolated footing.



Figure 15. Deterioration of the exterior brick at the northeast corner of the larger office

Similarly to the original building, the exterior grade of the building was set to approximately match the interior finished floor level. The grade of the interior face of the concrete foundation wall varies slightly, but was backfilled to create an approximately 3'-0" crawl space. At the multi-purpose room, a general dampness/humidity was observed in the crawl space, but no deterioration was observed at the wood structural members. The foundation walls were observed to be in good condition where they were not covered by insulation. The piers at the multi-purpose room were observed to be in good condition. The footings of all foundation elements were not exposed and therefore not observed. Mechanical and electrical runs were also observed in the addition's crawlspace.

At the hallway, the main level was observed to be supported by typically (2) 2x10 joists spaced at 16" on center. The existing drawings specified (1) 2x10 spaced at 16". It is unclear why an additional ply was implemented during construction. A ledger was observed on each side of the foundation walls with hangers supporting the joists. Silman observed that only the joist was supported by the hanger at some of double-ply joists. TJI joists are spaced at 16" on center (see Figure 19. Existing Foundation and Wood Structural Members at Multi-Purpose Room). Additional framing was observed around the fireplace but was not accessible. The additional drawings indicate (2) 2x12 members. However, an EEC staff member indicated the area around the chimney had additional structural work completed later to resolve a deflection and/or vibration issue.



Figure 16. Existing Foundation Wall in the Hallway

At the multi-purpose room, (3) 16" deep LVLs span in the east/west direction between the perimeter foundation walls and the two concrete piers. Perpendicular to the LVLs, 12" deep Similarly to the original building, 8" thick CMU block walls with an exterior face brick were used at the addition. The existing roof over the original entrance area was demolished and a new wood roof was placed over the hallway and multi-purpose rooms (see Figure 17. Existing Addition Drawings - Extent of Roof Replacement). An exposed wooden truss system was used to support the new roof at the addition (see Figure 20. Wood Trussed Roof at Multi-Purpose Room). At the multi-purpose room, the main rafters were observed to be (2) 3x12 (actual size) with a 6x12 ridge board and (2) 2x10 ties. At the hallway, (2) 3x8 (actual size) rafters were used instead.

In 2015, the greenhouse was demolished and a classroom extension at the southwest corner of the building was completed. Based on the construction drawings for the addition, a 10" thick concrete foundation wall was poured. The foundation wall supported by a 1'-0" thick x 1'-10" wide continuous footing was to match the existing bottom. The existing drawings indicate that the footings are located approximately 6'-0" below the interior finished floor. Unlike the other areas of the building, a 5" thick slab-on-grade was used to support the main floor. All the existing foundation elements were inaccessible.

Like the rest of the building, 8" thick CMU block was used around the perimeter of the addition. The exterior is clad in wood instead of brick (see Figure 21. Southwest Exterior Corner of Classroom Extension). Based on the addition drawings, the roof of the classroom addition is supported (5) W8x13 steel beams, spanning in the north/south direction. Two of the beams were designed to support mechanical units. 1-1/2" deep metal roof deck spans perpendicular to the beams.

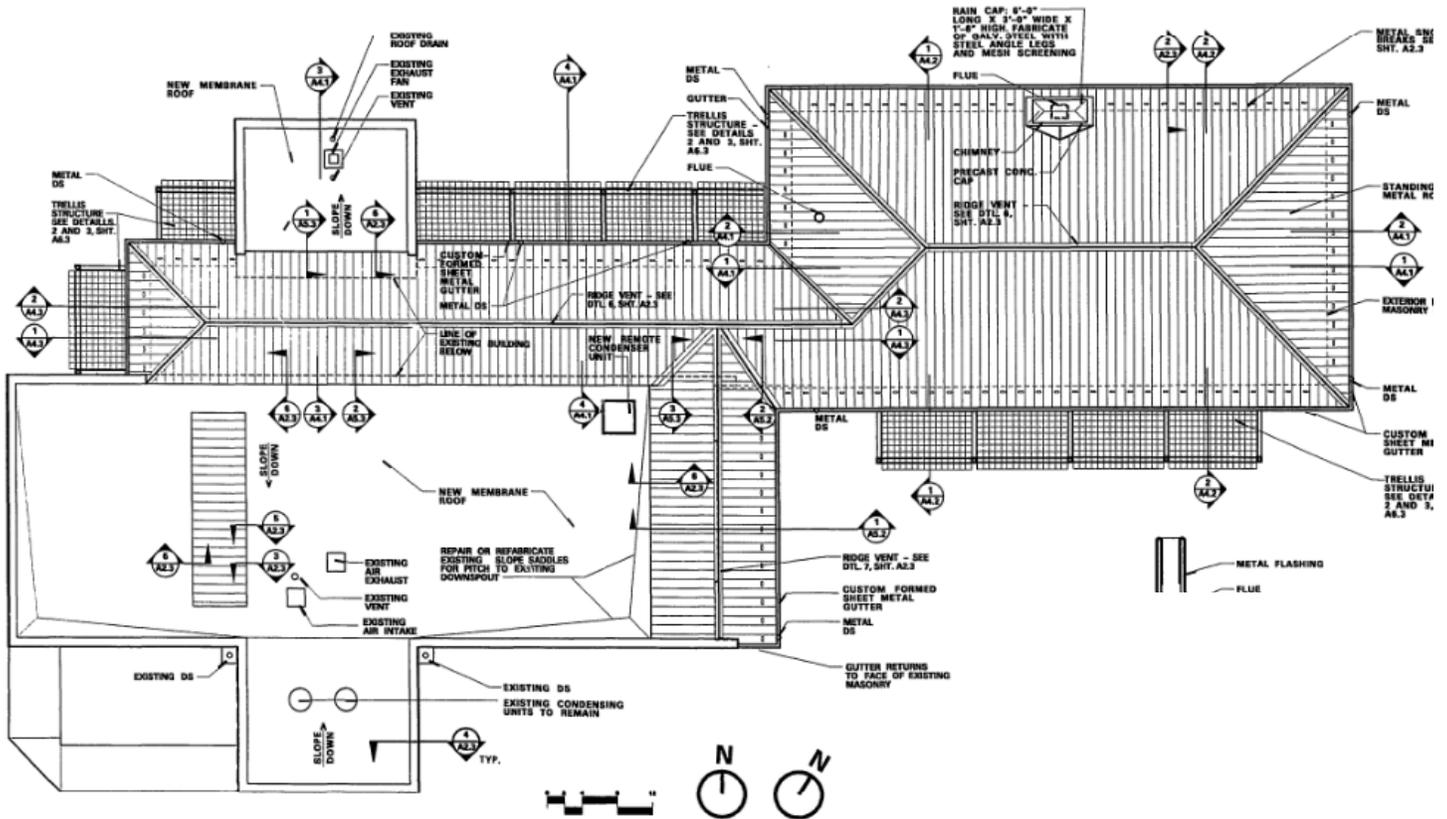


Figure 17. Existing Addition Drawings - Extent of Roof Replacement.



Figure 18. Existing foundation Pier at Multi-Purpose Room



Figure 19. Existing Foundation and Wood Structural Members at Multi-Purpose Room



Figure 20. Wood trussed Roof at Multi-Purpose Room



Figure 21. Southwest Exterior Corner of Classroom Extension



Figure 22. Nordyne MSA4BF048KB & \*O60KB (2010, 2011)

## Mechanical Observations

The classroom and office spaces that are part of the 1973 building are served by furnaces with gas heat and DX cooling. The classroom has an upflow configuration where air is supplied through wall mounted diffusers and returned through ductwork in the crawlspace. Some supply air branches off to the crawlspace to serve the restrooms and vestibule.

The office space has a downflow configuration where air is returned from above and supplied through the crawlspace to floor mounted and baseboard mounted diffusers. The diffusers are generally blocked by furniture so air distribution and temperature control are poor in this space. Neither system appears to have outside air connections. A 4-ton and 5-ton condensing unit on the roof were manufactured in 2010 and 2011 and approaching their useful ASHRAE service life of 15 years. (See Figure 22. Nordyne MSA4BF048KB & \*O60KB (2010, 2011)) They use R-410A refrigerant.



Figure 23. Maytag MGC2TC120D45D & MGC2TL120D45D (2009, 2011)

The furnaces are manufactured by Maytag in 2009 and 2011. (See Figure 23. Maytag MGC2TC120D45D & MGC2TL120D45D (2009, 2011)) There are several low curbs and penetrations through curb sides on the roof that may contribute to water infiltration into the mechanical room.

The multi-purpose ballroom and associated entry corridor was added as an extension to the original building in 2001. The spaces are served by a downflow furnace with gas heat and DX cooling. The supply air is ducted through the crawlspace to floor mounted diffusers. Air is returned through the top of the furnace closet. A dedicated water line and ducted humidifier were installed for the unit.

The system consists of a Trane cooling coil and 5-ton outdoor condensing unit manufactured in 2002. (See Figure 24. Trane 2TTR2060A1000AA Condensing Unit (2002)) It uses discontinued R-22 refrigerant. A Goodman gas-fired heating and fan section was retrofitted onto the cooling coil in 2013. The ASHRAE typical life expectancy for a residential grade system is 15 years.



Figure 24. Trane 2TTR2060A1000AA Condensing Unit (2002)

Overall, the system appears to be in poor condition. There is no outside air connection for code-required ventilation. It is past its useful service life and it was reported by the engineering department that the system is near failure and will require immediate replacement. It was also reported that the system is deficient at conditioning the entry corridor. They would like the future system to have separate zoning for the corridor.

## Entry / Circulation

The entry vestibule is served by underfloor ducted air from the classroom furnace connected to wooden diffusers. It was reported that this does not adequately heat the vestibule in the winter. Similarly, the restrooms are fed by underground ductwork and it was reported that they are not adequately heated or cooled. The metal floor diffusers are heavily corroded from condensation.

## Classroom

The classroom addition is heated and cooled by a 1-ton Panasonic split system heat pump with condensing unit on the roof and cassette mounted in the ceiling. The system is approximately 5 years old. It was reported that the cooling system fights with the other systems in the space because they do not have coordinated controls.



Figure 25. ComEd meter and C/T section outside

Supplemental heat is provided by electric baseboard heaters around the perimeter of the room. The baseboards are covered up by animal enclosures and very dirty. From an engineering standpoint, there is concern that this type of heat could be a fire risk due to the bedding used in the animal enclosures.

The main furnaces throughout the building have thermostats tied into Evanston's Schneider Electric EcoStruxure building management system. The systems communicate through an internet hub in the building.

### Electrical Observations

Electrical service (600A, 120/240V, 1ph, 3W) is entering the building from east side of the Storage room via ComEd meter and C/T cabinet. (See Figure 25. ComEd meter and C/T section outside). The two (2) 4" conduits then routed to junction box inside to feed 400A distribution panel in Storage room and 200A power panel in Mechanical room.



Figure 26. 200A panel in Multi-Purpose room

The 400A distribution panel is located in storage room and appears to have code required 3 feet clearance in front of the panel with red line marked on the floor however end users should be careful not to block the access to the panel.

The 200A panel located in Mechanical room is not shown on City's permit document and it appears to be double tapped from service entrance cabinet. (See Figure 26. 200A panel in Multi-Purpose room). The panel is outdated model and located near the water sources such as mop basin and water heater. It is recommended to be relocated and replaced after verification of feeder routing.

There are two more panels for the facility's power distribution and lightings. One (1) 100A panel is located near the entrance door to Storage room and One (1) 200A panel is located in the added Multi-purpose room. These panels are sub fed from 200A panel located in Mechanical room and 400A distribution panel in Storage room respectively.



Figure 27. Typical fluorescent light fixtures

The overall capacity of the electrical service appears to be adequate to support mechanical and plumbing equipment replacement to meet the City's CARP goal however final power consumption of the equipment has to be coordinated throughout the design process

Most light fixtures for the facility still utilize fluorescent bulbs (See Figure 27. Typical fluorescent light fixtures) except some fixtures with LED replacement bulbs. The areas which will be modified shall be equipped with high efficient LED type fixtures with energy code complaint control system such as occupancy sensor, daylight sensor and dimming control.

Emergency lighting for the facility is provided by battery backup EM lighting and Exit signs which meet the code requirement. The modified areas will be equipped with LED type battery backup units for high efficiency.

### Plumbing

Domestic water is provided from the municipal main at McCormick Blvd and enters the building within the crawlspace below the main toilet rooms. The service size appears to be 2" which is adequate to provide code compliant demand for all existing



Figure 28. Domestic water meter in crawlspace and PVC waste below floor

fixtures. An RPZ (See Figure 29.. RPZ in crawlspace) supplies exterior water features and irrigation and is located adjacent to the water meter in the crawlspace. It is recommended that the RPZ be moved outside of the crawlspace to a space more conducive to access and testing. The building relies on city pressure and no issues were reported with pressure at the fixtures. Observable piping from the hatch access point was copper, uninsulated, and appears to be in relatively good condition.

Domestic water piping is routed below the floor slab within the crawlspace. Crawlspace access points are available to access the piping, however, space is limited. Visible piping was a mix of copper and galvanized. Domestic water is routed below the floor and “pops up” at fixture locations. No piping insulation was observed.

Sanitary waste and vent piping was not observed to a great extent as access to the crawlspace was very limited. The observable piping was found to be PVC and in relatively good shape.

**Classroom:** Three total sinks. High/Low single bowl sinks in large area. Double bowl, counter mount in small area.

**Mechanical:** Mop sink, square, terrazzo with condensate discharge pipe. Washing machine.

**Office:** Single bowl pantry sink with grease trap and adjacent dishwasher.

**Hallway:** Hi/Low drinking fountain with bottle filling station.

**Mens and Womens Toilet Rooms:** Floor mount, water closets with flushvalve trim, wall mount urinal with flushvalve trim and wall mount lavatories with metering faucets.

**Multi-Purpose Room:** Counter mount single bowl sink.



Figure 29.. RPZ in crawlspace.

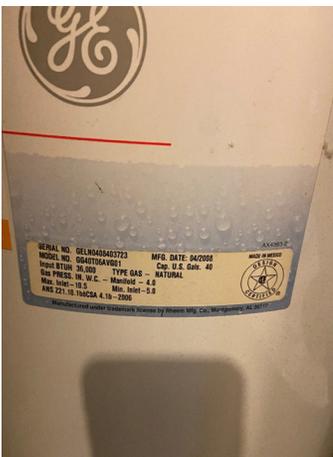


Figure 30. Gas Fired water heater name plate



Figure 31. Gas Fired water heater



Figure 32. Galvanized piping below classroom sink

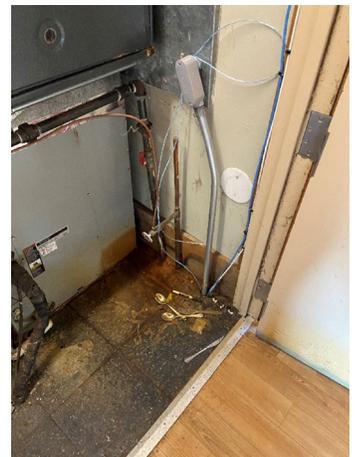


Figure 33. Copper piping at Multi-Purpose room Furnace



Figure 34. PVC Waste above floor



Figure 35. High and Low sinks



Figure 36. Double bowl Sinks



Figure 37. Mop Basin



Figure 38. Office Pantry sink with Dishwasher



Figure 39. Drinking Fountains



Figure 40A. Typical Toilet Room Fixtures



Figure 40B. Typical Toilet Room Fixtures



Figure 41. Multi-Purpose Room Sink

# 4.0

**Design  
Investigations /  
Programming**

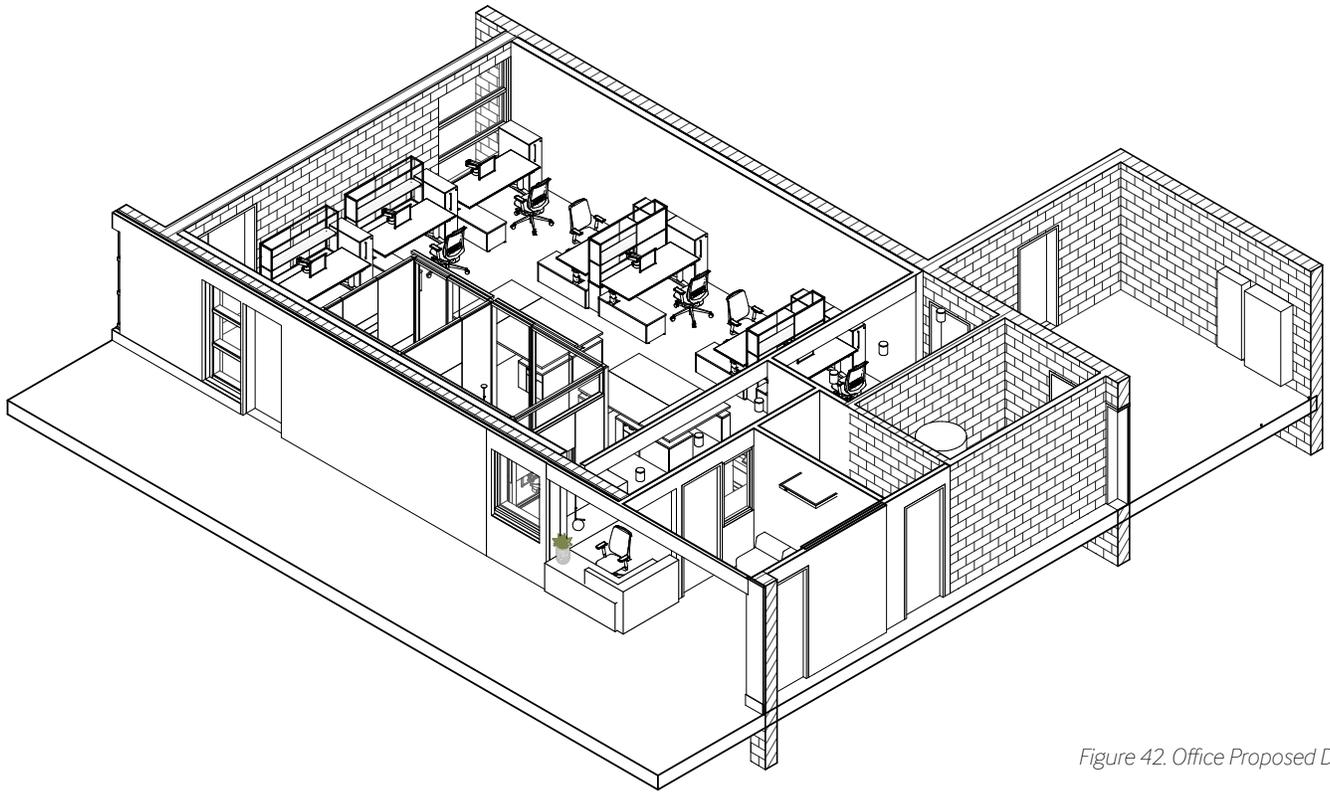


Figure 42. Office Proposed Design

## Program Research

The Evanston Ecology Center is a City of Evanston Facility, striving to foster a greater appreciation, awareness, and knowledge of the natural environment and our interdependence with it through educational programs and services. This facility and mission is supported by the Evanston Environmental Association (EEA) The Parks, Recreation, and Community Services Department (PRCS) operates the Ecology Center and uses it as a base of operations for many programs to serve the City of Evanston.

### Programs

The Evanston Ecology Center was originally built in 1974 and contained a lecture room, a laboratory, storage and public restrooms. The center received a major addition and renovation which added a multipurpose room, corridor, and vestibule. The existing laboratory was converted to a classroom, and the existing classroom was converted into an office. In 2015, an extension was added to the classroom as well as some improvements to the classroom floor. The Ecological Center is now 6,200 square feet.

As the operations located at the Ecology Center have evolved, the needs of the building have changed. There is substantial need for a customer service desk at the center which is currently provided through an interior window. Additionally, a public seating area outside of the classroom and office will be added. Lastly, the open office area is arranged in a way that inhibits phone conversation, A new layout with acoustics considerations in tangent with room for additional staff will be included in the project. (See Figure 42. Office Proposed Design)

# Evanston Ecology Center

## Personas

### Demographics

Several demographics are currently served by the Ecology Center. These include full and part-time staff, program and camp attendees, renters, birthday parties, school and scout groups, as well as volunteers and event attendees. In the future there will be an expansion of Ecology Center services that will include boat launch users and stewardship volunteer groups. (See Figure 43. Persona Demographics)

### Weekday Use

Through the weekdays, the Ecology Center has users like Full-Time and Part-Time staff, Program Attendees, Renters, School Groups spread out through all interior and exterior spaces

### Weekend Use

During weekends, the Ecology Center has Birthday Party guests, Program Attendees, Program Instructors and Full-Time staff mainly occupying most interior spaces and the exterior parking lot

### Warmer Months

In Warmer months, the Ecology Center is filled with Camp Attendees, Seasonal Staff, Sporadic Volunteers, Casual Visitors, and Potentially Canoe Boat launch users using all interior spaces and the channel, the parking lot, the canal and the arboretum

### Colder Months

In the Colder Months, the Ecology Center Serves as a shelter for the Indoor Farmers Market, Vendors and other organizations, staff and other sporadic visitors. (See Figure 44. Personas through the Year)



Figure 43. Persona Demographics

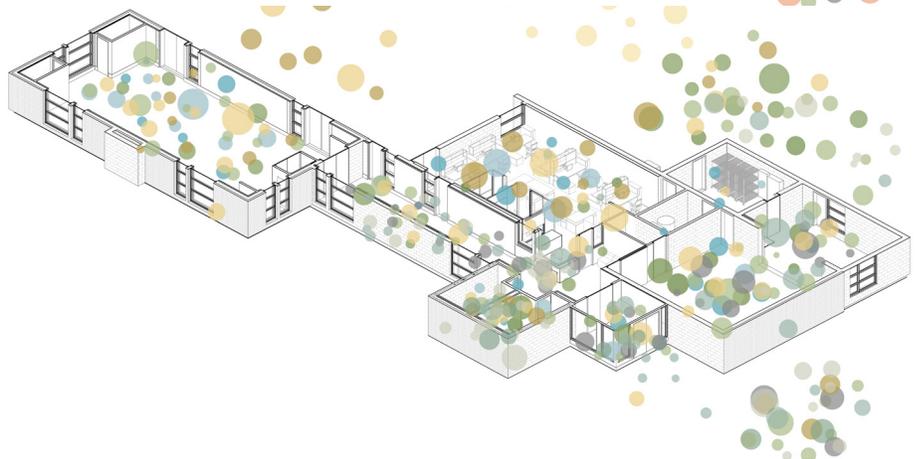
## Weekdays



## Weekends



## Warmer Months



## Colder Months

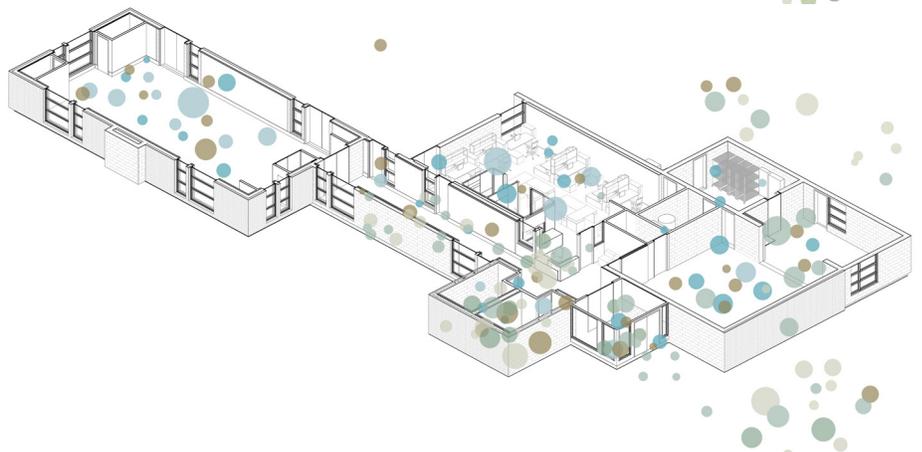


Figure 44. Personas through the Year

# 5.0

**Selected Design  
Option**

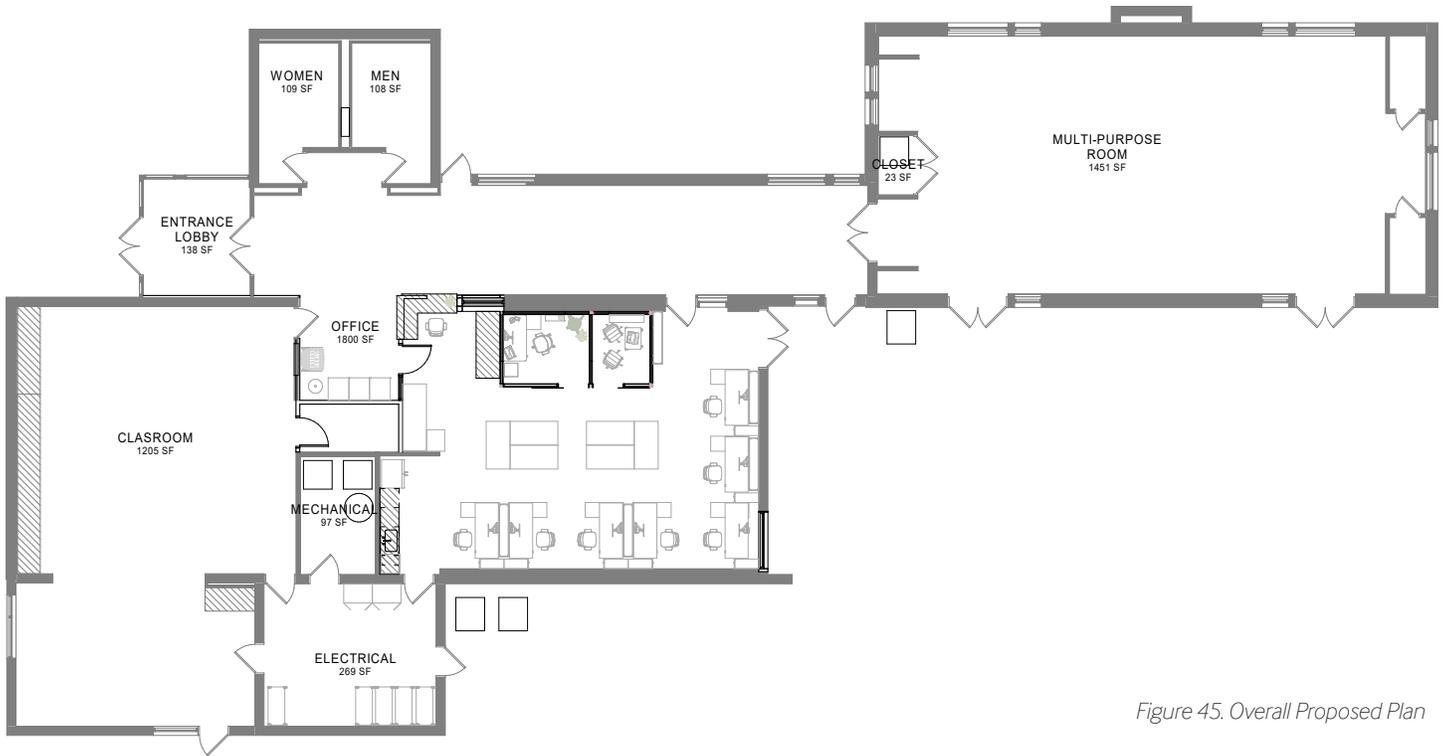


Figure 45. Overall Proposed Plan

## Selected Design Option

The above plan (See Figure 45. Overall Proposed Plan) was developed with feedback from the Evanston Ecology Center Staff over the course of four meetings during the months on January and February of 2023. During these design meetings, several key priorities arose for the new design of the open office space were discussed. These priorities influenced the final design in the following ways.(See Figure 46. Proposed Strategies)

### Create a new entry sequence

With the removal of the existing private office, additional space was able to be given to reception. This expansion allowed for the addition of a dedicated seating area. In addition, the reception desk was moved from its current location to the northwest corner of the open office in order to be more visually accessible from the entrance lobby.

### Mitigate acoustics

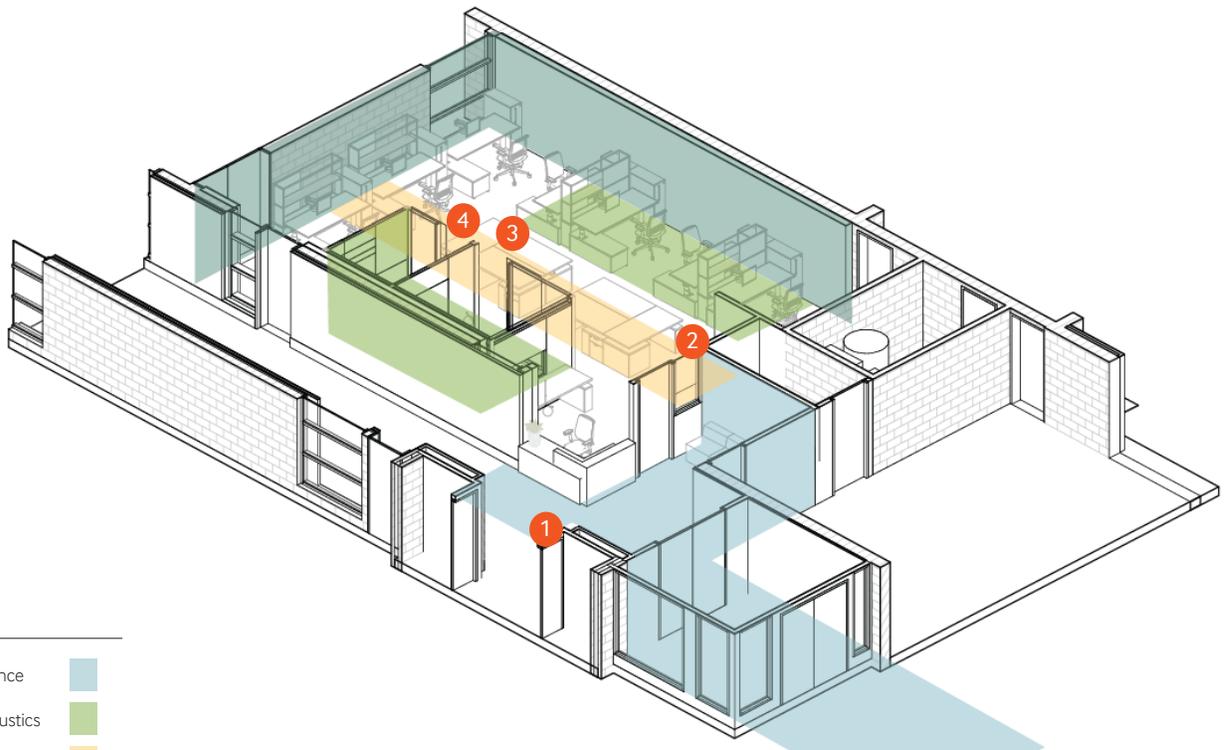
In order to address acoustical concerns, desks in the open office were separated and moved to the perimeter of the room. Additionally, tall, sound-attenuating separations were added between facing desks. To provide instances of additional acoustic separation, a private office and phone room were added.

### Centralize circulation

As individual desks were moved to the perimeter of the office, a central collaboration zone was created. The clusters of low tables allow for staff to both lay out items for ecology center events and store shared materials and equipment.

### Room to grow

Over the upcoming years, the Ecology Center anticipates the need for additional staff. With this in mind, HPZS brought a people-first perspective to the design, and increased the number of workstations from five to eight.



**Legend**

- Entry Sequence
- Mitigate Acoustics
- Central Circulation
- Room to Grow

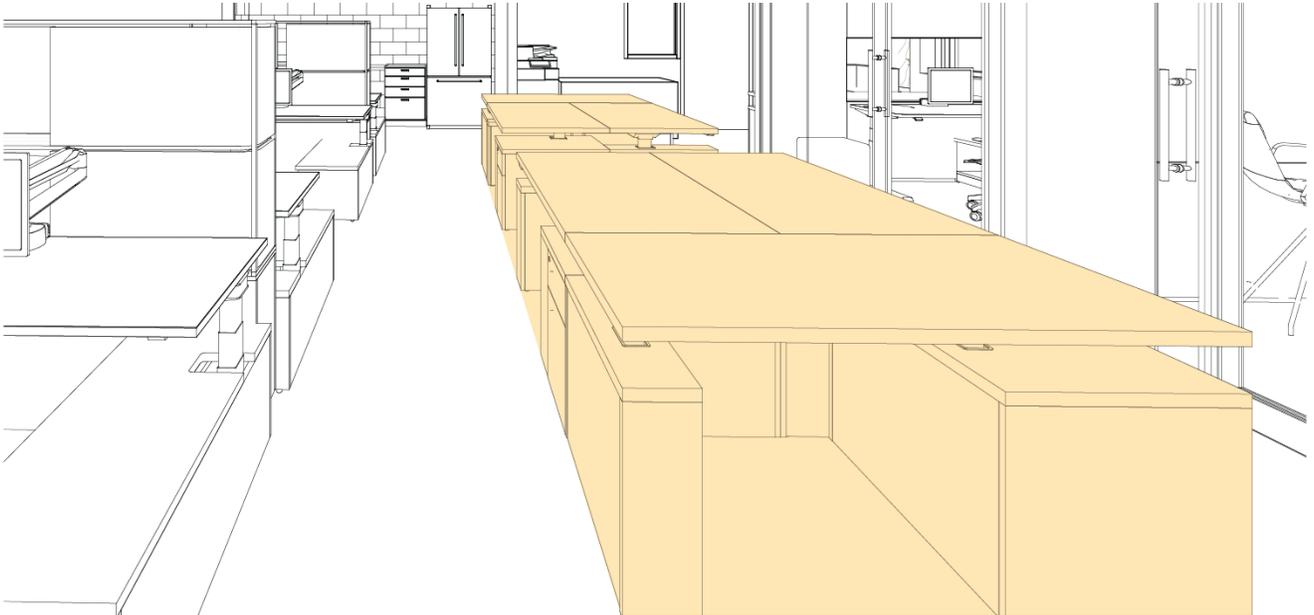
Figure 46. Proposed Strategies



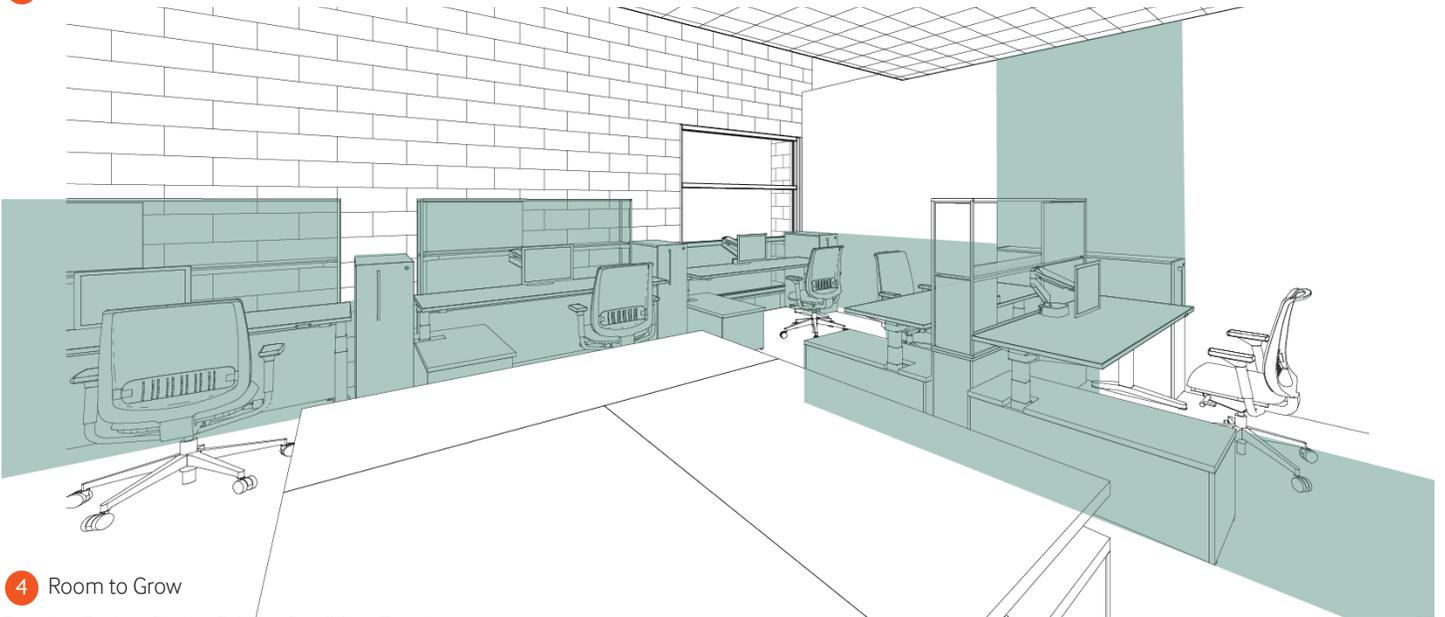
1 Entry Sequence



2 Mitigate Acoustics



3 Central Circulation



4 Room to Grow

# 6.0

## **Cost Estimate**

# Cost Estimate

Presented on the following pages is a Conceptual Cost Estimate, created by Bulley & Andrews, dated February 24, 2023, and updated on March 17, 2023 with additional information from the City of Evanston . It is based on information contained in this report from all disciplines, and has been reviewed by those disciplines. Also included is an additional page for possible Alternates to be considered by the City of Evanston.

**Estimate: 265 1230163 Evanston Ecology Center**

**Estimate Cost Totals**

Description	Total	Percent of Cost	Cost/SF
00 General Conditions	\$200,000	9.03%	32.26
01 General Requirements	\$162,500	7.34%	26.21
02 Existing Conditions	\$50,675	2.29%	8.17
04 Masonry	\$49,200	2.22%	7.94
05 Metals	\$1,000	0.05%	0.16
06 Woods, Plastics & Composites	\$111,855	5.05%	18.04
07 Thermal and Moisture Protection	\$8,652	0.39%	1.40
08 Openings	\$76,941	3.48%	12.41
09 Finishes	\$148,590	6.71%	23.97
10 Specialties and Accessories	\$3,000	0.14%	0.48
11 Equipment	\$6,200	0.28%	1.00
22 Plumbing	\$84,760	3.83%	13.67
23 HVAC	\$209,100	9.45%	33.73
26 Electrical	\$216,950	9.80%	34.99
27 Communications	\$24,800	1.12%	4.00
<b>Sub-Total ()</b>	<b>\$1,354,223</b>	<b>61.18%</b>	<b>218.42</b>
Escalation Contingency - 5%	\$67,711	3.06%	10.92
Design & Estimate Contingency - 7%	\$94,796	4.28%	15.29
Construction Contingency - 7%	\$106,171	4.80%	17.12
Fee - 5%	\$81,145	3.67%	13.09
SDI - 1.2%	\$16,156	0.73%	2.61
Insurance - 1.1%	\$18,922	0.85%	3.05
Payment and Performance Bond per B&A Surety Rates	\$20,000	0.90%	3.23
<b>Sub-Total ()</b>	<b>\$1,759,125</b>	<b>79.47%</b>	<b>283.73</b>
Architect Fees	\$144,500	6.53%	23.31
FF&E - Artwork, Furniture, Window Treatments, etc.	\$300,000	13.55%	48.39
Utility Contract Service Fees	\$0	0.00%	0.00
Construction Material Testing	\$5,000	0.23%	0.81
Owner Content Removal	\$0	0.00%	0.00
Owner Provided Low Voltage Systems - Security	\$0	0.00%	0.00
Signage	\$5,000	0.23%	0.81
Owner Contingency	\$0	0.00%	0.00
<b>Total Estimate</b>	<b>\$2,213,625</b>	<b>100%</b>	<b>357.04</b>

## 1230163 Evanston Ecology Center

## Estimate Detail

Description	Quantity	Unit	Unit Cost	Total
00 General Conditions	6,200.00	SF	32.26	200,000.00
<b>01 General Requirements</b>				
<b>01.0100 General Requirements</b>				
Lump Sum General Requirements	5.00	MO	32,500.00	162,500.00
<b>01 - General Requirements Totals</b>				<b>\$162,500.00</b>
<b>02 Existing Conditions</b>				
<b>02.0000 Self Perform</b>				
Remove Carpet	1,098.93	SF	3.92	4,307.37
Remove VCT	1,644.09	SF	4.15	6,819.12
Remove ACT Ceiling	1,431.25	SF	6.03	8,635.34
Remove Drywall Ceiling	299.31	SF	6.14	1,839.06
Remove Drywall Partition	47.79	LF	25.98	1,241.53
Remove Wood Wall Cladding	24.17	LF	29.00	700.86
Remove Wood Framing to Replace Deteriorating Wood Joists	42.64	LF	65.98	2,813.56
Remove Doors	5.00	EA	199.23	996.15
Remove Window	6.00	EA	346.77	2,080.62
Remove Frames	4.00	EA	49.23	196.92
General Clean-up	6,200.00	SF	0.27	1,648.58
<b>02.4100 Demolition</b>				
Resilient Flooring Demolition	4,926.50	SF	1.35	6,650.78
Remove subfloor as needed	1,005.42	SF	10.50	10,556.91
Tile Demolition	218.07	SF	5.25	1,144.87
Tile Demolition	198.80	SF	5.25	1,043.70
<b>02 - Existing Conditions Totals</b>				<b>\$50,675.37</b>
<b>04 Masonry</b>				
<b>04.0100 Masonry Maintenance</b>				
Exterior Masonry Repairs	1.00	LS	49,200.00	49,200.00
<b>04 - Masonry Totals</b>				<b>\$49,200.00</b>
<b>05 Metals</b>				
<b>05.5000 Misc Metals</b>				
Lintels - Double (Hot dip galvanized)	1.00	EA	1,000.00	1,000.00
<b>05 - Metals Totals</b>				<b>\$1,000.00</b>
<b>06 Woods, Plastics &amp; Composites</b>				

Description	Quantity	Unit	Unit Cost	Total
<b>06.1000 Rough Carpentry</b>				
Install Doors Frames & Hardware - Single	2.00	EA	950.00	1,900.00
Metal Strapping/2x4 Blocking	90.90	LF	14.00	1,272.60
Install Toilet Accessory - Per Each	20.00	EA	56.00	1,120.00
Install Upper Cabinets	9.05	LF	85.00	769.25
<b>06.1100 Wood Framing</b>				
New Wood Framing to Replace Deteriorating Wood Joists (REPLACE ALL 2"X12" JOISTS SUPPORTING MECHANICAL ROOM WITH 8" LVL OR 12" TJI @ 16" O.C. SPACING)	42.44	LF	250.00	10,610.00
Bulkhead Framing at New Reception Desk Only	11.08	LF	95.00	1,052.60
Structural Modification Allowance	1.00	AL	10,000.00	10,000.00
Repair subfloor as needed	994.10	SF	15.00	14,911.50
<b>06.4000 Millwork</b>				
Reception/Lobby/Security Desk Allowance	1.00	AL	18,500.00	18,500.00
Solid Surface Corian	14.53	LF	450.00	6,538.50
Metal Laboratory Base Cabinets	11.94	LF	750.00	8,955.00
Metal Laboratory Wall Cabinets	9.18	LF	650.00	5,967.00
Wood Paneling	355.76	SF	80.00	28,460.80
Millwork Installation - Cabinetry	14.38	LF	125.00	1,797.50
<b>06 - Woods, Plastics &amp; Composites Totals</b>				<b>\$111,854.75</b>
<b>07 Thermal and Moisture Protection</b>				
<b>07.1000 Waterproofing</b>				
Fluid Applied Waterproofing	1,236.00	SF	7.00	8,652.00
<b>07 - Thermal and Moisture Protection Totals</b>				<b>\$8,652.00</b>
<b>08 Openings</b>				
<b>08.1000 Doors, Frames &amp; Hardware</b>				
Fully Welded HM Borrowed Lites (2.5'Wx7'H)	1.00	EA	750.00	750.00
Door Light Frames & Glass	1.00	EA	500.00	500.00
HM Door - 20 minute	1.00	EA	650.00	650.00
HM Frame - Single - Welded	2.00	EA	400.00	800.00
Door Hardware Full Set: LCN closers, Mortise Lock Set, and Door Stop	2.00	EA	1,200.00	2,400.00
Wood Door	1.00	EA	850.00	850.00
<b>08.4000 Storefronts, Entrances and Curtainwall</b>				
Bird Glass Film	883.00	SF	40.00	35,320.00
Glass Doors - Single	2.00	EA	3,800.00	7,600.00
Interior Storefront - Non-Fire Rated	240.00	SF	80.00	19,200.00

costs for customer service desk

Page Number: 2

sustainability?

Description	Quantity	Unit	Unit Cost	Total
Windows - Aluminum Clad	47.95	SF	185.00	8,870.75
<b>08 - Openings Totals</b>				<b>\$76,940.75</b>
<b>09 Finishes</b>				
<b>09.2000 Drywall</b>				
Drywall Soffits	384.31	SF	35.00	13,450.85
Cut and Patch Drywall Ceilings	423.21	SF	25.00	10,580.25
New Chase Wall	181.20	SF	15.00	2,718.00
Drywall Partitions - Non-rated	378.53	SF	20.00	7,570.60
<b>09.3100 Tile</b>				
Ceramic Floor Prep	79.07	SF	4.00	316.28
Ceramic Base	39.26	LF	30.00	1,177.80
Ceramic Base (Kitchen)	21.11	LF	28.00	591.08
Ceramic Floor Tile	218.07	SF	30.00	6,542.10
Ceramic Floor Prep	218.07	SF	4.00	872.28
Ceramic Floor Tile at Kitchen	79.07	SF	23.00	1,818.61
Ceramic Wall Tile	710.56	SF	30.00	21,316.80
Ceramic Wall Tile Backsplash at Kitchen	32.13	SF	24.00	771.12
<b>09.5100 Acoustical Ceilings</b>				
Acoustic Ceiling	150.00	SF	10.00	1,500.00
ACT 2x2 - Standard (with exposed clerestory soffits included in Drywall)	1,307.12	SF	10.00	13,071.20
<b>09.6400 Wood Flooring</b>				
Repair wood flooring at all locations of invasive investigation/crawl space access hatches	68.66	SF	40.00	2,746.40
<b>09.6500 Resilient Flooring</b>				
Resilient Base	408.98	LF	5.00	2,044.90
Marmoleum Flooring (2 colors)	107.13	SF	13.00	1,392.69
Marmoleum floors (3 colors, 25%, 15%, 55%)	2,140.41	SF	13.00	27,825.33
Floor Prep	2,247.54	SF	2.25	5,056.97
<b>09.6800 Carpet</b>				
Carpet Floor Prep	960.55	SF	1.85	1,777.02
Replace carpet in Office with carpet tile (2 colors = 75%, 25%)	107.00	SY	68.00	7,276.00
<b>09.9100 Painting</b>				
Paint Ceilings	3,023.53	SF	1.00	3,023.53
Paint Doors	10.00	EA	150.00	1,500.00
Paint Interior Walls	4,959.80	SF	1.00	4,959.80

Description	Quantity	Unit	Unit Cost	Total
Paint Existing to Remain Areas	2,483.00	SF	3.50	8,690.50
<b>09 - Finishes Totals</b>				<b>\$148,590.11</b>
<b>10 Specialties and Accessories</b>				
<b>10.2800 Accessories</b>				
Framed Mirrors	2.00	EA	350.00	700.00
Hand Dryer: Xlerator® 40576 - ADA XChanger Combo Kit	2.00	EA	600.00	1,200.00
Soap Dispenser	2.00	EA	50.00	100.00
Toilet Accessories per stall	4.00	EA	250.00	1,000.00
<b>10 - Specialties and Accessories Totals</b>				<b>\$3,000.00</b>
<b>11 Equipment</b>				
<b>11.3100 Appliances</b>				
New microwave at Kitchen	1.00	EA	500.00	500.00
New refrigerator at Kitchen	1.00	EA	2,500.00	2,500.00
New dishwasher at Kitchen	1.00	EA	1,200.00	1,200.00
New stove at Kitchen	1.00	EA	2,000.00	2,000.00
<b>11 - Equipment Totals</b>				<b>\$6,200.00</b>
<b>22 Plumbing</b>				
<b>22.0000 Plumbing</b>				
New Electric Storage Water Heater, 50 gal, 18KW	1.00	EA	10,000.00	10,000.00
RPZ Relocation in Chase Wall behind removable mirror	1.00	EA	6,500.00	6,500.00
Provide non-freezing roof hydrant with a double check valve assembly to mechanical equipment on the roof for maintenance	1.00	EA	2,500.00	2,500.00
Plumbing Demo - Cut and Drop	420.11	SF	3.00	1,260.33
Water Closet	4.00	EA	6,500.00	26,000.00
Dishwasher Feed and Hook-up	1.00	EA	1,500.00	1,500.00
Lavs/Sinks	2.00	EA	6,000.00	12,000.00
New sink at Kitchen	1.00	EA	12,500.00	12,500.00
New urinal	1.00	EA	12,500.00	12,500.00
<b>22 - Plumbing Totals</b>				<b>\$84,760.33</b>
<b>23 HVAC</b>				
<b>23.0000 HVAC</b>				
New AHU and Condensing Units (FURNACE)	3.00	EA	32,500.00	97,500.00
BAS System with New Panels and New User Interface - Included in Pricing	1.00	AL	0.00	0.00
1.5kw Electric Unit Heater (Bathrooms) - Included in Pricing	2.00	EA	0.00	0.00
300 CFM TEF (Bathrooms) - Included in Pricing	2.00	EA	0.00	0.00

Description	Quantity	Unit	Unit Cost	Total
2-ton mini split system (Entry Corridor) - Included in Pricing	974.76	SF	0.00	0.00
Demo - Cut and Drop	6,200.00	SF	3.00	18,600.00
Ductwork modifications	6,200.00	SF	15.00	93,000.00
<b>23 - HVAC Totals</b>				<b>\$209,100.00</b>
<b>26 Electrical</b>				
<b>26.0000 Electrical</b>				
Replace Electric Panel and Relocate	1.00	EA	35,000.00	35,000.00
Power for new monitor location at entry	1.00	EA	2,500.00	2,500.00
New (retrofit) LED lighting for hallway, Multipurpose room - Pendant Lights	16.00	EA	750.00	12,000.00
Lighting Replacement in Classroom	21.00	EA	650.00	13,650.00
Lighting Replacement in Office Area	15.00	EA	650.00	9,750.00
New pendant mounted decorative fixtures at service desk	1.00	EA	1,250.00	1,250.00
Lighting Replacement in Toilets	2.00	EA	550.00	1,100.00
New recessed fixtures at entry counter/lounge area.	6.00	EA	750.00	4,500.00
New Surface mounted decorative fixtures at restrooms.	4.00	EA	750.00	3,000.00
New (retrofit) LED lighting Multipurpose room - Can Lights	10.00	EA	550.00	5,500.00
New (retrofit) LED lighting Multipurpose room - Drop in Lights	3.00	EA	550.00	1,650.00
Emergency LED type battery backup units	5.00	EA	950.00	4,750.00
Lighting Control & Dimming Rework	6,200.00	SF	5.50	34,100.00
Demo - Cut and Drop	6,200.00	SF	3.00	18,600.00
Small Appliance Connections	4.00	EA	1,000.00	4,000.00
Large Equipment Connection	4.00	EA	4,000.00	16,000.00
Emergency Power - NA	6,200.00	SF	0.00	0.00
Branch Power Re-work	6,200.00	LF	8.00	49,600.00
<b>26 - Electrical Totals</b>				<b>\$216,950.00</b>
<b>27 Communications</b>				
<b>27.0000 Fire Alarm</b>				
Fire Alarm System - Rework/Remove Reinstall Devices	6,200.00	SF	4.00	24,800.00
<b>27 - Communications Totals</b>				<b>\$24,800.00</b>
<b>Totals</b>				<b>\$1,354,223.31</b>

## 1230163 Evanston Ecology Center

## Cost Option Log - Detail

### Alternates

Description	Quantity	Unit	Unit Price	Total Estimate
<b>03 Waterproofing in Crawl Space - Option 2</b>				
<b>00 General Conditions</b>				
Lump Sum General Conditions	2.00	MO	61,178.24	122,356.48
<b>01 General Requirements</b>				
Lump Sum General Requirements	2.00	MO	49,707.32	99,414.64
<b>02 Existing Conditions</b>				
Remove Flooring and Subfloor	4,500.00	SF	9.18	41,295.31
<b>06 Woods, Plastics &amp; Composites</b>				
Subflooring Replacement	4,500.00	SF	22.94	103,238.28
<b>07 Thermal and Moisture Protection</b>				
20 mil Vapor on Walls and Gravel Base	5,900.00	SF	22.94	135,356.85
Closed Cell Spray at Rim Joist 3"	798.00	SF	16.82	13,425.56
<b>09 Finishes</b>				
Wood Flooring Replacement	1,000.00	SF	76.47	76,472.80
<b>22 Plumbing</b>				
Drain Tile	451.90	LF	53.53	24,190.64
Storm Ejector Pits	2.00	EA	19,118.20	38,236.40
Condensate Waste Piping Allowance	1.00	AL	5,353.10	5,353.10
<b>23 HVAC</b>				
Dehumidification in Crawl Space	4,900.00	SF	26.77	131,150.85
<b>26 Electrical</b>				
Electrical Hook-ups - Sumps and Dehumidification	3.00	EA	2,829.49	8,488.48
<b>31 Earthwork</b>				
Hand Dig Down Slab Area 1.5' in Original Crawl Space	187.00	CY	382.36	71,502.07
New Stone Base in Original Crawl Space	100.00	TN	229.42	22,941.84
Backfill Drain Tile	7.28	CY	229.42	1,670.17
Excavate - Drain Tile	125.53	CY	382.36	47,998.15
<b>03 - Waterproofing in Crawl Space - Option 2 Totals</b>				<b>\$943,091.61</b>
<b>Totals</b>				<b>\$943,091.61</b>



# 7.0

**Recommended  
Initial Scope of  
Work**

# Recommended Initial Scope of Work



This section of the report is focused on the scopes of work that our team believes should be executed to meet the goals of the original RFP by the City of Evanston, with a major focus on resilient outcomes intended to extend the life of the building and meet energy and sustainability goals set by the City and design team.

## Architectural Recommendations

### Interior Recommendation Highlights

Based on conversations with Bulley & Andrews, the interior pricing is carrying the office and phone room build outs as stick built, rather than unitized plug and play Steelcase options. The premium for the Steelcase office options are noted as an Alternate.

The inclusion of soffits due to relocation of ductwork, moving it out of the crawl space, is included and will be studied in detail during Schematic Design in order to identify the least obtrusive visual options for the spaces impacted. It is of the opinion of the design team that to the greatest extent possible, ductwork underfloor should continued to be considered in order to maintain the current design aesthetic of the Center.

Millwork for the kitchen and reception desk likely should be designed to an allowance budget in order to defray costs. Identifying how to limit the repair or installation of new wood paneling due to renovation and new construction items should be considered in order to limit costs associated.

Currently the basis of design for flooring is marmoleum, as linoleum products are sustainable and self healing. However, it is possible to identify less costly flooring options moving forward through Schematic Design.

It should be identified by the City which appliances and equipment will be procured outside the construction budget of the project.

Lighting considerations, such as identifying lamp retrofits (bulbs, etc.) for some fixtures in the Hallway and Multipurpose Room should be considered rather than replacing the fixtures themselves, to lower capital costs. That said, the design team has begun to understand that perhaps there may be funds outside the budget for the project for the lighting retrofit. The team will explore this prior to the next budget update.

#	Waterproofing Design Option	Cost	Constructibility	EEC Operational Impact	Outcome
1	<p>Install drain tile, drains and sump pump at OUTSIDE perimeter of foundation at all crawl spaces from first two additions</p> <p>Add waterproof membrane on outside of foundation wall all those locations</p>	<p>ROM \$150,000</p> <p>\$65,000 (MUST BE DONE WITH ABOVE)</p>	<p>Least Difficult</p> <p>No removal of subfloor</p>	No internal impacts re: phasing	<p>Least waterproofing installed/no guarantee of total moisture mitigation</p> <p>Short crawl spaces still dirt</p>
+a	PLUS dig out crawl space under bathroom to locate sump pump and dehumidification AND in that location install vapor barrier and gravel topping	\$35,000	We are removing bathroom subfloor anyway; no other subfloors	Impacts bathrooms; but we are tearing up the floor to install new subfloor for new tile floor anyway	<p>This allows the sump to be lower than the exterior drain tile AND gives us access to an aggregate of piping in the future AND gives us a place to install dehumidification that is accessible and centrally located.</p> <p>Will need to confirm with Mechanical how to keep dehumidifier from freezing up (add heat?)</p>
+b	Add a vapor barrier and reinstall gravel at MP room	\$60,000	Not difficult – This may not be doable without removing the floor and subfloor	No internal impacts re: phasing	Current MP room does not have a vapor barrier and should – helps to mitigate future issues in that location
+c	Add spray foam insulation to all locations of rim joist that currently do not have it	\$20,000	Only done in areas where rim joists are being accessed from the interior	No internal impacts re: phasing	Helps to create better building energy performance and thermal comfort outcomes for building occupants
2	<p>Create access to entirety of the dirt crawl space(s) by removing all flooring and subfloor to dig down existing crawl spaces to a useful and accessible height like the MP room crawl space, install vapor barrier topped with gravel all locations, spray foam all rim joists, drain tile installed on inside foundation perimeter.</p> <p>Detailed pricing breakdown located on page 46</p>	\$943,100	Most difficult	Major impact to schedule and operations due to extent of access created to install design option	<p>Most waterproof/least likelihood of future moisture issues</p> <p>Increased waterproofing installed in taller crawl spaces, greater moisture mitigation achieved w/ membrane in tall crawl space and installation of dehumidification</p> <p>There will be energy draw due to dehumidifiers running</p> <p>Benefit: keep the mechanicals under the floor</p>

Finally, considerations for the reuse and salvage of material from other projects under the City's umbrella, or from non-profits/ businesses and programs should be considered, as this type of installation is pursuant to the mission of the EEC and is a fantastic way to save capital costs on the project - as well as be a demonstration of how renovation can be achieved through sustainable practices.

### **Exterior Recommendation Highlights**

Exterior masonry repairs have been priced for the northwest corner of the electrical room section of the building indicated in the Existing Conditions Summary. This number should probably be considered outside the scope of the thirteen items identified as part of the RFP scope of work for the project. We do not believe this is currently a source of water infiltration however that could change.

Additionally, the design team has provided for pricing to include a glazing film to be applied to existing windows in order to meet the City's Bird Friendly Building Design Ordinance as well as take into account the mission of the Center and its location in the Ladd Arboretum..

### **Waterproofing Recommendations**

On the previous page (see Figure 47. EEC Waterproofing Options), a table indicating the escalating options for waterproofing the crawl spaces and mitigating moisture are provided, including Rough Order Magnitude pricing for each escalating design Option +a, +b, +c and an Option 2.

In terms of the pricing for these options, the design team explored the least costly Option 1 is provided in the Concept Cost Estimate. While Option 1 is not a full belt and suspenders option, it does start to address the moisture problem, it provides drain tile outside the entire building footprint in order not to negatively impact operations at the EEC. All other options start to impinge on operations due to removal of the subfloor internal to the building. Escalating options (a, b and c) were also considered.

Ultimately, the design and client team came to consensus and agree that the basis for the project is waterproofing and extending the life of the building to be resilient in the face of our changing climate. In that light, the best option in that case is Option 2, which is indicated in the budget that has been provided. This approach includes continuous drain tile around the perimeter of the entire Center, waterproofing and insulating foundation walls, providing vapor barriers and gravel under all crawl spaces. This also includes digging out the pipe chase crawl spaces to be at a serviceable height for the future (requiring the removal of all subfloors), therefore still allowing ductwork to exist in that location thereby keeping the current design aesthetic of the EEC unobstructed by potential need for soffits for air delivery.

It should also be noted that diverting the downspouts to grade as well as rectifying the 'back-pitching' of the patio away from the building, which would require limited regrading are options to be considered during Schematic Design to continue to move water away from the building perimeter.

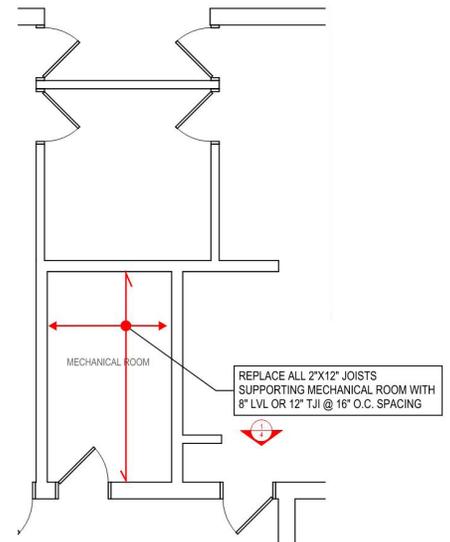
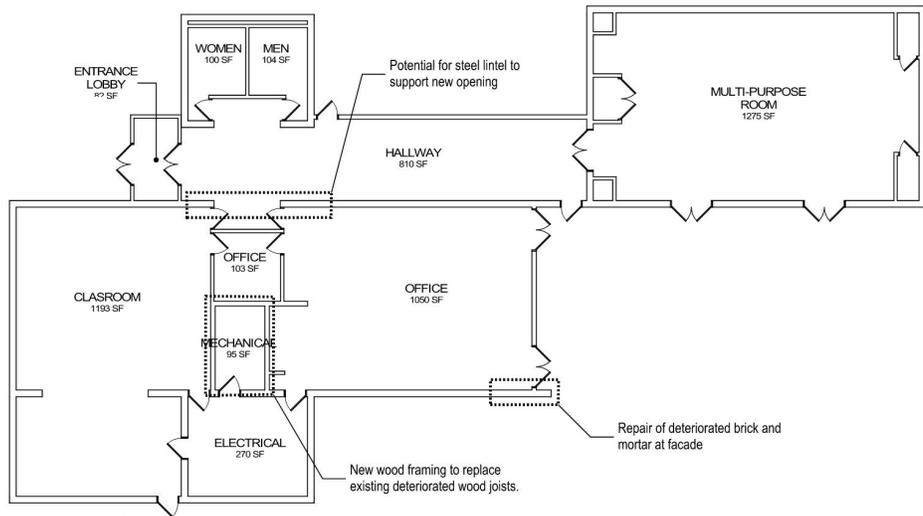


Figure 48. EEC Structural Scoping Plans

## Structural Recommendations

At the mechanical room, the deteriorated wood floor joists are to be removed and replaced. The new joists should span between the existing foundation wall and steel beams. Currently, a uniform mechanical live load is being assumed in this area, which would require an 8" deep LVL or 12" deep TJI to be used in place of the existing 2x12 joists. As the new mechanical equipment is defined and located, the design of these members can be refined. A new subfloor should also be provided to replace the damaged existing subfloor.

Depending on the final reconfiguration of the office space, a new steel lintel or structural support may be required above the reception desk. The block wall at this location was part of the original exterior bearing wall and supports the roof structure above.

At the southeast corner of the large office's exterior wall, the existing brick is to be repaired. Cracked bricks, including those that have been previously repaired, are to be replaced in kind. Open joints and cracked mortar are to be raked and repointed. A wall probe was requested at the interior face of the wall. This probe will help determine the extent of deterioration, as well as provide insight on the cause of the observed exterior damage. If the interior masonry has also cracked and/or has open joints, the same repair methodology will be implemented to repair and replace the CMU blocks.

We have attached a plan diagram (See Figure 48. EEC Structural Scoping Plans) which indicates structural repair scope based on what we were able to visually observe. These attachments are for reference only and not intended to represent the specific sizing or approach of this structure. Additional structural scope may be required to support mechanical, electrical, or plumbing scope. This could include reinforcement at a new opening in an existing foundation wall, dunnage for mechanical equipment, or penetrations through existing wood joists. The required structural scope for this work is currently pending coordination with these trades.

### Mechanical Recommendations

1. Quality Assurance
  - a. Standards: References for HVAC design will include the following:
    - i. ASHRAE Handbooks and Standards
    - ii. SMACNA Standards
    - iii. American National Standards Institute (ANSI).
    - iv. American Society of Mechanical Engineers (ASME).
    - v. American Society for Testing Materials (ASTM).
  - b. Heating and Cooling Load Calculations will utilize Carrier HAP or Trane CDS computer programs.



Figure 49. 5-ton Split System Heat Pump

2. Design Criteria
  - a. Heating-ventilating and air conditioning systems will be designed to operate through the normal change of seasons and maintain conditions. Systems will be designed to maintain inside conditions with all windows and doors closed.
  - b. Outdoor design conditions are based on American Society of Heating,



Figure 50. 5kW Electric Unit Heater



Figure 51. Packaged Condensing Units - VRF System



Figure 52. Downflow Multi-position VRF Air Handling Unit

- Ventilating and Air Conditioning Engineers (ASHRAE) criteria. Criteria listed for the Chicago O'Hare Airport weather station is used.
- i. Cooling system outdoor design temperatures are ASHRAE 0.4 percent criteria. In a normal summer, approximately 35 hours would be above the design values.
  - ii. Heating system outdoor design temperatures are ASHRAE 99.6 percent design criteria. In a normal winter, approximately 35 hours would be below the design values.
- c. Summer outdoor design conditions:
    - i. Dry-bulb temperature: 95 deg F
    - ii. Mean daily range: 19.6 deg F
    - iii. Wet-bulb temperature: 75 deg F
  - d. Winter outdoor design conditions:
    - i. Dry-bulb temperature: -10 deg F
    - ii. Wind speed: 15 mph
  - e. Indoor Design Conditions During Occupied Periods (For load calculations & equipment sizing):
 

	Winter		Summer	
Conditioned Area	deg F	RH%	deg F	RH%
All Occupied Areas	70	35	78	50
  - f. Indoor Design Conditions During Occupied Periods (For control set points and operation):
 

	Winter		Summer	
Conditioned Area	deg F	RH%	deg F	RH%
All Occupied Areas	70	35	74	50
  - g. Building solar and transmission heat gains and losses will be based on roof and wall construction shown on shell & core base building drawings.
  - h. Outside air for ventilation shall be based on governing codes and required exhaust systems.

3. New Systems
  - a. All mechanical systems shall perform better than the current version of ASHRAE 90.1.
  - b. Nominal sizes of equipment and loads listed herein are intended to clarify scope. Final equipment sizes and quantities may be different and are dependent on final design calculations. The following systems shall be included for each proposed building option.
  - c. Proposed Baseline Mechanical Systems
    - i. Remove all ductwork from the crawlspace under the classroom and office spaces.
    - ii. Provide (2) new 5-ton split system heat pumps with upflow fan configuration for classroom and office. Provide new overhead supply distribution to the office and classroom addition Reuse existing classroom supply distribution. Provide return air through wall. Provide outside air connection for code-required ventilation. Relocate condensing units to grade for maintenance.
    - iii. Provide (1) new 5-ton split system heat pump with downflow (See Figure 49. 5-ton Split System Heat Pump) fan configuration for ballroom. Reuse existing crawlspace ductwork. Provide outside air connection for code-required ventilation.



Figure 53. Energy Efficient LED Can Lighting



Figure 54. Energy Efficient LED Suspended Lighting

- iv. Provide (1) new 2-ton split system heat pump with wall cassette for main entry corridor.
  - v. Provide 5kW electric unit heater in vestibule.(See Figure 50. 5kW Electric Unit Heater)
  - vi. Provide 1.5kW electric unit heater in each toilet room.
  - vii. Provide 300 CFM toilet exhaust fan and new ductwork.
  - viii. Integrate all mechanical systems into Schneider Electric EcoStruxure BAS platform.
- d. Alternate Mechanical Systems (not currently priced)
- i. Remove all ductwork from the crawlspace under the class room and office spaces.
  - ii. Provide new 20-ton VRF heat recovery system with heating down to -22F. Mount (2) packaged condensing units at grade.(See Figure 51. Packaged Condensing Units - VRF System)
  - iii. Provide ceiling and wall cassettes in all zones including restrooms, corridor, and individual enclosed offices (approximately 11 cassettes).
  - iv. Provide downflow multi-position VRF air handling unit (See Figure 52. Downflow Multi-position VRF Air Handling Unit) for ballroom connected to existing ductwork. Provide outside air connection for code-required ventilation.
  - v. Provide slim, ceiling mounted energy recovery ventilator integrated into VRF system to process required outside air for classroom, office, and corridor. Provide ducting through roof or to sidewall louver. Provide minimal ducting to diffusers for each space requiring ventilation.
  - vi. Provide easily accessible headers and joints for refrigerant system in mechanical space or behind ceiling access panels. Utilize continuous refrigerant linesets between the header and indoor cassettes to minimize refrigerant leak points.
  - vii. Provide 5kW electric unit heater in vestibule.
  - viii. Provide 300 CFM toilet exhaust fan and new ductwork.
  - ix. Integrate all mechanical systems into Schneider Electric EcoStruxure BAS platform.
- e. Lay-in ceiling supply diffusers shall be Titus Omni or equal, Titus ML or equal slot diffusers, or Titus 300RL sidewall diffusers or equal. Lay-in return and exhaust registers shall be Titus PAR or equal, or Titus 350RLsidewall diffusers or equal. All diffusers, registers, grilles, and ductwork shall be aluminum in wet locations. Linear diffusers shall be used in all prominent public areas.
- f. Automatic Temperature Controls: Each indoor unit shall be provided with a wall mounted thermostat connected to BAS system. Setpoints shall be adjustable from central computer with overrides available in each space. Cabinet unit heaters shall have integral vandal resistant thermostat.
4. Materials:
- a. Supply and return ductwork for heating, ventilating and air conditioning shall be galvanized sheet metal. All transverse and longitudinal seams shall be sealed. Aluminum ductwork shall be used in wet areas subject to corrosion.



Figure 55. Electric Water Cooler with Bottle Filling Station

- b. General toilet exhaust ductwork shall be galvanized steel.
- c. All supply ductwork shall be externally insulated with mineral fiber board or blanket. R-Value and vapor barrier shall meet IECC requirements.
- d. All ductwork within 10 feet of exterior openings shall be internally lined with 1-inch, 3-pound density anti-microbial coated mineral fiber board and edges capped to minimize erosion.
- e. All modulating dampers shall be low-leakage type.
- f. All mechanical openings through the exterior envelope shall be sealed to prevent infiltration.
- g. All duct penetrations through partitions with a fire resistance rating of 2-hours or greater shall be provided with fire dampers.

### Electrical Recommendations

1. Quality Assurance:
  - 1) Standards: Electrical systems shall conform to applicable building codes and regulations including mentioned above and OSHA. Systems shall be designed and constructed to meet standards of ANSI, ASTM, AEIC, CBM, ETL, IESNA, IPCEA, NEMA, NFPA, NEA, and UL.
2. Electrical Service:
  - 1) Existing incoming services: 600A, 240/120V, 1 phase, 3 wire system will remain. One of the existing panels located in Mechanical room shall be replaced with new and relocated to the space near the existing 400A distribution panel since this panel is outdated and located near the mop basin. The rest of the panels appear in good condition and shall remain.
  - 2) Emergency power: Existing emergency power are provided by battery packs attached to emergency lights and exit signs. Emergency battery packs will be provided to meet the code required light level to accommodate new architectural layout of the spaces.
3. Lighting System:
 

All new light fixtures shall be energy efficient LED type fixtures. (See Figure 53. Energy Efficient LED Can Lighting and Figure 54. Energy Efficient LED Suspended Lighting)

Layout and type of light fixtures will be coordinated with architectural reflected ceiling plan however the fixtures will be selected to meet and exceed the requirement of IECC requirement for energy saving. The color temperature of light fixtures, ambient light level and uniformity of light distribution also will be considered based on IES (Illuminating Engineering Society of North America) and industry standards to provide comfort to children and efficiency of learning experience.
4. Lighting Control System:
  - 1) Individual offices will be equipped with occupancy sensor with manual ON and automatic OFF function.
  - 2) Perimeter lighting fixtures will be controlled by daylight harvesting



Figure 56. Vitreous China Bathroom Sink



Figure 57. Automatic Flush Valve

- 3) sensors to meet the IECC requirement.
- 3) Conference rooms, play areas, lounge and classrooms will be equipped with dimmable LED drivers with wall dimming control.

### Plumbing System Recommendations

1. Quality Assurance: Systems shall be designed and constructed to meet standards of:

American National Standards Institute (ANSI)  
 American Society of Mechanical Engineers (ASME)  
 American Society for Testing and Materials (ASTM)  
 American Water Works Association (AWWA)  
 Americans with Disabilities Act (ADA)  
 Underwriter's Laboratories (UL)

2. Building Utilities

1) Domestic water: The existing 2" domestic water supply shall be retained and served by city pressure alone.

a. The existing water meter location shall be retained in below the floor within the crawlspace. Further investigation is required to confirm that an acceptable backflow device is provided on the incoming water service to protect the municipal main from back feed.

b. The existing RPZ serving irrigation and exterior water features shall be relocated from the crawlspace to a new space above the floor in an accessible location. Initial design team consideration would relocate the RPZ to the shared plumbing chase between the Men's and Women's Toilet rooms behind a removable mirror for easy access.

c. The existing gas-fired water heater shall be replaced with a new electric, storage type water heater. The new electric water heater shall be 12KW and have 50 gallons of storage capacity. No existing hot water return system exists and is recommended to be provided pending any significant domestic water piping modifications below the floor in crawlspace. The new water heater will be served by an appropriately sized ASME rated expansion tank sized on the total system water volume. Water will be heated and stored at 140°F and distributed to the building mop sink at this temperature. Point of use mixing valves shall be provide at lavatory and sink.

2) Sanitary & vent system:

a. The building utilizes PVC for waste and vent. The system is a gravity flow type. All existing waste and vent shall be retained at non-renovated spaces and replaced at all renovated spaces. The waste and vent shall be replaced within the chase at the Men's and Women's Toilet rooms as part of the Washroom remodel and at the Office pantry sink as part of the Office remodel. All new waste and vent shall connect to existing exit piping.

b. Existing waste and vent piping is recommended to be rodded and televised to clear any and all blockages as well as give the design team a condition report to evaluate the condition as well as make replacement

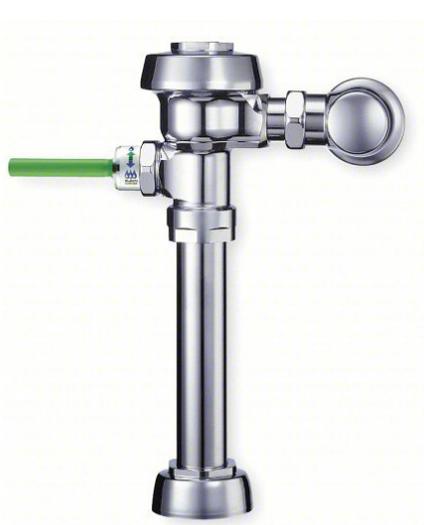


Figure 58. Manual Flush Valve

recommendations.

3) Domestic Water Piping:

- a. Domestic water piping will be sized to limit pressure drop to 2 psi / 100 feet of piping.
- b. Domestic cold and hot water distribution will be routed in the crawlspace below the floor at all the plumbing equipment and fixtures to be replaced as part of the room remodels. All new piping to be type L copper and insulated.
- c. Existing mains below the floor within the crawlspace will be retained pending they have been confirmed to be copper. Any copper found is recommended to be replaced.



Figure 59. Floor Drain

3. Terminal equipment:

Fixtures will be selected in compliance with the specifications for the project. The following flow rates have been selected for fixtures:

- 0.5 GPM Lavatories
- 1.28 GPF Water Closets
- 1.5 GPM Electric water cooler
- 1.5 GPM Sinks

Fixtures shall be replaced at both the Men's and Women's Washrooms as well as the Office pantry.



Figure 60. Non Freezing Roof Hydrant

1) Electric water cooler with bottle filling station will be provided. (See Figure 55. Electric Water Cooler with Bottle Filling Station) Recessed, vandal-resistant stainless-steel electric water coolers will be provided.

2) Bathroom fixtures in public restrooms will be manually activated flush valve or touch less battery operated "per the owner request", (See Figure 58. Manual Flush Valve and Figure 57. Automatic Flush Valve) vandal-resistant, low flow by approved manufacturers. Water closets will be floor mounted vitreous china (See Figure 56. Vitreous China Bathroom Sink) and urinals will be wall-mounted vitreous china.

3) Floor drains will be selected based on space usage and finished floor. In general, finished areas will be served by 6" round floor drains with vandal-resistant covers.(See Figure 59. Floor Drain) General utility and mechanical spaces will be provided with 8" round utility-grade floor drains.

4) Domestic water will be provided to exterior non-freezing hose bibs connections downstream of a reduced pressure zone backflow preventer or testable double check detector assembly. Hose threaded connections within the building shall be provided with a vacuum breaker mounted 7'-6" above the finished floor "if required". All accessible exterior hose connections will be vandal resistant and lockable.

5) Provide non-freezing roof hydrant with a double check valve assembly to mechanical equipment on the roof for maintenance. (See Figure 60. Non Freezing Roof Hydrant)

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