



CITY OF
PITTSBURGH
PROPERTY CONDITION REPORT



B135 – Firehouse 26
630 Brookline Blvd.
Pittsburgh, Pennsylvania 15226

June 2014



Massaro
www.massarocms.com

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1 Executive Summary

1.1 General Description

The City of Pittsburgh contracted with MCMS to provide a Property Condition Assessment (PCA) in order to prepare a Property Condition Report (PCR) of the subject property, located in the Brookline neighborhood at 630 Brookline Blvd., Pittsburgh, PA. A walk-through survey of the subject property was conducted on July 25, 2013.

The subject property consists of a 2-story fire station with basement; containing an apparatus room, storage, break room, lockers and offices. It is unclear when this facility was constructed. The property is on a 0.25 AC municipal corner lot.

1.2 General Physical Condition - FAIR

The general physical condition of properties is typically categorized as:

- **New** – Constructed within the last year.
- **Good** – Well constructed and maintained, without significant deficiencies.
- **Fair** – Apparent deferred maintenance issues and deficiencies that can be remedied at reasonable cost.
- **Poor** – Inadequately constructed and/or maintained, with substantial deficiencies that require significant cost and scope of work to remedy. Some items may require additional detailed analysis and testing to fully define the deficiency.
- **Derelict** – State of deficiencies and failure to maintain renders the property unfit for use and may pose direct hazard to occupants and/or the general public. For these properties, either major rehabilitation or demolition and replacement will be required.

Generally, the property appears to have been constructed within typical industry standards for the building type and period of construction. However, based on the findings of this PCA, the subject property is considered to be in **FAIR** overall condition. The major deficiencies and deferred maintenance issues are as follows:

- The masonry enclosure is in disrepair and in need of restoration.
- The interior stairs are in need of structural repair.
- The roofing system is in disrepair and will need replaced within 5 years.
- The apparatus room floor will need replacement within 5 years.
- The fire detection/notification and protection systems are inadequate.

1.3 Recommendations – Table 1

See various sections of this Report for details. For the Summary of Recommendations see Table 1, Attached.

Immediate and Short Term Repairs - Table 1
Opinion of Probable Costs
Building #B135 - Firehouse 26. BROOKLINE
MCMS Project No. 13-707.09

Section	Item	Quantity	Unit	Unit Cost	Cycle Replacement %	Replacement %	Immediate Total	Short-Term Total
3.1	SITE							
a	Replace asphalt paving and walk at parking area	2000	SF	\$20			\$39,600	
b	Repair concrete apron and seal joints	1	EA	\$5,000				\$5,000
3.2	SUBSTRUCTURE							
3.3	SHELL							
a	Replace apparatus bay floor (5yrs.)	1	EA	\$45,000				\$45,000
b	Masonry restoration, seal open joints, prep/paint wood trim	1	EA	\$260,000				\$260,000
c	Main roof and gables - Replace missing, loose or broken tiles, replace missing downspout and copper cornice	1	EA	\$20,000				\$20,000
d	Main roof - Replace entire tile roof and gutter system (5yrs)	2,900	SF	\$66				\$191,400
3.4	INTERIORS							
a	Repair / reinforce wood stairs at all levels	1	EA	\$30,000			\$30,000	
3.5	SERVICES							
	Plumbing							
	HVAC							
a	Boiler safety testing	1	EA	\$250			\$250	
	Fire Protection							
b	Add Fire Alarm devices and fire extinguishers	1	EA	\$1,800				\$1,800
c	GFI receptacles	1	EA	\$1,800				\$1,800
d	Emergency Light/sign fixtures	3	EA	\$2,750				\$8,250
e	CO detector in Boiler Room	1	EA	\$3,500				\$3,500
	Electrical							
3.6	EQUIPMENT AND FURNISHINGS							
3.7	SPECIAL CONSTRUCTION							
TOTALS							\$69,850	\$536,750

2 Team, Purpose and Scope

2.1 PCA Team

Team Lead, Site, Architectural, Accessibility, Drawings:

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2.2 PCA Purpose & Scope

Massaro Construction Management Services (MCMS) is providing Property Condition Assessment (PCA) services in general accordance with the ASTM E2018-08 *Standard Guide for Property Condition Assessments; Baseline Property Condition Assessment*. This standard is widely recognized in the real estate industry as a benchmark tool for evaluating the condition of real property. The City of Pittsburgh is undertaking a multi-year effort to complete PCA's with the following goals:

- Gain greater insight into the current scope and condition of their real property assets.
- Quantify physical deficiencies and immediate repair needs along with short and medium term capital reserve needs for preservation of those assets.
- Identify opportunities to implement Energy Efficiency Measures (ECM) to reduce energy use and hence, energy and/or demand costs.

The general scope of work in a typical PCA includes the following tasks:

- Document Review and Interviews
- Walk-Through Survey
- Opinion of Probable Costs
- Property Condition Report

2.3 Document Review and Interviews

Documents provided by the Owner include: architectural drawings dated 1983 for the Firehouse, as well as structural drawings dated 1988 for structural replacement of apparatus room slab. Although formal interviews were not performed the Point of Contact (POC) Mr. Henry Cafardi, Facilities Maintenance Supervisor, was available to answer questions.

2.4 Walk-Through Survey

The scope of the walk-through survey was limited to representative visual observations of site and property improvements and should NOT be considered all-inclusive. It is conducted without protective clothing, exploratory probing, removal or relocation of materials, testing, or the use of equipment, such as ladders (except as required for roof access), stools, scaffolding, metering/testing equipment, or devices of any kind. Out-of-scope issues include but are not limited to:

- Operating, measurement and/or testing of any building systems.
- Assessment of any process-related equipment or systems.
- Assessing components of systems that are not readily observable.
- Entering limited access or confined spaces.
- Accessing pitched roof areas or any roof area that appears unsafe.
- Determining applicability of Life Safety/Fire Protection code requirements.

2.5 Opinion of Probable Costs

Replacement, repairs, and routine maintenance of various building components and systems are discussed in various sections of this report and opinions of their probable costs are summarized for the evaluation period in the attached tables. Per ASTM E2018-08; costs indicated should be considered preliminary, order of magnitude budgets. Actual costs most probably will vary from those contained within depending on such matters as type and design of suggested remedy, quality of materials and installation, manufacturer and type of equipment or system selected, field conditions, whether a physical deficiency is repaired in part or replaced in whole, phasing of the work (if applicable), quality of contractor, quality of project management exercised, market conditions, and whether competitive pricing is solicited, etc. Certain opinions of probable costs can not be developed within the scope of this assessment without further study. Where applicable, the opinion of the probable costs for further study will be included.

- **Immediate Costs** are to remedy those deficiencies that require immediate action as the result of any of the following:
 - material existing or potential unsafe condition
 - material building or fire code violations
 - conditions that if left uncorrected have the potential to result in or contribute to critical element or system failure within one year or will result most probably in a significant escalation of its remedial cost.
- **Short-Term Costs** are to remedy physical deficiencies, such as deferred maintenance, that may not warrant immediate attention, but require repairs or replacements that should be undertaken on a priority basis in addition to routine preventative maintenance. Unless noted otherwise, generally the time frame for such repairs is 1-2 years. Such opinions of probable costs may include costs for testing, exploratory probing, and further analysis; or these services may be evaluated separately.

2.6 Property Condition Report (PCR)

The Property Condition Report documents the findings of the PCA. This report is for the use of this Client only, for the stated purpose above. Specific language in the descriptions of the various PCA processes, intent, scopes of work, and/or definitions throughout Section 1-2 of this PCR are excerpted directly in whole or in part from the ASTM E2018-08 Standard (herein the 'Standard') document without specific attribution. All rights remain with the ASTM. In the event of any discrepancy between statements in this Report and the Standard, the scope and intent in the respective sections of the Standard shall govern. A complete copy of the Standard may be made available upon request.

2.7 Additional Scope Considerations

For this assessment, in addition to the baseline PCA tasks, further considerations are taken into account and additional deliverables are included as follows:

- **Schematic Floor Plans** – Produced using Autodesk Revit™ Building Information Modeling (BIM) software, and including limited field check of representative dimensions and documentation of changes to layout. These drawings and associated floor area information provide a helpful quick reference tool for General Services and Architectural Division staff. They are schematic in nature and should NOT be considered complete documentation of as-built conditions. City develop a BIM Standard and/or Computer Aided Facilities Management (CAFM) program in the future, this initial modeling effort can be further enriched and aligned with those initiatives.
- **Energy Audit** – Level 1, Walk-Through Analysis, per the *Procedures for Commercial Building Energy Audits, 2nd Ed.* Published by the American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE). This Audit provides an overview of building systems and their functional operation, benchmarks the Energy Use Index (EUI) of the subject property against comparables, identifies low/no-cost changes to current Operations and Maintenance (O&M) process to provide savings, and identifies potential capital improvements for further study.

3 Element Descriptions and Observations

3.1 Site

The building is located on an approximately one-third acre (0.3AC) parcel containing both the Firehouse and an adjoining (but not internally connected) former police station. Overall the Site is in Fair condition.

1. Topography and Drainage – The site slopes considerably down from Brookline Blvd. along both Wedgemere and Fitch Way. The site appears to be positively drained away from the building. The steep grade at the parking area may create a safety hazard in winter conditions.
2. Access and Egress – Vehicle access to the subject property is available from Brookline Blvd. Egress from the building to grade is available from the first and lower levels.
3. Paving, Curbing and Parking – The site paving is asphalt and concrete. Concrete apron has areas of joint spalling but is in Fair condition. Accessible parking is NOT available. The asphalt at the parking area is in Poor condition.

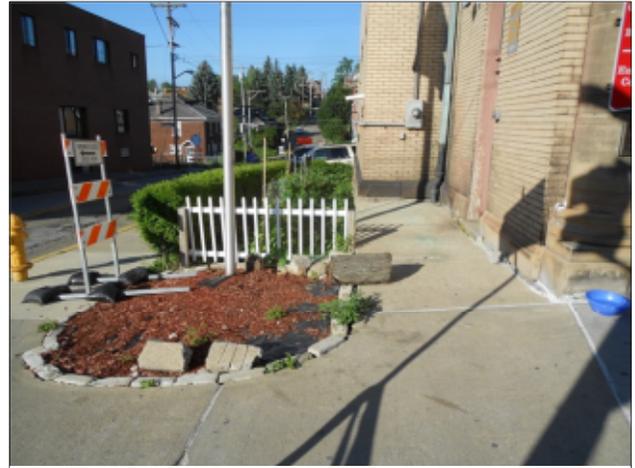
Recommendations:

- Replace asphalt paving and walks at parking area.
 - Repair concrete apron and seal all joints.
4. Landscaping and Appurtenances – Landscaping and plantings consist primarily of ornamental planting beds and a food garden. The NE side of the property consists of terraced vegetated areas that appear to be infrequently maintained.
 5. Site Amenities / Accessory Structures- Timber retaining walls in Fair condition support the terraces. The flagpole is in Good condition.

3.1 Site: Photos



ST1 – Looking east from Brookline Blvd.



ST2 – Planting beds along Wedgemere St.



ST3 – Looking south – parking area off Fitch Way



ST4 – Looking SW across parking area - storm inlet in foreground



ST5 – Asphalt paving off Fitch Way



ST6 – Timber retaining walls form terraces at NE side of lot

3.2 Substructure

This visual inspection included the observation of the substructure including foundation and basement construction. Overall the Substructure is in Good condition.

1. Foundation
 - a. Constructed of masonry - Fair condition: the basement walls have a few light cracks and small areas of missing mortar.
 - b. Attempts at repairs / repointing are evident at the NE side.
2. Slab on grade: The basement floor is concrete and has some light cracks.

3.1 Substructure: Photos



SS1 – North corner



SS2 – NE side looking S

3.3 Shell

1. Overall the Shell is in POOR condition.
2. Building Frame & Floors
 - 2.1. The first floor of the entire building is constructed of concrete T-Beams with clay tiles between the RC T Beams
 - 2.2. There is an area that was replaced by bolting angle iron to the encased beams and utilizing SIP Forms. The SIP have heavy rust and efflorescence is inadequate floor drainage
 - 2.3. The concrete reinforced concrete T Beams are in good condition they have areas of light cracks, light spalls and patches
 - 2.4. The first floor decking has some spalls. There a few concrete patches
 - 2.5. The concrete encased steel roof beams are in good condition, no steel is visible
 - 2.6. All interior stairs are in poor condition. The first to second floor string is cracked. The top stairs at the tower are unsafe and pulling away from the wall.
 - 2.7. Roof Framing is timber and in good condition

Recommendations:

- Repair / reinforce wood stairs. \$7,500
- Replace apparatus bay floor (5yrs). \$45,000

3. Building Façade

- 3.1 Construction: The building walls are constructed with brick masonry. Wall penetrations include: 1 garage door with wood frame, 2 metal man doors with wood frames, 1 garage door with wood frame, 27 windows with metal sashes and wood frames, 4 wood windows in the tower, 5 glass block windows, and 1 kitchen exhaust vent. 3 round windows are installed in the three gable areas. Clay tile covered facades are installed on the gable areas of the north, east and south walls.
- 3.2 There are areas with light brick cracking, step cracking, blistered brick and areas of minimal brick displacement
- 3.3 Wood framed copper cornice is in Fair condition, with one area missing on SE wall.
- 3.4 Clay tiles at the gables are in Fair condition.
- 3.5 Windows are in good condition, all exposed wooden trim needs repair, paint, sealant.

4 Roof Deck

- 4.1 Construction: The roof deck is wood sheathing.
- 4.2 Condition: No conditions were observed that would indicate deck problems.

5 Roof Insulation

- 5.1 Construction: No core cuts were taken.
- 5.2 Condition: No insulation is assumed to be installed on either roof area.

6 Roof System

- 6.1 Construction: The sloped roof systems on both areas is Ludowici flat clay tiles.
- 6.2 Condition: The roof systems appeared in poor condition. Some tiles are missing, broken and loose.

7 Flashings

7.1 Construction: Copper flashing is installed in the roof valleys, around the Hose Tower and around the chimneys.

7.2 Condition: The flashings appear to be in fair condition.

8 Perimeter Terminations

8.1 Construction: The building walls end at the eave line. The eaves and gable areas are constructed with a detailed copper cornice.

8.2 Condition: The cornices are in fair condition. One section of cornice is missing on the south side and one cornice joint is open on the north side.

9 Roof Top Penetrations

9.1 Firehouse 26: 2 vent pipes, 1 roof hatch and two chimneys on the main roof area.

9.2 Condition: The penetrations are in fair condition.

10 Drainage System

10.1 Construction: The Hose Tower roof drips onto the Main Roof area. The Main roof area slopes to and drains into a copper lined box gutter system with copper downspouts. I could not observe the gutter system or if there is slope to the drains in the box gutters.

10.2 Condition: There box gutters are assumed to be in fair condition as there was no evidence of leakage observed. One section of downspout is missing on the north side.

11 Access: The roof is accessible through the hatch. The pitched roof areas were not accessed during this assessment.

CONCLUSIONS

A few leaks have been reported and have been repaired.

The building walls are in fair condition. A few defects were observed. A few cracks were observed in the stone foundation walls. A few brick joint cracks and areas of blisters were observed on the north wall. The tile system on the gable facades is in poor condition.

The roof decking appears to be in fair condition. We did not observe any signs that would suggest a serious problem with the roof decking systems at this time

The Main Roof tile system is in poor to fair condition. Numerous tiles are loose, broken and missing.

The painted wood trim is in poor condition. Numerous areas of peeling paint was observed.

The roof top penetrations are in fair condition

The drainage system is in fair condition. Any debris should be cleaned from the gutter system and continued to be cleaned twice yearly

With proper Maintenance and corrective repairs, it is our opinion that the roofing system is in a maintainable condition for the next five years.

Estimates:

1 year: Replace missing and broken roof tiles. Repair tile system on the gable facades. Refasten loose tiles – this work does not have to be done at one time but as the maintenance budget permits. Estimated cost: \$12,000. Replace missing downspout near SE corner. Inspect roofs and walls yearly and remove debris from the gutter system.

5 year: Replace tile roofing and gutter system – Estimated cost: \$116,000 (2,900 SF x \$40/SF)

10 year: Maintain a pro-active maintenance program. Inspect the roof system and walls on a regular schedule – minimum twice a year (late spring and late fall). Estimated cost: none (perform in-house)

3.3 – Shell: Photos



SH1 – View from above – Brookline Blvd. and North is at right



SH2 – Peeling paint at windows



SH3 – Typical window on east wall – peeling paint at trim



SH4 – Missing cornice on east wall



SH5 – Opening at cornice



SH6 – Peeling paint and open joints at window on NE wall

3.4 Interiors

1. Interior Construction - Interior partitions are primarily wood framed with cement plaster and are in fair condition. Doors and frames are typically wood construction with commercial grade hardware. Overall the Interiors are in Fair condition.
2. Stairs – All interior stairs are in Poor condition. The first to second floor stringer is cracked. The top stairs at the hose tower are unsafe and pulling away from the wall.

Recommendation – Repair stairs at all levels.

3. Interior Finishes – Typical flooring throughout the building is resilient tile in Fair condition. Ceilings are typically ACT throughout and are in Fair condition. The ceiling in the apparatus room is original wood beadboard.

3.4 Interiors: Photos



11 – Apparatus bay



12 – Wood stair



13 – Kitchen / Dining



14 – Dormitory



15 – Locker Room



16 – Lower level – fitness center

Building Mechanical Systems: HVAC 4.5.1

1. HVAC System – General Description: Primary space heating for fire station is supplied by a central hot water system. It is comprised of central equipment, distribution systems, and room level terminal units. The hot water piping and room terminal units are reported to be original to the building. Space cooling is provided by window air-conditioning units (WACU). The boiler and hot water pump were being replaced with new high efficiency units at the time of the field audit. The Apparatus room ventilation is comprised of a Nederman DCVEX system and a general exhaust system (GEX). The general exhaust system ductwork and exhaust fan has been modified so as to serve only the kitchen stove exhaust hood.
 - 1.1. Room level terminal units: Room based heating terminals are comprised of various combinations of local window air conditioners, hot water convectors, and exhaust fans. Individual room heating units are interconnected with hot water supply and return distribution piping.

Room	Heating			Cooling			Ventilation			TStat	Notes - Comments
	RAD	BBD	UH	WACU	SAG	RAG	EAG	EF	GRV		
Apparatus Room	5	-	-	-	-	-	-	1	-	-	DCVEX, No control valve(s)
Kitchen / Lunch	2	-	-	1	-	-	-	-	-	-	Kitchen exhaust hood
Dormitory	2	-	-	2	-	-	-	-	-	-	No RAD control valve(s)
Lieutenant's Office	1	-	-	1	-	-	-	-	-	-	No RAD control valve(s)
Locker (small)	1	-	-	-	-	-	-	-	-	-	No RAD control valve(s)
Locker (large)	1	-	-	-	-	-	-	-	-	-	No RAD control valve(s)
Captains Lav	1	-	-	1	-	-	-	-	-	-	No RAD control valve(s)
Captain's office	1	-	-	1	-	-	-	-	-	-	No RAD control valve(s)

BBD = Hot Water Base Board - Copper Fin-Tube Element
 DCVEX = Direct Connect Vehicle Exhaust System (Nederman)
 EAG = Exhaust Air Grille
 EF = Exhaust Fan
 GRV = Gravity Relief Ventilator
 RAD = Cast Iron Hot Water Radiator
 RAG = Return Air Grille
 SAG = Supply Air Grille
 TStat = Thermostat
 UH = Hot Water Unit Heater - Integral Fan
 WACU = Window Air Conditioning Unit

- 1.1.1. Condition: Room terminal units - **Poor**
 - 1.1.1.1. Physical Deficiencies: No RAD Control Valves
 - 1.1.1.2. Functional Deficiencies: None reported or observed
 - 1.1.1.3. Performance Deficiencies: None reported or observed
 - 1.1.1.4. Maintenance observations: WACU casing corrosion
 - 1.1.1.5. Remaining useful life observations (RUL)
 - 1.1.1.5.1. WACU: 1-3 years
 - 1.1.1.5.2. Heating, Cooling, Ventilation: 5+ years
 - 1.1.1.5.3. DCVEX: 10+ years

- 1.2. Heating Distribution System: **New**
- 1.3. Central Boiler System: **New**
- 1.4. Controls: **New**

1.5. Performance Observations

1.5.1. Energy and Sustainability: The heating system boiler and pump will reduce heating cost significantly.

2. Utilities

2.1. General Description: Natural gas.

2.2. Construction

2.2.1. Low pressure natural gas meter and associated threaded, black steel piping.

2.3. Condition Assessment: **Fair**

3. Energy Performance Summary

3.1.1. Preliminary Energy-Use Analysis

4. Conclusion:

4.1. The HVAC system as found is in poor condition. However, the installation of the new boiler and pump should provide a system in fair to good condition.

5. Estimates: Suggested remedies and opinions of probable Cost

5.1. De minimus conditions

5.1.1. Boiler Safety Testing: \$250 (Fire and Ice heating)

5.1.2. De-lamp lighting fixtures to new ASHRAE/IES standard.

5.2. Short-Term Costs

5.2.1. Replace Three (3) existing manual lighting switches with motion based detectors (occupancy): \$1,500

5.2.2. Install Three (3) Motion based occupancy detectors for Window Air Conditioning Unit control (WACU):
\$1,600

5.2.3. Add Three (3) wireless thermostatic radiator control valves: \$1,700

5.2.4. Install new wireless, WEB based Energy Management Controller/Gateway/WEB server: \$4,000

6. Energy Conservation

6.1.1. Preliminary Energy Efficiency Measures: EEM's

EEM Summary Table - Firehouse 26

Measure Number	Measure Description	Expected energy reduction*	Estimated cost with Incentive		
			Measure Cost	Potential Utility Incentive	Net Measure Cost
EEM-1	A: Replace existing manual lighting switches with motion based detectors (occupancy) supply. B: De-lamp lighting fixtures to new ASHRAE/IES standard.	9%	\$ 1,400	\$ 200	\$ 1,200
EEM-2	Extend motion based occupancy detectors to Window Air Conditioning Unit control (WACU).	5%	\$ 1,600	\$ 150	\$ 1,450
EEM-3	Install wireless radiator control valves	10%	\$ 1,725	\$ 100	\$ 1,625
EEM-4	Install new wireless, WEB based Energy Management Controller/Gateway/WEB server	10%	\$ 4,000	\$ 400	\$ 3,600
TOTALS (Recommended Measures)		15%**	\$ 8,725	\$ 850	\$ 7,875

* Percentage of contributing system, not overall energy cost

** Expected percentage of overall gas and electrical energy cost

4.5.1.1 – HVAC: Roof and perimeter



HVAC 1- WACU - 1



HVAC 2 – WACU - 2



HVAC 3 – DCVEX and GEX fans



HVAC 4 – WACU - 3

4.5.1.2 – HVAC: 1st Floor



HVAC 5 – Hot water radiator: Apparatus room - 1



HVAC 6 – Hot water radiator: Apparatus room - 2



HVAC 7 – DCVEX system (round duct) & general exhaust duct



HVAC 8 – Kitchen hood (to general exhaust fan)



HVAC 9 – WACU: Kitchen



HVAC 10 – Hot water radiator: Kitchen

4.5.1.3 – HVAC: 2nd Floor



HVAC 11 – Hot water radiator - 3



HVAC 12 – WACU - 4



HVAC 13 – WACU - 5



HVAC 14 – WACU - 6



HVAC 15 – Hot water radiator - 4



HVAC 16 – WACU - 7

4.5.1.4 – HVAC: 2nd Floor



HVAC 17 – Hot water radiator - 5



HVAC 18 – Hot water radiator - 6



HVAC 19 – Hot water radiator - 7



HVAC 20 – Hot water radiator & WACU: Captain's room



HVAC 21 – Hot water radiator: Captain's room Lav



HVAC 22 – Thermostat

4.5.1.5 – HVAC: Misc.



HVAC 23 – Natural Gas meter

Building Electrical Systems 4.5.2

1. Interior Lighting

1.1. General Description: interior lighting is provided to the building by a combination of windows, and recessed mount and surface mount florescent fixtures.

1.2. Construction

Room	Fixture		Lamps				W2	Comments
	Q1	Length	Type	W1	Q2	Type		
Toilet 1 (a)	2	4'	Fluor.	32	4	T8	205	Man Sw, Mag Bal, NL
Toilet 1 (b)	3	na	Incand.	75	na	na	225	Man Sw
Total: Toilet 1							430	
Locker (large)	2	4'	Fluor.	32	4	T8	205	Man Sw, Mag Bal, NL
Back Hallway	1	2'	Fluor.	25	4	T8	80	Man Sw, Mag Bal, NL
Captains Lav	1	2'	Fluor.	25	4	T8	80	Man Sw, Mag Bal
Captain's office (a)	2	4'	Fluor.	32	4	T8	205	Man Sw, Mag Bal
Captain's office (b)	1	na	Incand.	75	na	na	75	Man Sw
Total: Captain's office							280	
Dormitory	7	4'	Fluor.	32	4	T8	717	Man Sw, Mag Bal, NL
Locker (small)	1	4'	Fluor.	32	4	T8	102	Man Sw, Mag Bal
Closet	1	na	Incand.	75	na	na	75	Man Sw
Tower Stairwell	2	na	Incand.	75	na	na	150	Man Sw
Lieutenant's Office	1	4'	Fluor.	32	4	T8	102	Man Sw, Mag Bal
Kitchen (a)	6	4'	Fluor.	32	4	T8	614	Man Sw, Mag Bal, NL
Kitchen (b)	2	4'	Fluor.	40	1	T12	80	Man Sw, Mag Bal
Total: Kitchen							694	
Apparatus room	7	8'	Fluor.	80	2	T8	896	Man Sw, Mag Bal, NL
Stairwell	1	4'	Fluor.	32	2	T8	-	Man Sw, Mag Bal
Side Room	1	na	Incand.	75	na	na	75	Man Sw
Storage Room (a)	3	4'	Fluor.	40	2	T12	240	Man Sw, Mag Bal
Storage Room (b)	1	na	Incand.	75	na	na	75	Man Sw
Total: Storage Room							315	
Boiler Room	1	4'	Fluor.	40	4	T12	160	Man Sw, Mag Bal
Main Room	8	4'	Fluor.	32	2	T8	410	Man Sw, Mag Bal
Toilet	1	na	Incand.	75	na	na	75	Man Sw
Stairwell landing	1	4'	Fluor.	32	2	T8	51	Man Sw, Mag Bal

AFF = Mounting Height Above Finished Floor

Flour = Fluorescent

Length = Standard Fixture Length

Mag Bal = Magnetic Ballast

Man Sw = Manual Wall Switch

NL = Natural Light

Q1 = Fixture Quantity

Q2 = Lamp Quantity per Fixture

W1 = Watts per Lamp

W2 = Watts/room (Net: 0.80 BF applied)

1.3. Condition Assessment: Interior

1.3.1. Condition: **Fair**

2. Power Distribution
 - 2.1. Construction and condition
 - 2.1.1. Distribution panels (original to building): Condition-**Fair**
 - 2.1.2. General Receptacles (original to building): Condition-**Fair**

3. Utilities Service
 - 3.1. Construction
 - 3.1.1. One (1) 3-phase original electric service.
 - 3.2. Condition Assessment
 - 3.2.1. Condition Power Service: **Fair**
 - 3.2.2. Condition Electric Meter: **Good**

4. Conclusions:
 - 4.1. The interior electrical system as a whole is in fair condition.

5. Estimates: Suggested remedies and Opinion of probable cost
 - 5.1. Immediate Costs
 - 5.1.1. See GFI in Life Safety section.

4.5.2.1 –Interior Lighting



E1 – Recessed fixture - 1



E2 – Recessed fixture - 2



E3 – Natural lighting 2nd floor



E4 – Task light - 1



E5 – Recessed fixture - 3



E6 – Task light - 2

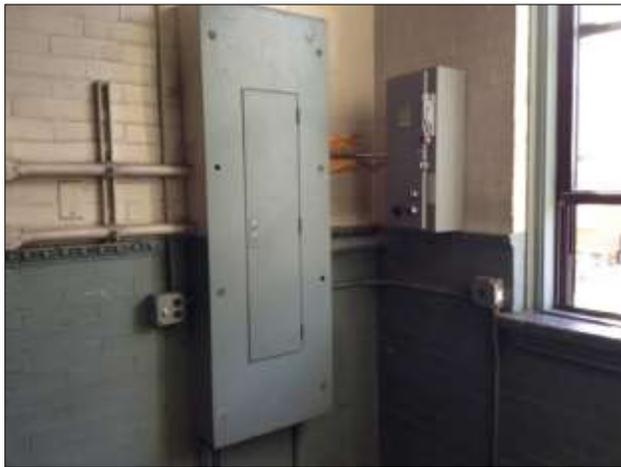
4.5.2.2 – Electrical: Service and Distribution



E7 – Electric service



E8 – Electric meter



E9 – Breaker panel 1st Floor



E10 – Breaker panel: Basement



E11 – Breaker panel: 2nd Floor

Building Plumbing Systems 4.5.3

1. Fixtures

- 1.1. General Description: The plumbing system is served by a combination of sanitary fixtures, supply and drain piping, and supply water meter service. Serving the locker room, men’s and ladies’ rooms, lunch room kitchen area, and laundry.
- 1.2. Construction
 - 1.2.1. Four (4) toilets
 - 1.2.2. Four (4) lavatory sinks
 - 1.2.3. One (1) shower head
 - 1.2.4. One (1) kitchen type sinks
 - 1.2.5. One (1) janitor’s sink
- 1.3. Condition Assessment
 - 1.3.1. Condition: **Fair**

2. Domestic Water Production

Construction: The domestic water heating system is served by one Vanguard (1) 50 gallon, commercial water heater and supply piping.

<u>Location</u>	<u>DWH</u>	<u>Type</u>	<u>CAP</u>	<u>Fuel</u>	<u>Pump</u>	<u>SSw</u>	<u>XTank</u>	<u>PRV*</u>	<u>CA</u>	<u>Control</u>	<u>Comments</u>
Basement M.E.R.	1	Tank	50	NG	No	Yes	Yes	Yes	Yes	Unit	Installation date: 2010

Note 1: Water heater safety devices and control testing not included in project scope.

Note 2: Water heater safety devices testing should be performed by competent technician.

- CA = Combustion air source: dedicated
- CAP = Storage Capacity: Gallons
- DWH = Domestic Water Heater
- M.E.R. = Mechanical Equipment Room
- NG = Natural Gas
- PRV = Pressure relief valve with extension piping
- SSw = Spill Switch: Draft safety
- XTank = Thermal Expansion Tank

2.1.1 Water Heater Condition: **Fair**

3. Utilities

- 3.1 General Description: Potable water supply
- 3.2 Construction
 - 3.2.1 Original meter, shut-off valve, and piping.
 - 3.2.2 Back-flow preventer present, older style.
- 3.3 Condition Assessment: Fair

4. Conclusions:

- 4.1 The plumbing systems are in fair to poor overall condition. Routine maintenance should continue to extend serviceability.

5. Estimates: Suggested remedies and Opinion of probable cost

- 5.1 De minimus conditions
 - 5.1.1 Insulate supply pipes from water heaters.
- 5.2 Immediate Costs

4.5.3.1 – Plumbing: Fixtures 1st Floor



P1 – Domestic water heater - 1



P2 – Domestic water heater - 2



P3 – Domestic water heater - 3



P4 – Domestic water heater expansion tank



P5 – Domestic water service

Building Fire Protection and Life Safety Systems 4.5.4

1. Flammable Gas Storage
 - 1.1. Liquid Propane (LP) gas tank is stored in the apparatus room/Vehicle garage with commercial BBQ grill. **Code Violation.**
2. Fire Extinguishers
 - 2.1. No observable fire extinguishers present. **Potential Code Violation.**
3. Alarm Systems
 - 3.1. Two (2) or smoke alarms present in dormitory and stairwell.
 - 3.2. Condition: **Fair**
4. Smoke Evacuation System and Stairwell Pressurization
 - 4.1. No Smoke Evacuation System or Stairwell Pressurization.
5. Sprinklers and Standpipes
 - 5.1. No sprinkler system present.
6. Emergency Lighting
 - 6.1. No observable emergency light fixtures or signage present. **Potential code violation.**
7. Ground Fault Interruption
 - 7.1. Construction: GFI's are present in (not all receptacles).
 - 7.2. Condition: **Fair**
8. Conclusions:
 - 8.1. The building fire protection and life safety systems are physically deficient.
9. Estimates: Suggested remedies and Opinions of probable cost
 - 9.1. De minimus conditions
 - 9.1.1. **Remove liquid propane (LP) gas tank for BBQ grill.**
 - 9.2. Short-Term Costs
 - 9.2.1. Add a minimum of Four (4) fire extinguishers
 - 9.2.1.1. Men's dormitory: \$250
 - 9.2.1.2. Lunch room: \$250
 - 9.2.1.3. Basement landing: \$250
 - 9.2.1.4. Outside boiler room: \$250
 - 9.2.2. Add a minimum of Four (4) smoke-fire detector/alarms:
 - 9.2.2.1. Men's dormitory: \$350
 - 9.2.2.2. Lunch room: \$350
 - 9.2.2.3. Basement landing: \$350
 - 9.2.2.4. Outside boiler room: \$350
 - 9.2.3. Add a minimum of one (1) GFI receptacles: \$400
 - 9.2.4. Add a minimum of three (3) emergency light/sing fixtures – LED type: \$1,400
 - 9.2.5. Add Carbon Monoxide Detector-Alarm in Boiler Room: \$3,500

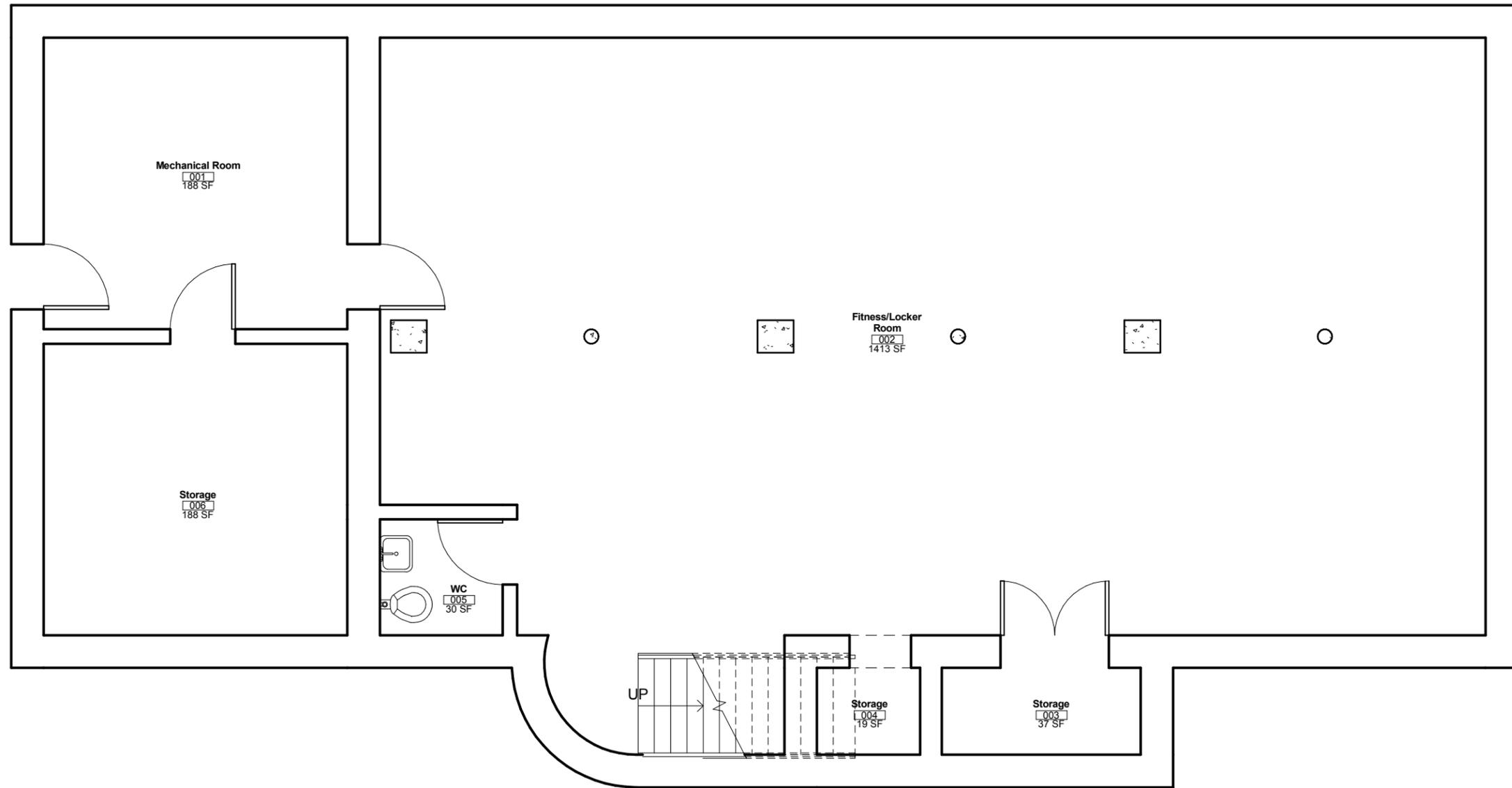
4.5.4.1 – Fire Protection and Life Safety Systems



FP1 – Smoke detector dormitory



FP2 – Smoke detector stairwell



1 Ground Floor Plan
3/16" = 1'-0"

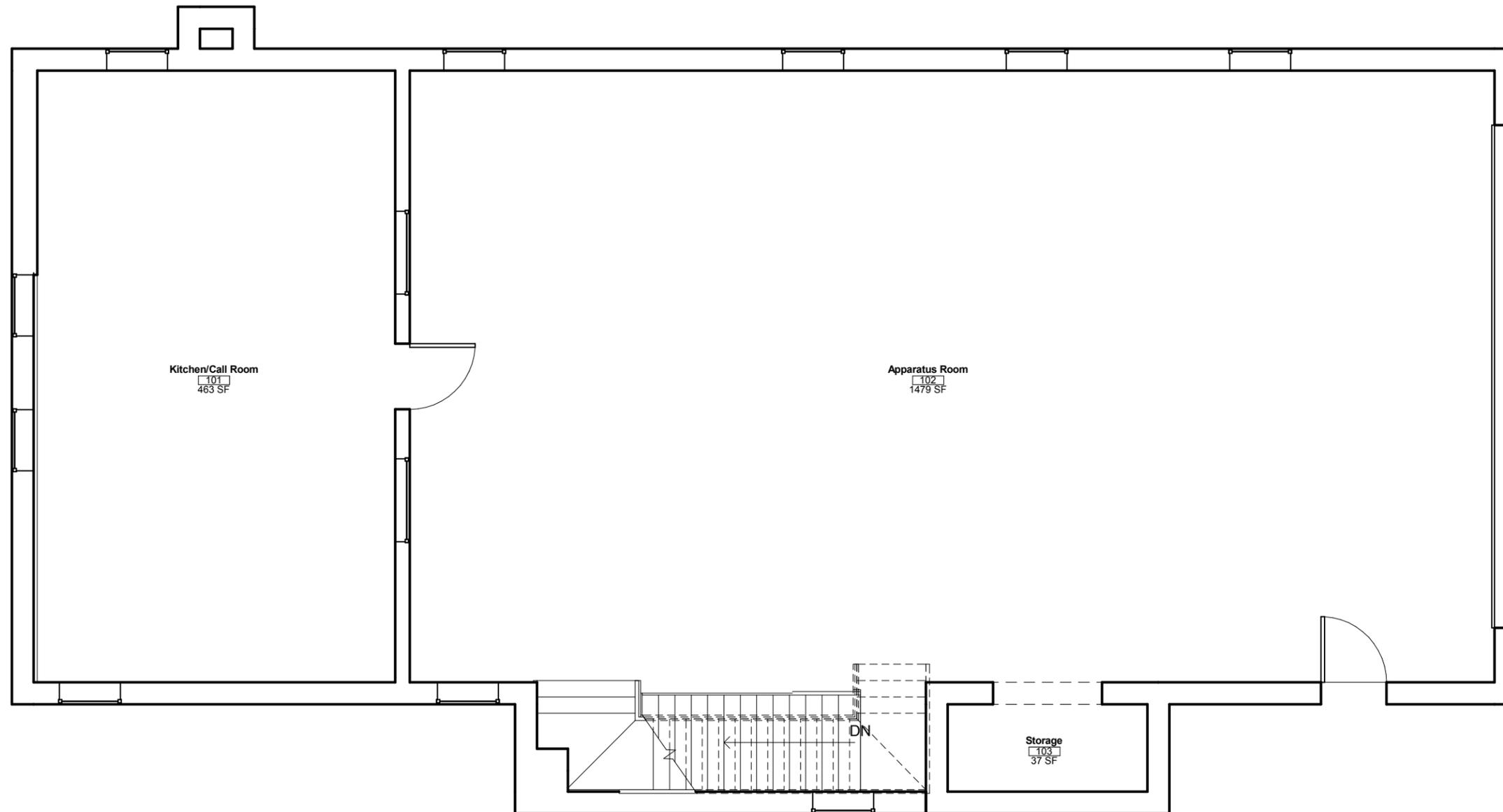


The drawings and related digital files are a schematic rendition of the existing conditions of the facility only. Please verify exact field conditions before using these for further construction and renovation work.



Firehouse 26
City of Pittsburgh

Ground Floor Plan		A1.00
Date	07/30/13	
Drawn by	AS	Scale 3/16" = 1'-0"



1 L1 Floor Plan
3/16" = 1'-0"

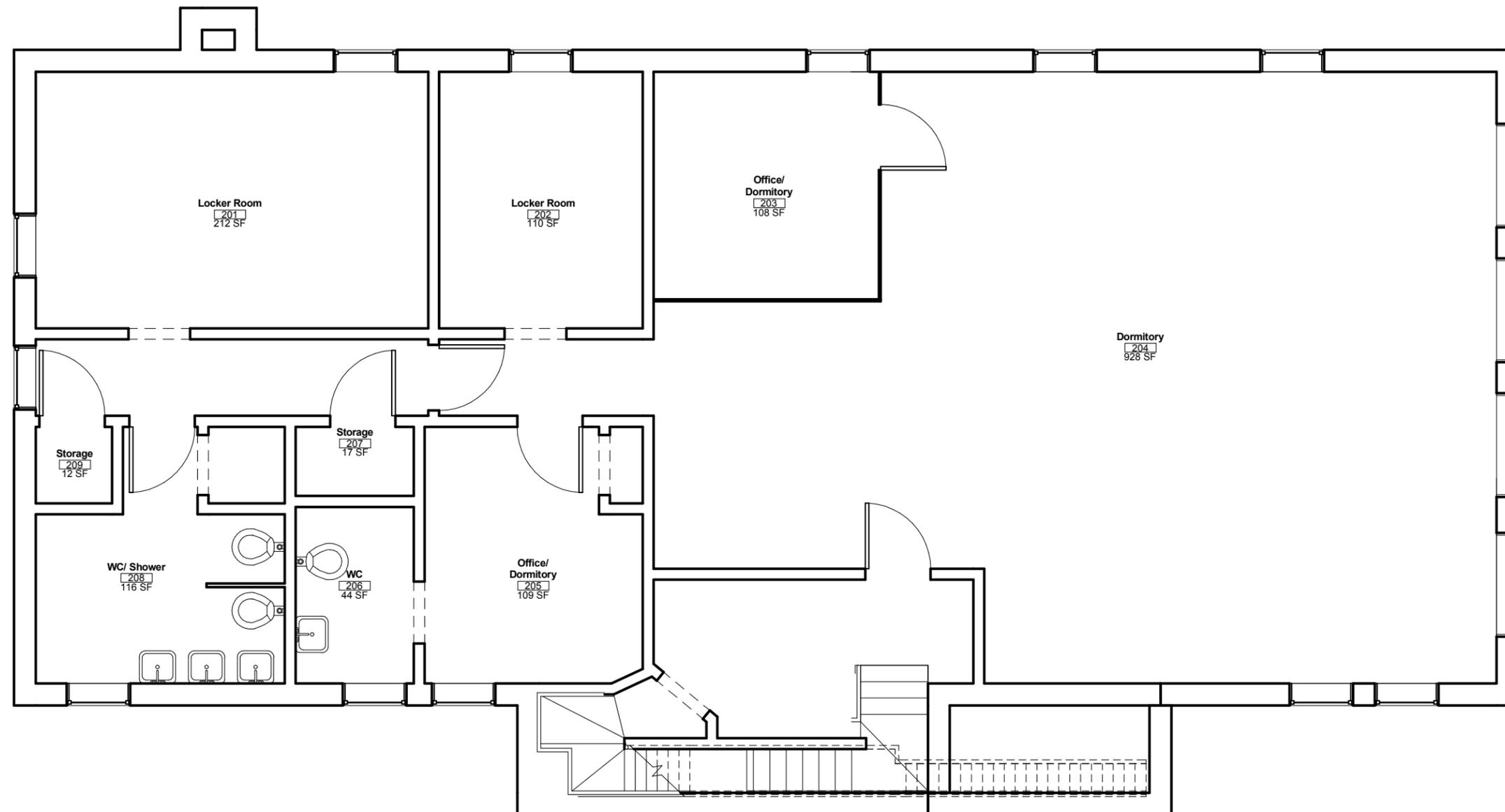


The drawings and related digital files are a schematic rendition of the existing conditions of the facility only. Please verify exact field conditions before using these for further construction and renovation work.



Firehouse 26
City of Pittsburgh

L1 Floor Plan		A1.10
Date	07/30/13	
Drawn by	AS	Scale 3/16" = 1'-0"

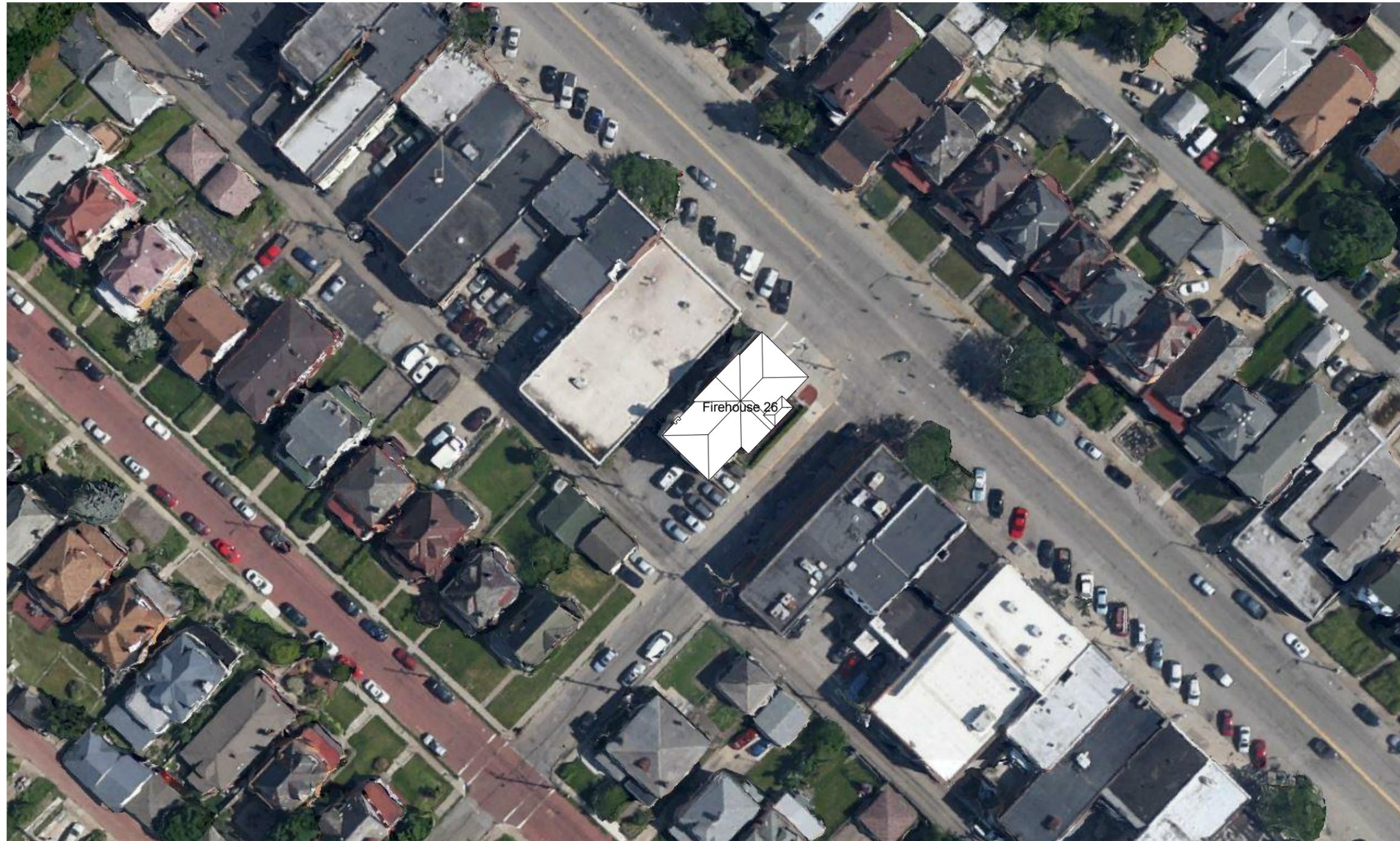


1 L2 Floor Plan
3/16" = 1'-0"



Firehouse 26
City of Pittsburgh

L2 Floor Plan		A1.20
Date	07/30/13	
Drawn by	Author	Scale 3/16" = 1'-0"



① Site Plan
1" = 50'-0"



The drawings and related digital files are a schematic rendition of the existing conditions of the facility only. Please verify exact field conditions before using these for further construction and renovation work.



Firehouse 26
City of Pittsburgh

Site Plan		C1.01
Date	07/30/13	
Drawn by	AS	Scale 1" = 50'-0"

B135 - FIREHOUSE 26

Tier II: Abbreviated Accessibility Survey					
	Item	Yes	No	N/A	Comments
A. Building History					
1.	Has an ADA survey previously been completed for this property?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
2.	Have any ADA improvements been made to the property?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
3.	Does a Barrier Removal Plan exist for the property?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
4.	Has the Barrier Removal Plan been reviewed/approved by an arms-length third party such as an engineering firm, architectural firm, building department, or other agency, etc.?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
5.	Has building ownership or building management reported receiving any ADA related complaints that have not been resolved?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
6.	Is any litigation pending related to ADA issues?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
B. Parking					
1.	Are there sufficient accessible parking spaces with respect to the total number of reported spaces? (See Table X2.1)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
2.	Are there sufficient van-accessible parking spaces available (96 in. wide by 60 in. aisle)? (See Table X2.1)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
3.	Are accessible spaces marked with the International Symbol of Accessibility? Are there signs reading "Van Accessible" at van spaces?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
4.	Is there at least one accessible route provided within the boundary of the site from public transportation stops, accessible parking spaces, passenger loading zones, if provided, and public streets and sidewalks?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
5.	Do curbs on the accessible route have depressed, ramped curb cuts at drives, paths and drop-offs?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
6.	Does signage exist directing you to accessible parking and an accessible building entrance?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
C. Ramps — N/A					
1.	If there is a ramp from parking to an accessible building entrance, does it meet slope requirements? (1:12 slope or less)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2.	Are ramps longer than 6 ft complete with railings on both sides?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
3.	Is the width between railings at least 36 in.?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
4.	Is there a level landing for every 30 ft horizontal length of ramp, at the top and at the bottom of ramps and switchbacks?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
D. Entrances/Exits					
1.	Is the main accessible entrance doorway at least 32 in. wide?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
2.	If the main entrance is inaccessible, are there alternate accessible entrances?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
3.	Can the alternate accessible entrance be used independently?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
4.	Is the door hardware easy to operate (lever/push type hardware, no twisting required, and not higher than 48 in. above floor)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
5.	Are main entry doors other than revolving doors available?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
6.	If there are two main doors in series, is the minimum space between the doors 48 in. plus the width of any door swinging into the space?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

FIG. X2.1 Abbreviated Accessibility Survey

Tier II: Abbreviated Accessibility Survey					
	Item	Yes	No	N/A	Comments
E. Paths of Travel					
1.	Is the main path of travel free of obstruction and wide enough for a wheelchair (at least 36 in. wide)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2.	Does a visual scan of the main path of travel reveal any obstacles (phones, fountains, etc.) that protrude more than 4 in. into walkways or corridors?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
3.	Is at least one wheelchair-accessible public telephone available?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
4.	Are wheelchair-accessible facilities (toilet rooms, exits, etc.) identified with signage?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
5.	Is there a path of travel that does not require the use of stairs?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
F. Elevators - N/A					
1.	Do the call buttons have visual signals to indicate when a call is registered and answered?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2.	Is the "UP" button above the "DOWN" button?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
3.	Are there visual and audible signals inside cars indicating floor change?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
4.	Are there standard raised and Braille markings on both jambs of each hoist way entrance?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
5.	Do elevator doors have a reopening device that will stop and reopen a car door if an object or a person obstructs the door?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
6.	Do elevator lobbies have visual and audible indicators of car arrival?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
7.	Are elevator controls low enough to be reached from a wheelchair (48 in. front approach/54 in. side approach)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
8.	Are elevator control buttons designated by Braille and by raised standard alphabet characters (mounted to the left of the button)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
9.	If a two-way emergency communication system is provided within the elevator cab, is it usable without voice communication?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
G. Toilet Rooms					
1.	Are common-area public toilet rooms located on an accessible route?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
2.	Are door handles push/pull or lever types?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
3.	Are there audible and visual fire alarm devices in the toilet rooms?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
4.	Are corridor access doors wheelchair-accessible (at least 32 in. wide)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
5.	Are public toilet rooms large enough to accommodate a wheelchair turnaround (60 in. turning diameter)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
6.	In unisex toilet rooms, are there safety alarms with pull cords?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
7.	Are toilet stall doors wheelchair-accessible (at least 32 in. wide)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.	Are grab bars provided in toilet stalls?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
9.	Are sinks provided with clearance for a wheelchair to roll under (29 in. clearance)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
10.	Are sink handles operable with one hand without grasping, pinching, or twisting?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
11.	Are exposed pipes under sinks sufficiently insulated against contact?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
H. Guestrooms - N/A					
1.	Are there sufficient reported accessible sleeping rooms with respect to the total number of reported guestrooms? (See Table X2.2)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2.	Are there sufficient reported accessible rooms with roll-in showers with respect to the total number of reported accessible guestrooms? (See Table X2.2)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

FIG. X2.1 Abbreviated Accessibility Survey (continued)

4.3 ASHRAE Level-1 Energy Audit

Executive Summary

The building systems for Firehouse 26 have been analyzed and evaluated according to ASHRAE Level-1 methodology and reporting requirements.

The following sections are complimentary to the PCR with additional focus on energy costing, benchmarking, and remediation planning. The detailed information as provided is of an initial nature according to the level-1 structure.

Methodology, calculations, standards, and reference material are drawn from these industry publications:

1. ASHRAE Procedures for Commercial Building Energy Audits -2011 Second Edition
2. ANSI/ASHRAE Standard 105-2007: Standard Methods of Measuring, Expressing, and Comparing Building Energy Performance
3. DOE/EIA US Energy Information Administration: U.S. Commercial Building Energy Intensity -2003 Table 7b.
4. Energy Star Target Finder tool
5. "Commercial Energy Auditing Reference Handbook", Steven Doty, PE, CEM

Scope of Work

The scope-of-work associated with the ASHRAE Level-1 includes the following items.

- Conduct walk-through survey: Completed see - PCR
- Identify low-cost/no-cost recommendations: Completed see - PCR
- Identify capital improvements and potential EEM's: Completed - see PCR
- PEA analysis
- Energy Systems Condition Assessment
- Utility rate structure commodity programs
- EUI target and comparative evaluation
- Potential savings from new EUI target
- Proposed Action Plan: Phase #1

Preliminary Energy Analysis (PEA)

Historical Energy Consumption by Year and Type:

2011 - Electricity

YEAR: 2011

Month	Cooling Degree Days	Billed Demand (kW)	Electric Use (kWh)	Demand Cost (\$)	Total Bill (\$)
January	0	9.1	3680	-	\$323
February	0	8.3	3420	-	\$300
March	0	8.8	3360	-	\$298
April	21	12	3850	-	\$362
May	94	14.2	5040	-	\$475
June	182	13.8	6210	-	\$568
July	397	15.2	8400	-	\$747
August	206	12.8	5660	-	\$519
September	78	12.6	3980	-	\$386
October	0	10.2	3830	-	\$360
November	0	10.1	3880	-	\$363
December	0	10.8	4320	-	\$402
Annual Totals			55,630	\$0	\$5,104

2011 - Natural Gas

YEAR: 2011

Month	Heating Degree Days	MCF	Therms	Total Bill (\$)
January	1240	115.1	1151	\$1,146
February	917	94.4	944	\$946
March	781	76.1	761	\$755
April	350	27.3	273	\$287
May	138	6.2	62	\$80
June	12	2.2	22	\$45
July	0	3	30	\$53
August	1	3	30	\$31
September	87	8.4	84	\$45
October	401	42.8	428	\$194
November	532	13.3	133	\$152
December	849	176.1	1761	\$1,648
Annual Totals			5,679	\$5,381

2012 - Electricity

YEAR: 2012

Month	Cooling Degree Days	Billed Demand (kW)	Electric Use (kWh)	Demand Cost (\$)	Total Bill (\$)
January	0	10.3	3630	-	\$345
February	0	7.9	3270	-	\$302
March	4	12	4000	-	\$384
April	7	13.1	4140	-	\$401
May	114	15.4	5500	-	\$521
June	181	16.5	8210	-	\$747
July	347	16.9	7790	-	\$716
August	226	15.2	6890	-	\$636
September	110	14.8	4360	-	\$436
October	24	10.8	4140	-	\$393
November	0	9.8	3710	-	\$353
December	0	9.6	4630	-	\$425
Annual Totals			60,270	\$0	\$5,662

2012 - Natural Gas

YEAR: 2012

Month	Heating Degree Days	MCF	Therms	Total Bill (\$)
January	993	27.9	279	\$280
February	860	165	1650	\$1,545
March	430	38.9	389	\$377
April	456	22.4	224	\$226
May	60	5.8	58	\$76
June	29	9.3	93	\$107
July	0	3	30	\$50
August	1	3.9	39	\$58
September	107	2.8	28	\$48
October	343	46.4	464	\$457
November	719	51	510	\$442
December	795	112.8	1128	\$946
Annual Totals			4,892	\$4,613

2013 - Electricity

YEAR: 2013

Month	Cooling Degree Days	Billed Demand (kW)	Electric Use (kWh)	Demand Cost (\$)	Total Bill (\$)
January	0	10	3980	-	\$377
February	0	8.9	3900	-	\$364
March	0	9.3	4230	-	\$393
April	22	9.3	3860	-	\$363
May	92	15.7	5290	-	\$472
June	-	-	-	-	-
July	-	-	-	-	-
August	-	-	-	-	-
September	-	-	-	-	-
October	-	-	-	-	-
November	-	-	-	-	-
December	-	-	-	-	-
Annual Sub-Totals			21,260	\$0	\$1,969

2013 - Natural Gas

YEAR: 2013

Month	Heating Degree Days	MCF	Therms	Total Bill (\$)
January	988	111.2	1112	\$933
February	998	106.1	1061	\$891
March	911	73.4	734	\$624
April	360	40.8	408	\$363
May	151	13.4	134	\$64
June	-	-	-	-
July	-	-	-	-
August	-	-	-	-
September	-	-	-	-
October	-	-	-	-
November	-	-	-	-
December	-	-	-	-
Annual Sub-Totals			3,449	\$2,875

Energy Performance Summary

The EUI values include in the performance summary below have been calculated using ASHRAE forms and formulas. Due to the low sampling response for Public order and Safety facilities in the northeast sector, the direct and literal application of these calculations is not advisable. The sections that follow will establish more a realistic target value in the context of a phased energy reduction program. The significant differences in these EUI rating will be treated in terms of potential opportunity.

The total annual cost information data source is the client provided utility bill spread sheet.

ENERGY PERFORMANCE SUMMARY
 Commercial Building Energy Audit Sample Forms

Energy Type	Total Annual Use	Units	Conversion Multiplier	kBtu	Total Annual Cost (\$)
Electricity	58,388	kWh	3.412142	199,229	\$ 4,336.74
Natural Gas	6,680	Therms	100	668,000	\$ 5,243.11
Purchased Steam			0	-	
Purchased Hot Water			0	-	
Purchased Chilled Water			0	-	
Oil #:			0	-	
Propane			0	-	
Coal			0	-	
Thermal—On-Site Generated			0	-	
Other			0	-	
Electricity—On-Site Generated			0	-	
Thermal or Electricity—Exported			0	-	
			0	-	
Total				867,229	\$ 9,579.85

Gross Conditioned Area	3623
EUI (kBtu/ft ²)	239.37
Target Finder Score*	145
CBECs EUI (for comparable , kBtu/ft ²)	88.3
ECI (\$/ft ²)	\$ 1.82

Notes: The CBECs sampling pool for Public Order and Safety facilities is limited for buildings in the North East sectors and must be interpreted accordingly.

Energy Systems Condition Assessment

The energy systems condition assessment is an additional effort beyond the scope of the ASTM PCA standard and the typical ASHRAE Level-1 requirements. It is a basis for a targeted audit as referred to in ASHRAE standard. This approach supplements the PCR and formal Level-1 to develop a credible EUI target and an actionable remediation program.

This section also provides an initial performance assessment of energy consuming systems and devices as part of the targeted audit effort.

Heating System

Energy System Condition: Boiler system including pump(s), piping, and room radiators - **Derelict**

Boiler System Deficiencies

- Combustion Efficiency: **Poor**
- Age: Near EUL see PCR
- Maintenance Condition: **Poor** see PCR
- Piping System Insulation: **None**

Control System Deficiencies

- Space Set-Point Control: **Poor**. Uncalibrated thermostat, excessive set-point temperatures, and open occupant adjustment
- Boiler Water Set-Point Control: **Poor**. Decommissioned controls, see PCR.
- Set-Back Controls: **None**
- Weekly Scheduling Controls: **None**

Energy Management System Deficiencies

- Active Energy Monitoring and Management System: **None**

Cooling System

Energy System Condition: Room Cooling Units (WACU) - **Derelict**

WACU Deficiencies

- Efficiency: **Poor**
- Age: Near EUL see PCR
- Maintenance Condition: **Poor** see PCR

Control System Deficiencies

- Space Set-Point Control: **Poor**. Uncalibrated integral thermostat, excessive set-point temperatures, and open occupant adjustment
- Set-Back Controls: **None**
- Weekly Scheduling Controls: **None**

Energy Management System Deficiencies

- Active Energy Monitoring and Management System: **None**

Lighting System

Energy System Condition: Interior Lighting - **Poor**

Fixture Deficiencies

- Lamp Efficiency: **Good**
- Ballast Efficiency: **Poor**
- Age: Near EUL see PCR
- Maintenance Condition: **Poor** see PCR

Control System Deficiencies

- Occupancy Controls: **None**
- Weekly Scheduling Controls: **None**

Energy Management System Deficiencies

- Active Energy Monitoring and Management System: **None**

Potable Water System

Energy System Condition: Water heating and piping - **Derelict**

Heater System Deficiencies

- Combustion Efficiency: **Poor**
- Age: Near EUL see PCR
- Maintenance Condition: **Poor** see PCR
- Piping System Insulation: **None**

Control System Deficiencies

- Set-Back Controls: **None**
- Weekly Scheduling Controls: **None**

Energy Management System Deficiencies

- Active Energy Monitoring and Management System: **None**

Utility rate structure commodity programs

The energy billing and cost data received to date are understood to be directly from local, single source utility companies. Energy rate structures may be reduced through a commodity sourcing approach. Such an approach could include natural gas and electrical energy brokering services. While such services have been successful in reducing cost per kWh and MCF, additional risk of such approach must be carefully considered. It would be expected that energy rate costs could be reduced from 10-15% in a city wide contract. However, such saving would typically require Smart Metering and potential interruption in service, which may not be compatible or acceptable for emergency services facilities. However, full consideration should be given to 'bidding' Natural Gas supply as contractual arrangement may be more acceptable. Further, alternative energy supply opportunities should be explored as peak season interruption obligations are in a state of change, which often favors the consumer.

EUI target and comparative evaluation

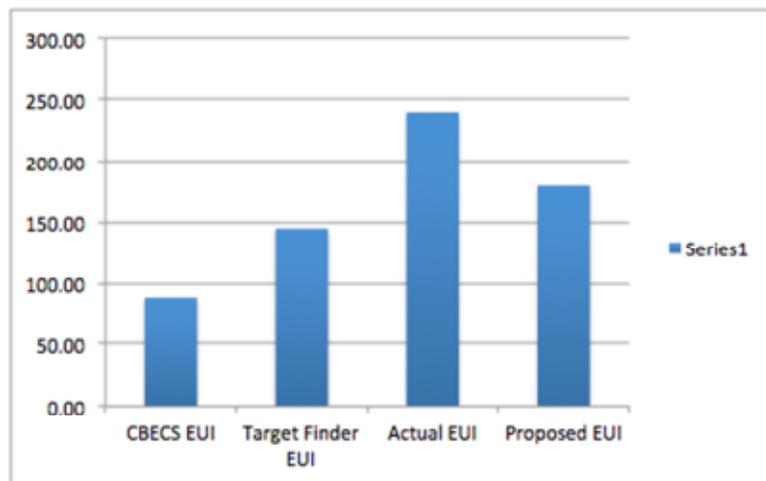
The EUI for Firehouse 26 is calculated at 239.37 kBtu/Ft².

The CBECs (Commercial Building Energy Consumption Survey) and 'Target Finder' scores, calculated in the above ASHRAE Energy Performance Summary section, conflict with empirical evidence provided by utility consumption data, Degree-day weather patterns, and the energy systems condition assessment. However, these EUI ratings are useful as bracketing limits.

Basement areas are occasionally occupied, and without extensive terminal heating units, and are not treated formally as conditioned spaces.

An EUI of 179.53 is proposed as an initial working target pending level-2 modeling or future on-site system sub-metering and data logging efforts.

CBECs EUI	88.30
Target Finder EUI	145.00
Actual EUI	239.37
Proposed EUI	179.53



Potential savings from achieving proposed EUI target

Energy Type	Total Annual Use (EUI=100)	Units	Conversion Multiplier	kBtu	Total Annual Cost (\$)
Electricity	43,792	kWh	3.412142	149,423	\$ 3,252.60
Natural Gas	5,010	therms	100	501,007	\$ 3,932.39
Purchased Steam			0	-	
Purchased Hot Water			0	-	
Purchased Chilled Water			0	-	
Oil #:			0	-	
Propane			0	-	
Coal			0	-	
Thermal—On-Site Generated			0	-	
Other			0	-	
Electricity—On-Site Generated			0	-	
Thermal or Electricity—Exported			0	-	
			0	-	
Total				650,430	\$ 7,184.99

Gross Conditioned Area*	3623
Actual EUI (kBtu/ft ²)	239.37
Proposed EUI (kBtu/ft ²)	179.53
Proposed ECI (\$/ft ²)	\$ 1.98

*Gross Conditioned Area excludes basement level, and the basis of the EUI calculations. Total building area including basement is 5,510 SF.

Proposed action plan: Phase #1

Scope: Wireless, WEB based energy management system with wireless instruments including:

- One (1) Boiler Control
- Three (3) Room level heating radiator controls
- Three (3) Lighting controls
- Three (3) Cooling controls
- Set-point, set-back, and scheduling controls
- Insulate basement level hot water supply piping
- Insulate basement level domestic water piping
- Insulate/Close-off (95%) Hose Tower lower opening