



Rental Assistance Demonstration (RAD): **PHYSICAL CONDITION ASSESSMENT**

805-807 West Washington Street, Ann Arbor, Michigan 48103

PREPARED FOR Norstar Development USA, LP
733 Broadway
Albany, NY 12207

AND The Ann Arbor
Housing Commission
727 Miller Ave
Ann Arbor, MI 48103

PROJECT # 9699U

PIC # MI064

DATE April 7, 2015

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1.0 OVERVIEW OF RPCA

AKT Peerless Environmental & Energy Services (AKT Peerless) was commissioned by Norstar Development USA, L.P. (Client) on behalf of the Ann Arbor Housing Commission (AAHC) to conduct a Rental Assistance Demonstration (RAD) Physical Condition Assessment (PCA) on the property referred to as West Washington located at 805-807 West Washington Street in Ann Arbor, Washtenaw County, Michigan (subject property). The RAD PCA was conducted in accordance with the Department of Housing and Urban Development (HUD) *Rental Assistance Demonstration (RAD): Physical Condition Assessment Statement of Work and Contractor Qualifications*, Version 2, December 2013.

1.1 Summary of Report

The following RAD PCA report includes the following parts:

- **Part 1: PCA Report Comparing Traditional and Green Requirements**
- **Part 2: Energy Audit**
- **Part 3: Utility Consumption Baseline**

1.2 RPCA Excel Tool

The completed RPCA Excel Tool was provided to AAHC for the West Washington location.

1.3 Acknowledgement Sections

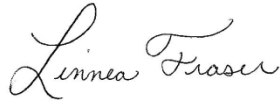
Following each report identified in Section 1.1 above, an acknowledgement section is included. The acknowledgement section contains the following information:

- Certification that report preparers meet the RPCA qualifications
- Acknowledgement of delivery and review of RPCA required deliverables

2.0 Part 1: Physical Condition Assessment Report Comparing Traditional and Green Requirements

2.1 Acknowledgements of Part 1: Physical Condition Assessment Report Comparing Traditional and Green Requirements

The Physical Condition Assessment Report Comparing Traditional and Green Requirements Report and Excel RPCA Model were completed by Linnea Fraser and Jeremy McCallion of AKT Peerless. AKT Peerless certifies that the report preparers meet the qualifications identified in the RAD Physical Condition Assessment Statement of Work and Contractor Qualifications Part 1.1 (Version 2, December 2013).



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Rental Assistance Demonstration (RAD): **PART 1: PHYSICAL CONDITION ASSESSMENT**

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733 Broadway
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1.0 EXECUTIVE SUMMARY

1.1 Summary of Findings

AKT Peerless Environmental & Energy Services (AKT Peerless) was commissioned by Norstar Development USA, L.P. (Norstar) on behalf of the Ann Arbor Housing Commission (AAHC) to conduct a Rental Assistance Demonstration (RAD) Physical Condition Assessment (PCA) on the property referred to as "West Washington" located at 805-807 West Washington Street in Ann Arbor, Washtenaw County, Michigan (subject property).

The site visit was conducted on February 10, 2015.

This low-rise residential complex consists of one, 1-story duplex building with storage basement, housing a total of 2,114 gross SF and 2 apartments. The building was constructed in 1969.

Generally, the property appears to have adhered to relevant building codes and industry standards at the time of construction. Given the limitations of facilities staff, the property appears to be properly maintained and is in fair-to-good overall condition. AKT Peerless does not recommend a forensic evaluation of the subject property's buildings based on AKT Peerless' site visit, visual inspection of major building systems, record review and interviews with AAHC.

Given the nature of the property's use, AKT Peerless identified a list of "Critical Needs," as defined by the Department of Housing and Urban Development (HUD)'s RAD PCA (RPCA) guidelines.

1.2 Capital Needs Input

The RPCA Statement of Work defines critical items to include:

- 1) Remedies for exigent health and safety hazards or code violations;
- 2) Correction of conditions that adversely affect ingress or egress;
- 3) Correction of conditions preventing sustaining occupancy;
- 4) Correction of accessibility deficiencies.

Critical repair items were not identified at the subject property.

1.3 Professional Evaluation(s) Recommended for Further Investigation

No additional evaluations are recommended at this time.

1.4 Opinions of Probable Cost

The estimates for the repair, replacement and proposed modernizations can be found in the "Cap Needs Input" tab of RPCA tool, located in Appendix A of this report.

1.5 RAD PCA Considerations and Approach

Based upon site observations, research, professional judgment, along with referencing Expected Useful Life (EUL) criteria established through Fannie Mae and other industry standards, AKT Peerless expresses an opinion as to when a system or component will most likely necessitate replacement.

Typically, for standard components with standard maintenance, the EUL table, often provided by the Lender, is used to determine a system or a component's Effective Remaining Life by deducting the age from anticipated EUL. However, this is not done automatically. AKT Peerless evaluates components with unusually good original quality or exceptional maintenance and occasionally estimates a longer useful life. Alternatively, if a component has been poorly maintained or was of below standard original quality, the useful life may be estimated to be shorter than expected. Consequently, the evaluator applies his or her professional judgment in making a determination of the Effective Remaining Life.

After a determination has been made on a system or a component's Effective Remaining Life, it is input into the RPCA tool in the "Cap Needs Input" tab in the relevant line item. This tab directly populates corresponding tabs, which result in the outputs described throughout this report. The corresponding tabs, including (but not limited to) the 20 Year Detail, 20 Year Schedule, and Capital Needs Input, are attached to this report and can be found in Appendix A.

The evaluation period, per the RPCA tool and statement of work, is defined as 20 years.

The RPCA Statement of Work establishes five categories of repairs, replacements, maintenance items and items for improvement. AKT Peerless utilized these categories as a method for evaluating the facilities:

- A) **Critical Needs**
 - a. See 1.2
- B) **Repair/Rehab items (Short Term Physical Needs)**
 - a. The cost of repairs, replacements, and significant deferred and other maintenance items that will need to be addressed within 12 months of closing
 - b. This category is not intended to include items that are not broken but may need replacement in the near future
- C) **Market Comparable Improvements**
 - a. The PCA contractor may include repairs or improvements (based on discussion with Lender/Owner or Lender's appraiser) that are necessary for marketability in the list of Repair/Rehab needs
 - b. The repairs/improvements should be necessary for the project to retain its market position as an affordable project in a decent, safe and sanitary condition
- D) **Long-term Physical Needs/Reserve Items**
 - a. Major maintenance and replacement items that are required to maintain the project's physical integrity over the next twenty (20) years
- E) **Reserve Costs**
 - a. The Initial Deposit to the Reserve for Replacement Account based on the cost of "Near Term" replacement and major maintenance needs of the Project

2.0 INTRODUCTION

AKT Peerless Environmental & Energy Services (AKT Peerless) was commissioned by Norstar Development USA, L.P. (Norstar) on behalf of the Ann Arbor Housing Commission (AAHC) to conduct a Rental Assistance Demonstration (RAD) Physical Condition Assessment (PCA) on the property referred to as "West Washington" located at 805-807 West Washington Street in Ann Arbor, Washtenaw County, Michigan (subject property).

This PCA was conducted in accordance with: (1) guidelines established by the American Society for Testing and Materials (ASTM) in the *Standard Guide for Property Condition Assessments: Baseline Property Condition Assessments* (ASTM Standard Practice E 2018-08), (2) Fannie Mae document: *Physical Needs Assessment Guidance to the Property Evaluator* (Exhibit 1), and (3) the Department of Housing and Urban Development (HUD) *Rental Assistance Demonstration (RAD): Physical Condition Assessment Statement of Work and Contractor Qualifications*, Version 1, October 2012, updated December 2013.

2.1 Purpose

The purpose of the RAD PCA (RPCA) is to complete a PCA that meets the RAD Physical Condition Assessment Statement of Work Issued by the US Department of Housing and Urban Development (HUD) on October 2012 and updated on December 2013. This included observation and documentation of the conditions and possible defects of readily visible materials and building systems which might significantly affect the value of the property, and to evaluate if conditions exist which may have a significant impact on the continued operation of the facility. The observations, findings, and conclusions within this report are based on professional judgment and information obtained during the course of this assessment. It is understood that AAHC will use the information provided in this report to assist in decisions regarding the continued operation of the subject property.

2.2 Scope of Services

This RPCA was conducted in accordance with AKT Peerless' Proposal for a RPCA (Proposal Number PU-17009), dated January 29, 2015 and is based on the Statement of Work Issued by the US Department of Housing and Urban Development (HUD) on October 2012. The RPCA Statement of Work has been updated by HUD on December 2013 and AKT Peerless' scope of work will meet Version 2, December 2013. No deviations have been made from the scope of work.

This Report is based on a site visit, in which AKT Peerless performed a visual, non-intrusive and non-destructive evaluation of various external and internal building components, in addition to reviews of original and "as-built" plans and specifications for the subject property, and available information from trade physical element reports. Representative samples of the major building components were observed and physical conditions evaluated in general accordance with ASTM E2018-08. These systems include site development, building structure, building exterior and interior areas; mechanical, electrical, and plumbing systems, conveyance systems, life safety/fire protection, and general ADA compliance. Photographs were taken to provide a record of general conditions of the facility, as well as the specific deficiencies observed. The PCA report is not a building code, safety, regulatory or environmental compliance inspection.

AKT Peerless observed the interior spaces to determine their general character and condition. During the site visit we interviewed the available site personnel and/or property managers to add or confirm information. AKT Peerless reviewed available drawings or site documentation to confirm the general

character of the construction. AKT Peerless also made inquiries to the local building department, zoning department and fire department.

If any additional information is encountered concerning the facility, it should be forwarded to AKT Peerless for possible re-evaluation of the assumptions, conclusions and recommendations presented herein. The recommendations and opinions of cost provided herein are for observed deficiencies based on the understanding that the facility will continue operating in its present occupancy classification.

This Report is based on the evaluator's judgment of the physical condition of the components, their ages and their expected useful life (EUL). The conclusions presented are based upon the evaluator's professional judgment. The actual performance of individual components may vary from a reasonably expected standard and will be affected by circumstances that occur after the date of the evaluation.

The Report does not identify minor, inexpensive repairs or maintenance items which are part of the property owner's current operating budget so long as these items appear to be addressed on a regular basis. The report does identify infrequently occurring maintenance items of significant cost, such as exterior painting, deferred maintenance and repairs and replacements that normally involve major expense or outside contracting.

The following terms are used throughout the report and are defined as follows:

- **EXCELLENT:** New or like new
- **GOOD:** Average to above-average condition for the building system or material assessed, with consideration of its age, design, and geographical location.
- **FAIR:** Average condition for the building system evaluated. Satisfactory; however, some short term and/or immediate attention is required or recommended.
- **POOR:** Below average condition for the building system evaluated; requires rehab, significant work or replacement anticipated to return the building system or material to an acceptable condition

Unless stated otherwise in this report, the systems reviewed are considered to be in good condition and their performance appears to be satisfactory.

2.3 Limitations and Exceptions

The information obtained from external sources, to the extent it was relied upon to form AKT Peerless' opinion about the condition of the site and structures, was assumed to be complete and correct. AKT Peerless cannot be responsible for the quality and content of information from these sources. However, based on a review of readily available and reasonably ascertainable information, AKT Peerless concluded that these limitations/data gaps should not materially limit the reliability of the report and that a thorough documentation of the subject site's condition has been conducted.

Information regarding the cost schedules for any specific property feature is based on AKT Peerless' professional opinion. The precise costs associated with replacing or repairing any referenced building or property structure can vary by items including but not limited to owner selection of product or equipment, vendor, economic conditions, or competitive bidding process. AKT Peerless recommends that the client contact an entity specializing in a particular architectural or engineering discipline to develop precise material/equipment specifications and cost estimates.

2.4 User Reliance

This report was prepared solely for the benefit of Norstar, AAHC, and HUD and no other party or entity shall have any claim against AKT Peerless due to the performance or nonperformance of the services presented herein. Only AAHC and HUD may rely upon this report for the sole purpose of obtaining financing, providing refinancing, acquisition of the subject site, lease of the subject site, or sale of the subject site. Any other parties seeking reliance upon this report must obtain AKT Peerless prior written approval. AKT Peerless specifically renounces any and all claims by parties asserting a third party beneficiary status.

3.0 APPLICABLE CODES, GUIDELINES, AND ACCESSIBILITY STANDARDS

3.1 Building and Fire Code Compliance

During this assessment, AKT Peerless conducted a review of City of Ann Arbor Building Department records available through the City's website. The review of City records did not reveal any documentation for past or open building code violations.

AKT Peerless also contacted the City of Ann Arbor Fire Department to obtain information on fire code, life safety, or environmental issues pertaining to the subject property. A response received indicated the fire department does not possess files associated with the subject property.

3.2 Americans with Disability Act (ADA) and Section 504 UFAS Compliance

The subject property is defined as a multi-family residential facility, providing “affordable” and “federally-assisted” housing. As such, there are accessibility requirements that must be adhered to for these types of facilities. Considerations include the following guidelines, standards, and/or requirements:

- The Fair Housing Act design and construction requirements
- Section 504 of the Rehabilitation Act of 1973
- The Americans with Disabilities Act of 1990

The Fair Housing Amendments Act (FHA) of 1988, prohibits discrimination in housing on the basis of race, color, religion, sex, handicap, familial status, or national origin. The Act also requires reasonable modification to dwellings, reasonable accommodation in policies or handicapped people, and the design and first construction of certain new, multi-family dwellings scheduled for first occupancy after March 13, 1991, meet certain adaptability and accessibility requirements.

Section 504 of the Rehabilitation Act of 1973 applies to all Federally assisted programs, facilities and housing and establishes accessibility standards per HUD requirements in 24 CFR Part 8, which generally follows the Uniform Federal Accessibility Standard (UFAS).

Buildings completed and occupied after January 23, 1993 are required to fully comply with ADAAG. Existing facilities constructed prior to this date are held to a lesser standard of complying, to the extent allowed by structural feasibility and the financial resources available, or a reasonable accommodation must be made.

The subject property was first occupied in the late-1960s (prior to 1991). As such, it is required to comply with provisions for existing buildings in Section 504/UFAS and under the FHA. AKT Peerless believes that this property is in compliance with these standards. AKT Peerless conducted a limited visual observation for ADA and accessibility compliance. Regardless of age, these areas and facilities must be maintained and operated to comply with the Americans with Disabilities Act Accessibility Guidelines (ADAAG).

In this case, the facility’s leasing office (offsite) must at least partially comply with ADA provisions, to the extent readily achievable – and appears to do so.

3.3 Floodplain

AKT Peerless reviewed a Flood Insurance Rate Map (FIRM), published by the Federal Emergency Management Agency (FEMA), to determine if the subject property is located within a 100-year flood

zone. According to review of Panel 244 of 585, Community Panel 26161C0244E, dated April 3, 2012, the subject property is located within a 100-year flood zone and is located in an area determined to be outside of the 500-year floodplain. A copy of the Flood Insurance Rate Map of the general project area is provided as Appendix D.

3.4 Seismic Zone

The subject site has been determined to be in Seismic Zone 1, on a scale of 0 to 4, with 0 representing the least severity, and 4 the greatest in terms of ground acceleration as compared to gravity. Zone 1 has a one in ten chance of experiencing an earthquake that will achieve a peak acceleration of one-tenth the acceleration of gravity within the next 50 years.

3.5 Environmental Concerns

AKT Peerless conducted a limited visual survey during the walk-through and no directly observed potential on-site environmental hazards were observed. No documented lead-based paint (LBP) had been identified prior to conducting this PCA. An Asbestos Materials Survey was completed by AKT Peerless on November 25, 2013.

An environmental survey and professional evaluation of the entire site was conducted by AKT Peerless. Because the subject building was constructed prior to 1978 and had not been demonstrated to be LBP, AKT Peerless recommends completing a LBP inspection. At the time of this report, AAHC was in the process of retaining services to complete this activity. AKT Peerless completed an asbestos identification survey inspection of the subject property. The results of the inspection can be provided under separate cover. No asbestos was detected in tested material (drywall, window caulk and flooring). However, the roofing material was not tested and assumed to contain asbestos. It is recommended further testing be completed for roofing material prior to any renovation or demolition to confirm or refute the presence of asbestos.

Refer to Appendix E for a copy of Form 4.4 Environmental Restrictions Checklist.

3.6 Green Building Standard(s)

AKT Peerless investigated opportunities to improve energy efficiency, maximize water efficiency, use re-used and recycled materials where practical, safeguard the indoor air quality of the property, be of less harm to the environment generally, and remove/re-use replaced materials and construction debris appropriately.

Specifically, AKT Peerless worked with the project team to utilize and reference the Enterprise Green Communities green building standard as a guideline and framework for making decisions on goal setting, areas to make green improvements, and overall implementation strategy.

The Enterprise Green Communities Criteria Checklist is referenced throughout this document.

4.0 PROPERTY DESCRIPTION

The following sections summarize the site description and physical setting of the subject property.

4.1 Subject Property Location

The subject property is located at 805-807 West Washington Street in Ann Arbor, Washtenaw County, Michigan. The subject property is owned by AAHC and is improved with one, 1-story building with a subgrade storage basement. The site area is approximately 0.56 acres. Construction of the property was completed in 1969.

Refer to Figure 1, Subject Property Location Map; and Figure 2, Topographic Location Map. Photographs of the subject property and significant features are included in Appendix B.

4.2 Subject Property Characteristics

The subject property includes one, 1-story affordable housing residential apartment building with a storage space basement commonly known as West Washington. The interior of the subject property consists of two one-bedroom, one bathroom apartment units. Common area consists of a storage garage/basement utilized by AAHC below the tenant units. The vacancy rate for this property over the period of February 2014-January 2015 was 0%.

4.3 Description of Structures and Other Improvements

General information regarding the on-site buildings (the subject buildings) is presented in the following table:

Table 4-1 Subject Building: West Washington

Total Leasable Area	2,114 square feet
Structure	Standard wood frame construction built over poured concrete basement
Exterior Wall	Vinyl siding and decorative wood paneling, poured concrete basement walls
Roof	Asphalt shingle roofs
Foundation	Poured concrete foundation
HVAC	Individual gas fired furnaces; window AC units at tenant units
Electrical	No transformer
Vertical Transportation	None

Table 4-2 Subject Buildings: Apartment Unit Types and Mix

Quantity	Type	Gross Floor Area (Square Feet)
2	1 Bedroom / 1 Bathroom	575

No additional structures are located on the subject property.

Table 4-3 Subject Buildings: Apartment Units Observed

Unit/Floor	Type	Units Observed
2	1 Bedroom / 1 Bathroom	805

5.0 SITE ELEMENTS

The following sections summarize the physical conditions associated with the exterior portions of the subject property.

5.1 Topography

According to the USGS' Topographic Map of the Ann Arbor West, Michigan Quadrangle, which was published in 2011, the subject property is situated between approximately 800 and 850 feet above the National Geodetic Vertical Datum (NGVD). The subject property's topography slopes to the southwest.

5.2 Storm Water Drainage

The storm water system is managed through Washtenaw County. Storm water runoff from the roof is directed through roof drains into downspouts that feed a mixture of splash blocks, pop up drains, and underground piping connected to the municipal system. Storm water catch basins, which are also connected to the municipal system, are located within the parking lot and landscaped areas on the subject property.

Assessment:

Large declines in the grading as well as a large amount of impervious surfaces at the subject property promote the potential for stormwater flooding near the southern boundary of the subject property.

Recommendation:

Installation of a rain garden along the southern boundary of the subject property is discussed further in Section 5.4. Please refer to the attached 20 Year Detail, 20 Year Schedule, and Capital Needs Input for additional information on condition, rehab costs and capital reserves.

Green Building Alternatives/Considerations:

#	Item	Recommended (for Study)	Already Exists	Appears Infeasible	Comments/Notes
3: Site Improvements					
1.2b	Surface Stormwater Management	X			Undue financial burden - Partial may be feasible

5.3 Ingress and Egress

Description:

Each tenant unit has two entrances, located on either side of the respective building. The entries to each unit are elevated. Cast-in-place concrete walkways, located in the north end of the property, connect the units at the subject building.

Assessment:

The existing vehicle ingress and egress location is in fair condition. Concrete walkways throughout the property appear to be in generally fair condition. The number and location of the site access points appear to be sufficient relative to the size and use of the property.

Recommendation:

Removal and replacement of the concrete walkways and entrance doors are discussed further in Sections 5.4 and 6.3. Please refer to the attached 20 Year Detail, 20 Year Schedule, and Capital Needs Input for additional information on condition, rehab costs and capital reserves.

Green Building Alternatives/Considerations:

#	Item	Recommended (for Study)	Already Exists	Appears Infeasible	Comments/Notes
1: Integrative Design					
1.2b	Universal Design (Substantial and Moderate Rehab only)	X		X	Undue financial burden - 10% not feasible
2: Location + Neighborhood Fabric					
2.9	Walkable Neighborhoods: Connections to Surrounding Neighborhood - Rural/Tribal/Small Towns	X	X		Explore add'l pathway(s)

5.4 Paving, Curbing, and Parking

Description:

The main access drives and parking lot consist of asphalt pavement with asphalt curbing and an asphalt paved approach off of Mulholland Street. Walkways consist of cast-in-place concrete. According to information provided by site personnel, the asphalt pavement parking lot is crack filled by on-site maintenance personnel on an as-needed basis. The date of the most recent seal coating and re-striping was unknown.

Assessment:

Overall, the asphalt and concrete paved areas appear to be in fair condition. However, longitudinal cracking and localized delamination was observed on the asphalt pavement drives and parking areas.

The subject property is equipped with approximately 2 parking spaces.

According to staff, the southern half of the asphalt paved driveway will be removed and replaced with a soil berm along the road as well as landscaping features and a rain garden.

Recommendation:

Replacement of 50% of the asphalt pavement with a permeable driveway and repair of the concrete sidewalk are recommended as rehab items. Additionally, removal of the southern half of the asphalt driveway for a soil berm and rain garden is recommended as a rehab item. Continued maintenance of paved areas is recommended. In addition, capital reserves should be considered for additional signage (accessibility, entry, and/or directional), future maintenance, and/or replacement and repair of paved areas. Please refer to the attached 20 Year Detail, 20 Year Schedule, and Capital Needs Input for additional information on condition, rehab costs and capital reserves.

Green Building Alternatives/Considerations:

#	Item	Recommended (for Study)	Already Exists	Appears Infeasible	Comments/Notes
6: Materials Beneficial to the Environment					
6.9b	Reduced Heat-island Effect: Paving	X		X	Any new areas could be high albedo

5.5 Flat Work

Description:

The pedestrian walkways associated with the subject property consist of cast-in-place concrete construction.

Assessment:

The flat work surrounding the building was observed to be in generally good condition. The step from the street to the walkway on the northeast side of the property may not meet tread depth and riser height requirements and restrictions.

Recommendation:

Repair and maintain broken concrete walkways around the subject property to avoid continued degradation and possible trip hazards.

Green Building Alternatives/Considerations:

#	Item	Recommended (for Study)	Already Exists	Appears Infeasible	Comments/Notes
6: Materials Beneficial to the Environment					
6.9b	Reduced Heat-island Effect: Paving	X			May be possible to replace certain sidewalks w/open grid; could be financially infeasible

5.6 Landscaping and Appurtenances

Description:

Landscape features include grass and deciduous trees.

The waste of the subject property is serviced by the City of Ann Arbor.

Assessment:

Vegetation appeared to be in a normal, mid-winter state of growth. Solid waste appeared to be handled and stored in an appropriate manner.

Recommendation:

Continued maintenance of landscaping on the north side of the property as part of normal facility operations is recommended. In addition, capital reserves should be considered for tree removal. Please

refer to the attached 20 Year Detail, 20 Year Schedule, and Capital Needs Input for additional information on condition, rehab costs and capital reserves.

Green Building Alternatives/Considerations:

#	Item	Recommended (for Study)	Already Exists	Appears Infeasible	Comments/Notes
3: Site Improvements					
3.4	Landscaping	X			Replace only those areas with site work being done (50% native)

5.7 Recreational Facilities

There are no recreational facilities associated with the property.

5.8 Utilities

Description:

The following utilities and are associated with the subject property. Utilities associated with the subject property are located underground.

- Water and sanitary sewer are provided by the City of Ann Arbor.
- Enclosed storm water drains are provided by Washtenaw County.
- Electric service is provided by DTE Energy Company through below-ground lines and pad-mounted transformers.
- Natural gas is provided by DTE Gas Company
- Telephone service is available to the subject property through several providers.

Assessment:

All utilities appear to be adequately servicing the subject property.

Recommendation:

Continued maintenance of utilities associated with the subject property as part of normal facility operations is recommended.

6.0 STRUCTURAL FRAME AND BUILDING ENVELOPE

The following sections summarize the physical conditions associated with the building envelope and structural elements of the subject buildings.

6.1 Foundation

Description:

Observations of the subject property indicate the foundation of the subject building consists of a poured slab floor. The subject building is set on a sloping site with poured concrete retaining walls. The poured concrete basement is only exposed on the south side of the subject property.

Assessment:

Overall, the foundation of the subject building appeared to be in good condition. Retaining walls appeared to be in fair condition. Minor cracks and staining on the retaining walls was observed.

Recommendation:

Repair of cracks in the retaining walls is recommended as a rehab item. The building foundation should be observed as a routine building operation.

Green Building Alternatives/Considerations:

#	Item	Recommended (for Study)	Already Exists	Appears Infeasible	Comments/Notes
7: Healthy Living Environment					
7.14	Integrated Pest Management	X			Seal all wall, floor, joint penetrations to prevent pest entry

6.2 Building Frame

Description:

The building located on the subject property is a standard wood-framed structure built on a poured concrete basement and foundation.

Assessment:

No evidence of structural failure or deficiencies was noted, and all framework, floors, and decks appeared to be in fair to good condition.

Recommendation:

The building exterior and interior structural supports should be observed as routine building operations for indications of frame issues. The contractor onsite may recommend additional supports.

Green Building Alternatives/Considerations:

#	Item	Recommended (for Study)	Already Exists	Appears Infeasible	Comments/Notes
---	------	-------------------------	----------------	--------------------	----------------

6: Materials Beneficial to the Environment					
6.8	Certified, Salvaged, and Engineered Wood Products	X		X	Only minor replacements/upgrades required

6.3 Exterior (Above Grade) Walls

Description:

The exterior walls of the subject building consist of vinyl siding and decorative wood beneath windows. The majority of the exterior windows consist of sliding single-paned aluminum and the exterior doors are solid steel with aluminum storm doors. Both doors and windows contain dry vinyl sealant systems.

Assessment:

The vinyl siding, decorative wood and steel entry doors generally appeared to be in fair to poor condition. However, the windows are beyond their EUL.

Recommendation:

Replacement of windows, exterior doors, siding with fiber cement siding, fascia, gutters and downspouts are recommended as rehab items. Repair of the vinyl soffits and wood fascia and air sealing is also recommended as a rehab item. Air se In addition, capital reserves should be considered for future, cleaning and/or re-caulking of the building exteriors.

Green Building Alternatives/Considerations:

#	Item	Recommended (for Study)	Already Exists	Appears Infeasible	Comments/Notes
5: Energy Efficiency					
5.1c	Building Performance Standard: Single family and Multi-family (three stories or fewer)	X			Must be equivalent to a Home Energy Rating System (HERS) Index score of 85
5.2	Additional Reductions in Energy Use	X			Add R-Value and increase building tightness for higher performance
6: Materials Beneficial to the Environment					
6.6	Recycled Content Material	X			Composite and Recycled Content materials available for exterior use and insulation
6.7	Regional Materials Selection	X			Should be pursued when feasible

6.4 Roofing

Description:

The roof is gabled, asphalt shingle roofs. The roof slopes to aluminum gutters affixed to the building. The roofing system was newly installed.

The interior side of the roof was observed from the attic. Roof sheathing appears to be 1/2" oriented strand board (OSB) and determined to be in good condition.

Storm water runoff from the roof appears to percolate directly into the ground or is directed to below-grade piping that leads to catch basins that discharge the storm water into the municipal system.

Assessment:

The roof system is newly installed.

Recommendation:

Capital reserves should be considered for future maintenance of the roofing system. Please refer to the attached Capital Needs Input, 20 Year Detail, 20 Year Schedule and Rehab Specifications for additional information.

Green Building Alternatives/Considerations:

#	Item	Recommended (for Study)	Already Exists	Appears Infeasible	Comments/Notes
5: Energy Efficiency					
5.1c	Building Performance Standard: Single family and Multi-family (three stories or fewer)	X			Must be equivalent to a Home Energy Rating System (HERS) Index score of 85
5.2	Additional Reductions in Energy Use	X			Add R-Value and increase building tightness for higher performance
6: Materials Beneficial to the Environment					
6.6	Recycled Content Material	X			Composite and Recycled Content materials available for exterior use and insulation
6.7	Regional Material Selection	X			Should be pursued when feasible

6.5 Exterior and Interior Stairs

There are no interior stairs at the subject property.

Exterior stairs are considered part of the wood porches and are covered in the next section.

6.6 Patio, Terrace, and Balcony

Description:

The tenant units contain a wood porch with wood stairway at each entrance. A storage space is located under the wood porch.

Assessment:

The pressure treated wood decks and stairways are in fair to poor condition. The railings and balusters are painted, and the paint has deteriorated, the hand rail surfaces are weathered and rough to the touch. The steps at resident entries may not meet tread depth and riser height requirements and restrictions.

Recommendation:

Repair or replace any hardware components contributing to loose railings with excessive lateral play, and brace as required. Prepare, sand, and paint all railing and baluster components. Wash pressure treated deck components with solution designed to stop mold growth in all areas. Please refer to the attached 20 Year Detail, 20 Year Schedule, and Capital Needs Input for additional information on condition, rehab costs and capital reserves.

Green Building Alternatives/Considerations:

#	Item	Recommended (for Study)	Already Exists	Appears Infeasible	Comments/Notes
6: Materials Beneficial to the Environment					
6.1	Low/No VOC Paints and Primers	X			When stairs are refinished, use low/no VOC paints and stains
6.7	Regional Material Selection	X			Should be pursued when feasible
6.8	Certified, Salvaged, and Engineered Wood Products	X			At time of replacement

7.0 INTERIOR ELEMENTS

The following sections summarize the physical conditions associated with the interior of the subject building.

7.1 Unit Types and Unit Mix/Building Area

Description:

West Washington has two, one-bedroom, one bathroom apartments. Both of the dwelling units were occupied on the date of the site inspection.

Interior finishes vinyl/composite material in bathtub surround areas, wood trim, 4-inch vinyl cove base, one-foot by one-foot resilient floor tiles or linoleum in the kitchens, ceramic floor tile in the bathrooms, and carpet. Aluminum single-paned windows were present throughout the dwelling units. Double-paned windows were installed in the tenant unit bathrooms.

According to site representatives, interior renovations typically occur in units when they are turned over including carpet replacement, painting, and cabinet re-facing/repair in some situations. However, the two units have been occupied by the same tenants since at least 2007.

Each unit contains a series of appliances including:

- a refrigerator
- an electric range and oven
- an under-sink garbage disposal

The individual units also have kitchen cabinetry, which primarily consists of wood veneer and Formica counter tops, and bathrooms are fitted with medicine cabinets. Kitchen sinks are stainless steel, bathroom fixtures are generally enamel coated steel or porcelain. Bathroom and kitchen flooring includes resilient floor tiles and linoleum. The walls of the tub stalls are covered with a vinyl material.

Each individual tenant unit is fitted with two solid, steel entry doors. Closet doors and interior doors are wood veneer and generally have a painted finish.

Assessment:

The entry doors, interior doors, closets, kitchen cabinets, garbage disposals, range hoods, sinks, refrigerators, ranges, and medicine cabinets were observed to be in generally fair condition. Most of the bathroom exhaust fans, flooring, and countertops, although functional, are at or beyond their EUL and show wear and tear due to use and age.

The painted surfaces in both units need repainting.

Recommendation:

Replacement or repair of the following items is recommended as a rehab item:

- tenant cabinets - wall and base in each unit
- replace interior doors in each unit
- countertops, sinks and plumbing attachments in each unit

- replace bath vanities in each unit
- replace or repair 100-percent of the tenant unit flooring, as appropriate
- paint 100-percent of the painted surfaces in the tenant units
- replace 100-percent of the bathroom fans with high-efficiency fixtures and vent through roof
- placement of additional attic insulation
- remove garbage disposals in each unit
- replace existing refrigerators with Energy Star refrigerators in each unit
- integrate a pest management policy

Continued maintenance of finishes and fixtures in dwelling units is recommended. In addition, capital reserves are included for future maintenance and/or replacement of remaining finishes and fixtures. Please refer to the attached 20 Year Detail, 20 Year Schedule, and Capital Needs Input for additional information on condition, rehab costs and capital reserves.

Green Building Alternatives/Considerations:

#	Item	Recommended (for Study)	Already Exists	Appears Infeasible	Comments/Notes
5: Energy Efficiency					
5.4	ENERGY STAR Appliances	X			For applicable appliances
6: Materials Beneficial to the Environment					
6.1	Low/No VOC Paints and Primers	X			On all paintable surfaces
6.2	Low/No VOC Adhesives and Sealants	X			Should be pursued when feasible
6.6	Recycled Content Material	X			Composite and Recycled Content materials available for many interior components - cost may limit product selection
6.7	Regional Material Selection	X			Should be pursued when feasible
6.8	Certified, Salvaged, and Engineered Wood Products	X			Applicable to Kitchen and Bath improvements and replacements
7: Healthy Living Environment					
7.1	Composite Wood Products that Emit Low/No Formaldehyde	X			Applicable to Kitchen and Bath improvements and replacements
7.2	Environmentally Preferable Flooring	X			Strategic/limited use of carpet
7.3	Environmentally Preferable Flooring: Alternative Sources	X		X	Non-vinyl, non-carpet floor coverings on all floors - may be cost prohibitive and difficult for sound control
7.9b	Mold Prevention: Surfaces	X			Use materials w/durable, cleanable surfaces in Kitchens and Bathrooms
7.9c	Mold Prevention: Tub and Shower Enclosures	X			Use moisture resistant drywall (non-paper faced)

7.2 Common Areas

There are no interior common areas associated with the subject property that are utilized by the tenants on a regular basis. The storage space in the basement is only accessible by AAHC staff and is not conditioned.

8.0 MECHANICAL, PLUMBING AND ELECTRICAL SYSTEMS

The following sections summarize the physical conditions associated with the mechanical and electrical systems at the subject building.

8.1 Plumbing

Description:

Potable water supply piping is copper, while drainage appears to be PVC, galvanized steel, and/or cast iron. Piping associated with the subject buildings was installed during construction in 1969.

Domestic hot water is supplied to the tenant units with individual 40-gallon hot water tanks. The tank in Unit 805 have been replaced as necessary in 2011, however, the tank in Unit 807, which contains a 40-gallon tank, was installed in 1989.

Individual tenant units have porcelain toilets, sinks, and tubs. Tub surrounds are vinyl. Kitchen fixtures include stainless steel sinks. The faucet fixtures are generally chrome plated steel.

Assessment:

The plumbing system is operational, with sufficient water pressure at the time of inspection. Low flow shower heads and low flow faucets in tenant unit kitchens have been installed in at least one of the units at the subject property.

No evidence of significantly obsolete equipment, evidence of leaking or deteriorated piping or sewage backup problems was noted or reported. No evidence of polybutylene, ABS, or lead supply piping was observed. The hot water heater in Unit 807 is reported to be past its expected useful life.

Toilets, sinks and most of the faucet fixtures in bathrooms and kitchens are generally in good condition. Some of the tubs and tub surrounds show signs of wear but are generally in good condition.

Recommendation:

Replacement of the following items is recommended as a rehab item:

- Replace both hot water tanks with on-demand hot water heater
- Insulation of hot water lines
- Replace toilets to low-flow units

Upon upgrade, continued maintenance of plumbing systems is recommended.

Please refer to the attached 20 Year Detail, 20 Year Schedule, and Capital Needs Input for additional information on condition, rehab costs and capital reserves.

Green Building Alternatives/Considerations:

#	Item	Recommended (for Study)	Already Exists	Appears Infeasible	Comments/Notes
4: Water Conservation					
4.1	Water-Conserving Fixtures	X	X		Use low flow Toilets, Showerheads, Kitchen and Bathroom faucets
4.2	Advanced Water-Conserving Appliances and Fixtures	X			Should be pursued when feasible; flow rates more aggressive
4.3	Water Reuse	X		X	Treatment on site would create undue financial burden at this location
5: Energy Efficiency					
5.7b	Photovoltaic/Solar Hot Water Ready	X		X	Site, building orientation and decentralized system design may prohibit use of solar thermal
7: Healthy Living Environment					
7.8	Combustion Equipment	X			Specify power-vented or direct vent
7.9b	Mold Prevention: Water Heaters	X	X		Adequate drainage; may require replacement of floor drains

8.2 Heating

Description:

Each apartment is equipped with a natural gas-fired up-flow furnace, located in a closet off the main entrance of each unit. These furnaces are single-stage burners with an output capacity of 45 BTU/hr. Heated supply air is generated from the furnace and distributed through insulated ducts located in the attic. Return air is provided through a grille in the mechanical closet, adjacent to the living room, and ducted directly to the unit.

These units appear to have been installed in 2011 and are considered standard efficiency (80%) units. Each furnace appears to be controlled by one non-programmable thermostat.

Heat to the apartment is supplied through sheet metal ducts, with no visible mastic for duct sealing. Return air is ducted to the furnace. Fresh air appears to be supplied by operable windows and natural infiltration. Mechanical exhaust is limited to the bathrooms, with overhead exhaust fans ducted to the outside.

Assessment:

The furnace units reportedly operate normally; however, they are standard efficiency units and should be replaced with correctly sized high efficiency natural gas-fired furnaces.

Recommendation:

Replacement of the following items is recommended as a rehab item:

- Identify and close/seal abandoned exhaust vents at each building
- Install a right-sized high efficiency natural gas fired furnace in both units
- Install programmable thermostats to allow for night setbacks

New units installed should comply with Air Conditioning Contractors of America (ACCA) Manual J sizing requirements. Please refer to the Energy Audit for completed ACCA Manual J calculations. Please refer to the attached 20 Year Detail, 20 Year Schedule, and Capital Needs Input for additional information on condition, rehab costs and capital reserves.

Green Building Alternatives/Considerations:

#	Item	Recommended (for Study)	Already Exists	Appears Infeasible	Comments/Notes
5: Energy Efficiency					
5.1c	Building Performance Standard: Single family and Multifamily (three stories or fewer)	X			Must be equivalent to a Home Energy Rating System (HERS) Index score of 85 - high efficiency furnaces
5.2	Additional Reductions in Energy Use	X			Install high efficiency heating equipment - 95% or better AFUE
5.3	Sizing of Heating and Cooling Equipment	X			Size equipment to ACCA Manual J
7: Healthy Living Environment					
7.8	Combustion Equipment	X			Specify power-vented or direct vent

8.3 Air Conditioning and Ventilation

Description:

At the time of the site visit, central air conditioning was not provided to the subject buildings. Both apartments were cooled by window air-conditioning units supplied by the residents.

Assessment:

Many of the AAHC commission residents are disabled and elderly or have health issues that are exacerbated by hot and humid weather.

The Great Lakes Adaptation Assessment for Cities estimates that the number hot days reaching 90 degrees or more in Southeast Michigan will increase to 30-50 days per year due to global climate changes.

Therefore, the AAHC wants to ensure each unit has air conditioning.

Recommendation:

Installing a high-efficiency conventional split-system for cooling is recommended. This will meet the needs of the AAHC and residents. This will include new standard efficiency condenser units, complete with electrical disconnect, and evaporator coil added into existing furnace blower cabinets. In addition, replacement of manual thermostats with energy management thermostats is recommended.

New units installed should comply with Air Conditioning Contractors of America (ACCA) Manual J sizing requirements. Please refer to the Energy Audit for more detail regarding the ground source heat pump analysis and completed ACCA Manual J calculations. Please refer to the attached Capital Needs Input, 20 Year Detail, 20 Year Schedule and Rehab Specifications for additional information on condition, rehab costs and capital reserves.

Green Building Alternatives/Considerations:

#	Item	Recommended (for Study)	Already Exists	Appears Infeasible	Comments/Notes
5: Energy Efficiency					
5.1c	Building Performance Standard: Single family and Multifamily (three stories or fewer)	X			Must be equivalent to a Home Energy Rating System (HERS) Index score of 85 - high efficiency furnaces
5.2	Additional Reductions in Energy Use	X			Install high efficiency heating equipment - 95% or better AFUE
5.3	Sizing of Heating and Cooling Equipment	X			Size equipment to ACCA Manual J
7: Healthy Living Environment					
7.8	Combustion Equipment	X			Specify power-vented or direct vent

8.4 Electrical

Description:

The subject building is provided electricity by DTE. Each unit has its own circuit breaker panel with 100-amp service. Facility wiring is copper and overload protection is provided by circuit breakers.

Interior tenant unit lighting is provided by standard socket fixtures.

Exterior lighting consists of 50 Watt high pressure sodium wall-mounted porch light (2 total) and a 150 Watt high pressure sodium wall-mounted security light near the garage door. HID technology is considered standard efficiency and can be upgraded. The lighting appears to be operated by photo-sensors. Three of the porch lights have been updated to 14W LED porch lights (3 total).

Assessment:

In general, the electrical systems for the subject building, including switchboards, panel boards, lighting and wiring systems, appear to be in good condition and sufficiently sized for the structure and use.

Exterior lighting appeared acceptable; however, was not visible during the daylight hours.

Recommendation:

Replacement of the remaining standard efficiency HID fixtures with LED fixtures and installation of in-unit LED bulbs and ceiling fixtures are recommended as rehab items. In addition, replacement of receptacles in each unit is recommended as a rehab item. Continued maintenance of electrical systems is recommended. Please refer to the attached 20 Year Detail, 20 Year Schedule, and Capital Needs Input for additional information on condition, rehab costs and capital reserves.

Green Building Alternatives/Considerations:

#	Item	Recommended (for Study)	Already Exists	Appears Infeasible	Comments/Notes
5: Energy Efficiency					
5.2	Additional Reductions in Energy Use	X			Install high efficiency equipment
5.5a	Efficient Lighting: Interior Units	X			Follow Energy Star MFHR guidance
5.5b	Efficient Lighting: Common Areas and Emergency Lighting	X			Follow Energy Star MFHR guidance
5.5c	Efficient Lighting: Exterior	X			Follow Energy Star MFHR guidance
5.7a	Renewable Energy	X		X	On site electric generation likely financially infeasible - site, orientation and scale issues
5.7b	Photovoltaic/Solar Hot Water Ready	X		X	On site electric generation likely financially infeasible - site, orientation and scale issues

9.0 VERTICAL TRANSPORTATION

There is no vertical transportation at the subject property.

10.0 LIFE SAFETY AND FIRE PROTECTION

Description:

Each tenant unit is equipped with a smoke detector located in the bedrooms and hallway. Also plug-in carbon monoxide detectors were recently installed in the units.

Assessment:

In general, the smoke detectors and carbon monoxide detectors were observed to be in good condition.

Recommendation:

Please refer to the attached 20 Year Detail, 20 Year Schedule, and Capital Needs Input for additional information on condition, rehab costs and capital reserves.

11.0 ADDITIONAL CONSIDERATIONS

No additional considerations were included as part of this RPCA.

12.0 DOCUMENT REVIEW AND INTERVIEWS

The following subsections document information associated with the subject property obtained by AKT Peerless during document reviews and interviews.

12.1 Document Review

AKT Peerless was able to obtain property information from City of Ann Arbor and AAHC property management. This information included general building construction components (blueprints), some limited facility diagrams, information on several building permits, building photographs, and a previous capital improvement summary. Copies of select building permits are provided in Appendix C. Additional records reviewed are provided under separate cover.

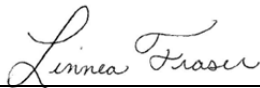
12.2 Interviews

During the course of this assessment, AKT Peerless interviewed Mr. Lance Mitchell, the Facilities & Maintenance Property Manager for AAHC, and Mr. Levi Clark, Facilities Technician for AAHC. Mr. Mitchell has been associated with the subject property for approximately three years and Mr. Clark has been associated with the subject property for approximately one year. Information provided by Mr. Mitchell and Mr. Clark is referenced throughout this report.

13.0 OPINIONS OF PROBABLE COST

Refer to Appendix A for the RPCA tool including the 20 Year Detail, 20 Year Schedule, and Capital Needs Input for additional information on condition, rehab costs and capital reserves.

14.0 SIGNATURES



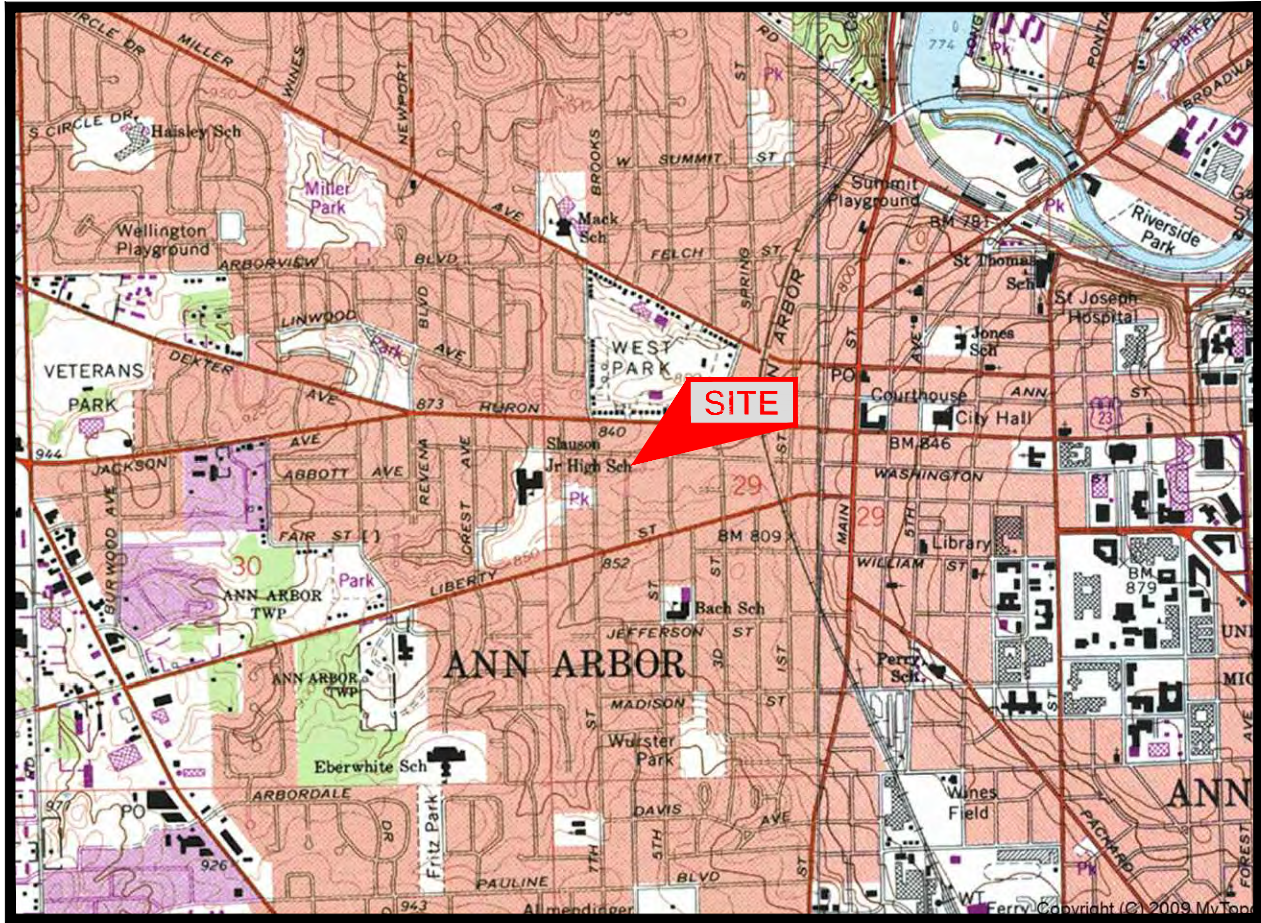
Linnea Fraser, E.I.T.
Project Consultant
AKT Peerless Environmental Services
Illinois Region
Phone: 773.993.3998
Fax: 248.615.1334



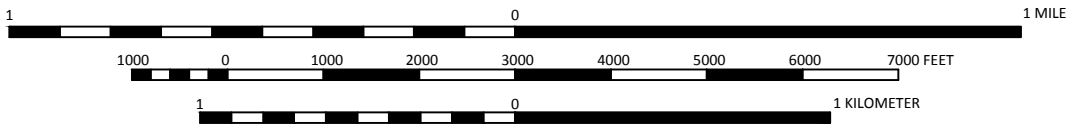
Jeremy McCallion, LEED AP
Sustainability Services Director
AKT Peerless Environmental Services
Southeast Michigan Region
Phone: 248.615.1333
Fax: 248.615.1334

Figures

ANN ARBOR WEST QUADRANGLE
 MICHIGAN - WASHTENAW COUNTY
 7.5 MINUTE SERIES (TOPOGRAPHIC)



T.2 S.-R.6 E.



MICHIGAN
 QUADRANGLE LOCATION

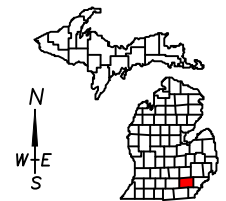


IMAGE TAKEN FROM 1965 U.S.G.S. TOPOGRAPHIC MAP
 PHOTOREVISED 1983



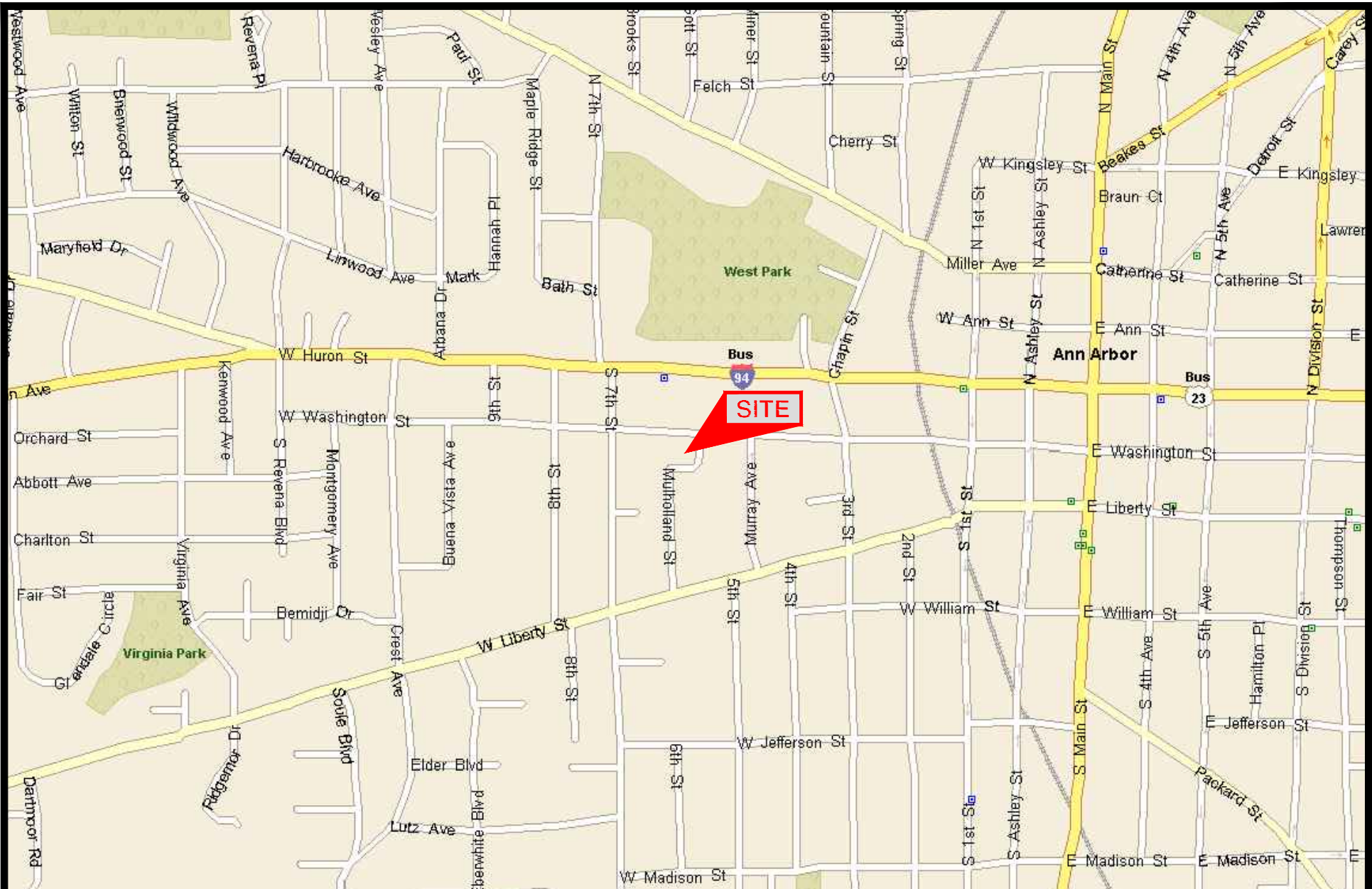
ILLINOIS MICHIGAN OHIO GEORGIA
 www.aktpeerless.com

TOPOGRAPHIC LOCATION MAP

805-807 WEST WASHINGTON STREET
 ANN ARBOR, MICHIGAN
 PROJECT NUMBER : 9699U-1-196

DRAWN BY: DDB
 DATE: 03/17/2015

FIGURE 1



AKTPEERLESS

ILLINOIS MICHIGAN OHIO GEORGIA

www.aktpeerless.com

SUBJECT PROPERTY LOCATION MAP

805-807 WEST WASHINGTON STREET
ANN ARBOR, MICHIGAN
PROJECT NUMBER : 9699U-1-196

LEGEND

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DRAWN BY: DDB
DATE: 03/17/2015

FIGURE 3

Appendix A
RAD PCA Tool

Appendix B
Reconnaissance Photographs



PHOTOGRAPH NO. 1: TYPICAL VIEW OF TENANT UNIT BUILDING



PHOTOGRAPH NO. 2: TYPICAL VIEW OF REAR OF TENANT BUILDING

AKT PEERLESS

RECONNAISSANCE PHOTOGRAPHS

805-807 WEST WASHINGTON STREET
ANN ARBOR, MICHIGAN

TAKEN BY: L. FRASER
DATE: 02.10.2015

PROJECT NUMBER:
9699U-1-196



PHOTOGRAPH NO. 3: TYPICAL VIEW OF LANDSCAPING AND FLATWORK THROUGHOUT SUBJECT PROPERTY



PHOTOGRAPH NO. 4: TYPICAL VIEW OF SUBJECT PROPERTY PARKING LOT

AKT PEERLESS

RECONNAISSANCE PHOTOGRAPHS

805-807 WEST WASHINGTON STREET
ANN ARBOR, MICHIGAN

TAKEN BY: L. FRASER
DATE: 02.10.2015

PROJECT NUMBER:
9699U-1-196



PHOTOGRAPH NO. 5: TYPICAL VIEW OF CRACKS IN RETAINING WALLS



PHOTOGRAPH NO. 6: TYPICAL SIDE VIEW OF WOOD PORCH

AKTPEERLESS

RECONNAISSANCE PHOTOGRAPHS

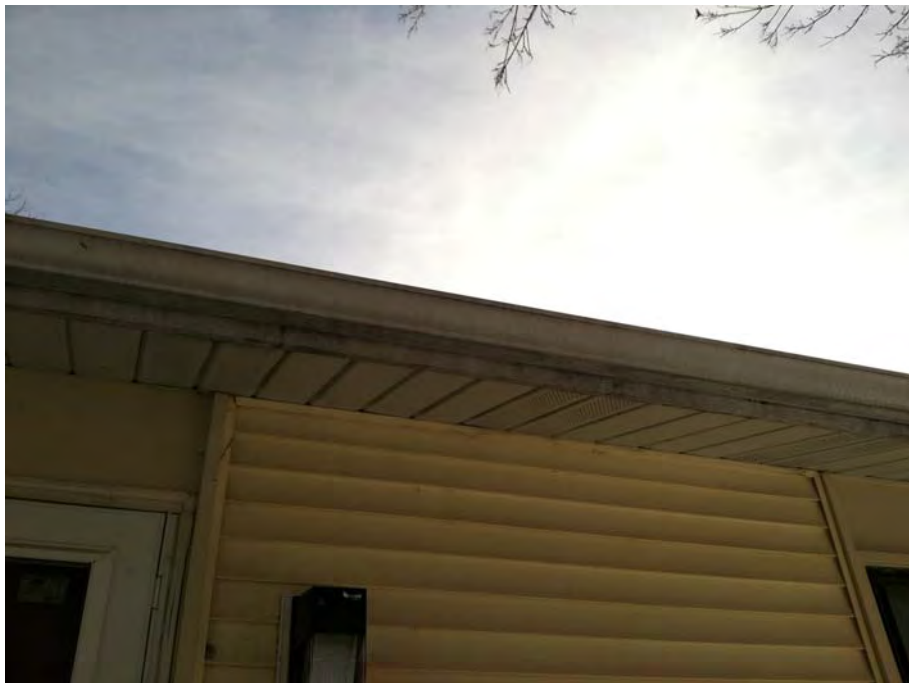
805-807 WEST WASHINGTON STREET
ANN ARBOR, MICHIGAN

TAKEN BY: L. FRASER
DATE: 02.10.2015

PROJECT NUMBER:
9699U-1-196



PHOTOGRAPH NO. 7: VIEW OF WOOD PORCH STAIRWELL AND RAILING



PHOTOGRAPH NO. 8 VIEW OF GUTTER SYSTEM

AKT PEERLESS

RECONNAISSANCE PHOTOGRAPHS

805-807 WEST WASHINGTON STREET
ANN ARBOR, MICHIGAN

TAKEN BY: L. FRASER
DATE: 02.10.2015

PROJECT NUMBER:
9699U-1-196



PHOTOGRAPH NO. 9: TYPICAL VIEW OF FURNACES IN TENANT UNITS (805)



PHOTOGRAPH NO. 10: TENANT UNIT FLOORING IN KITCHEN (805)

AKT PEERLESS

RECONNAISSANCE PHOTOGRAPHS

805-807 WEST WASHINGTON STREET
ANN ARBOR, MICHIGAN

TAKEN BY: L. FRASER
DATE: 02.10.2015

PROJECT NUMBER:
9699U-1-196



PHOTOGRAPH NO. 11: TYPICAL VIEW OF BATHTUB IN TENANT UNIT BATHROOM



PHOTOGRAPH NO. 12: EXHAUST FAN IN BATHROOM

AKTPEERLESS

RECONNAISSANCE PHOTOGRAPHS

805-807 WEST WASHINGTON STREET
ANN ARBOR, MICHIGAN

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DATE: 02.10.2015

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9699U-1-196



PHOTOGRAPH NO. 13: TYPICAL VIEW OF KITCHEN AREA



PHOTOGRAPH NO. 14: TYPICAL VIEW OF TENANT UNIT THERMOSTAT

AKT PEERLESS

RECONNAISSANCE PHOTOGRAPHS

805-807 WEST WASHINGTON STREET
ANN ARBOR, MICHIGAN

TAKEN BY: L. FRASER
DATE: 02.10.2015

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9699U-1-196



PHOTOGRAPH NO. 15: TYPICAL VIEW TENANT UNIT SIDE ENTRANCE



PHOTOGRAPH NO. 16: VIEW OF STORAGE AREA IN GARAGE/BASEMENT

AKT PEERLESS

RECONNAISSANCE PHOTOGRAPHS

805-807 WEST WASHINGTON STREET
ANN ARBOR, MICHIGAN

TAKEN BY: L. FRASER
DATE: 02.10.2015

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9699U-1-196



PHOTOGRAPH NO. 17: VIEW OF ENTRANCEWAY TO GARAGE/BASEMENT AREA



PHOTOGRAPH NO. 18: VIEW OF ALUMINUM DOWNSPOUT

AKTPEERLESS

RECONNAISSANCE PHOTOGRAPHS

805-807 WEST WASHINGTON STREET
ANN ARBOR, MICHIGAN

TAKEN BY: L. FRASER
DATE: 02.10.2015

PROJECT NUMBER:
9699U-1-196

Appendix C
Municipal Records



CITY OF ANN ARBOR, MICHIGAN

301 E. Huron Street, P.O. Box 8647, Ann Arbor, Michigan 48107-8647

Phone (734)794-6140 Fax (734)994-8296

www.a2gov.org

City Clerk

February 24, 2015

Linnea Fraser
280 Shuman Boulevard, Suite 170
Naperville, IL 60563
Via Email: fraserl@aktpeerless.com

Subject: Freedom of Information Act Request received February 17, 2015
15-053 Fraser

Dear Ms. Fraser:

I am responding to your request under the Michigan Freedom of Information Act received February 17, 2015 for fire department records for 805 and 807 West Washington. Your request is denied. Your request is denied to the extent that the records do not exist.


If you receive written notice that your request has been denied, in whole or in part, under Section 10 of the Act, you may, at your option either: (1) submit to the City Administrator a written appeal that specifically states the word "appeal" and identifies the reason(s) for reversal of the disclosure denial; or (2) file a lawsuit in the circuit court to compel the City's disclosure of the record. If after judicial review, the circuit court determines that the City has not complied with the Act, you may be awarded reasonable attorneys' fees and damages as specified under the Act.

If you have any questions concerning this response, please contact Jennifer Alexa, Deputy Clerk, at 734-794-6140.

Sincerely,

Jacqueline Beaudry
City Clerk

PERMIT NO: MECH10-1541 ON-LINE PERMIT

<p>ANN ARBOR 301 E. Huron St., MI 48104</p>	<p>PERMIT TYPE MECHANICAL</p>	<p>APPLIED DATE 8/2/2010</p>	
<p>INSPECTION REQUEST LINE 734.794.6263 OR SCHEDULE INSPECTION ON-LINE eTRAKIT</p>	<p>PERMIT SUB-TYPE MECHANICAL</p>	<p>APPROVED DATE 8/2/2010</p>	
	<p>JOB VALUE 0</p>	<p>ISSUED DATE 8/2/2010</p>	
	<p>APN 09-09-29-209-006</p> <p>DESCRIPTION Replace 40 Gal Hot Water Tank</p>		

PERMIT INFORMATION	FEE SUMMARY
<p>SITE 805 W WASHINGTON ST ANN ARBOR, MI 48103</p>	<p>MECHANICAL PERMIT FEES \$60.00 Total Fees Collected: \$60.00</p>
<p>APPLICANT Accurate Comfort Systems LLC 306 N Grove Ypsilanti MI 48198</p>	
<p>OWNER CITY OF ANN ARBOR 245 MULHOLLAND AVE Ann Arbor MI 48103</p>	
<p>CONTRACTOR Accurate Comfort Systems LLC 306 N Grove Ypsilanti MI 48198</p>	

NOTE: This job copy of this permit shall be kept on the job site to make the required entries thereon. The permit will expire if work is not started in 180 days, is abandoned, or does not receive an inspection for more than 180 days. Additional fees will be collected to renew expired permits. This is a Building Permit when properly filed out, signed and validated, and is not transferable. Construction Hour: Construction is limited to the hours of 7:00am to 7:00pm each day. No work shall be performed on certain holidays (MMC V-213-3(b)).

<p>LICENSED CONTRACTORS DECLARATION</p> <p>I hereby affirm under penalty of perjury that I am licensed under provisions of Chapter 9 (commencing with Section 7000) of Division 3 of the Business and Professions Code, and my license is in full force and effect.</p> <p>License No: _____ Expiration Date: _____ Contractor: _____</p> <p>OWNER-BUILDER DECLARATION</p> <p>I hereby affirm under penalty of perjury that I am exempt from the contractors license Law for the following reason (Sec. 7031.5, Business and Professions Code: Any city or county which requires a permit to construct, alter, improve, demolish, or repair any structure, prior to its issuance, also requires the applicant for such permit to file a signed statement that he or she is licensed pursuant to the provisions of the Contractors License Law (Chapter 9 (commencing with Section 7000) of Division 3 of the Business and Professions Code) or that he or she is exempt therefrom and the basis for the alleged exemption. Any violation of Section 7031.5 by an applicant for a permit subjects the applicant to a civil penalty of not more than five hundred dollars (\$500).)</p> <p>_____, I, as owner of the property, or my employees with wages as their sole compensation, will do the work, and the structure is not intended or offered for sale (Sec. 7044, Business and Professions Code: The Contractors License Law does not apply to an owner or property who builds or improves thereon, and who does such work himself or herself or through his or her own employees, provided that such improvements are not intended or offered for sale. If, however, the building or improvement is sold within one year of completion, the owner-builder will have the burden of proving that he or she did not build or improve for the purpose of sale.)</p> <p>_____, I, as owner of the property, am exclusively contracting with licensed contractors to construct the project (Sec. 7044, Business and Professions Code: The Contractors License Law does not apply to an owner or Property who builds or improves thereon, and who contracts for such projects with a contractor(s) licensed pursuant to the Contractors License Law.)</p> <p>I am exempt under Sec. _____ B.P.C. for this reason _____</p> <p>DATE _____ OWNER _____</p>	<p>INSPECTION SUMMARY</p> <p>_____ **MECH FINAL</p>
<p>WORKERS COMPENSATION DECLARATION</p> <p>I hereby affirm under penalty of perjury one of the following declarations:</p> <p>_____, I have and will maintain a certificate of consent to self-insure for workers' compensation, as provided for by Section 3700 of the Labor Code, for the performance of the permit is issued.</p> <p>_____, I have and will maintain workers' compensation insurance, as required by Section 3700 of the Labor Code, for the performance of the work for which this permit is issued. My workers' compensation insurance carrier and policy number are:</p> <p>Carrier/Policy No: _____</p> <p>(This section need not be completed if the permit is for one hundred dollars (\$100) or less.)</p> <p>_____, I certify that in the performance of the work for which this permit is issued, I shall not employ any person in any number so as to become subject to the workers' compensation laws or California, and agree that if I should become subject to the workers' compensation provisions of Section 3700 of the Labor Code, I shall forthwith comply with those provisions.</p> <p>DATE _____ APPLICANT: _____</p> <p>WARNING: FAILURE TO SECURE WORKERS' COMPENSATION COVERAGE IS UNLAWFUL, AND SHALL SUBJECT AN EMPLOYER TO CRIMINAL PENALTIES AND CIVIL FINES UP TO ONE HUNDRED THOUSAND DOLLARS (\$100,000), IN ADDITION TO THE COST OF COMPENSATION, DAMAGES AS PROVIDED FOR IN SECTION 3706 OF THE LABOR CODE, INTEREST, AND ATTORNEY'S FEES.</p> <p>CONSTRUCTION LENDING AGENCY</p> <p>I hereby affirm under penalty of perjury that there is a construction lending agency for the performance of the work for which this permit is issued (Sec. 3097, Civ. C.).</p> <p>DATE _____ APPLICANT: _____</p>	


* I certify that I have read this application and state that the above information is correct. I agree to comply with all city ordinances and state laws relating to building construction, and hereby authorize representatives of this city to enter upon the above-mentioned property for inspection purposes.

SIGNATURE OF APPLICANT OR AGENT : _____

DATE _____

Permit Finaled Date: _____ **Inspector Name:** _____ **Signature:** _____

PERMIT NO: BLDG14-2576 ON-LINE PERMIT

ANN ARBOR 301 E. Huron St., MI 48104	PERMIT TYPE BUILDING	APPLIED DATE 12/10/2014	
INSPECTION REQUEST LINE 734.794.6263 OR SCHEDULE INSPECTION ON-LINE eTRAKIT	PERMIT SUB-TYPE RES ROOF	APPROVED DATE 12/10/2014	
	JOB VALUE 0	ISSUED DATE 12/10/2014	
	APN 09-09-29-209-006 DESCRIPTION (805-807)Tear off existing & Install metal roof		

PERMIT INFORMATION	FEE SUMMARY
SITE 805 W WASHINGTON ST ANN ARBOR, MI 48103	
APPLICANT	
OWNER CITY OF ANN ARBOR PO BOX 8647 Ann Arbor MI 48107	
CONTRACTOR Chandler Metal Roofing 959 Baker Road Dexter MI 48130	

NOTE: This job copy of this permit shall be kept on the job site to make the required entries thereon. The permit will expire if work is not started in 180 days, is abandoned, or does not receive an inspection for more than 180 days. Additional fees will be collected to renew expired permits. This is a Building Permit when properly filed out, signed and validated, and is not transferable. Construction Hour: Construction is limited to the hours of 7:00am to 7:00pm each day. No work shall be performed on certain holidays (MMC V-213-3(b)).


<p align="center">LICENSED CONTRACTORS DECLARATION</p> <p>I hereby affirm under penalty of perjury that I am licensed under provisions of Chapter 9 (commencing with Section 7000) of Division 3 of the Business and Professions Code, and my license is in full force and effect. License No: _____ Expiration Date: _____ Contractor: _____</p>	<p align="center">INSPECTION SUMMARY</p> <p align="center">____ **FINAL</p>
<p align="center">OWNER-BUILDER DECLARATION</p> <p>I hereby affirm under penalty of perjury that I am exempt from the contractors license Law for the following reason (Sec. 7031.5, Business and Professions Code: Any city or county which requires a permit to construct, alter, improve, demolish, or repair any structure, prior to its issuance, also requires the applicant for such permit to file a signed statement that he or she is licensed pursuant to the provisions of the Contractors License Law (Chapter 9 (commencing with Section 7000) of Division 3 of the Business and Professions Code) or that he or she is exempt therefrom and the basis for the alleged exemption. Any violation of Section 7031.5 by an applicant for a permit subjects the applicant to a civil penalty of not more than five hundred dollars (\$500).):</p> <p>____ I, as owner of the property, or my employees with wages as their sole compensation, will do the work, and the structure is not intended or offered for sale (Sec. 7044, Business and Professions Code: The Contractors License Law does not apply to an owner or property who builds or improves thereon, and who does such work himself or herself or through his or her own employees, provided that such improvements are not intended or offered for sale. If, however, the building or improvement is sold within one year of completion, the owner-builder will have the burden of proving that he or she did not build or improve for the purpose of sale.)</p> <p>____ I, as owner of the property, am exclusively contracting with licensed contractors to construct the project (Sec. 7044, Business and Professions Code: The Contractors License Law does not apply to an owner or property who builds or improves thereon, and who contracts for such projects with a contractor(s) licensed pursuant to the Contractors License Law.) I am exempt under Sec. _____ B.P.C. for this reason _____ DATE _____ OWNER _____</p>	
<p align="center">WORKERS COMPENSATION DECLARATION</p> <p>I hereby affirm under penalty of perjury one of the following declarations: ____ I have and will maintain a certificate of consent to self-insure for workers' compensation, as provided for by Section 3700 of the Labor Code, for the performance of the permit is issued. ____ I have and will maintain workers' compensation insurance, as required by Section 3700 of the Labor Code, for the performance of the work for which this permit is issued. My workers' compensation insurance carrier and policy number are: Carrier/Policy No: _____ (This section need not be completed if the permit is for one hundred dollars (\$100) or less). ____ I certify that in the performance of the work for which this permit is issued, I shall not employ any person in any number so as to become subject to the workers' compensation laws or California, and agree that if I should become subject to the workers' compensation provisions of Section 3700 of the Labor Code, I shall forthwith comply with those provisions. DATE _____ APPLICANT: _____</p> <p>WARNING: FAILURE TO SECURE WORKERS' COMPENSATION COVERAGE IS UNLAWFUL, AND SHALL SUBJECT AN EMPLOYER TO CRIMINAL PENALTIES AND CIVIL FINES UP TO ONE HUNDRED THOUSAND DOLLARS (\$100,000), IN ADDITION TO THE COST OF COMPENSATION, DAMAGES AS PROVIDED FOR IN SECTION 3706 OF THE LABOR CODE, INTEREST, AND ATTORNEY'S FEES.</p>	
<p align="center">CONSTRUCTION LENDING AGENCY</p> <p>I hereby affirm under penalty of perjury that there is a construction lending agency for the performance of the work for which this permit is issued (Sec. 3097, Civ. C.). DATE _____ APPLICANT: _____ * I certify that I have read this application and state that the above information is correct. I agree to comply with all city ordinances and state</p>	

laws relating to building construction, and hereby authorize representatives of this city to enter upon the above-mentioned property for inspection purposes.

SIGNATURE OF APPLICANT OR AGENT : _____ DATE _____

Permit Finaled Date: _____ Inspector Name: _____ Signature: _____

PERMIT NO: MECH11-0531 ON-LINE PERMIT

ANN ARBOR 301 E. Huron St., MI 48104	PERMIT TYPE MECHANICAL	APPLIED DATE 3/21/2011	
INSPECTION REQUEST LINE 734.794.6263 OR SCHEDULE INSPECTION ON-LINE eTRAKIT	PERMIT SUB-TYPE MECHANICAL	APPROVED DATE 3/21/2011	
	JOB VALUE 0	ISSUED DATE 3/21/2011	
	APN 09-09-29-209-006		
	DESCRIPTION REPLACE 2 FURNACES & #807		

PERMIT INFORMATION		FEE SUMMARY	
SITE	805 W WASHINGTON ST ANN ARBOR, MI 48103	MECHANICAL PERMIT FEES	\$150.00
APPLICANT	Alltemp Htg & Clg Co Inc 1262 Clarita Ypsilanti MI 48198	Total Fees Collected:	\$150.00
OWNER	CITY OF ANN ARBOR 245 MULHOLLAND AVE Ann Arbor MI 48103		
CONTRACTOR	Alltemp Htg & Clg Co Inc 1262 Clarita Ypsilanti MI 48198		

NOTE: This job copy of this permit shall be kept on the job site to make the required entries thereon. The permit will expire if work is not started in 180 days, is abandoned, or does not receive an inspection for more than 180 days. Additional fees will be collected to renew expired permits. This is a Building Permit when properly filed out, signed and validated, and is not transferable. Construction Hour: Construction is limited to the hours of 7:00am to 7:00pm each day. No work shall be performed on certain holidays (MMC V-213-3(b)).

LICENSED CONTRACTORS DECLARATION

I hereby affirm under penalty of perjury that I am licensed under provisions of Chapter 9 (commencing with Section 7000) of Division 3 of the Business and Professions Code, and my license is in full force and effect.
 License No: _____ Expiration Date: _____ Contractor: _____

OWNER-BUILDER DECLARATION

I hereby affirm under penalty of perjury that I am exempt from the contractors license Law for the following reason (Sec. 7031.5, Business and Professions Code: Any city or county which requires a permit to construct, alter, improve, demolish, or repair any structure, prior to its issuance, also requires the applicant for such permit to file a signed statement that he or she is licensed pursuant to the provisions of the Contractors License Law (Chapter 9 (commencing with Section 7000) of Division 3 of the Business and Professions Code) or that he or she is exempt therefrom and the basis for the alleged exemption. Any violation of Section 7031.5 by an applicant for a permit subjects the applicant to a civil penalty of not more than five hundred dollars (\$500).)

_____, I, as owner of the property, or my employees with wages as their sole compensation, will do the work, and the structure is not intended or offered for sale (Sec. 7044, Business and Professions Code: The Contractors License Law does not apply to an owner or property who builds or improves thereon, and who does such work himself or herself or through his or her own employees, provided that such improvements are not intended or offered for sale. If, however, the building or improvement is sold within one year of completion, the owner-builder will have the burden of proving that he or she did not build or improve for the purpose of sale.)

_____, I, as owner of the property, am exclusively contracting with licensed contractors to construct the project (Sec. 7044, Business and Professions Code: The Contractors License Law does not apply to an owner or Property who builds or improves thereon, and who contracts for such projects with a contractor(s) licensed pursuant to the Contractors License Law.)
 I am exempt under Sec. _____ B.P.C. for this reason _____
 DATE _____ OWNER _____

WORKERS COMPENSATION DECLARATION

I hereby affirm under penalty of perjury one of the following declarations:
 _____ I have and will maintain a certificate of consent to self-insure for workers' compensation, as provided for by Section 3700 of the Labor Code, for the performance of the permit is issued.
 _____ I have and will maintain workers' compensation insurance, as required by Section 3700 of the Labor Code, for the performance of the work for which this permit is issued. My workers' compensation insurance carrier and policy number are:
 Carrier/Policy No: _____
 (This section need not be completed if the permit is for one hundred dollars (\$100) or less).
 _____ I certify that in the performance of the work for which this permit is issued, I shall not employ any person in any number so as to become subject to the workers' compensation laws or California, and agree that if I should become subject to the workers' compensation provisions of Section 3700 of the Labor Code, I shall forthwith comply with those provisions.
 DATE _____ APPLICANT: _____
WARNING: FAILURE TO SECURE WORKERS' COMPENSATION COVERAGE IS UNLAWFUL, AND SHALL SUBJECT AN EMPLOYER TO CRIMINAL PENALTIES AND CIVIL FINES UP TO ONE HUNDRED THOUSAND DOLLARS (\$100,000), IN ADDITION TO THE COST OF COMPENSATION, DAMAGES AS PROVIDED FOR IN SECTION 3706 OF THE LABOR CODE, INTEREST, AND ATTORNEY'S FEES.

CONSTRUCTION LENDING AGENCY

I hereby affirm under penalty of perjury that there is a construction lending agency for the performance of the work for which this permit is issued (Sec. 3097, Civ. C.).
 DATE _____ APPLICANT: _____

INSPECTION SUMMARY

_____ ****MECH FINAL**


* I certify that I have read this application and state that the above information is correct. I agree to comply with all city ordinances and state laws relating to building construction, and hereby authorize representatives of this city to enter upon the above-mentioned property for inspection purposes.

SIGNATURE OF APPLICANT OR AGENT : _____

DATE _____

Permit Finaled Date: _____ **Inspector Name:** _____ **Signature:** _____

PERMIT NO: CR2689 ON-LINE PERMIT

ANN ARBOR 301 E. Huron St., MI 48104	PERMIT TYPE RENTAL	APPLIED DATE 10/29/2012	
INSPECTION REQUEST LINE 734.794.6263 OR SCHEDULE INSPECTION ON-LINE eTRAKIT	PERMIT SUB-TYPE DUPLEX	APPROVED DATE	
JOB VALUE 0	ISSUED DATE		
APN 09-09-29-209-006			
DESCRIPTION			


PERMIT INFORMATION	FEE SUMMARY
SITE 805 W WASHINGTON ST ANN ARBOR, MI 48103	
APPLICANT	
OWNER CITY OF ANN ARBOR 245 MULHOLLAND AVE Ann Arbor MI 48103	
CONTRACTOR	

NOTE: This job copy of this permit shall be kept on the job site to make the required entries thereon. The permit will expire if work is not started in 180 days, is abandoned, or does not receive an inspection for more than 180 days. Additional fees will be collected to renew expired permits. This is a Bulk Permit when properly filed out, signed and validated, and is not transferable. Construction Hour: Construction is limited to the hours of 7:00am to 7:00pm each day. No work shall be performed on certain holidays (MMC V-213-3(b)).

<p align="center">LICENSED CONTRACTORS DECLARATION</p> <p>I hereby affirm under penalty of perjury that I am licensed under provisions of Chapter 9 (commencing with Section 7000) of Division 3 of the Business and Professions Code, and my license is in full force and effect. License No: _____ Expiration Date: _____ Contractor: _____</p> <p align="center">OWNER-BUILDER DECLARATION</p> <p>I hereby affirm under penalty of perjury that I am exempt from the contractors license Law for the following reason (Sec. 7031.5, Business and Professions Code: Any city or county which requires a permit to construct, alter, improve, demolish, or repair any structure, prior to its issuance, also requires the applicant for such permit to file a signed statement that he or she is licensed pursuant to the provisions of the Contractors License Law (Chapter 9 (commencing with Section 7000) of Division 3 of the Business and Professions Code) or that he or she is exempt therefrom and the basis for the alleged exemption. Any violation of Section 7031.5 by an applicant for a permit subjects the applicant to a civil penalty of not more than five hundred dollars (\$500).):</p> <p>_____, I, as owner of the property, or my employees with wages as their sole compensation, will do the work, and the structure is not intended or offered for sale (Sec. 7044, Business and Professions Code: The Contractors License Law does not apply to an owner or property who builds or improves thereon, and who does such work himself or herself or through his or her own employees, provided that such improvements are not intended or offered for sale. If, however, the building or improvement is sold within one year of completion, the owner-builder will have the burden of proving that he or she did not build or improve for the purpose of sale.)</p> <p>_____, I, as owner of the property, am exclusively contracting with licensed contractors to construct the project (Sec. 7044, Business and Professions Code: The Contractors License Law does not apply to an owner or Property who builds or improves thereon, and who contracts for such projects with a contractor(s) licensed pursuant to the Contractors License Law.) I am exempt under Sec. _____ B.P.C. for this reason _____ DATE _____ OWNER _____</p> <p align="center">WORKERS COMPENSATION DECLARATION</p> <p>I hereby affirm under penalty of perjury one of the following declarations: _____ I have and will maintain a certificate of consent to self-insure for workers' compensation, as provided for by Section 3700 of the Labor Code, for the performance of the permit is issued.</p> <p>_____ I have and will maintain workers' compensation insurance, as required by Section 3700 of the Labor Code, for the performance of the work for which this permit is issued. My workers' compensation insurance carrier and policy number are: Carrier/Policy No: _____ (This section need not be completed if the permit is for one hundred dollars (\$100) or less). _____ I certify that in the performance of the work for which this permit is issued, I shall not employ any person in any number so as to become subject to the workers' compensation laws or California, and agree that if I should become subject to the workers' compensation provisions of Section 3700 of the Labor Code, I shall forthwith comply with those provisions. DATE _____ APPLICANT: _____</p> <p>WARNING: FAILURE TO SECURE WORKERS' COMPENSATION COVERAGE IS UNLAWFUL, AND SHALL SUBJECT AN EMPLOYER TO CRIMINAL PENALTIES AND CIVIL FINES UP TO ONE HUNDRED THOUSAND DOLLARS (\$100,000), IN ADDITION TO THE COST OF COMPENSATION, DAMAGES AS PROVIDED FOR IN SECTION 3706 OF THE LABOR CODE, INTEREST, AND ATTORNEY'S FEES.</p> <p align="center">CONSTRUCTION LENDING AGENCY</p> <p>I hereby affirm under penalty of perjury that there is a construction lending agency for the performance of the work for which this permit is issued (Sec. 3097, Civ. C.). DATE _____ APPLICANT: _____</p> <p>* I certify that I have read this application and state that the above information is correct. I agree to comply with all city ordinances and state laws relating to building construction, and hereby authorize representatives of this city to enter upon the above-mentioned property for inspection purposes.</p> <p>SIGNATURE OF APPLICANT OR AGENT : _____ DATE _____</p>	<p align="center">INSPECTION SUMMARY</p>
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Permit Finaled Date: _____	Inspector Name: _____	Signature: _____
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PERMIT NO: PG060043 ON-LINE PERMIT

ANN ARBOR 301 E. Huron St., MI 48104	PERMIT TYPE SOIL EROSION	APPLIED DATE 3/21/2006	
INSPECTION REQUEST LINE 734.794.6263 OR SCHEDULE INSPECTION ON-LINE eTRAKIT	PERMIT SUB-TYPE GRADING	APPROVED DATE	
	JOB VALUE 0	ISSUED DATE 3/29/2006	
	APN 09-09-29-209-006 DESCRIPTION Replacing concrete slab in rear, adding fill dirt to front y		

PERMIT INFORMATION		FEE SUMMARY	
SITE	805 W WASHINGTON ST ANN ARBOR, MI	RES GRADING	\$47.00
		Total Fees Collected:	\$47.00
APPLICANT	First Contracting Inc P.O. Box 75 Ovid MI 48866		
OWNER	CITY OF ANN ARBOR 245 MULHOLLAND AVE Ann Arbor MI 48103		
CONTRACTOR	First Contracting Inc P.O. Box 75 Ovid MI 48866		

NOTE: This job copy of this permit shall be kept on the job site to make the required entries thereon. The permit will expire if work is not started in 180 days, is abandoned, or does not receive an inspection for more than 180 days. Additional fees will be collected to renew expired permits. This is a Building Permit when properly filed out, signed and validated, and is not transferable. Construction Hour: Construction is limited to the hours of 7:00am to 7:00pm each day. No work shall be performed on certain holidays (MMC V-213-3(b)).

<p align="center">LICENSED CONTRACTORS DECLARATION</p> <p>I hereby affirm under penalty of perjury that I am licensed under provisions of Chapter 9 (commencing with Section 7000) of Division 3 of the Business and Professions Code, and my license is in full force and effect. License No: _____ Expiration Date: _____ Contractor: _____</p> <p align="center">OWNER-BUILDER DECLARATION</p> <p>I hereby affirm under penalty of perjury that I am exempt from the contractors license Law for the following reason (Sec. 7031.5, Business and Professions Code: Any city or county which requires a permit to construct, alter, improve, demolish, or repair any structure, prior to its issuance, also requires the applicant for such permit to file a signed statement that he or she is licensed pursuant to the provisions of the Contractors License Law (Chapter 9 (commencing with Section 7000) of Division 3 of the Business and Professions Code) or that he or she is exempt therefrom and the basis for the alleged exemption. Any violation of Section 7031.5 by an applicant for a permit subjects the applicant to a civil penalty of not more than five hundred dollars (\$500).)</p> <p>_____, I, as owner of the property, or my employees with wages as their sole compensation, will do the work, and the structure is not intended or offered for sale (Sec. 7044, Business and Professions Code: The Contractors License Law does not apply to an owner or property who builds or improves thereon, and who does such work himself or herself or through his or her own employees, provided that such improvements are not intended or offered for sale. If, however, the building or improvement is sold within one year of completion, the owner-builder will have the burden of proving that he or she did not build or improve for the purpose of sale.)</p> <p>_____, I, as owner of the property, am exclusively contracting with licensed contractors to construct the project (Sec. 7044, Business and Professions Code: The Contractors License Law does not apply to an owner or property who builds or improves thereon, and who contracts for such projects with a contractor(s) licensed pursuant to the Contractors License Law.) I am exempt under Sec. _____ B.P.C. for this reason _____ DATE _____ OWNER _____</p>	<p align="center">INSPECTION SUMMARY</p>
<p align="center">WORKERS COMPENSATION DECLARATION</p> <p>I hereby affirm under penalty of perjury one of the following declarations: _____ I have and will maintain a certificate of consent to self-insure for workers' compensation, as provided for by Section 3700 of the Labor Code, for the performance of the permit is issued. _____ I have and will maintain workers' compensation insurance, as required by Section 3700 of the Labor Code, for the performance of the work for which this permit is issued. My workers' compensation insurance carrier and policy number are: Carrier/Policy No: _____ (This section need not be completed if the permit is for one hundred dollars (\$100) or less). _____ I certify that in the performance of the work for which this permit is issued, I shall not employ any person in any number so as to become subject to the workers' compensation laws or California, and agree that if I should become subject to the workers' compensation provisions of Section 3700 of the Labor Code, I shall forthwith comply with those provisions. DATE _____ APPLICANT: _____ WARNING: FAILURE TO SECURE WORKERS' COMPENSATION COVERAGE IS UNLAWFUL, AND SHALL SUBJECT AN EMPLOYER TO CRIMINAL PENALTIES AND CIVIL FINES UP TO ONE HUNDRED THOUSAND DOLLARS (\$100,000), IN ADDITION TO THE COST OF COMPENSATION, DAMAGES AS PROVIDED FOR IN SECTION 3706 OF THE LABOR CODE, INTEREST, AND ATTORNEY'S FEES.</p> <p align="center">CONSTRUCTION LENDING AGENCY</p> <p>I hereby affirm under penalty of perjury that there is a construction lending agency for the performance of the work for which this permit is issued (Sec. 3097, Civ. C.). DATE _____ APPLICANT: _____</p>	<p align="center">_____ FINAL GRADING</p>


* I certify that I have read this application and state that the above information is correct. I agree to comply with all city ordinances and state laws relating to building construction, and hereby authorize representatives of this city to enter upon the above-mentioned property for inspection purposes.

SIGNATURE OF APPLICANT OR AGENT : _____

DATE _____

Permit Finaled Date: _____ **Inspector Name:** _____ **Signature:** _____

PERMIT NO: PE041849 ON-LINE PERMIT

ANN ARBOR 301 E. Huron St., MI 48104	PERMIT TYPE ELECTRICAL	APPLIED DATE 10/29/2004	
INSPECTION REQUEST LINE 734.794.6263 OR SCHEDULE INSPECTION ON-LINE eTRAKIT	PERMIT SUB-TYPE ELECTRICAL	APPROVED DATE	
	JOB VALUE 0	ISSUED DATE 10/29/2004	
	APN 09-09-29-209-006		
	DESCRIPTION Install wiring for new garbage disposal		

PERMIT INFORMATION		FEE SUMMARY	
SITE	805 W WASHINGTON ST ANN ARBOR, MI	001 INSPECTION	\$26.00
APPLICANT	Wiltse Gary 1146 Camelot Dr. Pinckney MI 48169	MINIMUM PERMIT FEE	\$8.25
OWNER	PUMPING STATION NO 2 CONDOMIN 245 MULHOLLAND AVE ANN ARBOR MI 48103	003 CIRCUIT/FEEDER < 20 AMP	\$1.75
CONTRACTOR	Wiltse Electric Service Inc 1146 Camelot Dr. Pinckney MI 48169	Total Fees Collected:	\$36.00

NOTE: This job copy of this permit shall be kept on the job site to make the required entries thereon. The permit will expire if work is not started in 180 days, is abandoned, or does not receive an inspection for more than 180 days. Additional fees will be collected to renew expired permits. This is a Building Permit when properly filed out, signed and validated, and is not transferable. Construction Hour: Construction is limited to the hours of 7:00am to 7:00pm each day. No work shall be performed on certain holidays (MMC V-213-3(b)).

<p align="center">LICENSED CONTRACTORS DECLARATION</p> <p>I hereby affirm under penalty of perjury that I am licensed under provisions of Chapter 9 (commencing with Section 7000) of Division 3 of the Business and Professions Code, and my license is in full force and effect. License No: _____ Expiration Date: _____ Contractor: _____</p> <p align="center">OWNER-BUILDER DECLARATION</p> <p>I hereby affirm under penalty of perjury that I am exempt from the contractors license Law for the following reason (Sec. 7031.5, Business and Professions Code: Any city or county which requires a permit to construct, alter, improve, demolish, or repair any structure, prior to its issuance, also requires the applicant for such permit to file a signed statement that he or she is licensed pursuant to the provisions of the Contractors License Law (Chapter 9 (commencing with Section 7000) of Division 3 of the Business and Professions Code) or that he or she is exempt therefrom and the basis for the alleged exemption. Any violation of Section 7031.5 by an applicant for a permit subjects the applicant to a civil penalty of not more than five hundred dollars (\$500).)</p> <p>_____, I, as owner of the property, or my employees with wages as their sole compensation, will do the work, and the structure is not intended or offered for sale (Sec. 7044, Business and Professions Code: The Contractors License Law does not apply to an owner or property who builds or improves thereon, and who does such work himself or herself or through his or her own employees, provided that such improvements are not intended or offered for sale. If, however, the building or improvement is sold within one year of completion, the owner-builder will have the burden of proving that he or she did not build or improve for the purpose of sale.)</p> <p>_____, I, as owner of the property, am exclusively contracting with licensed contractors to construct the project (Sec. 7044, Business and Professions Code: The Contractors License Law does not apply to an owner or property who builds or improves thereon, and who contracts for such projects with a contractor(s) licensed pursuant to the Contractors License Law.) I am exempt under Sec. _____ B.P.C. for this reason _____ DATE _____ OWNER _____</p>	<p align="center">INSPECTION SUMMARY</p> <p align="center">_____ FINAL</p>
<p align="center">WORKERS COMPENSATION DECLARATION</p> <p>I hereby affirm under penalty of perjury one of the following declarations: _____ I have and will maintain a certificate of consent to self-insure for workers' compensation, as provided for by Section 3700 of the Labor Code, for the performance of the permit is issued. _____ I have and will maintain workers' compensation insurance, as required by Section 3700 of the Labor Code, for the performance of the work for which this permit is issued. My workers' compensation insurance carrier and policy number are: Carrier/Policy No: _____ (This section need not be completed if the permit is for one hundred dollars (\$100) or less). _____ I certify that in the performance of the work for which this permit is issued, I shall not employ any person in any number so as to become subject to the workers' compensation laws or California, and agree that if I should become subject to the workers' compensation provisions of Section 3700 of the Labor Code, I shall forthwith comply with those provisions. DATE _____ APPLICANT: _____ WARNING: FAILURE TO SECURE WORKERS' COMPENSATION COVERAGE IS UNLAWFUL, AND SHALL SUBJECT AN EMPLOYER TO CRIMINAL PENALTIES AND CIVIL FINES UP TO ONE HUNDRED THOUSAND DOLLARS (\$100,000), IN ADDITION TO THE COST OF COMPENSATION, DAMAGES AS PROVIDED FOR IN SECTION 3706 OF THE LABOR CODE, INTEREST, AND ATTORNEY'S FEES. align="center">CONSTRUCTION LENDING AGENCY I hereby affirm under penalty of perjury that there is a construction lending agency for the performance of the work for which this permit is issued (Sec. 3097, Civ. C.). DATE _____ APPLICANT: _____</p>	


* I certify that I have read this application and state that the above information is correct. I agree to comply with all city ordinances and state laws relating to building construction, and hereby authorize representatives of this city to enter upon the above-mentioned property for inspection purposes.

SIGNATURE OF APPLICANT OR AGENT : _____

DATE _____

Permit Finaled Date: _____ **Inspector Name:** _____ **Signature:** _____

PERMIT NO: PP042048 ON-LINE PERMIT

ANN ARBOR 301 E. Huron St., MI 48104	PERMIT TYPE PLUMBING	APPLIED DATE 10/28/2004	
INSPECTION REQUEST LINE 734.794.6263 OR SCHEDULE INSPECTION ON-LINE eTRAKIT	PERMIT SUB-TYPE PLUMBING	APPROVED DATE	
	JOB VALUE 0	ISSUED DATE 10/28/2004	
	APN 09-09-29-209-006 DESCRIPTION install garbage disposal		

PERMIT INFORMATION		FEE SUMMARY	
SITE	805 W WASHINGTON ST ANN ARBOR, MI	INSTALL GARBAGE DISPOSAL	\$36.00
Total Fees Collected:		\$36.00	
APPLICANT	Lang Frederick 7547 Woodwind Brighton MI 48116		
OWNER	PUMPING STATION NO 2 CONDOMIN 245 MULHOLLAND AVE ANN ARBOR MI 48103		
CONTRACTOR	Lang Plumbing 7547 Woodwind Brighton MI 48116		

NOTE: This job copy of this permit shall be kept on the job site to make the required entries thereon. The permit will expire if work is not started in 180 days, is abandoned, or does not receive an inspection for more than 180 days. Additional fees will be collected to renew expired permits. This is a Building Permit when properly filed out, signed and validated, and is not transferable. Construction Hour: Construction is limited to the hours of 7:00am to 7:00pm each day. No work shall be performed on certain holidays (MMC V-213-3(b)).

LICENSED CONTRACTORS DECLARATION
 I hereby affirm under penalty of perjury that I am licensed under provisions of Chapter 9 (commencing with Section 7000) of Division 3 of the Business and Professions Code, and my license is in full force and effect.
 License No: _____ Expiration Date: _____ Contractor: _____

OWNER-BUILDER DECLARATION
 I hereby affirm under penalty of perjury that I am exempt from the contractors license Law for the following reason (Sec. 7031.5, Business and Professions Code: Any city or county which requires a permit to construct, alter, improve, demolish, or repair any structure, prior to its issuance, also requires the applicant for such permit to file a signed statement that he or she is licensed pursuant to the provisions of the Contractors License Law (Chapter 9 (commencing with Section 7000) of Division 3 of the Business and Professions Code) or that he or she is exempt therefrom and the basis for the alleged exemption. Any violation of Section 7031.5 by an applicant for a permit subjects the applicant to a civil penalty of not more than five hundred dollars (\$500).)
 _____ I, as owner of the property, or my employees with wages as their sole compensation, will do the work, and the structure is not intended or offered for sale (Sec. 7044, Business and Professions Code: The Contractors License Law does not apply to an owner or property who builds or improves thereon, and who does such work himself or herself or through his or her own employees, provided that such improvements are not intended or offered for sale. If, however, the building or improvement is sold within one year of completion, the owner-builder will have the burden of proving that he or she did not build or improve for the purpose of sale.)
 _____ I, as owner of the property, am exclusively contracting with licensed contractors to construct the project (Sec. 7044, Business and Professions Code: The Contractors License Law does not apply to an owner or property who builds or improves thereon, and who contracts for such projects with a contractor(s) licensed pursuant to the Contractors License Law.)
 I am exempt under Sec. _____ B.P.C. for this reason _____
 DATE _____ OWNER _____

WORKERS COMPENSATION DECLARATION
 I hereby affirm under penalty of perjury one of the following declarations:
 _____ I have and will maintain a certificate of consent to self-insure for workers' compensation, as provided for by Section 3700 of the Labor Code, for the performance of the permit is issued.
 _____ I have and will maintain workers' compensation insurance, as required by Section 3700 of the Labor Code, for the performance of the work for which this permit is issued. My workers' compensation insurance carrier and policy number are:
 Carrier/Policy No: _____
 (This section need not be completed if the permit is for one hundred dollars (\$100) or less).
 _____ I certify that in the performance of the work for which this permit is issued, I shall not employ any person in any number so as to become subject to the workers' compensation laws or California, and agree that if I should become subject to the workers' compensation provisions of Section 3700 of the Labor Code, I shall forthwith comply with those provisions.
 DATE _____ APPLICANT: _____
WARNING: FAILURE TO SECURE WORKERS' COMPENSATION COVERAGE IS UNLAWFUL, AND SHALL SUBJECT AN EMPLOYER TO CRIMINAL PENALTIES AND CIVIL FINES UP TO ONE HUNDRED THOUSAND DOLLARS (\$100,000), IN ADDITION TO THE COST OF COMPENSATION, DAMAGES AS PROVIDED FOR IN SECTION 3706 OF THE LABOR CODE, INTEREST, AND ATTORNEY'S FEES.

CONSTRUCTION LENDING AGENCY
 I hereby affirm under penalty of perjury that there is a construction lending agency for the performance of the work for which this permit is issued (Sec. 3097, Civ. C.).
 DATE _____ APPLICANT: _____

INSPECTION SUMMARY

_____ FINAL

* I certify that I have read this application and state that the above information is correct. I agree to comply with all city ordinances and state laws relating to building construction, and hereby authorize representatives of this city to enter upon the above-mentioned property for inspection purposes.

SIGNATURE OF APPLICANT OR AGENT : _____

DATE _____

Permit Finaled Date: _____ **Inspector Name:** _____ **Signature:** _____

PERMIT NO: PE060054 ON-LINE PERMIT

ANN ARBOR 301 E. Huron St., MI 48104	PERMIT TYPE ELECTRICAL	APPLIED DATE 1/17/2006	
INSPECTION REQUEST LINE 734.794.6263 OR SCHEDULE INSPECTION ON-LINE eTRAKit	PERMIT SUB-TYPE ELECTRICAL	APPROVED DATE	
	JOB VALUE 0	ISSUED DATE 1/17/2006	
	APN 09-09-29-209-006		
DESCRIPTION Garage/Storage are renovation			

PERMIT INFORMATION	FEE SUMMARY
SITE 805 W WASHINGTON ST ANN ARBOR, MI	012 INSPECTION EXTRA \$38.00 001 INSPECTION \$56.00 MASTER PLAN SURCHARGE \$5.00 Total Fees Collected: \$99.00
APPLICANT Fleming Dennis 4129 Okemos Rd. Unit 5B Okemos MI 48864	
OWNER CITY OF ANN ARBOR 245 MULHOLLAND AVE Ann Arbor MI 48103	
CONTRACTOR First Contracting Inc P.O. Box 75 Ovid MI 48866	

NOTE: This job copy of this permit shall be kept on the job site to make the required entries thereon. The permit will expire if work is not started in 180 days, is abandoned, or does not receive an inspection for more than 180 days. Additional fees will be collected to renew expired permits. This is a Building Permit when properly filed out, signed and validated, and is not transferable. Construction Hour: Construction is limited to the hours of 7:00am to 7:00pm each day. No work shall be performed on certain holidays (MMC V-213-3(b)).

<p>LICENSED CONTRACTORS DECLARATION</p> <p>I hereby affirm under penalty of perjury that I am licensed under provisions of Chapter 9 (commencing with Section 7000) of Division 3 of the Business and Professions Code, and my license is in full force and effect.</p> <p>License No: _____ Expiration Date: _____ Contractor: _____</p> <p>OWNER-BUILDER DECLARATION</p> <p>I hereby affirm under penalty of perjury that I am exempt from the contractors license Law for the following reason (Sec. 7031.5, Business and Professions Code: Any city or county which requires a permit to construct, alter, improve, demolish, or repair any structure, prior to its issuance, also requires the applicant for such permit to file a signed statement that he or she is licensed pursuant to the provisions of the Contractors License Law (Chapter 9 (commencing with Section 7000) of Division 3 of the Business and Professions Code) or that he or she is exempt therefrom and the basis for the alleged exemption. Any violation of Section 7031.5 by an applicant for a permit subjects the applicant to a civil penalty of not more than five hundred dollars (\$500).)</p> <p>_____, I, as owner of the property, or my employees with wages as their sole compensation, will do the work, and the structure is not intended or offered for sale (Sec. 7044, Business and Professions Code: The Contractors License Law does not apply to an owner or property who builds or improves thereon, and who does such work himself or herself or through his or her own employees, provided that such improvements are not intended or offered for sale. If, however, the building or improvement is sold within one year of completion, the owner-builder will have the burden of proving that he or she did not build or improve for the purpose of sale.)</p> <p>_____, I, as owner of the property, am exclusively contracting with licensed contractors to construct the project (Sec. 7044, Business and Professions Code: The Contractors License Law does not apply to an owner or property who builds or improves thereon, and who contracts for such projects with a contractor(s) licensed pursuant to the Contractors License Law.)</p> <p>I am exempt under Sec. _____ B.P.C. for this reason _____</p> <p>DATE _____ OWNER _____</p>	<p>INSPECTION SUMMARY</p> <p>_____ FINAL _____ FINAL _____ ROUGH</p>
<p>WORKERS COMPENSATION DECLARATION</p> <p>I hereby affirm under penalty of perjury one of the following declarations:</p> <p>_____, I have and will maintain a certificate of consent to self-insure for workers' compensation, as provided for by Section 3700 of the Labor Code, for the performance of the permit is issued.</p> <p>_____, I have and will maintain workers' compensation insurance, as required by Section 3700 of the Labor Code, for the performance of the work for which this permit is issued. My workers' compensation insurance carrier and policy number are:</p> <p>Carrier/Policy No: _____</p> <p>(This section need not be completed if the permit is for one hundred dollars (\$100) or less.)</p> <p>_____, I certify that in the performance of the work for which this permit is issued, I shall not employ any person in any number so as to become subject to the workers' compensation laws or California, and agree that if I should become subject to the workers' compensation provisions of Section 3700 of the Labor Code, I shall forthwith comply with those provisions.</p> <p>DATE _____ APPLICANT: _____</p> <p>WARNING: FAILURE TO SECURE WORKERS' COMPENSATION COVERAGE IS UNLAWFUL, AND SHALL SUBJECT AN EMPLOYER TO CRIMINAL PENALTIES AND CIVIL FINES UP TO ONE HUNDRED THOUSAND DOLLARS (\$100,000), IN ADDITION TO THE COST OF COMPENSATION, DAMAGES AS PROVIDED FOR IN SECTION 3706 OF THE LABOR CODE, INTEREST, AND ATTORNEY'S FEES.</p> <p>CONSTRUCTION LENDING AGENCY</p> <p>I hereby affirm under penalty of perjury that there is a construction lending agency for the performance of the work for which this permit is issued (Sec. 3097, Civ. C.).</p> <p>DATE _____ APPLICANT: _____</p>	

* I certify that I have read this application and state that the above information is correct. I agree to comply with all city ordinances and state laws relating to building construction, and hereby authorize representatives of this city to enter upon the above-mentioned property for inspection purposes.

SIGNATURE OF APPLICANT OR AGENT : _____

DATE _____

Permit Finaled Date: _____ **Inspector Name:** _____ **Signature:** _____

PERMIT NO: PB060054 ON-LINE PERMIT

ANN ARBOR
301 E. Huron St., MI 48104

PERMIT TYPE
BUILDING

APPLIED DATE
1/17/2006



INSPECTION REQUEST LINE
734.794.6263
OR
SCHEDULE INSPECTION ON-LINE
eTRAKIT

PERMIT SUB-TYPE
RES. ADD/ALTER

APPROVED DATE

JOB VALUE 28000

ISSUED DATE
2/16/2006

APN 09-09-29-209-006

DESCRIPTION
New fire rated ceiling
& storage

PERMIT INFORMATION

FEE SUMMARY

Table with permit information including Site (805 W WASHINGTON ST), Applicant (Fleming Clarence), Owner (CITY OF ANN ARBOR), and Contractor (First Contracting Inc).

Table with fee summary including Plan Review (\$93.20), 3 Const \$10K-\$100K (\$233.00), Master Plan Surcharge (\$5.00), and Total Fees Collected (\$331.20).

NOTE: This job copy of this permit shall be kept on the job site to make the required entries thereon. The permit will expire if work is not started in 180 days, is abandoned, or does not receive an inspection for more than 180 days.

LICENSED CONTRACTORS DECLARATION

I hereby affirm under penalty of perjury that I am licensed under provisions of Chapter 9 (commencing with Section 7000) of Division 3 of the Business and Professions Code, and my license is in full force and effect.

License No: Expiration Date: Contractor:

OWNER-BUILDER DECLARATION

I hereby affirm under penalty of perjury that I am exempt from the contractors license law for the following reason (Sec. 7031.5, Business and Professions Code: Any city or county which requires a permit to construct, alter, improve, demolish, or repair any structure, prior to its issuance, also requires the applicant for such permit to file a signed statement that he or she is licensed pursuant to the provisions of the Contractors License Law (Chapter 9 (commencing with Section 7000) of Division 3 of the Business and Professions Code) or that he or she is exempt therefrom and the basis for the alleged exemption. Any violation of Section 7031.5 by an applicant for a permit subjects the applicant to a civil penalty of not more than five hundred dollars (\$500).)

I, as owner of the property, or my employees with wages as their sole compensation, will do the work, and the structure is not intended or offered for sale (Sec. 7044, Business and Professions Code: The Contractors License Law does not apply to an owner or property who builds or improves thereon, and who does such work himself or herself or through his or her own employees, provided that such improvements are not intended or offered for sale. If, however, the building or improvement is sold within one year of completion, the owner-builder will have the burden of proving that he or she did not build or improve for the purpose of sale.)

I, as owner of the property, am exclusively contracting with licensed contractors to construct the project (Sec. 7044, Business and Professions Code: The Contractors License Law does not apply to an owner or property who builds or improves thereon, and who contracts for such projects with a contractor(s) licensed pursuant to the Contractors License Law.)

I am exempt under Sec. DATE OWNER B.P.C. for this reason

WORKERS COMPENSATION DECLARATION

I hereby affirm under penalty of perjury one of the following declarations:

I have and will maintain a certificate of consent to self-insure for workers' compensation, as provided for by Section 3700 of the Labor Code, for the performance of the permit is issued.

I have and will maintain workers' compensation insurance, as required by Section 3700 of the Labor Code, for the performance of the work for which this permit is issued. My workers' compensation insurance carrier and policy number are:

Carrier/Policy No: (This section need not be completed if the permit is for one hundred dollars (\$100) or less).

I certify that in the performance of the work for which this permit is issued, I shall not employ any person in any number so as to become subject to the workers' compensation laws or California, and agree that if I should become subject to the workers' compensation provisions of Section 3700 of the Labor Code, I shall forthwith comply with those provisions.

DATE APPLICANT:

WARNING: FAILURE TO SECURE WORKERS' COMPENSATION COVERAGE IS UNLAWFUL, AND SHALL SUBJECT AN EMPLOYER TO CRIMINAL PENALTIES AND CIVIL FINES UP TO ONE HUNDRED THOUSAND DOLLARS (\$100,000), IN ADDITION TO THE COST OF COMPENSATION, DAMAGES AS PROVIDED FOR IN SECTION 3706 OF THE LABOR CODE, INTEREST, AND ATTORNEY'S FEES.

CONSTRUCTION LENDING AGENCY

I hereby affirm under penalty of perjury that there is a construction lending agency for the performance of the work for which this permit is issued (Sec. 3097, Civ. C.).

DATE APPLICANT:

INSPECTION SUMMARY

FINAL
DRYWALL
PARTIAL ROUGH

* I certify that I have read this application and state that the above information is correct. I agree to comply with all city ordinances and state laws relating to building construction, and hereby authorize representatives of this city to enter upon the above-mentioned property for inspection purposes.

SIGNATURE OF APPLICANT OR AGENT : _____

DATE _____

Permit Finaled Date: _____ **Inspector Name:** _____ **Signature:** _____

PERMIT NO: PE021737 ON-LINE PERMIT

ANN ARBOR 301 E. Huron St., MI 48104 INSPECTION REQUEST LINE 734.794.6263 OR SCHEDULE INSPECTION ON-LINE eTRAKIT	PERMIT TYPE ELECTRICAL	APPLIED DATE 12/3/2002	
	PERMIT SUB-TYPE ELECTRICAL	APPROVED DATE	
	JOB VALUE 0	ISSUED DATE 12/3/2002	
	APN 09-09-29-209-006		
DESCRIPTION Add ceiling fan			

PERMIT INFORMATION		FEE SUMMARY	
SITE	805 W WASHINGTON ST ANN ARBOR, MI	MINIMUM PERMIT FEE	\$10.00
APPLICANT	Fleming Dennis PO Box 1190 Okemos MI 48805	001 INSPECTION	\$25.00
OWNER	PUMPING STATION NO 2 CONDOMIN 245 MULHOLLAND AVE ANN ARBOR MI 48103	Total Fees Collected:	\$35.00
CONTRACTOR	First Contracting Inc P.O. Box 75 Ovid MI 48866		

NOTE: This job copy of this permit shall be kept on the job site to make the required entries thereon. The permit will expire if work is not started in 180 days, is abandoned, or does not receive an inspection for more than 180 days. Additional fees will be collected to renew expired permits. This is a Building Permit when properly filed out, signed and validated, and is not transferable. Construction Hour: Construction is limited to the hours of 7:00am to 7:00pm each day. No work shall be performed on certain holidays (MMC V-213-3(b)).

<p align="center">LICENSED CONTRACTORS DECLARATION</p> <p>I hereby affirm under penalty of perjury that I am licensed under provisions of Chapter 9 (commencing with Section 7000) of Division 3 of the Business and Professions Code, and my license is in full force and effect. License No: _____ Expiration Date: _____ Contractor: _____</p> <p align="center">OWNER-BUILDER DECLARATION</p> <p>I hereby affirm under penalty of perjury that I am exempt from the contractors license Law for the following reason (Sec. 7031.5, Business and Professions Code: Any city or county which requires a permit to construct, alter, improve, demolish, or repair any structure, prior to its issuance, also requires the applicant for such permit to file a signed statement that he or she is licensed pursuant to the provisions of the Contractors License Law (Chapter 9 (commencing with Section 7000) of Division 3 of the Business and Professions Code) or that he or she is exempt therefrom and the basis for the alleged exemption. Any violation of Section 7031.5 by an applicant for a permit subjects the applicant to a civil penalty of not more than five hundred dollars (\$500).)</p> <p>_____, I, as owner of the property, or my employees with wages as their sole compensation, will do the work, and the structure is not intended or offered for sale (Sec. 7044, Business and Professions Code: The Contractors License Law does not apply to an owner or property who builds or improves thereon, and who does such work himself or herself or through his or her own employees, provided that such improvements are not intended or offered for sale. If, however, the building or improvement is sold within one year of completion, the owner-builder will have the burden of proving that he or she did not build or improve for the purpose of sale.)</p> <p>_____, I, as owner of the property, am exclusively contracting with licensed contractors to construct the project (Sec. 7044, Business and Professions Code: The Contractors License Law does not apply to an owner or property who builds or improves thereon, and who contracts for such projects with a contractor(s) licensed pursuant to the Contractors License Law.) I am exempt under Sec. _____ B.P.C. for this reason _____ DATE _____ OWNER _____</p> <p align="center">WORKERS COMPENSATION DECLARATION</p> <p>I hereby affirm under penalty of perjury one of the following declarations: _____ I have and will maintain a certificate of consent to self-insure for workers' compensation, as provided for by Section 3700 of the Labor Code, for the performance of the permit is issued.</p> <p>_____ I have and will maintain workers' compensation insurance, as required by Section 3700 of the Labor Code, for the performance of the work for which this permit is issued. My workers' compensation insurance carrier and policy number are: Carrier/Policy No: _____</p> <p>(This section need not be completed if the permit is for one hundred dollars (\$100) or less). _____ I certify that in the performance of the work for which this permit is issued, I shall not employ any person in any number so as to become subject to the workers' compensation laws or California, and agree that if I should become subject to the workers' compensation provisions of Section 3700 of the Labor Code, I shall forthwith comply with those provisions. DATE _____ APPLICANT: _____</p> <p>WARNING: FAILURE TO SECURE WORKERS' COMPENSATION COVERAGE IS UNLAWFUL, AND SHALL SUBJECT AN EMPLOYER TO CRIMINAL PENALTIES AND CIVIL FINES UP TO ONE HUNDRED THOUSAND DOLLARS (\$100,000), IN ADDITION TO THE COST OF COMPENSATION, DAMAGES AS PROVIDED FOR IN SECTION 3706 OF THE LABOR CODE, INTEREST, AND ATTORNEY'S FEES.</p> <p align="center">CONSTRUCTION LENDING AGENCY</p> <p>I hereby affirm under penalty of perjury that there is a construction lending agency for the performance of the work for which this permit is issued (Sec. 3097, Civ. C.). DATE _____ APPLICANT: _____</p>	<p align="center">INSPECTION SUMMARY</p> <p>_____ FINAL-805</p>
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* I certify that I have read this application and state that the above information is correct. I agree to comply with all city ordinances and state laws relating to building construction, and hereby authorize representatives of this city to enter upon the above-mentioned property for inspection purposes.

SIGNATURE OF APPLICANT OR AGENT : _____

DATE _____

Permit Finaled Date: _____ **Inspector Name:** _____ **Signature:** _____

PERMIT NO: PE040162 ON-LINE PERMIT

ANN ARBOR 301 E. Huron St., MI 48104	PERMIT TYPE ELECTRICAL	APPLIED DATE 2/3/2004	
INSPECTION REQUEST LINE 734.794.6263 OR SCHEDULE INSPECTION ON-LINE eTRAKIT	PERMIT SUB-TYPE ELECTRICAL	APPROVED DATE	
JOB VALUE 0	ISSUED DATE 2/3/2004		
APN 09-09-29-209-006 DESCRIPTION Add A/C circuits at 2 units duplex			

PERMIT INFORMATION		FEE SUMMARY	
SITE	805 W WASHINGTON ST ANN ARBOR, MI	MINIMUM PERMIT FEE	\$6.50
APPLICANT	Fleming Dennis 4129 Okemos Rd. #5 Okemos MI 48864	001 INSPECTION	\$26.00
OWNER	PUMPING STATION NO 2 CONDOMIN 245 MULHOLLAND AVE ANN ARBOR MI 48103	003 CIRCUIT/FEEDER < 20 AMP	\$3.50
CONTRACTOR	First Contracting Inc P.O. Box 75 Ovid MI 48866	Total Fees Collected:	\$36.00

NOTE: This job copy of this permit shall be kept on the job site to make the required entries thereon. The permit will expire if work is not started in 180 days, is abandoned, or does not receive an inspection for more than 180 days. Additional fees will be collected to renew expired permits. This is a Building Permit when properly filed out, signed and validated, and is not transferable. Construction Hour: Construction is limited to the hours of 7:00am to 7:00pm each day. No work shall be performed on certain holidays (MMC V-213-3(b)).

LICENSED CONTRACTORS DECLARATION	INSPECTION SUMMARY
I hereby affirm under penalty of perjury that I am licensed under provisions of Chapter 9 (commencing with Section 7000) of Division 3 of the Business and Professions Code, and my license is in full force and effect. License No: _____ Expiration Date: _____ Contractor: _____	FINAL
OWNER-BUILDER DECLARATION I hereby affirm under penalty of perjury that I am exempt from the contractors license Law for the following reason (Sec. 7031.5, Business and Professions Code: Any city or county which requires a permit to construct, alter, improve, demolish, or repair any structure, prior to its issuance, also requires the applicant for such permit to file a signed statement that he or she is licensed pursuant to the provisions of the Contractors License Law (Chapter 9 (commencing with Section 7000) of Division 3 of the Business and Professions Code) or that he or she is exempt therefrom and the basis for the alleged exemption. Any violation of Section 7031.5 by an applicant for a permit subjects the applicant to a civil penalty of not more than five hundred dollars (\$500).) I, as owner of the property, or my employees with wages as their sole compensation, will do the work, and the structure is not intended or offered for sale (Sec. 7044, Business and Professions Code: The Contractors License Law does not apply to an owner or property who builds or improves thereon, and who does such work himself or herself or through his or her own employees, provided that such improvements are not intended or offered for sale. If, however, the building or improvement is sold within one year of completion, the owner-builder will have the burden of proving that he or she did not build or improve for the purpose of sale.) I, as owner of the property, am exclusively contracting with licensed contractors to construct the project (Sec. 7044, Business and Professions Code: The Contractors License Law does not apply to an owner or property who builds or improves thereon, and who contracts for such projects with a contractor(s) licensed pursuant to the Contractors License Law.) I am exempt under Sec. _____ B.P.C. for this reason _____ DATE _____ OWNER _____	
WORKERS COMPENSATION DECLARATION I hereby affirm under penalty of perjury one of the following declarations: I have and will maintain a certificate of consent to self-insure for workers' compensation, as provided for by Section 3700 of the Labor Code, for the performance of the permit is issued. I have and will maintain workers' compensation insurance, as required by Section 3700 of the Labor Code, for the performance of the work for which this permit is issued. My workers' compensation insurance carrier and policy number are: Carrier/Policy No: _____ (This section need not be completed if the permit is for one hundred dollars (\$100) or less). I certify that in the performance of the work for which this permit is issued, I shall not employ any person in any number so as to become subject to the workers' compensation laws or California, and agree that if I should become subject to the workers' compensation provisions of Section 3700 of the Labor Code, I shall forthwith comply with those provisions. DATE _____ APPLICANT: _____ WARNING: FAILURE TO SECURE WORKERS' COMPENSATION COVERAGE IS UNLAWFUL, AND SHALL SUBJECT AN EMPLOYER TO CRIMINAL PENALTIES AND CIVIL FINES UP TO ONE HUNDRED THOUSAND DOLLARS (\$100,000), IN ADDITION TO THE COST OF COMPENSATION, DAMAGES AS PROVIDED FOR IN SECTION 3706 OF THE LABOR CODE, INTEREST, AND ATTORNEY'S FEES.	
CONSTRUCTION LENDING AGENCY I hereby affirm under penalty of perjury that there is a construction lending agency for the performance of the work for which this permit is issued (Sec. 3097, Civ. C.). DATE _____ APPLICANT: _____	

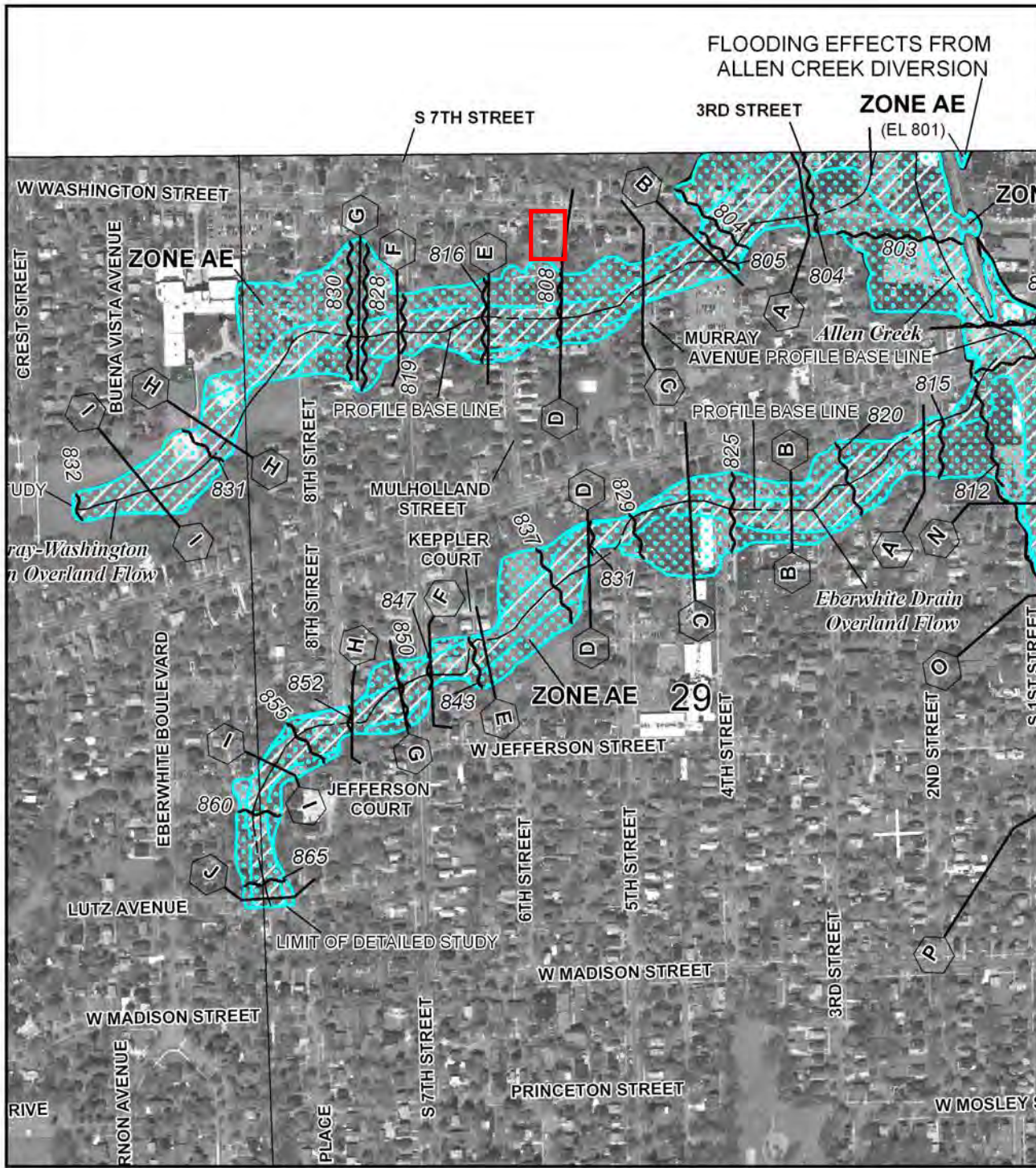
* I certify that I have read this application and state that the above information is correct. I agree to comply with all city ordinances and state laws relating to building construction, and hereby authorize representatives of this city to enter upon the above-mentioned property for inspection purposes.

SIGNATURE OF APPLICANT OR AGENT : _____

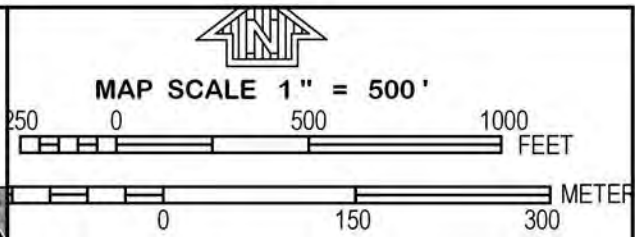
DATE _____

Permit Finaled Date: _____ **Inspector Name:** _____ **Signature:** _____

Appendix D
FEMA Floodplain Map



FLOODING EFFECTS FROM ALLEN CREEK DIVERSION



NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0244E

FIRM
 FLOOD INSURANCE RATE MAP
 WASHTENAW COUNTY,
 MICHIGAN
 (ALL JURISDICTIONS)

PANEL 244 OF 585
 (SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
ANN ARBOR	260535	0244	E
CHARTER TOWNSHIP OF ANN ARBOR, CITY OF	260213	0244	E
LODI, TOWNSHIP OF	261789	0244	E
PITTSFIELD	260923	0244	E
CHARTER TOWNSHIP OF SCIO, TOWNSHIP OF	260537	0244	E

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.



MAP NUMBER
 26161C0244E
 EFFECTIVE DATE
 APRIL 3, 2012

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

Appendix E

Form 4.4 Environmental Restrictions Checklist

Rental Assistance Demonstration Program Environmental Restrictions Checklist

Project Name and Location (Street, City, County, ST, Zip Code): West Washington 805-807 West Washington Street Ann Arbor, Washtenaw County, MI 48103	Owner Name, Address (Street, City, ST, Zip Code), and Phone: Ann Arbor Housing Commission 727 Miller Avenue, Ann Arbor MI 48103 (734) 794-6720	
Project Description: Completion of a Rental Assistance Demonstration (RAD) Property Condition Assessment (PCA) to determine repairs, replacements, maintenance items and items for improvement at the property.		
ENVIRONMENTAL REVIEW FINDINGS	YES	NO
FLOOD PLAIN		
Is the project located in a FEMA Special Flood Hazard Area? (Current flood plain maps should be found in each HUD field office or call FEMA at 1-877-FEMA-MAP, FEMA's web site URL is www.fema.gov/FHM/)		X
Identify Map Panel and Date Panel 244 of 585, Community Panel 26161C0244E, dated April 3, 2012		
Does the project currently carry Flood Insurance?	X	
Do any structures appear to be within or close to the floodplain? (If yes and if the project does not currently carry flood insurance, flood insurance is required.)	X	
HISTORIC PRESERVATION (If yes, identify relevant restrictions below.)		
Is the property listed on the National Register of Historic Places?		X
Is the property located in a historic district listed on the National Register of Historic Places?		X
Is the property located in a historic district determined to be eligible for the National Register?		X
AIRPORT HAZARDS		
Is the project located in the clear zone of an airport? (24 CFR Part 51 D. If yes, Notice is required.)		X
HAZARDOUS OPERATIONS		
Is there any evidence or indication of manufacturing operations utilizing or producing hazardous substances (paints, solvents, acids, bases, flammable materials, compressed gases, poisons, or other chemical materials) at or in close proximity to the site?		X
Is there any evidence or indication that past operations located on or in close proximity to the property used hazardous substances or radiological materials that may have been released into the environment?		X
EXPLOSIVE/FLAMMABLE OPERATIONS/STORAGE (24 CFR Part 51C)		
Is there visual evidence or indicators of unobstructed or unshielded above ground storage tanks (fuel oil, gasoline, propane etc.) or operations utilizing explosive/flammable material at or in close proximity to the property?		X
FOR YES RESPONSES, SUMMARIZE RESTRICTIONS BELOW:		

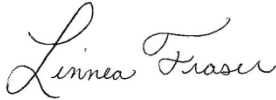
RENTAL ASSISTANCE DEMONSTRATION PROGRAM ENVIRONMENTAL RESTRICTIONS CHECKLIST

ENVIRONMENTAL REVIEW FINDINGS	YES	NO
TOXIC CHEMICALS AND RADIOACTIVE MATERIALS		
Petroleum Storage		
Is there any evidence or indication of the presence of commercial or residential heating activities that suggest that underground storage tanks may be located on the property?		X
If yes, are any such tanks being used? If yes, indicate below whether the tank is registered, when it was last tested for leaks, the results of that test, and whether there are any applicable state or local laws that impose additional requirements beyond those required under federal law.		
Are there any out-of-service underground fuel storage tanks? If yes, indicate whether the tank was closed out in accordance with applicable state, local and federal laws.		X
Is there any evidence or indication that any above ground storage tanks on the property are leaking?		X
Polychlorinated Biphenyls (PCB)		
Is there any evidence or indication that electrical equipment, such as transformers, capacitors, or hydraulic equipment (found in machinery and elevators, installed prior to July 1, 1884) are present on the site?		X
If yes, is any such equipment (a) owned by anyone other than a public utility company; and (b) not marked with a "PCB Free" sticker?		X
If yes, indicate below whether such equipment has been tested for PCBs, the results of those tests, and (if no testing has been performed) the proposed testing approach. (Electrical equipment need not be tested but will be assumed to have PCBs)		
If PCBs are found in non-electrical equipment over 50ppm it must be replaced or retrofitted, otherwise any equipment with PCBs or assumed to have PCBs require an O&M Plan.		
Asbestos Containing Materials (ACM)		
Is there any evidence or indication of ACM insulation or fire retardant materials such as boiler or pipe wrap, ceiling spray, etc. within the buildings on the property? If yes, the property is required to have an Operations and Maintenance Plan for asbestos containing materials.		X
Lead Based Paint		
Are there residential structures on the property that were built prior to 1978?	X	
If yes, has the property been certified as lead-free?	Unknown	
If property has not been certified as lead-free, has a Risk Assessment been completed?		
If yes, has the owner developed a plan including Interim Controls to address the findings of the Risk Assessment including Tenant notifications and an Operations and Maintenance plan?		
If yes, has a qualified Risk Assessor reviewed the Owner's plan and O&M plan for compliance with 24 CFR 35?		
EASEMENT AND USE RESTRICTIONS		
Are there easements, deed restrictions or other use restrictions on this property? (e.g. oil and gas well pumping, transformer boxes/units, navigation, microwave, rights of way (ROW), for hi-voltage power transmission lines, interstate/intrastate gas and liquid petroleum pipelines, etc.)		X
FOR YES RESPONSES, SUMMARIZE RESTRICTIONS BELOW:		
A lead-based survey will be performed on the subject property.		
<p align="center">If you have questions, please call or E-mail the HUD Housing Environmental Clearance Officer, Eric Axelrod at Eric.Axelrod@HUD.GOV or 202-708-1104 x 2275.</p>		

3.0 Part 2: Energy Audit

3.1 Acknowledgements of Part 2: Energy Audit

The Energy Audit Report and Excel RPCA Model were completed by Linnea Fraser of AKT Peerless. AKT Peerless certifies that the report preparers meet the qualifications identified in the RAD Physical Condition Assessment Statement of Work and Contractor Qualifications Part 2.1 (Version 2, December 2013).



Linnea Fraser, EIT
Senior Energy Analyst
AKT Peerless Environmental Services
Illinois Region
Phone: 773.993.3998
Fax: 248.615.1334

Date: April 7, 2015

Part 2 Energy Audit Report and Excel RPCA Model were Received and Reviewed by Owner:

Jennifer Hall, Executive Director
Ann Arbor Housing Commission
404 N. Ashley
Ann Arbor, MI 48103
Phone: 734-794-6721
Fax: 734-994-0781

Date: _____



Rental Assistance Demonstration (RAD): **PART 2: ENERGY AUDIT**

805-807 West Washington Street, Ann Arbor, Michigan 48103
WEST WASHINGTON

PREPARED FOR Norstar Development USA, LP
733 Broadway
Albany, NY 12207

ON BEHALF OF The Ann Arbor
Housing Commission
727 Miller Ave
Ann Arbor, MI 48103

PROJECT # 9699U-2-96

PIC # MI064

DATE March 17, 2015

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Energy Audit

West Washington

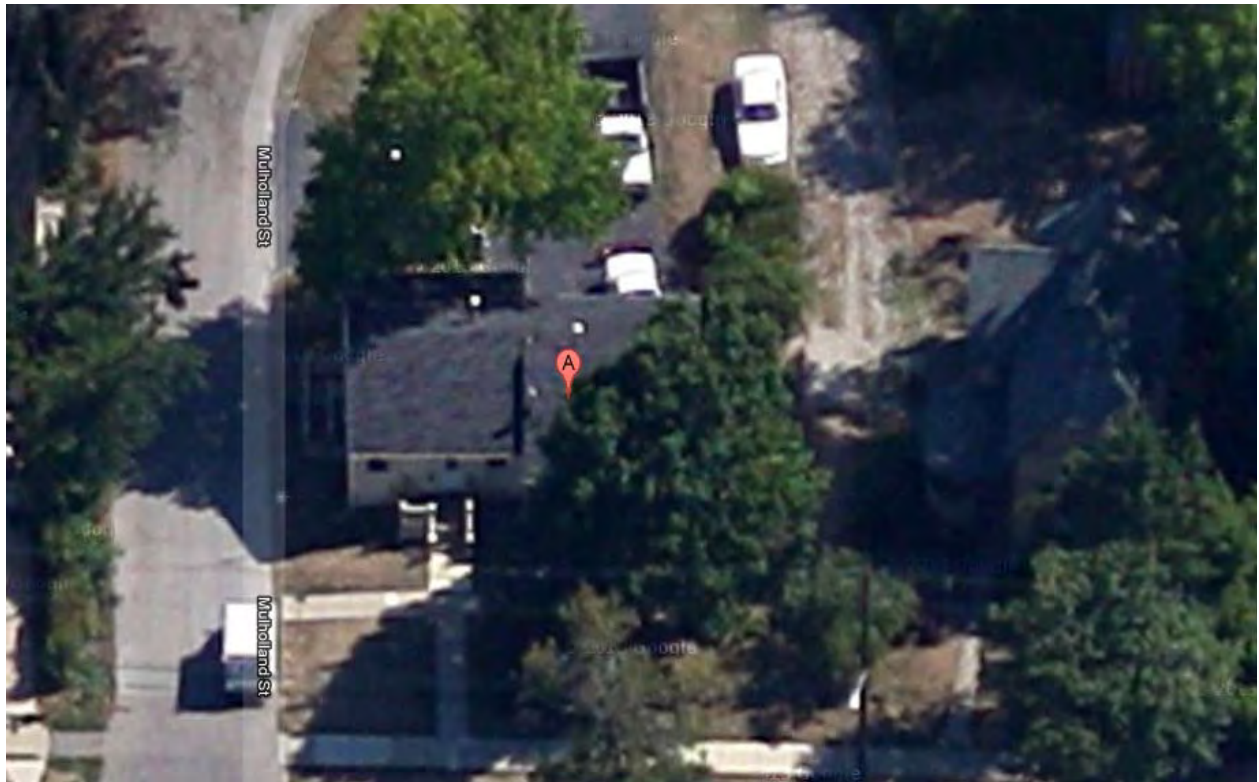
805-807 WEST WASHINGTON STREET
ANN ARBOR, MICHIGAN 48103

for

Ann Arbor Housing Commission

727 MILLER AVENUE
ANN ARBOR, MICHIGAN 48103

AKT PEERLESS PROJECT No. #9699U



1.0 Executive Summary

This report presents the findings and recommendations from a building energy and water audit conducted at West Washington located at 805-807 West Washington Street in Ann Arbor, Michigan. The energy and water audit follows industry standards and acceptable practice for assessing energy and water performance of commercial and multi-family buildings. The audit has been conducted by AKT Peerless and has involved a coordinated effort between AKT Peerless, the Client and building operating staff.

Documents were provided for review, interviews and field investigations were conducted, and building systems were analyzed. In the year analyzed (February, 2014 to January, 2015) the Ann Arbor Housing Commission spent approximately \$974 on utilities at the subject property. Tenants spent approximately \$3,354 on utilities.

AKT Peerless identified six (6) separate Energy Conservation Measures (ECMs) and one (1) Water Conservation Measure (WCM). The annualized savings of all recommendations totals \$1,514 (at current energy and water prices), with the potential to reduce total energy consumption and GHG emissions by 35%. If fully implemented, the payback period from annual energy savings for these ECMs is estimated to be 6.5. Measures associated with common areas (PHA expenses) and measures specific to tenant units have been separated for planning purposes.

Measures best suited for implementation at the End of Useful Life (EUL), advanced ECMs, and measures recommended for further evaluation have been identified and are included in Sections 9-10 of this report.

A preliminary energy use assessment was conducted prior to the cost reduction measure analysis. The figure below describes the historical annual energy consumption and cost for the subject property.

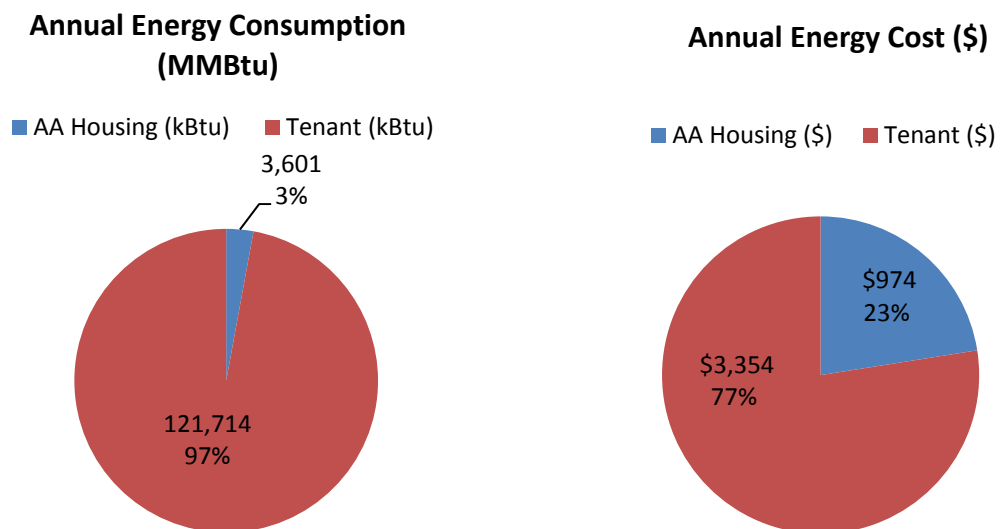
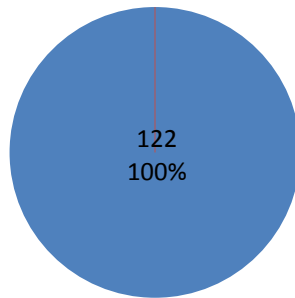


Figure 1. Historical Annual Energy Consumption and Cost

Annual Water Consumption (ccf)

■ AA Housing (ccf) ■ Tenant (ccf)



Annual Water Cost (\$)

■ AA Housing (\$) ■ Tenant (\$)

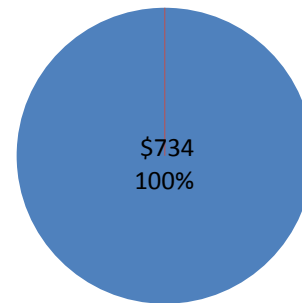


Figure 2. Historical Annual Water Consumption and Cost

The implementation costs and annual savings estimates for each proposed Energy and Water Conservation Measure are presented in Table 1 and Table 2. Table 1 outlines ECMs and WCMs that will directly impact the Owner’s annual costs.

Table 1. Financial Summary of All Energy Conservation Measures (Owner)

Energy or Water Conservation Measure	ID	Additional First Cost	Annual Savings	Simple Payback (yrs)
Install Low-Flow Showerheads, Faucet Aerators and Toilets	WCM1	\$520	\$246	2.1
Exterior Lighting Retrofit	ECM1	\$522	\$204	2.6
Totals		\$1,042	\$450	2.3

The following ECMs are recommended specifically for tenant spaces. Due to separate billing for tenants, the following energy and cost savings will only benefit the tenants.

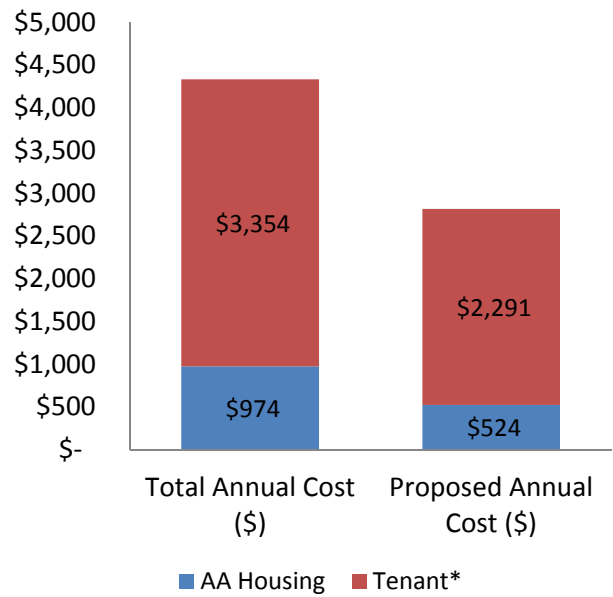
Table 2. Financial Summary of All Energy Conservation Measures (Tenant)

Energy Cost Reduction Measure (ECM)	ID	Additional First Cost	Annual Savings	Simple Payback (yrs)
Interior Lighting Retrofit	ECM2	\$187	\$475	0.4
Install Programmable Thermostats	ECM3	\$200	\$76	2.6
Control Air Leakage	ECM4	\$1,200	\$101	11.9
Increase Attic Insulation to R-49	ECM5	\$1,155	\$80	14.4
Install High Efficiency AC Units	ECM6	\$1,810*	\$332	5.4
Totals		\$4,552	\$1,064	4.3

*The first cost and annual savings are associated with the installation of a high efficiency item over a standard efficiency item.

Table 3. Impact Summary

% Energy Savings	31%
% Water Savings	28%
% Cost Savings	35%
Annual Cost Savings (\$)	\$1,514
% Reduction in GHG Emissions (CO ₂ Equivalent Metric Tonnes)	35%



2.0 Purpose and Scope

Norstar Development USA, LP, on behalf of the Ann Arbor Housing Commission (the Client), retained AKT Peerless Environmental & Energy Services (AKT Peerless) to conduct an ASHRAE Level II Energy Survey and Analysis of West Washington located at 805-807 West Washington Street in Ann Arbor, Michigan.

AKT Peerless' scope of work and report is based on its proposal PU-17009, dated January 29, 2015 and authorized by Norstar Development USA, LP on behalf of the Ann Arbor Housing Commission (the Client), and the terms and conditions of that agreement.

The purpose of this report is to assist the Client in evaluating the current energy and water use and energy and water cost of the subject property relative to other, similar properties; and also to identify and develop modifications that will reduce the energy and water use and /or cost of operating the property. This report will identify and provide the savings and cost analysis of all practical measures that meet the client's constraints and economic criteria, along with a discussion of any changes to operation and maintenance procedures. It may also provide a listing of potential capital-intensive improvements that require more thorough data collection and engineering analysis, and a judgment of potential costs and savings.

Relevant documentation has been requested from the client that could aid in the understanding of the subject property's historical energy use. The review of submitted documents does not include comment on the accuracy of such documents or their preparation, methodology, or protocol. The following documents were available for review while performing the analysis:

- Energy Utility Bills
- 2009 United States Greenhouse Gas Inventory, Annex 2
- USEPA Climate Leaders Calculator for Low Emitters
- HUD Residential Energy Benchmark Tool
- HUD Residential Water Use Benchmarking Tool
- National Oceanic Atmospheric Administration "Normal Monthly Heating Degree Days (Base 65)" and "Normal Monthly Cooling Degree Days (Base 65)"

3.0 Additional Scope Considerations

In addition to fully satisfying the American Society of Heating, Refrigeration and Air-Conditioning Engineers (ASHRAE) Procedures for Commercial Building Energy Audits, Second Edition 2011, Level II guidelines, this report includes all the necessary requirements of an Energy Audit as defined in the Rental Assistance Demonstration (RAD): Physical Condition Assessment (RPCA) statement of Work and Contractor Qualifications released by the Department of Housing and Urban Development (HUD) in October 2012, updated December 2013. These items are identified as follows:

- Heating and cooling systems sized according to the methodology proposed in the Air Conditioning Contractors of America (ACCA) Manual J guide. (See Section 11.4)
- Hot water heater analysis of existing size of individual hot water heater and the appropriate efficiency replacement sizing using First Hour Rating or another professionally recognized sizing tool. (See Section 11.2)
- An initial assessment of the potential feasibility of installing alternative technologies for electricity, heating and cooling systems, and hot water heating at the property. (See Section 13.0)
- An expected end of useful life study for all recommended energy and water efficiency measures.
- Recommendations of any additional professional reports needed (including, for example alternative energy system feasibility studies, air infiltration tests for energy loss and ventilation needs, blower door tests, infrared imaging, duct blasting, etc.)

4.0 General Information

4.1 Audit Team

This audit is the result of a collaborative process between the following AKT Peerless and client personnel:

Table 4. Audit Team

Name	Organization	Title
Jason Bing	AKT Peerless	Senior Energy Analyst
Linnea Fraser	AKT Peerless	Energy Engineer
Lance Mitchell	Ann Arbor Housing Commission	Facilities & Maintenance Property Manager
Jennifer Hall	Ann Arbor Housing Commission	Executive Director

4.2 Audit Process

AKT Peerless collected historical energy data and floor plans for the building, when available. The square footage of all spaces was determined and the size and location of pertinent mechanical equipment was documented. AKT Peerless conducted a walk-through survey of the building on February 13, 2013 collecting specific information on the mechanical, electrical, and plumbing systems as well as occupancy, scheduling, and use patterns.

AKT Peerless utilized industry accepted measuring devices, including but not limited to: a blower door to quantify air infiltration, an infrared camera to visually identify areas of potential energy loss, and a ballast discriminator to identify existing T12 lighting. Light levels were measured using a light meter in various areas to compare to Illuminating Engineering Society of North America (IESNA) recommended levels.

A visual inspection of the mechanical equipment, lighting systems, controls, building envelope and plug loads was performed. Mechanical equipment nameplate data was recorded and the specifications and performance data were reviewed and used in this analysis. Additionally, a blower door test was performed on one of the units to determine the air tightness of the apartment units, as well as identify areas of infiltration.

4.3 Energy Calculations Methodology

The primary methods of energy calculation for this analysis were simplified manual and spreadsheet tabulations based on professional standards. Actual calculation methods are discussed in each applicable section.

The end use consumption breakdown, found later in this report, is based on 2003 Commercial Buildings Energy Consumption Survey (CBECS) data for lodgings of relatively similar scale and age.

Because historic utility bill information was limited for the facility, the audit team did not have an accurate accounting of all energy consumption in the facility. The benchmark information provided in the 2009 Residential Energy Consumption Survey (RECS) and CBECS survey allowed our audit team to approximate the total energy end use consumption for the facility.

5.0 Property Description

This section summarizes physical characteristics and general use of the subject property.

5.1 Location

The subject property is located in ASHRAE Climate Zone 5A. According to National Oceanic and Atmospheric Administration recording of heating and cooling degree days, on an annual basis Ann Arbor, MI is expected to experience an average of 6,813 heating degree days (HDD) and 855 cooling degree days (CDD) with a basepoint temperature of 65 degrees Fahrenheit.

5.2 Property Characteristics

General information pertaining to the subject building is summarized in the following table:

Table 5. Property Characteristics

Primary Building Type / Occupancy	Multi-Family (General)
Region	ASHRAE 5A
Date of Construction	1969
Approximate Total Square Footage	2,114 sf

The subject property Primary Building Type is designated as Multi-Family (General). For all energy performance comparisons presented in this report the subject building will be compared to similar buildings of the same Primary Building Type.

5.3 Property Spaces

The subject property is a duplex, divided into two (2) approximately identical apartments situated over top of a maintenance garage. Spaces refer to the building as a whole and the rooms that comprise the building. Typically, the various space types will serve specific functions within the facility. The following table identifies the space types for the subject building.

Table 6. Summary of Property Spaces

Space	Use	Sq Footage	% of Total Area
Two (2) 1-bdr units	Residential Apartments	529 sf/unit	50%
Maintenance Garage	Facilities	1,057 sf	50%

5.4 Building Occupancy

Occupancy schedule has a significant impact on a facilities energy usage. In fact, the relationship between occupancy and system operating schedules and setpoints are typically more important than equipment efficiencies. The occupancy schedules for the subject building as follows:

Table 7. Building Occupancy Schedule

Day	Time	Use	Average Population
Sunday-Saturday	24/7	Primary Residence	1-2/unit

5.5 Building Envelope

This section summarizes physical characteristics of the subject building envelope.

5.5.1 Walls and Wall Insulation

The typical above grade wall construction appears to be a standard wood framed structure built on a poured concrete basement and foundation with light colored vinyl siding to the outside mechanically fastened to an exterior grade board on 2x4 wood studs. Limited amounts of exterior paneled siding framed with trim create a decorative finish around the windows and doors. The overall 5" wide assembly is finished with painted drywall on the interior. Fiberglass insulation was not observed in the exterior walls, but is assumed to be located throughout the perimeter at each building, based on temperature readings and conversations with facilities. Depth of insulation could not be determined but is assumed at 3.5" and rated at R-11. This is generally considered standard efficiency for age of construction.

The building sets on a sloping site, and the poured concrete basement is exposed on the south side of the building to allow for a garage door and man door for a Maintenance Garage. The basement walls are uninsulated. The audit team was not able to determine insulation levels in the floor cavity above the garage, but it is assumed at R-19. The drywall had been recently repaired/replaced on the ceiling. This insulation level would be considered standard efficiency.

5.5.2 Roof and Roof Insulation

The roof design on the subject building is a gabled, passively vented roof. Approximately 16-24" overhangs with staggered soffit vents run parallel to the ridge. There appears to be no ridge vent at this site, and no insulation baffles at the perimeter. The roof assembly is asphalt shingled roof (grey) over felted wood substrate mechanically fastened to prefabricated or site built 2x wood trusses. The attic inspected contains approximately 3.5" fiberglass batts with an additional 1-5" of blown fiberglass insulation on top of the attic floor for a maximum estimated R-value of 19. The insulation is displaced in several locations, and this uneven distribution of insulation results in a lower effective insulation value in the attic. The attic hatch is not insulated or weather-sealed. Overall, this insulation would be considered substandard efficiency.

The audit team was not able to determine the attic ventilation strategy at this site, and the attic may not be adequately ventilated. Proper attic ventilation can and should be addressed at the time of a reroof. Improper attic ventilation can lead to a series of problems, including but not limited to:

- Mold, mildew and rust
- Frost and ice dams
- Excessive heat in the summer
- Shorter roof life

5.5.3 [Windows and Other Fenestrations](#)

The apartment windows are varied. Original windows appear to be in place on the south side, and are dual glazed units with aluminum frames and a 3/8" thermal pane gap, slider style, with two layers of single pane glass (window and integral storm slider). Window frames are thought to be thermally unbroken and are a source of significant air leakage.

Vinyl, double pane windows have replaced the original windows in at least two locations on the north side (Washington St side). These appear to be standard efficiency units.

5.5.4 [Doors](#)

All of the exterior entrance doors appear to be standard hollow metal doors set in wood frames with standard knob handle hardware. Each exit/entry has a tandem aluminum storm door in place.

5.5.5 [Air Leakage](#)

A blower door test was conducted on the building during the site visit. The blower door test was used to quantify air leakage by determining the 50-Pascal airflow rate. This blower door reading, expressed in cubic feet per minute (CFM₅₀), is the actual flow rate measured at 50 Pascals of house pressure. CFM₅₀ is the most direct measurement of the airtightness of a building. For the subject property, West Washington, the blower door airflow rate was 1,550 CFM₅₀.

Using standard industry practice (accounting for wind speed, shielding of the building by external elements, and the buildings height and size), the estimated natural air change rate was calculated to be 1.33 air changes per hour (ACH_n).

5.5.6 [Minimum Ventilation Requirement \(MVR\)](#)

Either air leakage or a whole-house ventilation system must provide acceptable indoor air quality. The American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE) set minimum ventilation requirements (MVRs) to ensure acceptable indoor air quality in homes. The older ASHRAE Standard 62-1989 recognizes air leakage as a legitimate ventilation strategy. The newer ASHRAE Standard 62.2-2007 requires a whole-house mechanical ventilation system.

ASHRAE Standard 62-1989 requires that air leakage must provide at least 15 CFM per person or 0.35 air changes per hour, whichever is greater. For the subject property, West Washington, the MVR was

calculated to be 30 CFM (=0.35 ACH) per average unit. This equates to a building tightness limit (BTL) of 501 CFM50 per average unit.

The blower door test determined that air leakage provides excessive ventilation.

5.6 Heating, Ventilation, and Air Conditioning (HVAC)

The HVAC system provides the primary heating, cooling and ventilation needs of the facility. The subject building at the W. Washington apartments has a decentralized HVAC system in place, with equipment located and zoned for each individual apartment.

Each of the units is heated by one (1) Goodman down-flow gas-fired, forced-air furnace rated at 45 kBtu/h input and 36 kBtu/h output with an 80% AFUE. These units were installed in 2010, and located in a mechanical closet in the hall near the kitchen. Heated supply air is distributed from the furnace through ductwork concealed in soffits in the maintenance garage ceiling, and return air is ducted direct to the furnace through a grille in the mechanical closet. The heating for each unit is controlled by a single Honeywell non-programmable dial thermostat. During the cooling season, it appears each of the tenants use personal window air conditioning units.

The tenant in the unit investigated (805 W Washington) had removed the window unit for the winter, whereas the other tenant (807) leaves the unit in the south facing living area window year round. This could represent an area of significant heat loss for the tenant, as the slider type windows do not accommodate through-window air conditioning units particularly well.

Ventilation for the units is supplied by both natural ventilation in window openings and a ceiling exhaust fan in each bathroom. The bathroom exhaust fan appears to require maintenance to better remove contaminated air. Furthermore, the exhaust fan appears to be ducted directly to the attic, and may not be ventilated to the outside. This can create or exaggerate (already existing) moisture problems in the attic.

Additionally, the kitchen has a ductless range hood fan that circulates air with a manual switch.

The domestic hot water for each unit is supplied by a dedicated tank-style, gas-fired, water heater located in a separate mechanical closet. The unit (805) inspected during the site visit contained a Lochinvar, 40 gallon tank with a 34 kBtu/h rating, installed in 2010. This unit is at or near the end of its useful life.

5.7 Lighting

This section describes this property's interior and exterior lighting.

5.7.1 Interior Lighting

Interior Lighting in each of the typical residential units consists of the following fixture types:

Kitchen/Living/Bedroom/Bath/Hall

- Standard socket (A lamp) 2 lamp 60-75W Incandescent Surface Mount - (5)

- Standard socket (A lamp) 2 lamp (60-75W) Clg Fan – (1)
- Standard socket (A lamp) 1 lamp (60-75W) Range Hood – (1)

Additional plug load fixtures housing 60-75W incandescents were observed at the unit (805) investigated. The incandescent lamps observed in the subject unit are considered substandard efficiency lamps. There are higher efficiency alternatives available.

5.7.2 [Exterior Lighting](#)

Exterior lighting for the West Washington apartments consists of the following for single building:

- 50W High Intensity Discharge (HID) wall-mounted porch light (2 total)
- 150W HID wall-mounted security light (1 total)
- 14W LED wall-mounted porch lights (3 total)

HID technology is considered standard efficiency and can be upgraded. Some of the exterior lighting appears to be updated to LED lighting and operating by photo-sensors. The remaining lighting should be replaced with LED lighting.

There are two (2) overhead ceiling mounted fixtures in the maintenance garage, providing storage and work area lighting. These fixtures are estimated to house 75W incandescent lamps (2 total). This technology can be replaced with more efficient alternatives.

5.8 Other Equipment (Energy)

Typical apartment unit kitchens include a refrigerator, microwave and range hood for the natural gas-fired stove. Equipment is generally considered standard efficiency equipment. The range hood appears to only circulate air, and is not vented to the outside.

Each apartment unit also supplies an electric hook up (vent, water, and electricity) for a washer and dryer near the north entrance. Typical washers and dryers observed during field investigations were standard or substandard efficiency units.

Based on energy profiles and conversations with tenants, electric resistance space heaters may be in use at this location. Electrical consumption increases the energy use and costs of a facility, and the supplemental heat can decrease the efficiency and performance of the central heating system. Furthermore, personal heaters can increase the risk of fire and potential injury, and should be discouraged.

5.9 Water Consuming Devices

Each typical apartment unit has devices in the kitchen and bath that consume water. Typical apartment unit kitchens appear to have a standard double sink with standard efficiency aerators. Each apartment appears to have one bathroom, each with a lavatory and toilet. Each bath has a shower/tub. It appears most units have standard efficiency flow devices installed in each of the bathrooms, including showerheads and faucet aerators (2.5 gpm showerhead, 2.0-2.2 gpm faucet aerator). Toilets appear to be 3.5 gpf units.

5.10 Improvements since Previous Audits (2009)

The audit team believes the following equipment replacements/upgrades have taken place since the previous energy/water audits were conducted in 2009:

- New (standard efficiency) furnace installed
- New (standard efficiency) hot water tank installed
- New double pane vinyl windows replaced at two openings on north side

6.0 Energy Use Analysis

This section provides information on energy delivery to the subject property.

Energy use and cost indices for each fuel or demand type, and their combined total, have been developed using generally accepted industry methods and benchmarking tools provided by the Department of Housing and Urban Development (HUD). The Energy Utilization Index (EUI) and cost index of the subject building are compared (benchmarked) with the EUI and cost index of similar buildings evaluated in the HUD Residential Energy Benchmark Tool.

AKT Peerless was not provided with all of the utility bills for this analysis, and this portion has been estimated. The following figures summarize the most recent annual energy consumption and costs for this property. These graphs reflect West Washington’s estimated annual utility consumption and cost.

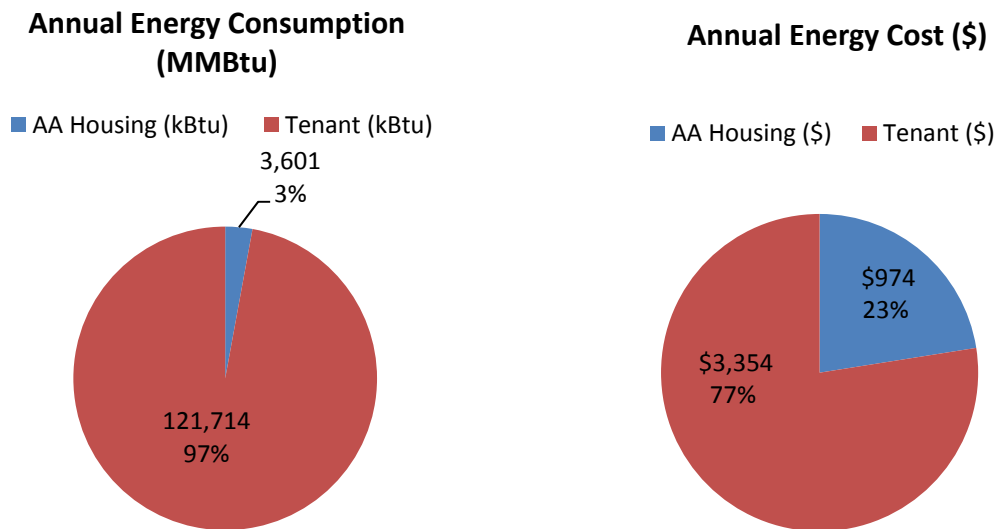


Figure 3. Historical Annual Energy Consumption and Cost

*Estimate. Please refer to Section 3.3 Energy Calculations Methodology.

6.1 Electricity

Electricity is supplied and delivered to the subject property by DTE Energy. Historic common area and tenant electrical uses compared to cooling degree days is summarized in the following figure:

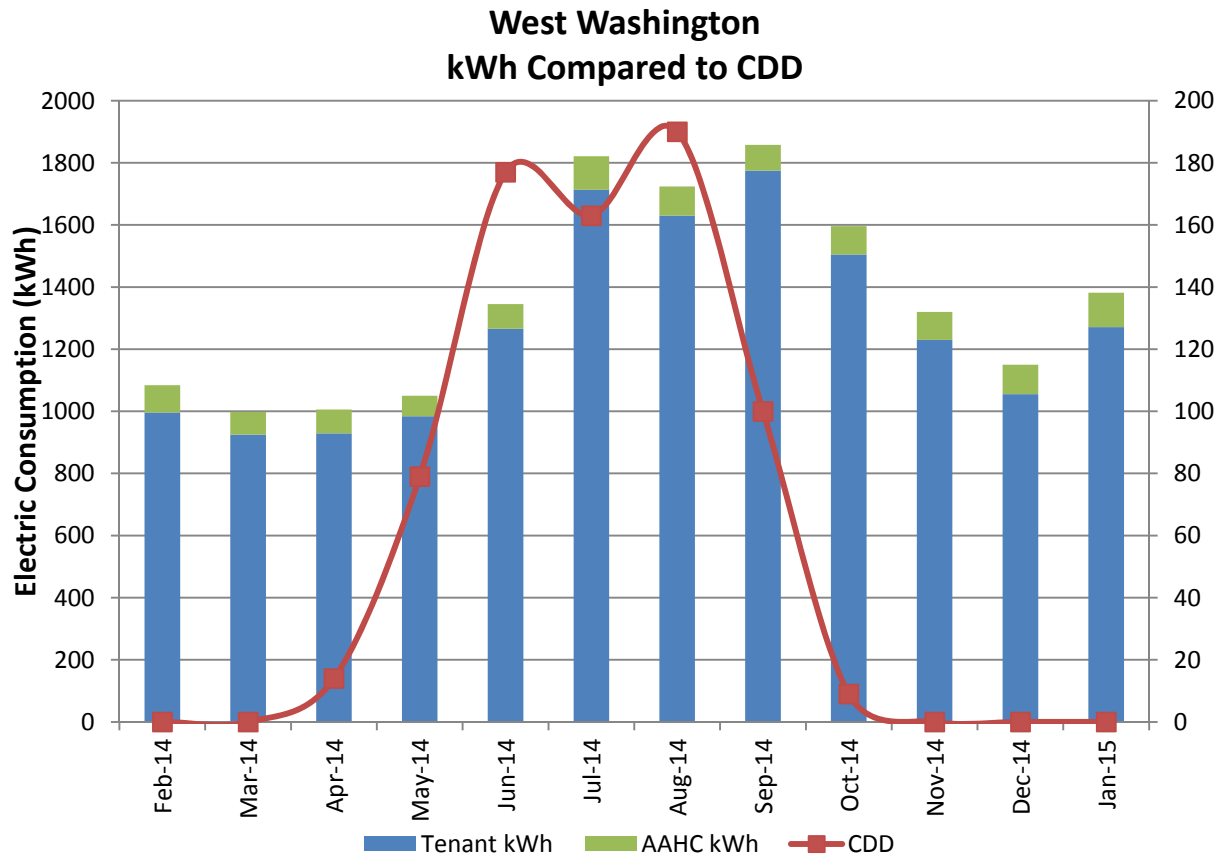


Figure 4. Electricity Consumption Graph

Table 8. Annual Electricity Metrics

	Owner	Tenant
Consumption	1,055 kWh	15,279 kWh
Energy Use Intensity	1.00 kWh / sf	14.46 kWh / sf
MMBtu	4 MMBtu	52 MMBtu

	Owner	Tenant
Cost per kWh	\$0.227 / kWh	\$0.147 / kWh
Cost per ft²	\$0.23 / sf	\$2.13 / sf
Electricity Cost	\$240	\$2,247

Based on the method described in Section 3.3, Energy Calculations Methodology, the following figure shows the estimated electricity consumption per end use.

Electrical End-Use Breakdown

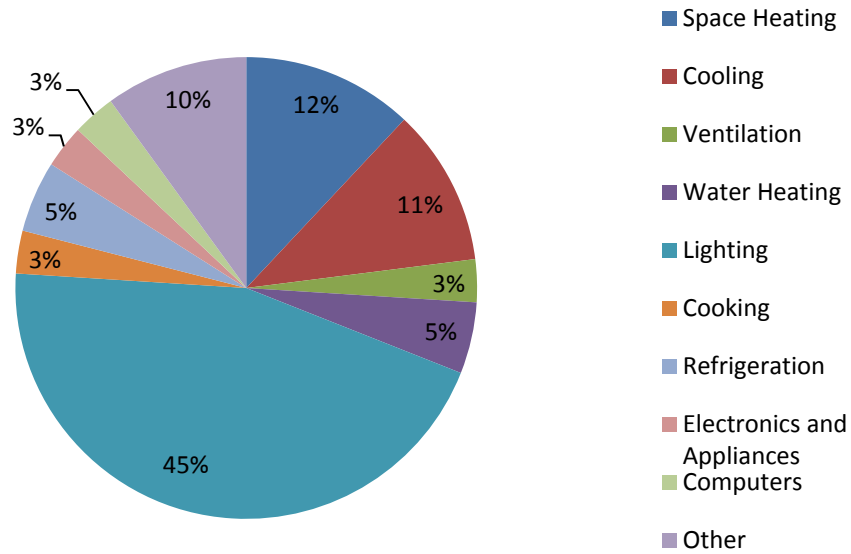


Figure 5. Estimated Electricity Consumption Per End Use (Tenant)

6.2 Natural Gas

Natural gas is supplied and delivered to the subject property by DTE Energy. Historic natural gas use is summarized in the following figure:

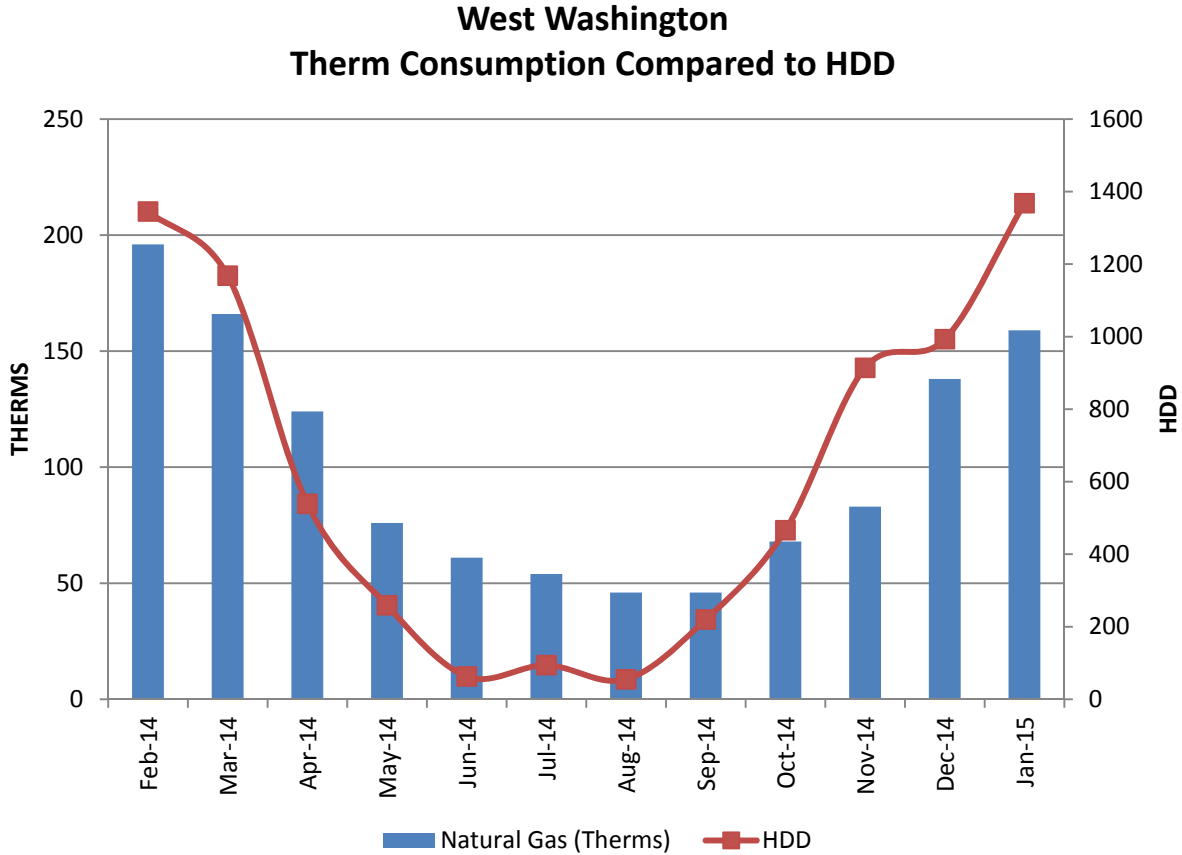


Figure 6. Natural Gas Consumption Graph

Table 9. Annual Natural Gas Metrics

	Tenant
Consumption	1,217 therms
Energy Use Intensity	1.15 therms / ft ²
MMBtu	122 MMBtu

	Tenant
Cost per therm	\$0.91 / therm
Cost per ft²	\$1.05 / ft ²
Natural Gas Cost	\$1,107

Based on the method described in Section 3.3, Energy Calculations Methodology, the following figure shows the estimated Natural Gas consumption breakdown by end use.

Natural Gas End-Use Breakdown

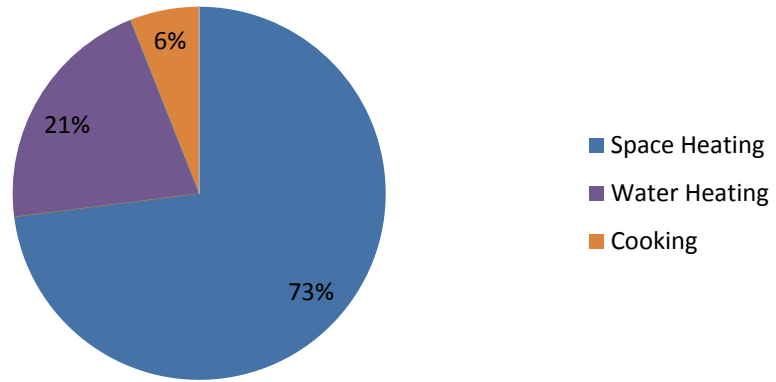


Figure 7. Estimated Natural Gas Consumption Per End Use

6.3 Domestic Water Use

For the time period covered by client provided records, historic domestic water use is summarized in the following figures.

Providers	Number of Meters Provided	Unit of Consumption
City of Ann Arbor	2	CCF

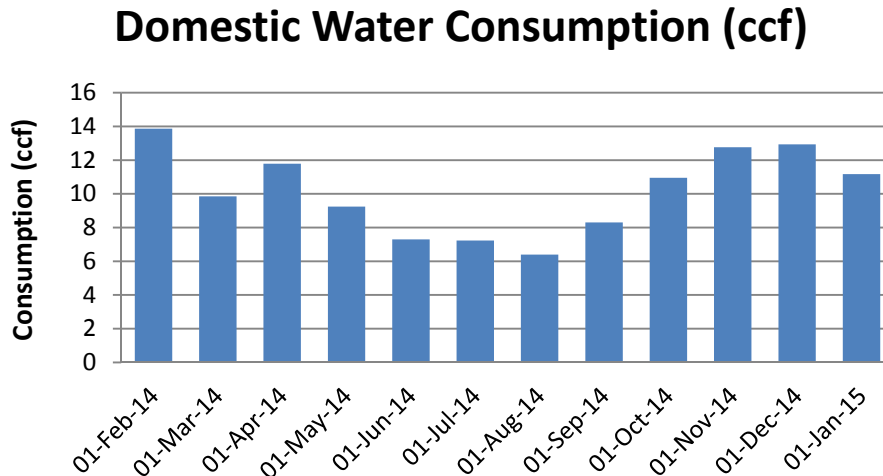


Figure 8. Domestic Water Consumption Graph (Owner)

Table 10. Annual Domestic Water Metrics

Consumption	122 CCF	Cost per ccf	\$6.03 / CCF
Water Cost	\$734	Cost per ft²	\$0.70 / ft ²

The provided annual water consumption was 122 CCF. Average cost per CCF for domestic water and sewer on an annual basis is \$6.03. Total annual domestic water and sewer cost is \$734.

According to the EPA, residential water use accounts for more than half of the publicly supplied water in the United States. For this reason, the EPA has introduced the WaterSense program to identify possible water efficiency methods and technologies for consumers throughout the country. Considering the responsibility that typically lies with the tenants, multi-family homes are no stranger to excessive water usage. Fortunately, implementation of improved technologies throughout these facilities can impact the water supply as well as the rising overhead costs associated with distribution and collection.

The HUD Energy Benchmarking Tool was used to compare water consumption data for the subject property to typical water consumption data for similar HUD properties. The tool utilizes normalized data

from its database of more than 9,100 buildings to provide comparative metrics on domestic water consumption based on a facility’s historic water data and design characteristics. Finally, a score is generated for the analyzed building to identify its ranking among similar buildings.

The Residential End Uses of Water study (REUWS) published in 1999 by the AWWA Research Foundation and the American Water Works Association is a research study that examined where water is used in single-family homes in North America. Conducted by Aquacraft, PMCL, and John Olaf Nelson, the REUWS was the largest study of its kind to be completed in North America and efforts are underway to repeat the effort and obtain updated results. The “end uses” of water include all the places where water is used in a single-family home such as toilets, showers, clothes washers, faucets, lawn watering, etc. The full REUWS final report is available to the public at no charge from the Water Research Foundation (WRF).

Figure 8 below shows the REUWS typical domestic water consumption breakdown by end use.

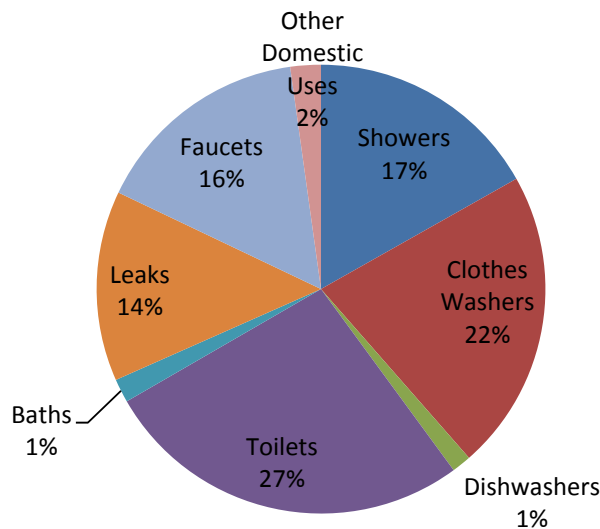


Figure 9. Domestic Water Typical End Use

6.4 Utility Cost Breakdown

The disparate energy types (electricity and natural gas for this facility) and water costs have been aggregated to provide a breakdown of total utility cost into end use components. The breakdown of energy and water cost is based on the energy use breakdown, as described in Section 3.3, Energy Calculations Methodology.

The following table and charts detail the breakdown of energy and water costs. It should be noted that the consumption percentage identified in Section 5.1 Electricity, Section 5.2 Natural Gas, and Section 5.3 Domestic Water Use and the overall cost percentage for each end use are different. This is due to the cost difference for purchasing each energy type.

Currently, Ann Arbor Housing Commission pays \$66.56 per MMBtu of electricity. It is estimated that the tenants pay \$43.09 per MMBtu of electricity and \$9.10 per MMBtu of natural gas.

Table 11. Annual Utility Use Breakdown

Categories	Electricity (MMBtu)	NG (MMBtu)	Total Consumption (MMBtu)	Consumption (%)
Space Heating	3.34	88.84	92.18	52%
Cooling	6.13	0.0	6.13	3%
Ventilation	0.56	0.0	0.56	0%
Water Heating	0.0	25.56	25.56	14%
Lighting	30.1	0.0	30.1	17%
Cooking	0.0	7.3	7.3	4%
Refrigeration	6.13	0.0	6.13	3%
Electronics and Appliances	0.56	0.0	0.56	0%
Computers	8.36	0.0	8.36	5%
Other	0.56	0.0	0.56	0%
TOTAL	55.73	121.7	177.43	100%

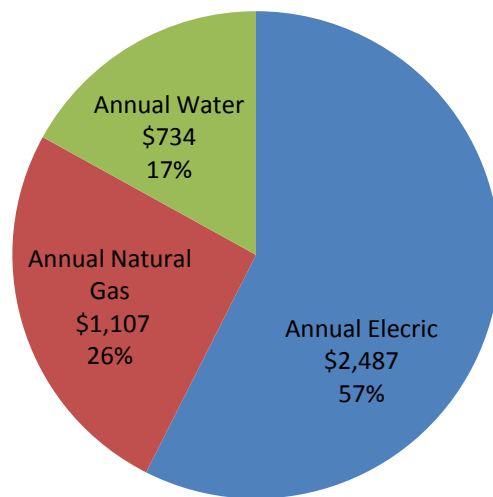


Figure 10. Annual Utility Cost by Type (Owner + Tenant)

Owner Total Annual Utility Costs (\$)

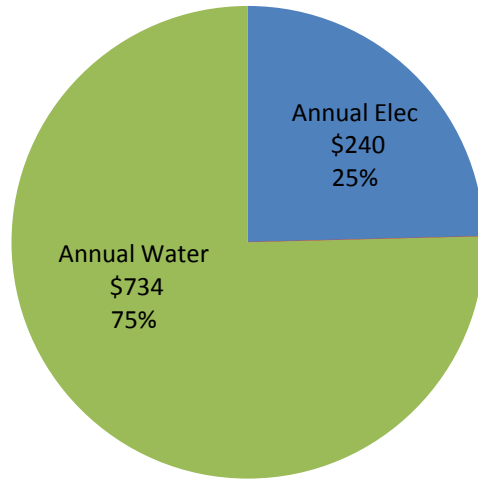


Figure 11. Annual Utility Cost by Type (Owner)



7.0 Energy Performance Benchmark

A benchmark is a standard by which something can be measured. Energy Benchmarking is the comparison of one building's energy consumption to the use of energy in a similar building. HUD's Office of Public and Indian Housing (PIH) has developed the Energy Benchmarking Tool to establish if a building's energy consumption is higher or lower than expected energy usage for similar buildings. AKT Peerless utilized the HUD Energy Benchmarking Tool to quantify the performance of the subject building relative to the family of HUD residential buildings.

This statistical analysis of the HUD tool is based on filters for the building's location, gross square footage, total number of units and year of construction (refer to the appendix for more information regarding dataset filters). This filtered data set is used to calculate the benchmarks for an overall benchmark Energy Use Intensity (EUI) as well as the Energy Cost Intensity (ECI). The benchmarks shown in the portfolio summary are derived from the statistical analysis described in this section.

The following table compares the building energy performance of the subject property and the established benchmark.

Table 12. HUD Residential Energy Use Benchmarking Tool

	Actual	Benchmark
Score Against Peers	41	50
 EUI (Energy Use Index)	83.9 kBtu/ft ²	76.6 kBtu/ft ²
 ECI (Energy Cost Index)	1.70 \$ / ft ²	1.55 \$ / ft ²

7.1 Estimated Energy Star Score

ENERGY STAR is a joint program of the U.S. Environmental Protection Agency and the U.S. Department of Energy dedicated to helping all building owners save money and protect the environment through energy efficient products and practices.

Results are already adding up. Americans, with the help of ENERGY STAR, saved enough energy in 2010 alone to avoid greenhouse gas emissions equivalent to those from 33 million cars — all while saving nearly \$18 billion on their utility bills.



Because a strategic approach to energy management can produce twice the savings — for the bottom line and the environment — as typical approaches, EPA's ENERGY STAR partnership offers a proven energy management strategy that helps in measuring current energy performance, setting goals, tracking savings, and rewarding improvements.

EPA provides an innovative energy performance rating system which businesses have already used for more than 200,000 buildings across the country. EPA also recognizes top performing buildings with the ENERGY STAR.

Energy Star certification is based on your building's performance against typical energy performance of similar buildings. A target efficiency rating of 75 is required to qualify for the Energy Star. Because the audit team does not have all the utility bills for the entire facility, and the energy performance utilized in this investigation is based on estimates generated through best practice software results, the facility at the subject property is not currently eligible for the Energy Star.

If the building owner would like to pursue Energy Star certification in the future, our audit team can work with ownership and tenants/lessees to establish an accurate benchmark and determine the necessary steps towards efficiency improvements required for the certification.

8.0 Water Performance Benchmark

Water Benchmarking is the comparison of one building's water utilization to the use of water in a similar building. HUD's Office of Public and Indian Housing (PIH) has developed the preliminary benchmarking tool to establish if a building's water utilization is higher or lower than normal usage for similar buildings.

In order to develop the water consumption benchmarking tool, water consumption data was collected through voluntary release of information from thousands of buildings in nearly 350 PHAs nationwide. Regression analyses were performed on these datasets to see which of over 30 characteristics were most closely linked to water conservation.

Your building will score from 0 - 100, where 0 means water consumption is probably excessive and 100 means that the building probably uses water very efficiently. Important: this is a whole-building tool. Water use inputs include resident-paid consumption, when applicable/available.

The table below quantifies the performance of a use-defined building relative to the family of HUD residential buildings.

Table 13. HUD Residential Water Use Benchmarking Tool

	Actual	Benchmark
Score Against Peers	51	50
WUI (Water Use Intensity)	86.2 gal/ft ²	87.8 gal/ft ²
WCI (Water Cost Intensity)	0.69 \$ / ft ²	0.71 \$ / ft ²

9.0 Operations and Maintenance (O&M) Opportunities

Operation and maintenance make up the largest portion of the economic and environmental life cycle of a building and have become primary considerations of building owners and operators. Effective O&M is one of the most cost-effective methods for ensuring reliability, safety, and energy efficiency. Inadequate maintenance of energy-using systems is a major cause of energy waste in both the Federal government and the private sector. Improvements to facility maintenance programs can often be accomplished immediately and at a relatively low cost.

The following recommendations are believed to have the opportunity to reduce energy and water consumption for the facility.

9.1 Develop a Preventative Maintenance Plan for Equipment

Planned or preventative maintenance is proactive (in contrast to reactive) and allows the maintenance manager control over when and how maintenance activities are completed. When a maintenance manager has control over facility maintenance, budgets can be established accurately, staff time can be used effectively, and the spare parts and supplies inventory can be managed more efficiently.

Regardless of which strategy is used, maintenance should be seen as a way to maximize profit and/or reduce operating costs. From this perspective, the main functions of a maintenance department/staff are as follows:

- Control availability of equipment at minimum cost
- Extend the useful life of equipment
- Keep equipment in a condition to operate as economically and energy efficiently as is practical

The maintenance department/staff would be responsible for the following tasks:

- Maintenance planning
- Organizing resources, including staffing, parts, tools, and equipment
- Developing and executing the maintenance plan
- Controlling maintenance activities
- Budgeting

At the time of the assessment, the Facilities Director indicated that a plan is currently being established for the housing authority. It is recommended this continue. Additional considerations for the future plans should include, but not be limited to:

- Energy efficiency for vacant apartments at move-out
- Tenant education
- Tenant support maintenance program
- Tenant incentives program

9.2 Institute an Energy Star Purchasing Policy

Energy costs associated with electrical plug loads should be minimized where possible. Plug loads are electrical devices plugged into the building's electrical system and generally include things like appliances and fixtures. When purchasing appliances and fixtures, the U.S. EPA ENERGY STAR standards should be specified. Manufacturers are required to meet certain energy efficiency criteria before they can label a product with the ENERGY STAR emblem, so these products represent your best energy saving value.

9.3 Utilize Setback/Programmable Thermostats

Heating requirements in residential buildings will typically depend on the comfort level of the occupants. Generally speaking, residents should try to keep the temperature at the lowest possible level while still maintaining comfort for all its occupants. Natural gas savings for this measure can be significant (5%-20%).

Recommended heating temperatures for residential buildings is in the range of 68-72°F. These temperatures apply to occupied daytime hours; a reduction to 55°F is recommended when homes are unoccupied or occupants are asleep.

Even a minor temperature setback during unoccupied building hours can produce a substantial savings. Owners should consider reviewing current heating temperatures in comparison to recommended levels with their residents. Significant energy savings can often be achieved for FREE by adjusting thermostats.

The recommended cooling temperature for residential buildings is 76°F during daytime hours. When air conditioning a building, you should try to keep the cooling temperature at the highest possible setting while still maintaining comfort.

The savings can be quite significant for this measure. For example, it can cost up to *36% more* to cool offices to 72°F rather than 76°F.

(Ideally, the air conditioning should be shut off when the building is unoccupied, but studies have shown that over half of the savings available are achieved with just a 5-degree increase. Even minor temperature increases during unoccupied hours can produce a good savings).

9.4 Water Heater Tank and Pipe Insulation

A water heater keeps water continually heated to a specific, set temperature. As the water loses heat through the tank walls during periods of non-use, the burner or heating element has to reheat the water. An insulation jacket will reduce the heat loss and, as a result, the energy required to maintain the hot water temperature and the water heater will not need to cycle as often. The insulation jacket enables the heater to bring the water up to temperature quicker, too, saving additional energy. Certain manufacturers may prohibit this on newer models. Please consult the tank manufacturer for newer models.



During periods of non-use, the heated water will rise to the top of the tank. The pipes can actually draw heat out of the tank, like a *wick*, and should be insulated. The first ten feet of hot and cold piping, if accessible, should be wrapped. If the water heating system is located in an unconditioned (cold) area, all accessible piping should be insulated.

9.5 Adequately Seal Doors and Windows

Infiltration is the flow of air through openings in a building. In order to reduce infiltration, the cracks and holes in a building must be adequately sealed. Maintaining caulking and weather stripping in good condition saves both money and energy. It also preserves the building and improves the comfort of its occupants. Verify that all doors and windows are adequately sealed. Verify that doors in existing entrance hallways are being closed to prevent unnecessary infiltration. Also, inspect the exterior of the buildings for cracks or other damage.



Seals worn at bottom of entry door

Older windows can be a major source of heat loss and air leakage, and can greatly impact the heating load on a building. A detailed engineering study is generally required to determine the best way to upgrade windows. However, be sure to consider low-e high performance glazing when window replacement becomes necessary. The additional cost will usually be paid for in energy savings in less than ten years.

A solution to infiltration from the bathroom exhaust fan involves installing a backdraft damper in the vent to restrict the flow of unwanted air into the building while still allowing the fan to properly exhaust unwanted air.

9.6 Regularly Clean Heating Equipment and Ductwork

A typical problem with multifamily properties is the presence of uneven heating within each unit. This is often attributed to the distribution system as well as the maintenance of the heating equipment. Heating systems that are not maintained can begin to collect debris in places like filters or the interior of the ductwork where it interferes with the flow of conditioned air from the furnace. This misdirected flow can cause a temperature differential between the rooms in the apartment and influence the occupants to adjust the appropriate thermostat set point.

Scheduled cleaning maintenance of the heating equipment and distribution system will not only ensure the occupant's continued comfort, but will also reduce the unnecessary energy consumption from increased temperature settings. Additionally, the proper maintenance will increase the lifetime of the equipment.

9.7 Furnace Filter Replacement for Tenants

A dirty air filter can increase energy costs and lead to early equipment failure. It is important to clean or change the air filter in your heating and cooling system regularly. Also, it's important to have the HVAC equipment checked seasonally to make sure it's operating efficiently and safely – check-ups can identify problems early. According to www.energystar.gov, dirt and neglect are the #1 causes of system failure.

The audit team recommends a program to either: A) seasonally assist tenants in inspecting and replacing filters; and/or B) modifying return air ducts to accommodate filters so that tenants can change them as required.

Maintaining clean filters can also protect and improve the indoor air quality of the tenant apartments.

10.0 Proposed Energy Conservations Measures (ECMs) and Water Conservation Measures (WCMs)

This analysis identified and included three primary types of ECM/WCMs:

- ECM/WCMs impacting the Owner (the Client) costs; and
- ECM/WCMs impacting the Tenant(s) costs; and
- ECM/WCMs to be implemented at the End of Useful Life (EUL) of equipment (includes both Owner and Tenant impacts)

The energy and water audit of the facility identified six (6) energy conservation measures (ECMs) and one (1) water conservation measure (WCM). These ECMs are estimated to provide approximately \$1,514 in annual savings. The investment required to implement all of the measures before the inclusion of applicable utility incentives is estimated to be \$5,594. These savings measures are summarized within this section. Incentives are not included in the calculation of payback times and savings calculations. Utilizing available incentives is expected to reduce project costs and decrease simple payback.

Table 14. Financial Summary of ECMs and WCMs (Insert ECMs)

Energy Cost Reduction Measure (ECM)	ID	Additional First Cost	Annual Savings	Simple Payback (yrs)
Install Low-Flow Showerheads, Faucet Aerators and Toilets	WCM1	\$520	\$246	2.1
Exterior Lighting Retrofit	ECM1	\$522	\$204	2.6
Interior Lighting Retrofit	ECM2	\$187	\$475	0.4
Install Programmable Thermostats	ECM3	\$200	\$76	2.6
Control Air Leakage	ECM4	\$1,200	\$101	11.9
Increase Attic Insulation to R-49	ECM5	\$1,155	\$80	14.4
Install High Efficiency AC Units	ECM6	\$1,810	\$332	5.4
Total		\$5,594	\$1,514	3.7

Table 15. Summary of Energy Savings for ECMs and WCMs (Insert New Info)

ECM Description	kWh Annual Savings (kWh)	Therm Annual Savings (Therms)	Water Annual Savings (gallons)	GHG Reduction (Metric Tonnes)
Install Low-Flow Showerheads, Faucet Aerators and Toilets	0	45	25,432	0.24
Exterior Lighting Retrofit	899	0	0	0.67
Interior Lighting Retrofit	3,227	0	0	2.39
Install Programmable Thermostats	0	83	0	0.44
Control Air Leakage	0	111	0	0.59
Increase Attic Insulation to R-49	0	88	0	0.47
Install High Efficiency AC Units	2,260	0	0	1.67
Totals	6,386	327	25,432	6.46

Table 16. Measures for Consideration at the End of Useful Life (EUL) of Equipment

Energy Cost Reduction Measure (ECM)	ID	Additional First Cost	Annual Savings	Simple Payback (yrs)
Replace Refrigerators with Energy Star Models	EUL1	\$50	\$8	6.0
Replace Old Hot Water Heaters	EUL2	\$225	\$30	7.5
Install Energy Star Windows	EUL3	\$247	\$67	3.7
Install High Efficiency Furnaces	EUL4	\$1,100	\$97	11.3

10.1 WCM1 - Install Low-Flow Fixtures at Bathrooms

Summary					
Cost to Implement	Estimated Annual Cost Savings	Simple Payback (years)	Natural Gas Savings (therms)	Water Savings (gal/yr)	GHG Reduction (Metric Tonnes)
\$520	\$246	2.1	45	25,432	0.24

Recommendation Description

In some areas, water and sewer rates have increased dramatically over the past few years and are rivaling the cost of energy. Reducing water use through conservation strategies can generate significant cost savings. These strategies include implementing low flow shower heads and faucet aerators.



Existing toilet @ 805

WaterSense, a program sponsored by the U.S. Environmental Protection Agency (EPA), is helping consumers identify high performance water-efficient toilets that can reduce water use in the home and help preserve the nation's water resources.

It is recommended to install a low-flow faucet aerator (0.5 GPM) in each bathroom on the entire campus. Additionally, it is recommended to replace every showerhead with a low-flow showerhead (1.5 GPM).

Toilets

Significant advances in technology over the past decade have resulted in the availability of reliable, high-quality water-saving toilets on the market. Older toilets (pre-1994) typically have a flush volume of 3.5 gallons per flush (GPF) or greater. The current standard for new toilets is 1.6 GPF.

It is recommended that all older toilets (3.5 GPF / pre-1994) be replaced with new toilets meeting the 1.6 GPF (at minimum) or (recommended) replace with a toilet certified with the WaterSense label. Such toilets use 20 percent less water than the current federal standard, while still providing equal or superior performance. WaterSense, a program sponsored by the U.S. Environmental Protection Agency (EPA), is helping consumers identify high performance water-efficient toilets that can reduce water use in the home and help preserve the nation's water resources.

Assumptions

Calculation of savings is based on replacing two (2) showerheads currently using 2.5 GPM with a new showerhead using 1.5 GPM. A value of 8 min of shower use per occupant per day (from the REUWS survey referenced in Section 5.3) was used, assuming four occupants or greater in each house.

Lavatory water savings calculation were based on replacing two (2) faucet aerators using 2.0-2.2 GPM with a low-flow faucet aerator (>0.5 or equal up to 1 GPM) in each of the residential unit bathrooms.

Toilet water savings is based on replacing two (2) toilets using 3.5 GPF with new toilets using 1.6 GPF (1.28 recommended). A value of 4 flushes per occupant per day (from the REUWS survey referenced in Section 5.3) was used. In total, the analysis of replacing showerheads, faucet aerators and toilets produced a water savings of greater than or equal to 12,716 gallons per household annually (2 total households).

Incentives

Currently, DTE Energy's Multifamily Program is offering direct install incentives on low-flow showerheads and faucet aerators; however, the program does not offer incentives on water efficient toilets. The required application for this program is included in the appendix of this report.

Expected Useful Life Study

Faucet aerators and showerheads have an expected useful life of ten years and toilets have an expected useful life of 20 years. It is believed that faucets and showerheads were installed approximately 10 years and are need of replacement.

10.2 ECM1 - Exterior Lighting Retrofit

Summary					
Cost to Implement	Estimated Annual Cost Savings	Simple Payback (years)	Electricity Savings (kWh)	Natural Gas Savings (therms)	GHG Reduction (Metric Tonnes)
\$522	\$204	2.6	899	0	0.67

Recommendation Description

Exterior lighting on the building façade and around the building is outdated. Significantly more efficient lighting options exist. Therefore, it is recommended that exterior lighting be retrofitted with more efficient lighting. Specifically, light emitting diode (LED) lighting.

Along with significant electrical savings at equivalent lumen output, maintenance will be greatly reduced as the LED lights proposed have an L70 lifespan of 100,000 hours. L70 is an industry standard to express the useful lifespan of an LED. It indicates the number of hours before light output drops to 70% of initial output. Maintenance reduction is not factored into the savings calculated for this report. LED lighting is considered a green technology due to the high fixture efficacy and the absence of mercury, arsenic, and ultraviolet (UV) light.



50W HPS lighting

The initial cost of this project is the material cost for five (5) of the subject exterior wall packs. Two (2) overhead fixtures found in the garage were not included in this study as hours of operation were difficult to estimate. Again, the additional savings associated with reduced maintenance costs are not included in the calculated savings.

Assumptions

It is assumed that all the lighting is used at night and is property owned.

Installation of new LED wall packs would be performed by in-house maintenance staff at no additional labor cost.

It is assumed that the proposed fixtures will provide adequate light level for safety and security purposes. The lighting calculator spreadsheet result is included in the appendix.

Calculations

This ECM analysis was based on replacing the existing wall pack fixtures with model #WPLED5, or **equivalent**, 5 watt high performance LED wall packs. Specification sheets for the analyzed models are included in the appendix.

$$\text{Energy Cost Savings} = \text{Energy Consumption Savings} \times \text{Energy Cost per kWh}$$

Where:

$$\begin{aligned} \text{Energy Consumption Savings} &= \text{Existing Usage} - \text{Proposed Usage} \\ \text{Usage} &= \sum (\# \text{ of fixtures} \times \text{watts per fixture} \times \text{burn hours}) \end{aligned}$$

Incentives

DTE Energy's Multifamily Program is offering incentives for replacing existing HID exterior lighting with LED lighting. Existing lighting must operate more than 3,833 hours per year and replacement must result in at least a 40% power reduction. The application and detailed specifications for this incentive are included in the appendix of this report.

Expected Useful Life Study

Lamps in the exterior light fixtures were installed in 2008 and have an expected useful life of six years. It is believed that the lamps will need to be replaced next year. The expected useful life of an LED replacement fixture is typically around 15 years.

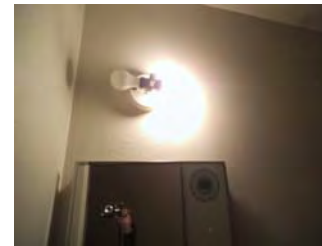
10.3 ECM2 - Replace Incandescent Lamps with LEDs

Summary					
Cost to Implement	Estimated Annual Cost Savings	Simple Payback (years)	Electricity Savings (kWh)	Natural Gas Savings (therms)	GHG Reduction (Metric Tonnes)
\$187	\$475	0.4	3,227	0	2.39

Recommendation Description

There are a number of lamps used in the building which should be updated. The current, outdated, incandescent lamps are inefficient and require unnecessary amounts of energy.

LED A-lamps are a good alternative to incandescent bulbs. On average, LEDs use eighty percent less electricity than incandescent bulbs and have a lifetime that is 20 times longer.



2 Lamp fixtures @ Bath

It is recommended to upgrade the remaining incandescent bulbs in the home to LED A-lamps.

Assumptions

This ECM is calculated using a replacement total of 34 CFLs (17 CFLs per household). Lamps are assumed to operate approximately 4 hours per day each. It is assumed all of the existing lamps are 60, 65, or 75 watt incandescent, and they will be replaced with 8 watt LEDs.

A lighting survey of the property was conducted by AKT Peerless during the walk-through. A table of existing and proposed lighting can be found in the appendix.

Calculations

$$\text{Energy Cost Savings} = \text{Energy Consumption Savings} \times \text{Energy Cost per kWh}$$

Where:

$$\text{Energy Consumption Savings} = \text{Existing Usage} - \text{Proposed Usage}$$

$$\text{Usage} = \sum (\# \text{ of fixtures} \times \text{watts per fixture} \times \text{burn hours})$$

Incentives

DTE Energy's Multifamily Program is offering incentives for replacing incandescent lamps with LEDs in tenant spaces. The required application for this program is included in the appendix of this report.

Expected Useful Life Study

Incandescent lamps have an expected useful life of 1-2 years. Alternatively, LED lamps have an expected useful life of 13-15 years, depending on the amount of usage per day.

10.4 ECM3 - Install Programmable Thermostats

Summary					
Cost to Implement	Estimated Annual Cost Savings	Simple Payback (years)	Electricity Savings (kWh)	Natural Gas Savings (therms)	GHG Reduction (Metric Tonnes)
\$200	\$76	2.6	0	83	0.44

Recommendation Description

Currently, control of the furnace heat in each home is by a digital thermostat located in the living area. The thermostat observed during the site visit was a manual, Honeywell brand non-programmable thermostat.



Existing Thermostat @ 805

It is recommended that a programmable thermostat is installed to control the heat. The programmable thermostats would allow a nighttime setback to be employed, thereby saving energy on heating during overnight hours.

Because the thermostat is controlled by the resident, a “tamper-proof” type design should be considered. Tenant or resident energy education is crucial when replacing manual thermostats with temperature limiting programmable thermostats. At the time of installation, tenants and residents should be informed about why the thermostats were selected and how they operate.

At the time of the site visit the thermostat in the subject unit observed was set to approximately 75 °F. This is high, and may be due to the fact that the resident occasionally leaves windows cracked open.

Recommended temperature settings are included below:

	Heating Daytime Setting	Heating Nighttime Setback
Current Setpoints (estimated)	75-78 °F	75-78 °F
Proposed Setpoints	72 °F	67 °F

Calculations

Calculations were performed using an energy savings calculator that was developed by the U.S. EPA and U.S. DOE for estimating purposes. The calculator was modified to more closely represent the actual building heating load. Weekday and weekend typical usage pattern used an 8 hour nighttime setback of 67 degrees and a regular set-point of 72 degrees.

Assumptions

The subject energy savings calculator assumes the following:

Savings per Degree of Setback (Heating Season) = 3% based on Industry Data 2004

The baseline energy consumption for heating dedicated to the building was estimated using a combination of the consumption profiles in Section 5.2 and the auditor's judgment. Resultant consumption was 76 MMBtu for heating.

A reduction of 5 degrees (nighttime setback of 67 degrees) for an 8 hour setback every night was assumed.

Incentives

DTE Energy's Multifamily Program is offering a direct install incentive for installing programmable thermostats in the individual units. The required application for this program is included in the appendix of this report.

Expected Useful Life Study

The existing manual thermostats have an expected useful life of 15 years. These thermostats were installed in 1999 and will reach the end of their useful life in 2014. At this time, replacement of the manual thermostats with programmable thermostats, with the same expected useful life, is recommended.

10.5 ECM4 - Control Air Leakage

Summary					
Cost to Implement	Estimated Annual Cost Savings	Simple Payback (years)	Electricity Savings (kWh)	Natural Gas Savings (therms)	GHG Reduction (Metric Tonnes)
\$1,200	\$101	11.9	0	111	0.59

Recommendation Description

Air leakage through holes, gaps, cracks, penetrations, and electrical receptacles is a major source of heat loss from a dwelling unit. Controlling this air leakage through a combination of weather stripping and strategic sealing can significantly reduce the amount of heat lost to the outside, thus reducing the amount of energy needed to heat the dwelling unit. Insulation also can help reduce air leakage.

In addition to saving energy, controlling air leakage can reduce moisture problems and reduce the influx of odors and contaminated air from the basement and other units, while increasing the overall comfort of the residents.

But reducing air leakage through air-sealing techniques is more complicated than simply weather-stripping and caulking. Two important principles must be understood. First, even if a building is full of holes, air will not move through those holes unless there is a difference in pressure between indoors and outdoors. This pressure differential depends on the difference between indoor and outdoor temperatures, wind speed and direction, and mechanical ventilation. If there is no pressure differential, the air stands still and does not leak in or out. This is important because sealing a hole where there is no pressure differential will not save energy. Pressure tends to be highest on upper and lower floors and in basements. In the heating season, hot air rises and pushes on the ceiling, creating high positive pressure and eventually leaking out. When it does leak out, it is replaced by cold air coming into the lower part of a building, where the pressure is negative from all the warm air moving upward. This force is called the “stack effect.”



Bath exhaust vent connection to outside should be verified

The second important principle is that air sealing can affect air quality. Air leakage is the primary source of ventilation in many buildings. Tightening a building by reducing air leakage can endanger the health of the occupants in buildings with no mechanical ventilation. This risk is highest in buildings with significant sources of indoor air pollution, such as back drafting from gas appliances or high occupancy levels. If a building does not have mechanical ventilation, it is recommended that a ventilation system be installed before air leakage is significantly reduced.

For the subject property, W. Washington: (see Section 5.5.5 and 5.5.6 for details)

The blower door test determined that air leakage is adequate for ventilation, but excessive. **It is highly recommended that air sealing is performed at this property.**

The blower door airflow rate was estimated at 1,550 CFM50.
 The building tightness limit (BTL) is 501 CFM50.
 Therefore, an air leakage reduction limit of 68% should not be exceeded.

Air Sealing Strategy:

Air seal the home to the minimum ventilation rate (MVR) for air leakage, but **not** below. During the blower test of one representative sample unit, the air leakage was identified to be in the following areas:

1) Window areas are cause of drafts. All interior window casing should be sealed with caulk (outside of the casing to the wall, inside of the casing to the jamb extensions, and the jamb extensions to the window frame). Products such as Dap’s Seal & Peel (removable weather-strip caulk provides a watertight and weatherproof seal to temporarily seal out drafts and save energy / peels away when removal is desired / won't damage painted surfaces) can be used to air seal the leaks between the slider units and window frame. The tested unit had weather stripping at the entry doors (complete jambs and new threshold sweep), but all units should be checked for the same.



Air pathways at switch cover

2) Floor to wall joints have air leakage. Base molding and shoe molding should be caulked complete at floor and wall.

3) Wall penetrations have air leakage. Plumbing pipes under sinks, electrical outlets, and other wall and ceiling penetrations should be sealed.

4) Air seal the attic as necessary. This would include ceiling and top plate penetrations (electrical and plumbing vent stack); also, the perimeter furring cavity is likely to have significant air leakage.

5) There may be significant leakage present in the ducts in these units. Please refer to Section 11 – ECM10 – Duct Blaster Test and Duct Sealing

Assumptions

Air sealing would cost approximately \$600 per unit (\$1,200 total for the facility) to achieve 50% of the targeted 68% reduction in air leakage (the remainder to be targeted through additional measures – see ECM10 - Duct Blaster Test and Duct Sealing). This is difficult to predict, and it is highly recommended to air seal a sample unit while conducting periodic “post” blower door tests to track air sealing progress and verify scope of work. This method should result in a scope of work that will provide a predictable reduction in air leakage.

Calculations

See Section 5.5.5 and 5.5.6 for details.

The sensible heat loss due to excess air leakage was estimated based on a 34% reduction of existing air leakage (31 CFM). This preserves the MVR detailed in the recommended description above. Equation used for estimation was: $Q = 1.08 * (31 \text{ cfm}) * (6,818 \text{ HDD}) * 24 \text{ hr/day} = 5,550,358 \text{ Btu}$ (approx. 55

therms) per unit.

Incentives

DTE Energy's Multifamily Program is not offering incentives for air sealing at the present time.

Expected Useful Life Study

Depending on the applied location, the life expectancy of caulks and sealants can be in the range of five to ten years. It is believed that the areas identified with air leakage have either never been sealed in the past or need to be resealed.

10.6 ECM5 - Increase Attic Insulation to R-49

Summary					
Cost to Implement	Estimated Annual Cost Savings	Simple Payback (years)	Electricity Savings (kWh)	Natural Gas Savings (therms)	GHG Reduction (Metric Tonnes)
\$1,155	\$80	14.4	0	88	0.47

Recommendation Description

Attic insulation reduces the amount of heat that flows from a dwelling unit through the attic to the cold outside air. By reducing this heat loss, attic insulation reduces the amount of energy needed to heat the dwelling unit in the winter. In the summer, attic insulation saves on cooling costs and keeps buildings more comfortable by reducing the conduction of heat from the hot attic through the ceiling and into the unit.



Existing attic @ 805

A material’s resistance to heat flow is measured in units of “R-value”. The higher the R-value, the better the insulating property. The R-value of insulation depends on the type of insulation and its thickness. Optimal R-value for attic insulation depends on the existing insulation, fuel costs, and climate.

The attic inspected contains approximately 3.5” fiberglass batts with an additional 1-5” of blown fiberglass insulation on top of the attic floor for a maximum estimated R-value of 19. The insulation is displaced in several locations, and this uneven distribution of insulation results in a lower effective insulation value in the attic. Overall, this insulation would be considered substandard efficiency (<R-21).

This ECM explored adding an additional insulation level of R-30 or better, bringing the total to R-49, which is the target Energy Star recommended insulation level for retrofitting wood-framed buildings in this climate zone.

If the attic insulation is increased at some point in the future, be sure to do any required air sealing first.



Also, rafter vents (insulation baffles) will likely be required to achieve the desired insulation depth near the eaves. The following is from the Energy Star website regarding rafter vents:

To completely cover your attic floor with insulation out to the eaves you need to install rafter vents (also called insulation baffles). Complete coverage of the attic floor along with sealing air leaks will ensure you get the best performance from your insulation. Rafter vents ensure the soffit vents are clear and there is a channel for outside air to move into the attic at the soffits and out through the

gable or ridge vent. To install the rafter vents, staple them directly to the roof decking. Rafter vents

come in 4-foot lengths and 14-1/2 and 22-1/2 inch widths for different rafter spacings. Rafter vents should be placed in your attic ceiling in between the rafters at the point where your attic ceiling meets your attic floor.

Once they are in place, you can then place the batts or blankets, or blow insulation, right out to the very edge of the attic floor. Note: Blown insulation may require an additional block to prevent insulation from being blown into the soffit. A piece of rigid foam board placed on the outer edge of the top plate works very well for this

Assumptions

Assumes an estimated cost of \$1.10 per square foot (from RS Means) of approximately 6-7" of an additional blown loose -fill cellulose insulation

Calculations

The conductive heat loss due through the ceiling was estimated based comparing an effective insulation value of R-17 in the ceiling area with an R-49 ceiling area. Equation used for estimation was the standard heat loss: $Q = U * A * (6,818 \text{ HDD}) * 24 \text{ hr/day}$

Incentives

DTE Energy's Multifamily Program is not offering incentives for adding insulation to the attic at the present time.

Expected Useful Life Study

Aside from potential exposure to environmental elements, insulation, for the most part, has an expected useful life of over fifty years. Adding insulation to the existing layer should be considered when the existing insulation is still in good condition and is sufficient to fulfill code requirements.

10.7 ECM6 - Install High Efficiency AC Units

Summary					
Premium Cost*	Estimated Annual Cost Savings	Simple Payback (years)	Electricity Savings (kWh)	Natural Gas Savings (therms)	GHG Reduction (Metric Tonnes)
\$1,810	\$332	5.4	2,260	0	1.67

Recommendation Description
<p>According to the Great Lakes Adaption Assessment for Cities, the estimated number of days reaching temperatures at or above 90 degrees in Southeast Michigan will increase to 30-50 days per year due to global climate changes. With many of the Ann Arbor Housing residents being disabled or elderly, health issues often are exacerbated by the hot and humid weather. Consequently, AAHC plans on including air conditioning to all the tenant spaces.</p> <p>At the present time, only a few of the tenant units at West Washington have window air conditioners for space cooling. In cases where window air conditioners are present, the resident is responsible for those purchases and installation. Often, improper installation can cause damage to the windows and walls. Additionally, the appropriate size is not always selected; thus reducing the efficiency of the unit and increasing energy costs.</p> <p>Several options, including geothermal systems and through-the-wall units, were considered for West Washington. A geothermal system appears infeasible due to the overall costs associated with installation. Alternatively, through-the-wall units are feasible for this property; however, installation would involve framing, interior finish, and exterior finish work.</p> <p>The most cost effective and efficient option for this property is a high efficiency split system. This system consists of both an indoor and outdoor unit. The indoor unit (evaporator coil) is installed in the current forced air furnace. The unit is connected to the outdoor unit with just a few lines running through a small opening in the exterior wall. The outdoor condensing unit has a small footprint and can easily be hidden behind the surrounding landscape.</p> <p>The efficiency of an air-conditioning unit is identified by the Seasonal Energy Efficiency Ratio (SEER) rating. The SEER rating of a unit is the cooling output during a typical cooling-season divided by the total electric energy input during the same period. The higher the unit's SEER rating the more energy efficient it is. Standard efficiency through-the-wall air conditioners typically have SEER ratings at or below 10. Technological developments have produced great advances in air conditioning efficiency, with current split system SEER ratings of 18 or better.</p> <p>It is recommended that AAHC install a high efficiency split system (condensing unit and evaporator coil) in all tenant spaces.</p>
Calculations
<p>This ECM analyzes the cost savings associated with installing split systems over through-the-wall air</p>

conditioners in all of the units at West Washington. The premium cost is the difference between the cost of the high efficiency item (ductless split systems) and the standard replacement item (through-the-wall room air conditioners).

Equipment and installation cost of \$2,500 for a through-the-wall air conditioner (10 SEER).

Base cost of \$2,710 for split systems

Additional labor cost of \$800 per unit for high efficiency installation. This is for the cost of installing necessary refrigerant and electrical lines.

An online Air-Conditioning Cost Calculator was used to generate all estimates used in this ECM. The result output is included in the appendix. For the purposes of this report, it was assumed that four of the tenant spaces were being considered for air-conditioning upgrades. On average, the typical number of annual cooling hours was estimated to be about 600 hours and the typical rating per unit to be approximately 1.5 tons.

Incentives

DTE Energy's Multifamily Program is not offering incentives to install high efficiency air conditioners at the present time.

Expected Useful Life Study

Room air-conditioners typically have an expected useful life of 15 years. The recommended split system also has an expected useful life of 15 years.

Manual J Calculation Results

To confirm appropriate sizing of the recommended cooling equipment, AKT Peerless performed calculations in accordance with Air Conditioning Contractors of America (ACCA) Manual J guidelines. An industry accepted software program, HVAC-Calc Residential 4.0.58c, was used to calculate the heat loss and heat gain in a unit. A detailed report of the Manual J calculations is included in the appendix of this report.

It was assumed that most of the units at West Washington were all constructed in a similar manner; therefore, the sizing of cooling systems would be the same for both units. According to the calculations, the total heat gain for a typical unit would be approximately 8 kBtu/h. It should be noted that these calculations have assumed previously recommended ECMs have already been implemented. Recommended size for the air-conditioning system should be around 1 to 1.5 ton units per tenant space.

11.0 ECMs for End of Useful Life (EUL)

The following are ECMs for which the calculated payback period exceeds the useful life of the product, when considered for immediate replacement. However, these ECMs have a viable payback period when the replacement occurs at the end of the product’s useful life (EUL), since the item would be replaced at this time in any case. In order to demonstrate the benefit of upgrading to an energy efficient product, only the premium cost for upgrading to the energy efficient product is considered in the initial investment. The premium cost is the difference between the cost of the energy efficient item and the standard replacement item.

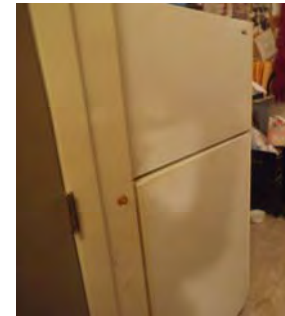
11.1 EUL1 – Replace Older Refrigerators with Energy Star Models

Summary (per refrigerator)					
Premium Cost	Estimated Annual Cost Savings	Simple Payback (years)	Electricity Savings (kWh)	Natural Gas Savings (therms)	GHG Emissions (Metric Tonnes)
\$50	\$8	6.0	57	0	0.04

Recommendation Description

After lighting, refrigerators are the second largest users of electricity in most households (not including households with electric heat or hot water). Older refrigerators can use up to four times more electricity than the most efficient new models available in the same size.

Replacing these inefficient units with new, more efficient refrigerators can realize substantial energy and cost savings. In many cases, it is cost-effective to replace older refrigerators before scheduled replacement because of the electricity cost savings.



Existing Refrigerator

It was believed that these 1 bedroom homes have refrigerators approximately 15 cu ft. and the units were manufactured between 1997 and 2000. The replacement model used in the ECM calculation is 15 cu ft. model that is estimated to use 343kWh per year and has an estimated cost of \$500 each. This automatic-defrost model is ENERGY STAR® qualified because it is 15 percent more efficient than federal standards require. By contrast, the average refrigerator in that size purchased before 1990 uses around 1,100 kWh, with older units using more than 1,500 kWh per year.

Assumptions

There exist a total of two (2) refrigerators that were likely manufactured on or before 2000 and are approximately 15 cu ft in capacity.

Calculations

The Stanford University Appliance Calculator was used to generate all estimates used in this ECM. The calculator result output is included in the appendix.

The Appliance Calculator Project is part of the Stanford Large-Scale Energy Reductions through Sensors, Feedback & Information Technology Initiative, an Advanced Research Projects Agency for Energy research program (ARPA-e), funded by the Department of Energy <http://arpa-e.energy.gov/>

Incentives

DTE Energy's Multifamily Program is not offering incentives to install Energy Star products at the present time.

Expected Useful Life Study

The expected useful life of refrigerators is approximately fifteen years. The existing refrigerators are at or near the end of their useful life and are recommended for replacement.

11.2 EUL2 - Replace Hot Water Heaters with Energy Star Models

Summary (per water heater)					
Premium Cost	Estimated Annual Cost Savings	Simple Payback (years)	Electricity Savings (kWh)	Natural Gas Savings (therms)	GHG Reduction (Metric Tonnes)
\$225	\$30	7.5	0	33	0.18

Recommendation Description
<p>Usually, a water heater is replaced only when it fails. But if the existing water heater is at least ten years old, it is near the end of its useful life, and it may make sense to replace it before it fails. By replacing the water heater before it stops working, the HA may enjoy significant energy savings, in addition to avoiding a situation in which residents are without hot water while a new system is being selected. Replacements of old water heaters that are oversized will generally yield higher savings than if the old system is appropriately sized. In any case, if the old water heater is leaking or shows signs of heavy rust or water streaking in the combustion chamber, it should be replaced (Weingarten and Weingarten 1996).</p> <p>The energy factor (EF) indicates a water heater's overall energy efficiency based on the amount of hot water produced per unit of fuel consumed over a typical day. This includes the following:</p> <ul style="list-style-type: none"> • Recovery efficiency – how efficiently the heat from the energy source is transferred to the water • Standby losses – the percentage of heat loss per hour from the stored water compared to the heat content of the water (water heaters with storage tanks) • Cycling losses – the loss of heat as the water circulates through a water heater tank, and/or inlet and outlet pipes. <p>A new standard efficiency 40-gallon gas water heater has a current minimum Energy Factor of .59, due to inefficiencies of combustion, a central flue carrying heat away with combustion exhaust, and a continuous gas pilot light, as well as standby losses through insulation and thermo-siphoning.</p> <p>This ECM recommends Energy Star qualified gas water heaters (Energy Factor of .67 or greater). This represents a 14% percent savings compared to a standard efficiency gas water heater. In addition to reducing standby losses with added insulation and anti-thermo-siphon device (heat traps), these improved efficiencies can be achieved for very little added cost by using electronic ignition instead of a pilot light, having automatic draft dampers, and reducing losses out the flue by recovering more of the heat first.</p> <p>Energy Star Qualifying Models: Residential High-Efficiency Gas Storage Water Heaters http://www.energystar.gov/index.cfm?fuseaction=find_a_product.showProductGroup&pgw_code=WGS</p> <ul style="list-style-type: none"> • Minimum Energy Factor (EF) of 0.67 as of September 1st, 2010. • Minimum First Hour Rating (FHR) of 67 gallons • Annual energy savings of 14% (Based on the National Gas Average Energy Cost and a comparison to a conventional gas water heater with an EF rating of 0.59)

Calculations

Data used in this ECM are from a cost comparison study conducted by the American Council for an Energy-Efficient Economy (ACEEE). <http://aceee.org/about>

Incentives

DTE Energy’s Multifamily Program is not offering incentives for replacing older hot water heaters with Energy Star models at this time.

Expected Useful Life Study

Tenant Unit #	Tank Size	Installed Date
Unit 805	40 gallon	1989
Unit 807	40 gallon	2010

First Hour Rating Calculation

Use	Avg. Gal. of Hot Water Use		Times used during 1 hour		Gallons used in 1 hour
Shower (8 minutes avg.)	10	x	# of tenants	=	10
Shaving (.05 gpm)	2	x	1	=	2
Hand Dishwashing or Food prep (2 gpm)	4	x	1	=	4
Clothes Washer (one load)	7	x	1	=	7
Total Peak Hour Demand				=	23

Depending on the anticipated number of tenants in a unit, the recommended size for replacement hot water heaters is 30 gallon tanks. Some of the existing tank sizes in units are adequate for standard replacements; however, it is recommended that any existing 40 gallon tanks be replaced with 30 gallon tanks at the end of their useful life.

11.3 EUL3 - Install Energy Star Windows

Summary					
Premium Cost	Estimated Annual Cost Savings	Simple Payback (years)	Electricity Savings (kWh)	Natural Gas Savings (therms)	GHG Reduction (Metric Tonnes)
\$247	\$66	3.7	0	72	0.38

Recommendation Description

Windows play a major role in the energy use and comfort of a dwelling unit. In the winter, heat in a room is lost when cold outside air infiltrates into the dwelling unit around the edges of the window. Heat can also be lost by conduction directly through the pane, even if the window fits tightly. The cold drafts and the chilly window pane make the room uncomfortable. But windows can also help to heat a room, by letting the sun's rays enter. Solar radiation is beneficial in the winter but can be a major source of discomfort in hot summer climates.

It is recommended that the remaining older, single pane existing tenant windows be replaced with Energy Star rated windows to reduce the energy consumption caused by overheating. Replacing poor-quality windows can save 10% to 20% on energy consumption for heating.

It is important to choose a window that is right for the particular climate. In most climates, the best energy buy for residential windows is a medium-performance window, such as a gas-filled, double-pane window with low-emissivity glazing and a wood or vinyl frame. This type of window is typically about 5% to 15% more expensive than plain double-pane windows (E Source 1995). Higher-performance windows may be cost-effective in areas with severe winter climates and expensive heating fuel. In climates with mild winters and hot summers, a window with a reflective or selective coating should be specified.

ENERGY STAR® Qualification Criteria for Residential Windows, Doors, and Skylights

Windows				Doors		
Climate Zone	U-Factor ¹	SHGC ²		Glazing Level	U-Factor ¹	SHGC ²
Northern	≤ 0.30	Any	Prescriptive	Opaque	≤ 0.21	No Rating
	≤ 0.31	≥ 0.35	Equivalent Energy Performance	≤ ½-Lite	≤ 0.27	≤ 0.30
	≤ 0.32	≥ 0.40		> ½-Lite	≤ 0.32	≤ 0.30
North-Central	≤ 0.32	≤ 0.40				
South-Central	≤ 0.35	≤ 0.30				
Southern	≤ 0.60	≤ 0.27				

Skylights		
Climate Zone	U-Factor ¹	SHGC ²
Northern	≤ 0.55	Any
North-Central	≤ 0.55	≤ 0.40
South-Central	≤ 0.57	≤ 0.30
Southern	≤ 0.70	≤ 0.30

¹ Btu/h-ft²·F

² Fraction of incident solar radiation

Source:

http://www.energystar.gov/ia/partners/prod_development/archives/downloads/windows_doors/Windows_Doors_and_Skylights_Program_Requirements.pdf?8c9b-add8

Assumptions

It is estimated that the entire campus has approximately 83 ft² of window eligible for this ECM.

Calculations

A spreadsheet showing energy savings is provided in the appendix of this report.

Incentives

DTE Energy's Multifamily Program is not offering incentives for installing Energy Star rate windows at this time.

Expected Useful Life Study

Windows have an expected useful life of 30 years. A portion of the windows have recently been upgraded. The remaining windows are believed to be at or near their expected useful life and are in need of replacement.

11.4 EUL4 - Install High Efficiency Furnaces

Summary					
Premium Cost to Upgrade	Estimated Annual Cost Savings	Simple Payback (years)	Electricity Savings (kWh)	Natural Gas Savings (therms)	GHG Reduction (Metric Tonnes)
\$1,100	\$97	11.3	0	107	0.57

Recommendation Description

Replacing the old heating plant in a building can generate considerable savings if the existing equipment is inefficient and/or the fuel source is expensive compared to other options. A furnace near the end of its useful life is a particularly good candidate for replacement with high-efficiency equipment. Unfortunately, this opportunity was missed by the AAHC when both of the furnaces were recently replaced with standard efficiency (80%) units in 2011.

Because of technology advances, new furnaces are much more efficient than they used to be, presenting opportunities for significant savings on heating costs. Existing furnaces have a designed efficiency of 80-81%. Replacement units are available with efficiencies of up to 95%. Significant energy savings can be realized with the installation of more efficient units. This ECM is calculated for replacing both (2) furnaces (80% AFUE) with high efficiency furnaces, (92% AFUE) at the end of useful life.

Calculations

Natural gas consumption of existing furnaces is approximately equal to 73% of total consumption (888 therms for furnace heating). Efficiency gain from 80% to 92% with high efficiency units.

Base cost of \$1,900 for standard efficiency furnaces (80% AFUE).

Base cost of \$2,600 for high efficiency furnaces (92% AFUE).

Additional labor cost of \$200 per furnace for high efficiency installation. This is for the cost of installing necessary PVC venting runs through the exterior wall.

Calculations

A spreadsheet showing energy savings is provided in the appendix of this report.

Incentives

The Detroit HVAC Incentives offers up to \$300 in incentives for a replacement of natural gas furnaces. An implementation of this incentive with the ECM would aggregate savings with labor and the new furnace to \$300 for a natural gas furnace of 94% or higher efficiency. Refer to table in appendix for further details. A retrofit of 8 new furnaces on the property amounts to a potential of \$2,400 in incentives.

Additional Federal Tax Credits are available for replacing furnaces where up to 30% of the installed cost or \$1,500 for all systems in each unit retrofit, whichever is less, can be reimbursed at the end of the

year.

Expected Useful Life Study

Furnaces have an expected useful life of 20 years. The existing units were installed at different dates. The following lists the furnaces per tenant unit and their installed date:

Tenant Unit #	Installed Date
Unit 805,807	2011

Manual J Calculation Results

To confirm appropriate sizing of the recommended heating equipment, AKT Peerless performed calculations in accordance with Air Conditioning Contractors of America (ACCA) Manual J guidelines. An industry accepted software program, HVAC-Calc Residential 4.0.58c, was used to calculate the heat loss and heat gain in a unit. A detailed report of the Manual J calculations is included in the appendix of this report.

It was assumed that both of the units at West Washington were all constructed in a similar manner; therefore, the sizing of heating systems would be identical for both units. Overall values for the heat loss within the software are often increased by a factor of 15% to 25% to account for averages used in the winter design temperatures. According to the calculations, the total heat loss for a typical unit would be approximately 23 kBtu/h. It should be noted that these calculations have assumed previously recommended ECMs have already been implemented. Because high-efficiency furnaces are not typically manufactured with a rating below 40kBtu/h, it is recommended that the furnaces be replaced with units with an input capacity of 40kBtu/h.

12.0 Advanced ECMs and/or ECMs Recommended for Further Evaluation

The following capital intensive measures may be feasible but would require an additional, detailed engineering analysis of the entire facility.

12.1 FE1 – Add Wall Insulation incl. Continuous @ Perimeter

Recommendation Description

The purpose of wall insulation is to reduce the amount of heat that flows from a dwelling unit through the walls to the cold outside air. By reducing this heat loss, wall insulation reduces the amount of energy needed to heat the dwelling unit. Wall insulation also can save on cooling costs and reduce overheating in the summer.

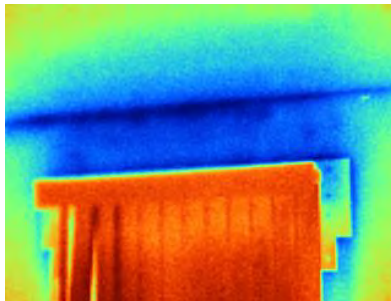
A material's resistance to heat flow is measured in units of "R-value." Higher R-values have better insulating properties. The R-value of insulation depends on the type of insulation and its thickness.

Based on the age of the property and the unknown condition of any existing wall insulation, an in-depth study would be required to establish the costs and potential savings of implementing this recommendation.

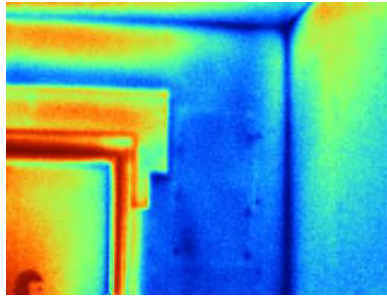
An infrared (IR) thermal imaging camera was used during the site visit to evaluate the thermal properties of a similar construction home at North Maple Estates. The findings are detailed below:



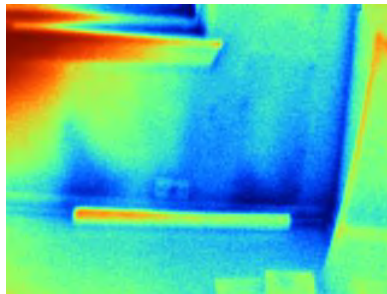
Wall insulation appears to have settled in wall cavities or was never insulated to top of stud bays.



Displays thermal bridging at headers above windows.



Displays missing insulation above door header.



Displays poorly placed insulation above baseboard.

One solution would be to use the IR camera on a colder day, and mark areas that need insulation. Those voided areas could then be then filled with dense pack cellulose.

Furthermore, the Owner should investigate the use of exterior foam insulation panels whenever these buildings undergo exterior renovation (ie, replacement of siding). Foam insulation sheathing reduces thermal bridging through structural elements like wood studs, where it serves as a thermal break. Adding insulation, either in the cavities or continuous insulation on the exterior requires further study.

Incentives

DTE Energy's Multifamily Program is not offering incentives for insulation at this time.

Expected Useful Life Study

Aside from potential exposure to environmental elements, insulation, for the most part, has an expected useful life of over fifty years. Adding insulation to the existing layer should be considered when the existing insulation is still in good condition and is sufficient to fulfill code requirements.

12.2 FE2 - Replace/Invest in Energy Star Clothes Washers

Recommendation Description

Because the Owner of the property is responsible for paying the water utility, the audit team believes an investigation into high efficiency clothes washers may be a sound investment for the Ann Arbor Housing Commission.

Typically, residents are responsible for providing their own washers and dryers. This reduces a first cost for the housing commission – however, residents appear to be installing/utilizing the cheapest functioning units available. These units are often very old, and extremely inefficient. This results in high electrical energy consumption, but even greater water consumption.



Inefficient Clothes Washer

In the past few years, the change in design and operation of the clothes washer units has allowed the consumer to reduce water usage and drying time. Typical high-efficiency washers use 27 gallons of water per load. In contrast, conventional models that were built from 1980 to the late nineties consumed between 43 and 51 gallons of water per load.

In addition to a reduction in water usage, many of the energy efficient washers will minimize the amount of hot water use by utilizing cold water as much as possible. The faster cycle on the efficient washers also minimizes the time needed to dry clothes, which overall minimizes the electrical consumption for laundry.

The existing washers at the subject property were identified to be approximately 10-20 years old. It is assumed that all tenant units are occupied; however, the typical usage of the laundry units is unknown and would require additional analysis to properly determine the savings from installing Energy Star rated washing machine units. Additionally, converting the existing washing machines to only using a cold rinse can also provide substantial savings based on tenant usage.

Because the Owner is responsible for water consumption, and water costs continue to rise, the team recommends a further life cycle investigation into funding and installing Owner-supplied (cold rinse) Energy Star units.

Incentives

DTE Energy’s Multifamily Program is not offering incentives for insulation at this time.

Expected Useful Life Study

With typical use, the average clothes washing machine has an expected useful life of 14 years. It is believed that the existing units are at or near the end of their useful life.

12.3 FE3- Upgrade Floor Insulation at First Floor in Garage Ceiling @ Remodel

Recommendation Description

Many building science experts argue that crawl spaces should be constructed as mini-basements, and should not be vented. They believe that best-practice efficient crawl space construction includes these under-floor spaces as part of the conditioned space, with a dedicated HVAC supply duct (Energy Efficient Building Association – www.eeba.org).



Unconditioned Maintenance Garage - ceiling

However, this method is often dismissed for initial cost of construction when a project is value-engineered. Instead of insulating the foundation from the exterior, builders will insulate the floor cavity between the unheated crawl space and the conditioned space, while providing open venting for natural ventilation through the crawl space (above grade) foundation wall.

A similar condition exists at the W Washington property. In this design, often fiberglass batts – R-19 or greater – are used for floor insulation. Unfaced batts avoid moisture problems in the insulation because they don’t have a vapor barrier to trap moisture coming either from the ground or indoors. These unfaced batts are often held in place with lath, stapled twine, or wire insulation supports (in this case, finished drywall). Most importantly perhaps, these batts should be installed so they touch the underside of the floor. Any gaps will allow convective loops or currents to carry away heat before the insulation can do its job.

The audit team believes the **originally installed insulation may be substantially displaced or poorly installed** in several locations in each of the subject buildings. For this reason, the audit team recommends a detailed inspection of the current condition of existing insulation, and the evaluation of replacement with properly installed insulation rated at R-30 or better. This would conform to current energy standards in Michigan, and increase the overall energy efficient performance of these facilities.

One method for consideration would be the application of a spray-foam urethane insulation, which could provide both the necessary insulation levels and an additional air infiltration barrier. This extra benefit is particularly relevant for this building, as the audit team observed significant leakage at the subject unit inspected.

An additional consideration would be to ensure that any and all ductwork located in the crawl space remained sealed, insulated and protected. For more information please see 11.3 - ECM10.

It appears work has been conducted on the ceilings recently, and upgrades may have occurred at that time. The audit team could not verify what work, if any, had been done relative to insulation levels.

Incentives

DTE Energy’s Multifamily Program is not offering incentives for insulation at this time.

Expected Useful Life Study

Aside from potential exposure to environmental elements, insulation, for the most part, has an expected useful life of over fifty years. Adding insulation to the existing layer should be considered when the existing insulation is still in good condition and is sufficient to fulfill code requirements.

12.4 FE3 - Duct Blaster Test and Duct Sealing

Recommendation Description

The HVAC ducting located in the subject unit observed (805 W Washington) displayed above average leakage. Duct leakage may be contributing to overall air infiltration levels. The project team believes 20-50% of the leakage resulting from the blower door test may be associated with unsealed, uninsulated or displaced ductwork, hidden in dropped soffits in the Maintenance Garage.

Studies indicate that duct leakage typically wastes 10% to 30% of the heating energy purchased (Kriger and Dorsi, *Residential Energy, 5th Edition*). When ducts are located in an intermediate zone, as in this unheated crawl space, some of the heating energy contained in duct leakage is reclaimed by the home. The amount reclaimed depends on how well-connected the intermediate zone is to the conditioned zones versus how well-connected it is to the outdoors.

In this case, with direct ventilation openings around the perimeter, the ducts are fairly well-connected to the outdoors. This air exchange between ducts and outdoor air wastes energy in two ways. Heated air is lost or outdoor air enters and needs to be conditioned. Duct air leakage also pressurizes and depressurizes the home, providing a driving force for air leakage. Operation of the forced-air system increases home air leakage an average of two to five times.

It is recommended that unconnected duct joints are repaired and leaky duct joints are sealed and insulated to meet or exceed current energy codes. Duct mastic used with fabric webbing is the best material for sealing ducts.

A pre and post duct blaster test is recommended to quantify the impact of a potential improvement, and verify the quality of any work performed.

It appears work has been conducted on the ceilings recently, and upgrades may have occurred at that time. The audit team could not verify what work, if any, had been done relative to ductwork – sealing or insulation.



Diagnostic testing equipment for ducts

Incentives

DTE Energy's Multifamily Program is not offering incentives for HVAC duct repairs at this time.

13.0 Feasibility Assessment of Green Energy Technologies

13.1 Photovoltaic for Electricity

Implementing photovoltaic panels for electricity at the subject property is not recommended due to high installation costs. Further study is not recommended.

13.2 Solar Thermal for Hot Water Heating

Hot water usage at the subject property is not high enough to justify initial costs of solar heating therefore the property is not a viable candidate of solar thermal for hot water heating. Further study is not recommended.

13.3 Wind Turbine

The property is not a viable candidate of installing wind turbines due to insufficient wind power in this geographic area. Further study is not recommended.

13.4 Combined Heat and Power

The property has less than 80 units (a rule of thumb for minimum number of units for feasibility) and does not have a central power source. The property is not a viable candidate of implementing combined heat and power and further study is not recommended.

13.5 Geothermal Heat Pumps

Geothermal heat pumps were originally considered by the Ann Arbor Housing Commission for this property. While the property has sufficient acreage to drill wells, the cost associated with geothermal heat pumps is not effective at this time. Further study is not recommended.

13.6 Fuel Cells

Due to the high initial costs associated with fuel cells, implementation is not recommended at the subject property. Further study is not recommended.

14.0 Recommendations & Impact

Based on the analysis described in this report, AKT Peerless believes substantial energy conservation opportunities are available, and recommends implementation of all proposed ECMs.

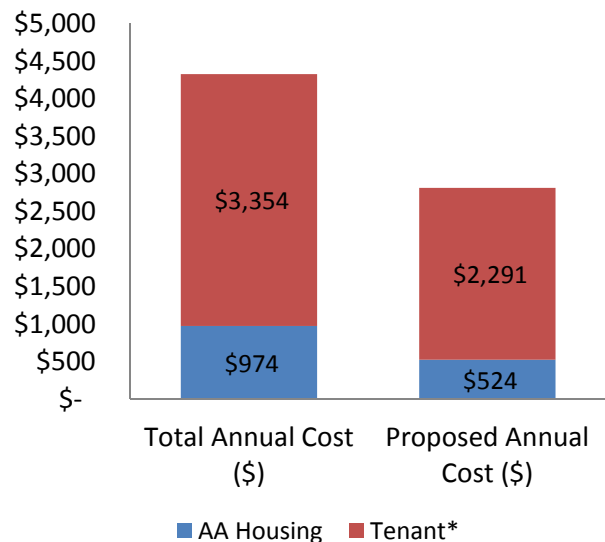
The combined annual EUI for the subject building is estimated at 83.94 kBtu per square foot per year. The annual energy cost index is an estimated \$1.70 per square foot per year. Reduction of fuel (non-electrical) and electrical energy consumption through the implementation of recommended ECMs will potentially result in a reduced EUI of 58.16 kBtu per square foot per year, a potentially reduced annual cost index of \$0.98 per square foot per year, and potential total annual energy cost savings of \$1,284 per year.

An additional result of implementing the recommended ECMs would be the reduction of greenhouse gas (GHG) emissions by 6.46 metric tonnes. Measurements of greenhouse gas emissions are based on data gathered from the United States Environmental Protection Agency (USEPA) eGRID database.

The subject building is located in eGRID electric utility sub-region RFCW. Greenhouse gas emissions from electrical consumption are based on emissions data measured at the electrical generating facilities serving consumers located in the specified eGRID utility sub-region, and therefore greenhouse gas emissions and the estimated reduction in greenhouse gas emissions reflect the mix of fuel sources used by the regional electrical utilities serving the subject property. Emissions factors for natural gas consumption are based on data gathered from the 2009 United States Greenhouse Gas Inventory, Annex 2.

Table 17. Impact Summary

% Energy Savings	31%
% Water Savings	28%
% Cost Savings	35%
Annual Cost Savings (\$)	\$1,514
% Reduction in GHG Emissions (CO ₂ Equivalent Metric Tonnes)	35%



15.0 Limitations

AKT Peerless accepts responsibility for the competent performance of its duties in executing this assignment and preparing this report in accordance with the normal standards of the profession, but disclaims any responsibility for consequential damages. Although AKT Peerless believes the results contained in herein are reliable, AKT Peerless cannot warrant or guarantee that the information provided is exhaustive, or that the information provided by the client, third parties, or the secondary information sources cited in this report is complete or accurate.

Nothing in this report constitutes a legal opinion or legal advice. For information regarding individual or organizational liability, AKT Peerless recommends consultation with independent legal counsel.

ASHRAE Procedures for Commercial Building Energy Audits recommends that the Energy Analyst apply a consistent definition of building square footage to both the subject building and to similar buildings used for energy performance comparisons. AKT Peerless cannot evaluate the accuracy or consistency of building square footage measurements of similar buildings included in the comparison database. However, in order to improve the consistency and accuracy of building measurements and comparisons within the Client's own building portfolio, a procedure for measuring the subject building square footage has been incorporated into the Basic Buildings Characteristics form provided to the Client and located in the appendix.

The Energy Analyst has not verified the accuracy of building floor area as reported by the building owner/operator and has not verified that the building owner/operator's definition of building usage is consistent with the definitions used in the CBECS.

The Energy Analyst has not evaluated the potential financial savings from changing to a different utility price structure.

Also, the Energy Analyst has not verified that the property owner/operator has reported all sources and records of energy consumed at the subject property. Potentially unreported information may include, but is not limited to, bills, meters, and types of energy consumed. Inaccurate information provided to the energy analyst and information not reported to the energy analyst may influence the findings of report. Information provided by the owner/operator of the subject building or other client representatives is summarized in the Basic Building Characteristics form located in the appendix and the utility bills and other energy invoices included in the appendix.

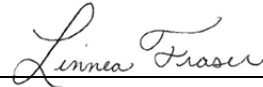
16.0 Signatures

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Appendix

NATURAL GAS UBA											
AAHCSite: West Washington											
Month	Start	End	Days	HDD	Consumption Therms	Actual (0) Estm (1)	Delivery \$	Gas \$	Total \$		
Feb-14	14-Jan-14	2/13/2014	30	1345	196	0	\$ -	\$162	\$162		
Mar-14	13-Feb-14	3/14/2014	29	1168	166	0	\$ -	\$140	\$140		
Apr-14	14-Mar-14	4/14/2014	31	539	124	0	\$ -	\$108	\$108		
May-14	14-Apr-14	5/14/2014	30	259	76	0	\$ -	\$68	\$68		
Jun-14	14-May-14	6/13/2014	30	63	61	0	\$ -	\$57	\$57		
Jul-14	13-Jun-14	7/15/2014	32	94	54	0	\$ -	\$53	\$53		
Aug-14	15-Jul-14	8/13/2014	29	55	46	0	\$ -	\$51	\$51		
Sep-14	13-Aug-14	9/12/2014	30	220	46	0	\$ -	\$51	\$51		
Oct-14	12-Sep-14	10/13/2014	31	466	68	0	\$ -	\$70	\$70		
Nov-14	13-Oct-14	11/11/2014	29	914	83	0	\$ -	\$81	\$81		
Dec-14	11-Nov-14	12/11/2014	30	993	138	0	\$ -	\$126	\$126		
Jan-15	11-Dec-14	1/15/2015	30	1368	159	0	\$ -	\$143	\$143		
				7,484	1,217					\$1,107	
										\$0.90991	
										\$/Therm	

ELECTRICAL UBA											
AAHCSite: West Washington											
Month	Start	End	Days	HDD	CDD	Actual (0) Estm (1)	Consumption kWh	Total Charges (\$)			
Feb-14	14-Jan-14	2/13/2014	30	1345	0	0	1084	\$165			
Mar-14	13-Feb-14	3/14/2014	29	1168	0	0	998	\$153			
Apr-14	14-Mar-14	4/14/2014	31	539	14	0	1006	\$154			
May-14	14-Apr-14	5/14/2014	30	259	79	0	1050	\$161			
Jun-14	14-May-14	6/13/2014	30	63	177	0	1345	\$205			
Jul-14	13-Jun-14	7/15/2014	32	94	163	0	1821	\$276			
Aug-14	15-Jul-14	8/13/2014	29	55	190	0	1724	\$263			
Sep-14	13-Aug-14	9/12/2014	30	220	100	0	1858	\$284			
Oct-14	12-Sep-14	10/13/2014	31	466	9	0	1596	\$243			
Nov-14	13-Oct-14	11/11/2014	29	914	0	0	1320	\$202			
Dec-14	11-Nov-14	12/11/2014	30	993	0	0	1150	\$178			
Jan-15	11-Dec-14	1/15/2015	30	1368	0	0	1382	\$201			
				7484	732			16,334	\$2,486.65		
										\$0.15224	
										Blended \$/kWh	

HUD Residential Energy Use Benchmarking Tool

For single-family, semi-detached, row/townhouse, multi-family walk-up, and elevator buildings.

The HUD Residential Energy Use Benchmarking Tool quantifies the performance of a user-defined building relative to the family of HUD residential buildings. A score of 75 denotes performance at the top 25th percentile of HUD residential buildings. A score of 50 denotes performance at the 50th percentile (in the middle) of HUD residential buildings. For definitions or help on the terms below, simply click on any underlined text. Click on "Return" to come back to this page.

Directions: Provide entries in ALL the grey spaces that apply for your Building Description and Annual Energy Consumption.

Building Description

Preliminary: 9/17/07

Building Name: (optional entry)

5-digit Zip Code:

Heating Degree Days:

Mapping Location:

Cooling Degree Days:

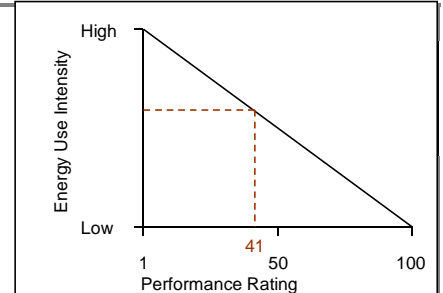
Building Description:	Gross Floor Area (ft ²)	Total Number of Units	Is This a	Is this a Multi-	Heated Floor Area (ft ²)	Year Built
			Multifamily Building with Central Laundry? (Y/N)	Family Walkup Building? (Y/N)		
	2,114	2	N	N	1,057	1969

Annual Consumption

	Electricity	Gas	#2 Fuel Oil	#4 Fuel Oil	District Steam	District Hot Water	Propane
Select Units:	kWh	Therms	Gal	Gal	kLbs	MMBtu	Gal
Energy	16,334	1,217					
Cost (\$)	2,487	1,107					
Calculated unit cost:	\$0.15 \$/kWh	\$0.91 \$/therm					

Results

	Your Building	HUD Typical
Score Against Peers	41	50
Building Site Energy Use (kBtu/year)	177,432	161,934
Site Energy Use Intensity (kBtu/ft ² -year)	83.9	76.6
Energy Cost Intensity (\$/ft ² -year)	1.70	1.55
Total Annual Energy Cost (\$/year)	3,594	3,280



HUD Residential Water Use Benchmarking Tool

For single-family, semi-detached, row/townhouse, multi-family walk-up and elevator buildings.

The HUD Residential Water Use Benchmarking Tool quantifies the performance of a user-defined building relative to the family of HUD residential buildings. A score of 75 denotes performance at the top 25th percentile of HUD residential buildings. A score of 50 denotes performance at the 50th percentile (in the middle) of HUD residential buildings. For definitions or help on the terms below, simply click on any underlined text. Click on "Return" text to come back to this page.

Directions: Provide entries in the gray spaces below with your **building description** and **annual water consumption**.

Building Description

ORNL 8/22/2007

Building Name: (optional entry)

5-digit Zip Code:

Mapping Location: **Ann Arbor, MI**

<u>Gross Floor Area of Building(s) (ft2)</u>	<u>Building(s) is Single-Family Detached or Semi-Detached? (Y/N)</u>	<u>Is Residents Water Use Paid Directly by the PHA? (Y/N)</u>	<u>Number of Units in Building(s)</u>	<u>Number of Units in Building(s) with In-Unit Laundry Hookups or Central Laundry Access?</u>	<u>How Many Buildings share this Water Meter?</u>
1,057	Y	Y	2	2	1

Annual Consumption

Building Annual Water Use: (gallons/year)

Building Annual Water Use Cost: (\$/year)

Average Annual Water Cost: **\$0.8** (\$/100 gallons)

Results

	Your Building	HUD Typical
<u>Score Against Peers</u>	51	50
Annual Water Use (gal/year)	91,106	92,807
Annual Water Use Intensity (gal/ft2-year)	86.2	87.8
Annual Water Cost Intensity (\$/ft2-year)	0.69	0.71
Total Annual Water Cost (\$/year)	734	748



Photo 1: Exterior view of the complex back



Photo 2: Exterior view of the entrance of the complex



Photo 3: Older windows in need of replacement



Photo 4: Typical washing machine in unit



Photo 5: Typical furnace in unit



Photo 6: Typical DHW storage tank in unit



Photo 7: Standard Hotpoint refrigerator



Photo 8: Gas range and oven in kitchen



Photo 9: Microwave in kitchen



Photo 10: Faucet aerator on sink faucet bathrooms



Photo 11: Standard toilet in bathroom



Photo 12: Standard showerhead in bathroom

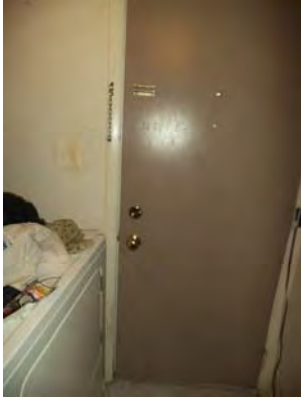


Photo 13: Entrance Door to unit



Photo 14: No weather-stripping causing leakage



Photo 15: Fiberglass blown insulation in attic



Photo 16: Roof frame in attic space



Photo 17: Mechanical storage room below units



Photo 18: Basement window in storage room

Interior Lighting

Zone / Space	Qty	Burn Hours	Existing Fixture Type	Existing Fixture	Input Watts per Fixture	Annual Consumption (kWh)	Proposed Fixture Type	Proposed Fixture	Input Watts per Fixture2	Annual Consumption (kWh)3	Demand Reduction (kW)	Retrofit Cost (\$)	Annual Energy Savings (kWh)	Annual Cost Savings (\$)	SP (yrs)
Tenant Spaces	34	1825	Incandescent	A lamp Standard Socket	60	3723	LED	8 watt LED	8	496	1.77	\$187.00	3227	\$474.52	0.4
TOTALS											1.77	\$187.00	3,227	\$474.52	0.4

Exterior Lighting

Zone / Space	Qty	Burn Hours	Existing Fixture Type	Existing Fixture	Input Watts per Fixture	Annual Consumption (kWh)	Proposed Fixture Type	Proposed Fixture	Input Watts per Fixture2	Annual Consumption (kWh)3	Retrofit Cost (\$)	Annual Energy Savings (kWh)	Annual Cost Savings (\$)	SP (yrs)
Exterior Wall packs	2	4380	MH50	50 watt HPS	65	569	MaxLite WP	MaxLITE 14w LED Wall Pack	14	123	\$311.78	447	\$65.70	4.7
Overhead Parking Garage light	1	2920	MH150	150 watt HPS	188	549	MLSWP30LED	30W LED Wall Pack	33	96	\$210.00	453	\$66.56	3.2
TOTALS											\$521.78	899	\$132.26	3.95

Tenant Unit Programmable Thermostats (2)

This energy savings calculator was developed by the U.S. EPA and U.S. DOE and is provided for estimating purposes only. Actual energy savings may vary based on use and other factors. The calculator was modified by the auditor as detailed in subject report.

Enter your own values in the gray boxes or use our default values.

<p>Number of Units <input style="width: 50px;" type="text" value="2"/></p> <p>Initial Cost for one programmable thermostat <input style="width: 50px;" type="text" value="\$51"/></p> <p>Initial Cost for one manual thermostat <input style="width: 50px;" type="text" value="\$1"/></p> <p>Unit Fuel Cost (Cooling) (\$/kWh) <input style="width: 50px;" type="text" value="\$0.147"/></p> <p>Unit Fuel Cost (Heating) (\$/Therm) <input style="width: 50px;" type="text" value="\$0.91"/></p> <p style="text-align: center; margin-top: 10px;">City</p> <p>Choose your city from the drop-down menu <input style="width: 100px;" type="text" value="MI-Detroit"/></p> <p>Heating Season*</p> <p>Typical Indoor Temperature w/o Set-Back <input style="width: 50px;" type="text" value="74"/></p> <p>Nighttime Set-Back Temperature (Average) <input style="width: 50px;" type="text" value="67"/></p> <p>Daytime Set-Back Temperature (Average) <input style="width: 50px;" type="text" value="72"/></p> <p>Heating System Type <input style="width: 100px;" type="text" value="Gas Furnace"/></p>	<p>24 Hour Typical Usage Patterns*</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <td></td> <td style="border: none;">Weekday</td> <td style="border: none;">Weekend</td> </tr> <tr> <td>Nighttime Set-Back/Set-Up Hours</td> <td style="border: 1px solid gray;">8</td> <td style="border: 1px solid gray;">8</td> </tr> <tr> <td>Daytime Set-Back/Set-Up Hours</td> <td style="border: 1px solid gray;">16</td> <td style="border: 1px solid gray;">16</td> </tr> <tr> <td>Hours without Set-Back/Set-Up</td> <td style="border: 1px solid gray;">0</td> <td style="border: 1px solid gray;">0</td> </tr> </table> <p>Cooling Season*</p> <p>Typical Indoor Temperature w/o Set-Up <input style="width: 50px;" type="text" value="75"/></p> <p>Nighttime Set-Up Temperature (Average) <input style="width: 50px;" type="text" value="82"/></p> <p>Daytime Set-Up Temperature (Average) <input style="width: 50px;" type="text" value="82"/></p> <p>Cooling System Type <input style="width: 100px;" type="text" value="None"/></p>		Weekday	Weekend	Nighttime Set-Back/Set-Up Hours	8	8	Daytime Set-Back/Set-Up Hours	16	16	Hours without Set-Back/Set-Up	0	0
	Weekday	Weekend											
Nighttime Set-Back/Set-Up Hours	8	8											
Daytime Set-Back/Set-Up Hours	16	16											
Hours without Set-Back/Set-Up	0	0											

*All temperatures are in degrees Fahrenheit. Setpoint is defined as the temperature setting for any given time period. Set-back temperature is defined as the lower setpoint temperature for the energy-savings periods during the heating season, generally nighttime and daytime. Set-up temperature is defined as the higher setpoint temperature for the energy-savings periods during the cooling season, generally nighttime and daytime.

	2 Programmable Thermostat(s)	2 Manual Thermostat(s)	Savings
Annual Energy Costs			
Heating Energy Cost	\$698	\$775	\$76
Heating Energy Consumption (MBTU)	77	85	8
Cooling Energy Cost	\$0	\$0	\$0
Cooling Energy Consumption (MBTU)	0.0	0.0	0
Total	\$698	\$775	\$76

MLSEC14LED50

14 WATT SECURITY LIGHT WITH PHOTOCCELL



FEATURES:

- 120V VAC operation
- 50,000 hour life and maintenance free for up to 13 years
- CRI: 82
- Mercury free and operates without emitting UV radiation
- Heavy-duty, die-cast aluminum base and vandal resistant injection molded polycarbonate housing maintain a sleek appearance and enable long life
- High quality shatter resistant polycarbonate lens
- Fixture is sealed to be dirt and insect free
- Back and bottom is plugged with conduit holes for mounting and wiring flexibility
- PhotoCell standard
- 5 Year limited warranty
- Does not attract insects
- Power factor is greater than .99
- IES BUG rating - B0 U3 G2

CONSTRUCTION:

Fixture: The heavy duty die-cast, powder-coat aluminum base, with a one-piece injection molded polycarbonate prismatic lens/housing masked and painted for a seamless cover. The fixture is gasketed and assembled with two screws to produce a sealed fixture that is free of water, dirt and insects.

Lens: Polycarbonate lens with UV stabilizers

LED Module: Aluminum components in the LED module act as a heat sink to reduce heat and ensure long life. The module uses directional settings to control the fall of light and the light levels. This fixture is an efficient replacement for metal halide and incandescent fixtures that reduces wattage and extends life.

LED Driver: Self contained driver meets UL 1310 UL 48 Class2

Finish: The bronze base is powder-coat painted, and the housing is masked and painted bronze to match the base.

Installation: Can mount to recessed J-box or directly to the wall

Luminaire Ordering Information:

WATTS	ORDER CODE	MODEL NUMBER	DELIVERED LUMENS	LAMP LIFE (Hrs.)	DIMENSIONS (L"xW"xH")	CCT
14	71416	MLSEC14LED50	887	50,000	11.8 x 6.8 x 5.3	5500

Lighting layouts and spacing criteria available upon request

PROJECT NAME
CATALOG NUMBER
NOTES
FIXTURE SCHEDULE



MAX12008



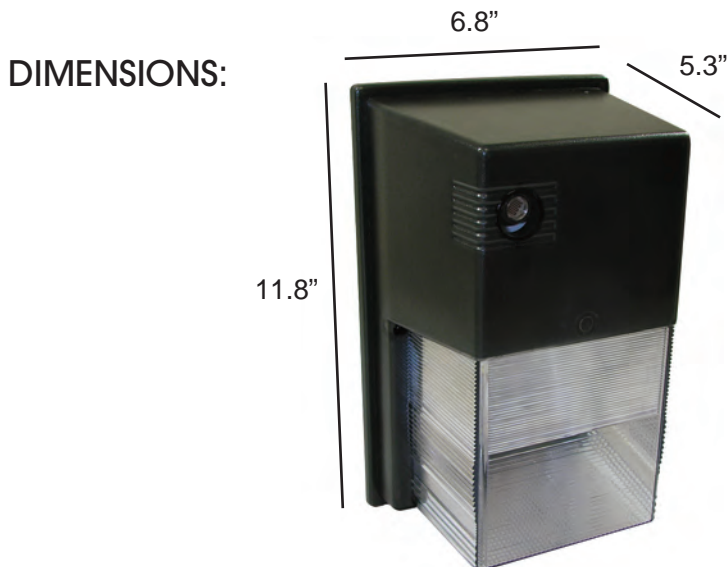
MLSEC14LED50

14 WATT SECURITY LIGHT WITH PHOTOCELL

SPECIFICATIONS:

Item	Specification	Details
General Performance	Spacing Criteria	Available upon request
	Color Temperature (CCT)	5500K
	CRI	82
	Lumens Delivered	887
	Efficacy	62.3 lumen/watt
	Color Consistency	Proprietary binning for uniform color
	Lumen Maintenance (L70)	50,000 hours
	IES Classification	Type IV
	Cutoff Class	Non- Cutoff
	IES B.U.G. Rating	B0 U3 G2
Electrical	Power Factor	Over 98%
	Input Voltage	120V 50/60 Hz
	Power Consumption	14 Watts nominal
Physical	Dimensions	11.8" x 6.8" x 5.3"
	Weight	3 lbs
	Housing	Aluminum & Polycarbonate
	Lens	Polycarbonate w/ UV Stabilizers
	Mounting	Can mount to recessed J-box or direct to walls
	Operating Temperature	-30°F to 130°F
	Humidity	20% - 85% RH, non condensing
Certification	Certification	cETLus
	Material Usage	RoHS compliant; no mercury
	Environment	Outdoor
	LED Class	N/A

Lighting layouts and spacing criteria available upon request



PhotoCell:



PhotoCell is "potted solid state" sensor and has a 2-minute reset at power disruption.

LED lighting facts®	
A Program of the U.S. DOE	
Light Output (Lumens)	895
Watts	14
Lumens per Watt (Efficacy)	63
Color Accuracy Color Rendering Index (CRI)	82
Light Color Correlated Color Temperature (CCT)	5487 (Daylight)
<small>All results are according to IESNA LM-79-2008: Approved Method for the Electrical and Photometric Testing of Solid-State Lighting. The U.S. Department of Energy (DOE) verifies product test data and results.</small>	
<small>Visit www.lightingfacts.com for the Label Reference Guide.</small>	
<small>Registration Number: WJP2-VX4Y2H (3/2/2012)</small>	
<small>Model Number: MLSEC14LED50</small>	
<small>Type: Other</small>	



MLSWP30LED50

LED WALLMAX - 30 SERIES SMALL WALL PACK



FEATURES:

- Replaces up to 150 Watt Metal Halide
- Universal 120-277V
- Maintenance free for up to 13 Years
- Mercury free; no UV
- Heavy-duty cast aluminum housing; rust and corrosion proof; polyester powdercoat
- High quality shatterproof glass.
- Sealed fixture is dirt and bug free
- Multiple knockouts for mounting convenience
- Occupancy/Dusk to Dawn sensor compatible
- LM-79/80 data available
- 5 Year Limited Warranty
- Does not attract insects

CONSTRUCTION:

Fixture: Heavy-duty cast aluminum one-piece housing; polyester powdercoat; rust and corrosion proof. Fixture is sealed to be dirt and bug proof.

Lens: High quality shatterproof glass.

Reflector: Internal aluminum reflector for increased efficacy and optimal light distribution.

LED Module: Aluminum components in the LED module act as heat sinks to reduce heat and add to life. The module uses directional settings to control the fall of light and the light levels. This makes the fixture an efficient replacement for metal halide and high pressure sodium fixtures, while reducing wattage and extending life.

LED Driver: Self contained driver meets UL 1310 UL 48 Class2.

Finish: Dark Bronze or white finish available; polyester powdercoated.

Installation: Can mount to recessed outlet box or direct to surface.

Luminaire Ordering Information:

Watts	Order Number	Model Number	Lumens	Luminaire Life (Hrs.)	Fixture Dimensions W"x H" x L"	CCT
33	70724	MLSWP30LED50	2080	50,000	14.25 x 9.0 x 7.5	5000
33	71127	MLSWP30LED50W	2080	50,000	14.25 x 9.0 x 7.5	5000

Lighting layouts and spacing criteria available upon request

PROJECT NAME
CATALOG NUMBER
NOTES
FIXTURE TYPE



MAX11362



MLSWP30LED50

LED WALLMAX - 30 SERIES SMALL WALL PACK



SPECIFICATIONS:

Item	Specification	Details
General Performance	Spacing Criteria	Available upon request
	Color Temperature	5000K
	Lumens Delivered	2080
	Efficacy	50 lumen/watt
	Color Consistency	Proprietary binning for uniform color
	Lumen Maintenance (L70)	50,000 hours
Electrical	Power Factor	Over 98%
	Input Voltage	120V-277V 50/60 Hz
	Power Consumption	33 Watts
Physical	Dimensions	14.25" x 9.0" x 7.5"
	Weight	6.15 lbs
	Housing	Aluminum
	Lens	High quality shatterproof glass
	Mounting	Can mount to recessed outlet box or direct to surface.
	Operating Temperature	-30°F to 130°F
	Humidity	20% - 85% RH, non condensing
Certification	Certification	CETL, FCC, LM79, LM80
	Material Usage	RoHS compliant; no mercury
	Environment	Indoor / Outdoor
	LED Class	L70 rated to 50,000 hours

MaxLite

LED lighting facts
A Program of the U.S. DOE

Light Output (Lumens) 2076
Watts 34.26
Lumens per Watt (Efficacy) 60

Color Accuracy
Color Rendering Index (CRI) 70

Light Color
Correlated Color Temperature (CCT) 4986 (Daylight)

2700K 3000K 4500K 6500K

Warranty** Yes

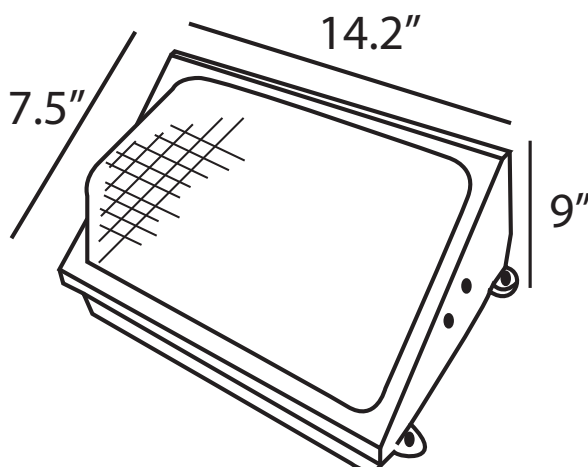
All results, except LED Lumen Maintenance, are according to IESNA LM-79-2008: Approved Method for the Electrical and Photometric Testing of Solid-State Lighting. The U.S. Department of Energy (DOE) verifies product test data and results.

** See www.lightingfacts.com/products for details.

Registration Number: WJP2-EXB4SM (1/7/2013)
 Model Number: MLSWP30LED50 [UPGRADE 12/2012]
 Type: Outdoor wall pack

Lighting layouts and spacing criteria available upon request

DIMENSIONS:



MLSWP30LED50

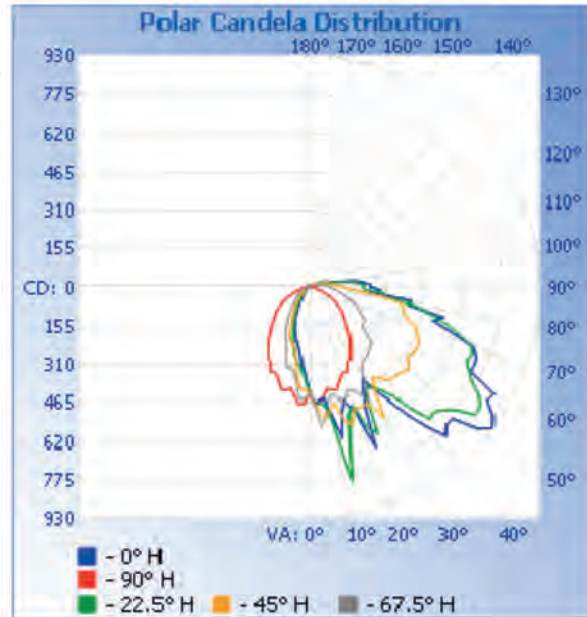
LED WALLMAX - 30 SERIES SMALL WALL PACK



PHOTOMETRICS:

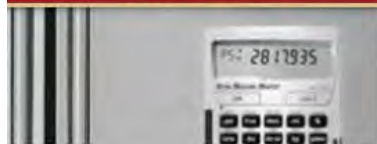
Intensity (Candlepower) Summary at 25°C - Candelas

Angle	0	22.5	45	67.5	90
MLSWP30LED50					
0	423	423	423	423	423
5	456	463	505	560	471
10	523	554	493	456	414
15	514	631	558	466	429
20	532	507	520	448	379
25	526	651	517	478	372
30	426	462	601	448	330
35	549	510	440	368	289
40	726	637	488	360	252
45	780	708	498	345	214
50	884	766	516	306	183
55	903	839	479	260	158
60	858	754	498	252	125
65	733	699	481	223	90
70	700	696	450	188	61
75	516	569	390	160	38
80	403	431	373	126	22
85	244	302	211	101	12
90	246	215	134	80	8
95	212	194	103	55	9
100	110	133	89	35	10
105	80	74	66	25	10
110	65	59	41	20	9
115	24	30	32	15	9
120	18	20	22	12	8
125	16	17	17	10	6
130	14	16	15	8	5
135	14	14	12	6	3
140	13	12	10	5	2
145	11	10	8	3	1
150	8	8	5	2	1
155	6	5	1	0	0
160	2	0	0	0	0



Lighting layouts and spacing criteria available upon request





Appliance Calculator

The Appliance Calculator helps you:

- Find out how much your current refrigerator is costing in electricity use.
- Determine when it makes sense to upgrade.
- Shop for a new refrigerator based on electricity consumption and other features.

Follow the instructions below—note that your Results will get updated anytime you change a dropdown selection.

Electricity Saving Refrigerator Calculator

Step 1: Describe Your Current Refrigerator

State:

Refrigerator Type:

Approx Model Year:

Size:

Icemaker:

EnergyStar:

Your Current Refrigerator Energy Usage Results

Electricity Consumption of Your Refrigerator: **1082**

kWh/yr

Average Electricity Price in Your State: **\$0.125/kWh**

Step 2: Describe Your Desired New Refrigerator

EnergyStar:

Electricity Consumption:

Price Range:

Brand:

Refrigerator Type:

Color:






Size:



Icemaker:

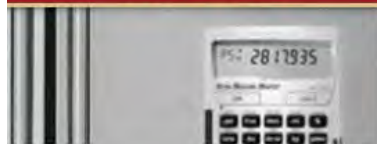
[Show All Models](#)

Your New Refrigerator Search Results

[Save/Compare](#)

	New Refrigerators	Price	Annual Electricity Use	Lifetime Electricity Cost	EnergyStar
<input type="checkbox"/>	 Whirlpool 14.6 cu. ft. Top Freezer Black See at SEARS/Kmart	\$700	354 kWh	\$515	Yes
<input type="checkbox"/>	 Whirlpool 14.6 cu. ft. Top Freezer White See at SEARS/Kmart	\$700	354 kWh	\$515	Yes
<input type="checkbox"/>	 Frigidaire 14.8 cu. ft. Top Freezer See at SEARS/Kmart	\$590	355 kWh	\$517	Yes
<input type="checkbox"/>	 Frigidaire 14.8 cu. ft. Top Freezer See at SEARS/Kmart	\$590	355 kWh	\$517	Yes
<input type="checkbox"/>	 Frigidaire 14.8 cu. ft. Top Freezer See at SEARS/Kmart	\$620	355 kWh	\$517	Yes

<input type="checkbox"/>		GE 15.5 cu. ft. Top Freezer GTH16BBXR	See at SEARS/Kmart	\$500	363 kWh	\$528	Yes
<input type="checkbox"/>		GE 15.5 cu. ft. Top Freezer GTH16BBXR	See at SEARS/Kmart	\$500	363 kWh	\$528	Yes



Appliance Calculator

The Appliance Calculator helps you:

- Find out how much your current refrigerator is costing in electricity use.
- Determine when it makes sense to upgrade.
- Shop for a new refrigerator based on electricity consumption and other features.

Follow the instructions below—note that your Results will get updated anytime you change a dropdown selection.

Electricity Saving Refrigerator Calculator

Step 1: Describe Your Current Refrigerator

State: Michigan

Refrigerator Type: Top Freezer

Approx Model Year: 1980-1989

Size: 16.5-18.9 cu. ft.

Icemaker: without icemaker

EnergyStar: No

Your Current Refrigerator Energy Usage Results

Electricity Consumption of Your Refrigerator: **1082**

kWh/yr

Average Electricity Price in Your State: **\$0.125/kWh**

Step 2: Describe Your Desired New Refrigerator

EnergyStar: Any

Electricity Consumption: Any

Price Range: Any

Brand: Any

Refrigerator Type: Any

Color: Any






Size: Any












Icemaker: Any

Show All Models

Your New Refrigerator Search Results

Save/Compare

	New Refrigerators	Price	Annual Electricity Use	Lifetime Electricity Cost	EnergyStar
<input type="checkbox"/>	 Frigidaire 20.6 cu. ft. Top Freezer See at SEARS/Kmart	\$950	356 kWh	\$518	Yes
<input type="checkbox"/>	 Frigidaire 19.0 cu. ft. Freezerless, Stainless Steel See at SEARS/Kmart	\$1,550	39 kWh	\$57	Yes
<input type="checkbox"/>	 SMEG 9.2 cu. ft. Top Freezer FAB28U See at SEARS/Kmart	\$1,980	305 kWh	\$444	No
<input type="checkbox"/>	 SMEG 9.2 cu. ft. Top Freezer FAB28U See at SEARS/Kmart	\$1,980	305 kWh	\$444	No
<input type="checkbox"/>	 Frigidaire 18.2 cu. ft. Top Freezer See at SEARS/Kmart	\$900	335 kWh	\$488	Yes

<input type="checkbox"/>		Frigidaire 18.2 cu. ft. Top Freezer	See at SEARS/Kmart	\$1,000	335 kWh	\$488	Yes
<input type="checkbox"/>		Frigidaire 18.2 cu. ft. Top Freezer	See at SEARS/Kmart	\$1,000	335 kWh	\$488	Yes
<input type="checkbox"/>		Frigidaire 18.3 cu. ft. Top Freezer	See at SEARS/Kmart	\$1,050	335 kWh	\$488	Yes
<input type="checkbox"/>		Frigidaire 18.3 cu. ft. Top Freezer	See at SEARS/Kmart	\$1,050	335 kWh	\$488	Yes
<input checked="" type="checkbox"/>		Whirlpool 18.9 cu. ft. Top Freezer White	See at SEARS/Kmart	\$750	343 kWh	\$499	Yes
<input type="checkbox"/>		Whirlpool 18.9 cu. ft. Top Freezer Black	See at SEARS/Kmart	\$750	343 kWh	\$499	Yes
<input type="checkbox"/>		Whirlpool 18.9 cu. ft. Top Freezer Stainless Steel	See at SEARS/Kmart	\$950	343 kWh	\$499	Yes
<input type="checkbox"/>		Whirlpool 18.5 cu. ft. Top Freezer w/ Humidity Controlled Crispers Black	See at SEARS/Kmart	\$750	345 kWh	\$502	Yes
<input type="checkbox"/>		Whirlpool 18.9 cu. ft. Top Freezer with CEE Tier 3 Rating White	See at SEARS/Kmart	\$800	345 kWh	\$502	Yes
<input type="checkbox"/>		Whirlpool 18.9 cu. ft. Top Freezer with CEE Tier 3 Rating Black	See at SEARS/Kmart	\$800	345 kWh	\$502	Yes
<input type="checkbox"/>		Maytag 18.9 cu. ft. Top Freezer w/ Strongbox™ Door Bins White	See at SEARS/Kmart	\$850	345 kWh	\$502	Yes

In accordance with ACCA Manual J

Report Prepared By:

AKT Peerless

For: West Washington
805 West Washington Street
Ann Arbor, Michigan 48103

Design Conditions: Yipsilanti

Indoor:		Outdoor:	
Summer temperature:	75	Summer temperature:	89
Winter temperature:	70	Winter temperature:	5
Relative humidity:	50	Summer grains of moisture:	22
		Daily temperature range:	Medium

Building Component		Sensible Gain (BTUH)	Latent Gain (BTUH)	Total Heat Gain (BTUH)	Total Heat Loss (BTUH)
Whole House	575 sq.ft.	7,848	230	8,078 (0.5 tons)	23,040
First Floor		7,848	230	8,078	23,040
All Rooms	575 sq.ft.	7,848	230	8,078	23,040
Infiltration		1,607	0	1,607	7,461
- Tightness: Avg.; Winter ACH: 1.3 ; Summer ACH: 1.3					
Duct		1,024	0	1,024	3,840
- Supply above 120; Exposed to outdoor ambient; R-4					
People	1	300	230	530	0
Miscellaneous		1,200	0	1,200	0
Floor	575 sq.ft.	0	0	0	4,074
- Over unheated basement; Carpeted; No insulation					
S Wall	171.5 sq.ft.	272	0	272	1,003
- Wood frame, with sheathing, siding or brick; R-113 1/2 in.; none					
Window	24 sq.ft.	854	0	854	774
- Double pane; Vinyl frame; Clear glass					
- No inside shading; Coating: None (clear glass); No outside shading.					
N Wall	118.4 sq.ft.	188	0	188	693
- Wood frame, with sheathing, siding or brick; R-113 1/2 in.; none					
Window	31.6 sq.ft.	651	0	651	1,019
- Double pane; Vinyl frame; Clear glass					

Building Component		Sensible Gain (BTUH)	Latent Gain (BTUH)	Total Heat Gain (BTUH)	Total Heat Loss (BTUH)
- No inside shading; Coating: None (clear glass); No outside shading.					
Door	18 sq.ft.	116	0	116	429
- Metal; Fiberglass; Storm					
E Wall	194.5 sq.ft.	308	0	308	1,138
- Wood frame, with sheathing, siding or brick; R-113 1/2 in.; none					
Door	18 sq.ft.	116	0	116	429
- Metal; Fiberglass; Storm					
W Wall	34 sq.ft.	54	0	54	199
- Wood frame, with sheathing, siding or brick; R-113 1/2 in.; none					
Ceiling	575 sq.ft.	1,158	0	1,158	1,981
- Under ventilated attic; R-19 (4 - 6.5 inch); Dark					
Whole House	575 sq.ft.	7,848	230	8,078 (0.5 tons)	23,040

In accordance with ACCA Manual J

Report Prepared By:

AKT Peerless

For: West Washington 807
807 West Washington Street
Ann Arbor, Michigan 48103

Design Conditions: Yipsilanti

Indoor:		Outdoor:	
Summer temperature:	75	Summer temperature:	89
Winter temperature:	70	Winter temperature:	5
Relative humidity:	50	Summer grains of moisture:	22
		Daily temperature range:	Medium

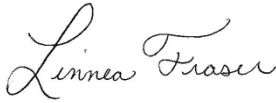
Building Component		Sensible Gain (BTUH)	Latent Gain (BTUH)	Total Heat Gain (BTUH)	Total Heat Loss (BTUH)
Whole House	575 sq.ft.	7,848	230	8,078 (0.5 tons)	23,040
First Floor		7,848	230	8,078	23,040
All Rooms	575 sq.ft.	7,848	230	8,078	23,040
Infiltration		1,607	0	1,607	7,461
- Tightness: Avg.; Winter ACH: 1.3 ; Summer ACH: 1.3					
Duct		1,024	0	1,024	3,840
- Supply above 120; Exposed to outdoor ambient; R-4					
People	1	300	230	530	0
Miscellaneous		1,200	0	1,200	0
Floor	575 sq.ft.	0	0	0	4,074
- Over unheated basement; Carpeted; No insulation					
S Wall	171.5 sq.ft.	272	0	272	1,003
- Wood frame, with sheathing, siding or brick; R-113 1/2 in.; none					
Window	24 sq.ft.	854	0	854	774
- Double pane; Vinyl frame; Clear glass					
- No inside shading; Coating: None (clear glass); No outside shading.					
N Wall	118.4 sq.ft.	188	0	188	693
- Wood frame, with sheathing, siding or brick; R-113 1/2 in.; none					
Window	31.6 sq.ft.	651	0	651	1,019
- Double pane; Vinyl frame; Clear glass					

Building Component		Sensible Gain (BTUH)	Latent Gain (BTUH)	Total Heat Gain (BTUH)	Total Heat Loss (BTUH)
- No inside shading; Coating: None (clear glass); No outside shading.					
Door	18 sq.ft.	116	0	116	429
- Metal; Fiberglass; Storm					
E Wall	34 sq.ft.	54	0	54	199
- Wood frame, with sheathing, siding or brick; R-113 1/2 in.; none					
W Wall	194.5 sq.ft.	308	0	308	1,138
- Wood frame, with sheathing, siding or brick; R-113 1/2 in.; none					
Door	18 sq.ft.	116	0	116	429
- Metal; Fiberglass; Storm					
Ceiling	575 sq.ft.	1,158	0	1,158	1,981
- Under ventilated attic; R-19 (4 - 6.5 inch); Dark					
Whole House	575 sq.ft.	7,848	230	8,078 (0.5 tons)	23,040

4.0 Part 3: Utility Consumption Baseline

4.1 Acknowledgements of Part 3: Utility Consumption Baseline

The Consumption Narrative Report and Utility Consumption – Summary and Utility Consumption – Monthly worksheets in the RPCA Model were completed by Linnea Fraser of AKT Peerless. AKT Peerless certifies that the report preparers meet the qualifications identified in the RAD Physical Condition Assessment Statement of Work and Contractor Qualifications Part 3.2 (Version 2, December 2013).



Linnea Fraser, EIT
Senior Energy Analyst
AKT Peerless Environmental Services
Illinois Region
Phone: 773.993.3998
Fax: 248.615.1334

Date: April 7, 2015

Part 3 Consumption Narrative Report and Excel RPCA Model were Received and Reviewed by Owner:

Jennifer Hall, Executive Director
Ann Arbor Housing Commission
404 N. Ashley
Ann Arbor, MI 48103
Phone: 734-794-6721
Fax: 734-994-0781

Date: _____



Rental Assistance Demonstration (RAD): **PART 3: UTILITY CONSUMPTION BASELINE**

805-807 West Washington Street, Ann Arbor, Michigan 48103
WEST WASHINGTON

PREPARED FOR Norstar Development USA, LP
733 Broadway
Albany, NY 12207

ON BEHALF OF The Ann Arbor
Housing Commission
727 Miller Ave
Ann Arbor, MI 48103

PROJECT # 9699U-3-96

PIC # MI064

DATE March 17, 2015



Rental Assistance Demonstration (RAD): **CONSUMPTION NARRATIVE REPORT**

805-807 West Washington Street, Ann Arbor, Michigan 48103
WEST WASHINGTON

PREPARED FOR Norstar Development USA, LP
733 Broadway
Albany, NY 12207

ON BEHALF OF The Ann Arbor
Housing Commission
727 Miller Ave
Ann Arbor, MI 48103

PROJECT # 9699U-3-96

PIC # MI064

DATE March 17, 2015

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1.0 EXECUTIVE SUMMARY

1.1 Purpose and Scope of Work

The purpose of the Part 3: Utility Consumption Baseline is to establish a twelve-month consumption baseline for normalized heating, cooling, lighting, and other electric, gas and water usage (not cost) for the subject property as defined in the Rental Assistance Demonstration (RAD): Physical Condition Assessment (RPCA) statement of Work and Contractor Qualifications released by the US Department of Housing and Urban Development (HUD) on October 2012 and updated on December 2013.

This report contains data on all utility usage at the subject property, both tenant-paid and owner-paid (if applicable), and including all common areas for a full 12-month period. It establishes a baseline to allow for benchmarking, and for future measurement of consumption and costs. As such, the utility baseline creates a whole building consumption profile, addressing missing utility data, vacancies, and weather patterns, in achieving its aim of establishing that standard on which future consumption can be compared.

1.2 Subject Site Description

1.2.1 General Site Description

The subject property contains one (1) 2,114 square foot multi-family buildings. The subject building was constructed in 1969 and contains one (1) story units with a basement. There are a total of two (2) one bedroom, one bathroom units at the site. The subject building is generally referred to as West Washington.

1.2.2 Site Utilities and Usage

Each unit at the subject property has an electric meter and a natural gas meter. Each unit has one water meter. One common electric meter exists at the site. Therefore, there are a total of three (3) electric meters, two (2) natural gas meters, and two (2) water meters at the site.

1.3 Baseline Site Energy Consumption

The Actual Site Energy Use, Energy Use Intensity (EUI), Weather Normalized Site Energy Use and Weather Normalized EUI displayed below are consistent with the ASHRAE Procedures for Commercial Building Energy Audits. This methodology establishes the property's baseline use and cost conditions that are representative of the building's energy performance.

This statistical analysis removes the bias of independent variables such as historic weather, occupancy and operating hours. These calculations have been normalized to the mean values of the independent variables impacting the building's energy performance and represent the most probable performance under actual conditions accounting for weather, occupancy and operating hour variability.

As the subject site has been 100% occupied for the duration of the analysis period, no pro-forma adjustment factors to the consumption have been made.

1.3.1 Actual Site Energy Use and EUI

Actual Site Energy Use	Actual Site Energy Use Intensity (EUI)
177,448 kBtu/yr	83.94 kBtu/ft ² /yr

1.3.2 Weather Normalized Site Energy Use and EUI

Weather Normalized Site Energy Use	Weather Normalized Site Energy Use Intensity (EUI)
171,143 kBtu/yr	80.96 kBtu/ft ² /yr

2.0 INTRODUCTION

2.1 Purpose

The purpose of the Part 3: Utility Consumption Baseline is to establish a twelve-month consumption baseline for normalized heating, cooling, lighting, and other electric, gas and water usage (not cost) for the subject property as defined in the Rental Assistance Demonstration (RAD): Physical Condition Assessment (RPCA) statement of Work and Contractor Qualifications released by the US Department of Housing and Urban Development (HUD) on October 2012 and updated on December 2013.

This report contains data on all utility usage at the subject property, both tenant-paid and owner-paid (if applicable), and including all common areas for a full 12-month period. It establishes a baseline to allow for benchmarking, and for future measurement of consumption and costs. As such, the utility baseline creates a whole building consumption profile, addressing missing utility data, vacancies, and weather patterns, in achieving its aim of establishing that standard on which future consumption can be compared.

2.2 Scope of Work

AKT Peerless' scope-of-services is based on its proposal PU-17009, dated January 29, 2015 and authorized by Norstar Development USA, LP (the Client), and the terms and conditions of that agreement.

The purpose of the Part 3: Utility Consumption Baseline is to establish a twelve-month consumption baseline for normalized heating, cooling, lighting, and other electric, gas and water usage (not cost) for the subject property as defined in the Rental Assistance Demonstration (RAD): Physical Condition Assessment (RPCA) statement of Work and Contractor Qualifications released by the US Department of Housing and Urban Development (HUD) on October 2012 and updated on December 2013.

This report contains data on all utility usage at the subject property, both tenant-paid and owner-paid (if applicable), and including all common areas for a full 12-month period. It establishes a baseline to allow for benchmarking, and for future measurement of consumption and costs. As such, the utility baseline

creates a whole building consumption profile, addressing missing utility data, vacancies, and weather patterns, in achieving its aim of establishing that standard on which future consumption can be compared.

3.0 SUBJECT SITE DESCRIPTION

3.1 General Site Description

The subject property contains one (1) 2,114 square foot multi-family building. The subject building was constructed in 1969 and contains one (1) story with a basement. There are a total of two (2) one bedroom, one bathroom units at the site. The subject building is generally referred to as West Washington.

3.2 Current/Planned Use of the Property

The subject property has been used as a multi-family structure and operated by the AAHC since its initial construction in 1969. AAHC is participating in HUD's Rental Assistance Demonstration pilot program and intends to continue operating the building as a multi-family residential facility.

4.0 ENERGY CONSUMPTION ANALYSIS

This section provides information on energy utilities associated with the subject property.

4.1 Electricity

The following figure (Figure 4.1) identifies monthly electrical consumption (kWh) in comparison to cooling degree days (CDD). Cooling Degree Days (CDD) are roughly proportional to the energy used for cooling a building, while Heating Degree Days, (HDD) are roughly proportional to the energy used for heating a building. In general, daily degree days are the difference between a base point temperature (65 degrees) and the average outside temperature.

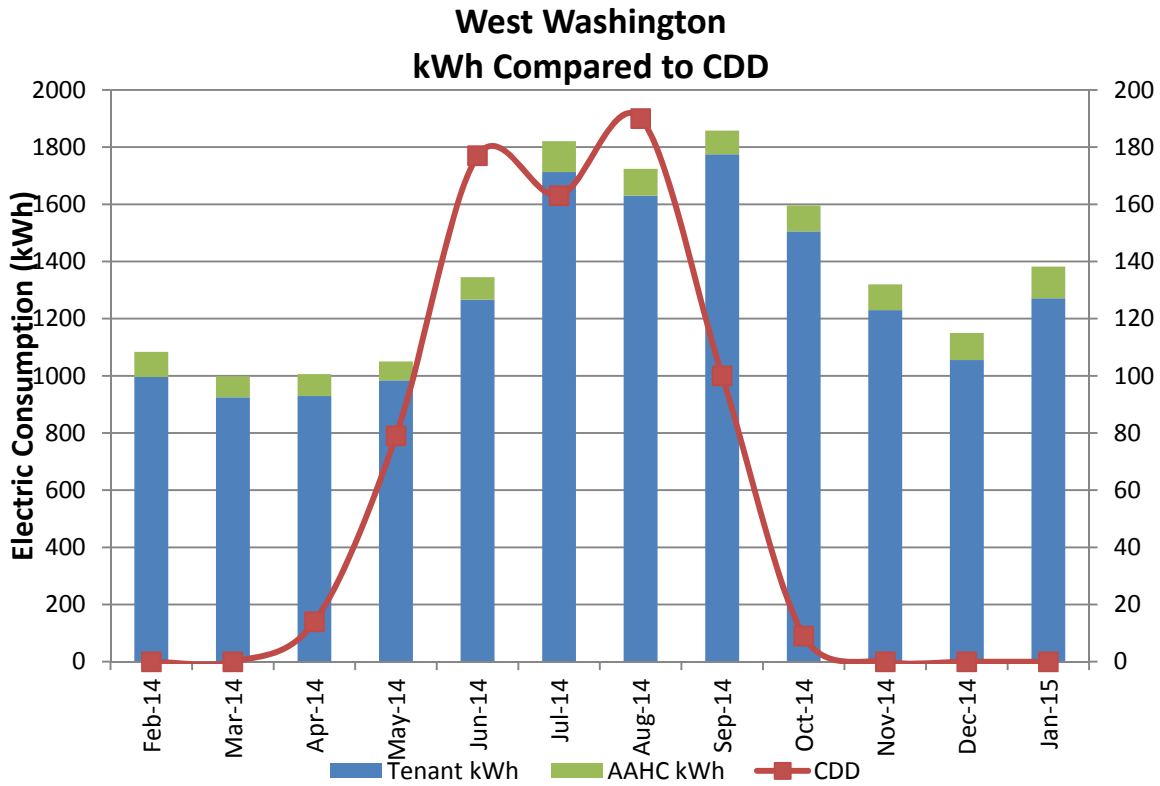


Figure 4.1 Electricity Consumption Graph

The following table (Table 4.1) identifies key information regarding the electric utility associated with the property.

Table 4.1 Annual Electricity Metrics

Vendor	DTE Energy
Meters on Site	Residential - Two (2) Non-Residential (Common) – One (1)
Use for Residential	Lighting, electric appliances, tenant plug loads, tenant ac window units (if present), washing machines, furnace blower and control.
Use for Non-Residential	Exterior lighting Basement/Garage lighting
Responsible for Payment	Residential – Tenant Non-Residential - Owner
Rate	Residential - \$0.147 / kWh Non-Residential - \$0.227 / kWh

Site Consumption	16,334 kWh / year (55,748 kBtu / year)
Energy Use Intensity (EUI)	7.73 kWh / ft ² (26.37 kBtu / ft ²)
Weather Normalized Site Consumption	16,604 kWh / year (56,670 kBtu / year)
Weather Normalized EUI	7.85 kWh / ft ² (26.81 kBtu / ft ²)

AKT Peerless received tenant electric bill information in an electronic spreadsheet from the owner (AAHC) for the subject property. This spreadsheet included the following information for each individual unit at the subject property: meter read date, invoice amount (\$), usage days per billing period, and net usage (kWh). For the subject property, West Washington, monthly electrical data was included from August 2014 to January 2015. The most current twelve (12) months of electrical data provided (February 2014 through January 2015) were used for this analysis and input into the RPCA model.

The actual electric consumption was adjusted to produce a weather-normalized summary of electric consumption. This process involved the following steps:

- CDD for the base year billing periods were calculated. Source for CDD is www.degreedays.net (using temperature data from www.wunderground.com) at weather station ANN ARBOR MUNICIPAL AIRPORT, MI, US (83.74W,42.22N), Station ID: KARB.
- Base year billing consumption (kWh) and CDD were normalized by number of days in each billing period.
- Relationship between usage (kWh/day) and weather (CDD/day) was established by using spreadsheet software (Excel) to determine the “best fit” linear regression trend line and R² value. The R² value is a statistical indicator that represents goodness of fit of the trend line, with R² > 0.75 considered an acceptable fit.
- Weather Normalized Site Consumption was calculated using the linear regression equation and the 10 year average CDD per month.

4.2 Natural Gas

The following figure (Figure 4.2) identifies monthly natural gas consumption (therms) in comparison to heating degree days (HDD). HDD are roughly proportional to the energy used for heating a building. In general, daily degree days are the difference between a base point temperature (65 degrees) and the average outside temperature.

West Washington Therm Consumption Compared to HDD

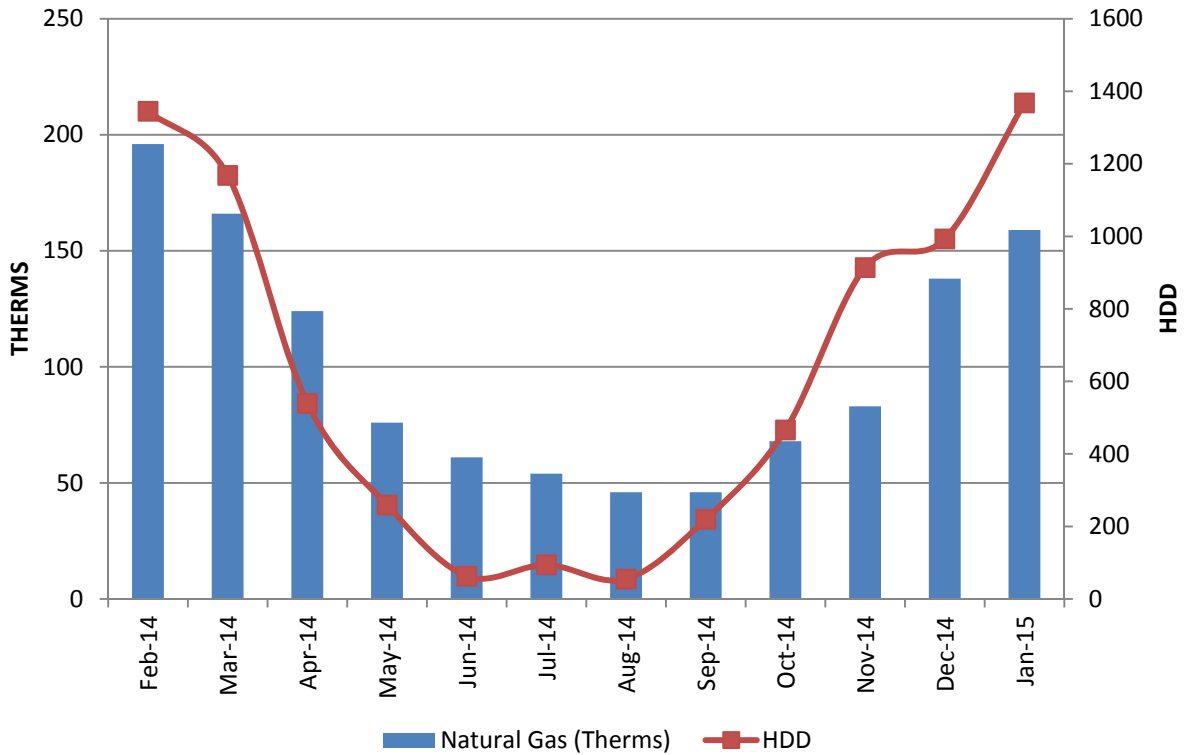


Figure 4.2 Natural Gas Consumption Graph

The following table (Table 4.2) identifies key information regarding the natural gas utility associated with the property.

Table 4.2 Annual Natural Gas Metrics

Vendor	DTE Energy
Meters on Site	Residential – Two (2) Non-Residential (Common) – None (0)
Use for Residential	Gas-fired furnaces for space heating, ranges for cooking, dryers for laundry.
Use for Non-Residential	None
Responsible for Payment	Tenant
Rate	\$0.910 / therm
Site Consumption	1,217 therms / year (121,700 kBtu / year)

Energy Use Intensity (EUI)	57.57 kBtu / ft ²
Weather Normalized Site Consumption	1,145 therms / year (114,473 kBtu / year)
Weather Normalized EUI	54.15 kBtu / ft ²

AKT Peerless received tenant natural gas bill information in an electronic spreadsheet from the owner (AAHC) for the subject property. This spreadsheet included the following information for each individual unit at the subject property: meter read date, invoice amount (\$), usage days per billing period, and net usage (therms). For the subject property, West Washington, monthly natural gas data was included from August 2013 to January 2015. The most current twelve (12) months of natural gas data provided (February 2014 through January 2015) were used for this analysis and input into the RPCA model.

The actual natural gas consumption was adjusted to produce a weather-normalized summary of natural gas consumption. This process involved the following steps:

- HDD for the base year billing periods were calculated. Source for HDD is www.degreedays.net (using temperature data from www.wunderground.com) at weather station ANN ARBOR MUNICIPAL AIRPORT, MI, US (83.74W,42.22N), Station ID: KARB.
- Base year billing consumption (therms) and HDD were normalized by number of days in each billing period.
- Relationship between usage (therms/day) and weather (HDD/day) was established by using spreadsheet software (Excel) to determine the “best fit” linear regression trend line and R² value. The R² value is a statistical indicator that represents goodness of fit of the trend line, with R² > 0.75 considered an acceptable fit.
- Weather Normalized Site Consumption was calculated using the linear regression equation and the 10 year average HDD per month.

5.0 LIMITATIONS

5.1 Assumptions

The Ann Arbor Housing Commission (AAHC), the property owner, released utility information to AKT Peerless delivered directly from the utility provider(s), DTE Energy. It is assumed that this monthly usage and cost data is accurate and contains no data gaps or errors.

Information on how the utilities are utilized was generated from conversations with AAHC staff and results of the RPCA through the Energy Audit.

5.2 Limitations and Exceptions

AKT Peerless accepts responsibility for the competent performance of its duties in executing this assignment and preparing this report in accordance with the normal standards of the profession, but disclaims any responsibility for consequential damages. Although AKT Peerless believes the results contained herein are reliable, AKT Peerless cannot warrant or guarantee that the information provided is exhaustive, or that the information provided by the client, owner, third parties, or the secondary information sources cited in this report is complete or accurate.

AKT Peerless has not verified that the property owner/operator has reported all sources and records of energy consumed at the subject property. Potentially unreported information may include, but is not limited to, bills, meters, and types of energy consumed. Inaccurate information provided to AKT Peerless and information not reported to AKT Peerless may influence the findings of report.

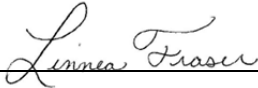
AKT Peerless has not verified the accuracy of building floor area as reported by the owner.

Should additional information become available to the Client or Owner that differs significantly from our understanding of conditions presented in this report, AKT Peerless requests that such information be forwarded immediately to our attention so that we may reassess the conclusions provided herein and amend this project's scope of services as necessary and appropriate.

Nothing in this report constitutes a legal opinion or legal advice. For information regarding individual or organizational liability, AKT Peerless recommends consultation with independent legal counsel.

6.0 SIGNATURES

Report submitted by:

A handwritten signature in cursive script that reads "Linnea Fraser". The signature is written in black ink and is positioned above a horizontal line.

Linnea Fraser, EIT

Project Consultant

AKT Peerless Environmental Services

Illinois Region

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