Halfmoon Township Municipal Building Feasibility Study

Port Matilda, PA 16870

PROJECT NO: 11005.01

Prepared By

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SECTION I- INTRODUCTION

Statement of Purpose

The purpose of this report is to analyze the current use and future needs of the Halfmoon Township Municipal Building and present an analysis and recommendations to the Halfmoon Township supervisors and administrative staff in order for them to make a decision regarding the renovation or enlargement of the existing municipal building or the construction of a new municipal building.

Description of Report Format

The report is divided into four sections based on the purpose of the report as described above.

Section I- Introduction

Section II- Description of Existing Conditions

Section III- Analysis of Options & Summary of Workshops:
- Section IIIA- Description of Options
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- Section IIIC- Summary of Workshops

Section IV- Conclusions and Recommendations

In addition, two sections containing supporting information for the first four sections are included at the end of the report:

Section V- References

Section VI- Appendices

List of Professionals Involved

The professionals who prepared this report are:

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Michael L. Norris, P.E., Mechanical and Electrical
Karen E. Norris, LEED AP, Leed Certification Requirements

Disclaimers

This report is a compilation of information gathered by the professionals from workshops and meetings with Halfmoon Township employees and elected officials. However, the views and opinions presented here-in are strictly those of the professionals and are not to be interpreted or represented by anyone other than the professionals.

Existing conditions documents were developed as a result of field observations, measurements and photographs taken by the professionals and not from forensic or invasive investigations.
Design drawings contained in this report are included for the sole purpose of generating analytical information for use in preparing this report and limited to the purpose of this report. The Design Drawings are not intended to represent the actual appearance or scope of future projects.

Opinions of probable construction costs contained in this report are based on the best opinions of the professionals as they relate to current construction cost trends and their relation to possible future cost

projection fluctuations. However, all construction costs are subject to the vagaries of labor and material costs as well as the general condition of the economy in which a project is being constructed. As a result, the opinions of probable construction costs presented in this report are not to be understood to be actual construction estimates or precise budget numbers for the project options for which the cost opinions were generated.

The conclusions and recommendations put for by the professionals in this report are based on research conducted and information compiled during the preparation of this report. The professionals cannot be held responsible or liable from any information forthcoming at a future date concerning the contents of this report which could be applicable to or amend the conclusions and recommendations presented in this report.

Report Statement

In an effort to achieve the goals for this report outlined in the "Statement of Purposes" above, the bulk of the material contained in this report deals with the existing municipal building. The reasons for this are simple.

Since it is existing and has been utilized and occupied for some time, there is a history to the existing municipal building that yields much more information to be presented and analyzed in this report than a new building which has not yet been designed and for which no real resources have yet been dedicated to its design or construction.

An analysis of the past and present of an existing facility also yields much information concerning the approach to the design and construction of any future construction projects designed to augment or replace it. Simply stated, knowing what works and what doesn't work in an existing facility is a valuable design tool for future planning regardless of whether that future involves an entirely new facility or just the renovation of the existing facility.

Therefore, it is primarily through the analysis of the existing municipal building that the professionals who prepared this report have developed the conclusions and recommendations presented at the end of this report.

Section II- Description of Existing Conditions

1. General Description

Halfmoon Township is located in the Southwest corner of Centre County which is approximately located in center of the Commonwealth of Pennsylvania. It is bordered by Taylor, Worth, Patton and Ferguson Townships in Centre County, by Warriors Mark Township in Huntingdon County and by Snyder Township in Blair County. Halfmoon Township was incorporated in 1847 and is governed in accordance with the Commonwealth of Pennsylvania Code of Laws for a Second Class Township. The land area of Halfmoon Township is 23.72 square miles. It is traditionally a rural area and has a rich agricultural history. It is located approximately 10 miles from The Pennsylvania State University Main Campus at University Park, Pennsylvania.

According to the 2000 census, Halfmoon Township was the home to 2,357 residents (99 residents per square mile). The population of Halfmoon Township stayed steady at around 450 to 550 residents from the 1940 census through the 1970 census. However, starting with the 1980 census the population density of the township began to trend upwards at the following rates:

1970- 543 residents
1980- 717 residents (increase of 32.04%)
1990- 1,469 residents (increase of 104.88%)
2000- 2,351 residents (increase of 60.04%)

The apparent major reason for this upward population trend is the recent growth in the region centered on The Pennsylvania State University and the resulting conversion of local farmland into residential developments primarily comprised of single family residences. However, recent efforts to maintain open space and preserve open farmland have been undertaken in the township to maintain its traditional rural atmosphere.

2. Site

The existing municipal building is located in Stormstown, PA at 100 Municipal Lane a short distance from the Rte. 550/ Municipal Lane intersection at which point there is a concentration of older single family residences, churches and small commercial establishments. Close by are local farms, farm buildings and newer residential developments constructed on old farm land. Public bus service is available on Rte. 550 which connects the area with nearby State College and Bellefonte.

The existing municipal building shares a site with adjacent township recreational facilities including a tennis court and a Little League baseball field. The municipal building is also adjacent to a gravel parking lot which it shares with the other township facilities located on the site. There is direct pedestrian access from the parking lot to the front entrance of the municipal building. However, grade from the parking lot slopes down towards the building which does not allow for rain water and snow melt to drain away from the building.

The municipal building utilities consist of water, on-site septic system, electric and phone/data.
The water line comes from a source up the hill from the building and is piped to this and other buildings in the vicinity.

Approximately 400 feet behind the building a stream flows roughly parallel to the long dimension of the municipal building. This stream also passes under Municipal Lane.
The sewer system is an on-site, in-ground collection and dispersal system located behind the municipal building between the building and the stream.

The electric, phone and data services come into the building from overhead poles which run down Municipal Lane from Rte. 550.

3. Architectural And Structural

The municipal building is a pre-fabricated, single story metal building. It was built circa 1974 with a pre-fabricated, single story metal building addition constructed circa 1991. It is rectangular in shape with a simple gable roof with a roof ridge running down the center of the building parallel to the long dimension of the building. It sits on a concrete slab on grade. The windows and doors appear to be part of the pre-fabricated metal building package. The building has metal siding and a metal roof. Wall insulation appears to be that which was supplied with the original metal buildings. The ceiling is insulated above the suspended ceiling system with lay-in fiberglass batt insulation.

The building is approximately 31-0" wide by 85'-0" long (approximately 2,600 sq. ft.). The original building was 57'-6" long and the addition added 27'-6" to the length of the building.

The interior layout of the building consists of the following spaces:

1. MULTI-PURPOSE ROOM- 29'-0" X 35'-0" (1015 SQ. FT.)
2. PARKS AND REC STORAGE- 5'-0" X 8'-0" (40 SQ. FT.)
3. OFFICE SUPPLIES- 8'-0" X 12'-0" (96 SQ. FT.)
4. ENTRY FOYER- 10'-0" X 21'-0" (120 SQ. FT.)
5. WOMEN- 6'-0" X 9'-0" (54 SQ. FT.)
6. MEN- 6'-0" X 9'-0" (54 SQ. FT.)
7. OFFICE VESTIBULE- 7'-0" X 12'-0" (84 SQ. FT.)
8. MANAGER'S OFFICE- 10'-0" X 11'-0" (110 SQ. FT.)
9. CONFERENCE ROOM- 11'-0" X 16'-0" (176 SQ. FT.)
10. OPEN OFFICE- 14'-0" X 17'-0" (238 SQ. FT.)
11. COPY CENTER- 7'-0" X 13'-0" (91 SQ. FT.)
12. FILE ROOM- 10'-0" X 13'-0" (130 SQ. FT.)

Please refer to Drawings E-1, E-2 and Existing Site and Existing Building Photos located in "SECTION VI- Appendices".

The existing building contains a large amount of furniture, fixtures and equipment (FFE) all of which is necessary to administer to the needs of the township. As a result of the amount of FFE, and the lack of adequate storage space, the existing spaces within the municipal building are filled to capacity. This is especially true of the existing File Room, Conference Room and Parks and Rec Storage Room. The Multi-purpose Room contains a quantity of tables and chairs to allow for various activities and meetings to occur in the space. However, there is no storage space for tables and chairs when they are not in use so they end up being stacked against walls or stacked into corners in the Multi- Purpose Room taking up floor space that could be used for other activities.

The existing building is exhibiting a level of wear that is worth noting. While most of this is limited to damaged floor and wall finishes and worn out gaskets at windows and doors, a new mold and mildew problem has developed which is particularly concerning. Old roof leaks have been repaired for some time, but moisture continues to enter the building. While the source of the moisture is not certain, visual observation of the existing building leans towards leaks in the exterior metal cladding, moisture penetrating under and around exterior doors and compromise(s) to the existing wall insulation and/or vapor barrier as the most likely causes of the problem. As a result, a mold and mildew problem has developed that is primarily located in the Multi-Purpose Room. It is detectable by its odor immediately upon entering the room.

4. HVAC

A. HVAC (General Description)

The building consists of two primary spaces, one serving as council chambers and the other serving as township office space. Both spaces include significantly different usage requirements for HVAC systems. These differences include occupancy schedules, ventilation requirements, load profiles, and noise levels.

The Council chambers are spaces that typically house larger groups of people than the office space. The chambers are also primarily used during late afternoons, evenings or on weekends. Office space use usually does not overlap council chamber use. Office space occupancies are low, with most spaces having single occupants. Lower ventilation rates are required for office areas. The larger crowds in the public meeting room require larger quantities of ventilation when the space is occupied.

Primary heating and cooling energy is electric. There are no other energy sources, such as oil natural or bottled gas on site.

B. Heating

Wall-mounted, fan forced unit heaters are used in the existing building. The heaters have self contained thermostats. All unit heaters were purchased within the last few years.
See Figure H1: Typical Electric Wall Heater, Cover Removed

C. Cooling

Two window type thru-wall air conditioners, one at either end of the building, provide cooling. The units extend to the exterior through a wall sleeve. Both air conditioners were purchased within the last few years.
See Figure H2: Thru-Wall Air Conditioning Unit

D. Exhaust

There are two spaces in the existing building that require exhaust. Both spaces are toilet rooms. It appears that there was a renovation at one time. The men's bathroom has an inoperable exhaust fan. The women's bathroom has no exhaust fan. An exhaust fan in the office vestibule runs constantly during business hours. The renovation theory would support the improper placement of the exhaust fan in the vestibule area, and not in the toilet room as mentioned. See Figure H3: Exhaust Fan, Cover Removed

An exhaust fan in the storage room behind the manager's office is turned on as needed. All of the exhaust fans discharge into the attic, without properly discharging to the exterior.

Exhaust fans were observed to discharge into the attic space above the ceiling insulation level, below the metal decking of the roof.

E. Ventilation

There is currently no mechanical ventilation to introduce outdoor air into the building. All outdoor air is brought in through operable windows, infiltration, or cracks in windows and doors.

5. Plumbing

A. Domestic Water

The existing plumbing system consists of a city water service supplied by the local water authority. The existing service entrance is a ¾" nominal copper line. The service entrance piping consists of a shut off valve, meter, and pressure reducing valve. There is a check valve on the inlet, but there is no building service back flow preventer. Current available system flows and pressure are not known. The water system is a series of exposed and concealed copper tubing. There is no observed pipe insulation on any of the domestic water lines. See Figure P1: Water Service Entrance located in Men's Restroom

Hot water is produced by an electric water heater. The heater, a 40 gallon, residential style heater is over 10 years old. The heater could not be used under current codes in a commercial building. The water heater is located behind a curtain, in the woman's toilet room. There is no drain pan under the heater, and the temperature and pressure relief valve discharge directly into the room.

There are no water softeners in the building.

B. Drainage, Waste and Vent

The existing sanitary system connects to an on-site, private septic sewage system. The septic system does not contain any inspection pipes in the drainage field. However, a fresh air intake was observed immediately outside the building. See Figure P2: Sanitary Fresh Air Intake and FigureP3: Drainage Field

Current code requires a minimum 750-gallon septic tank capacity, plus 2 gallons per person for an assembly hall. Current meetings include up to 100 people. That means the septic tank must be 950 gallons. The size of the current septic tank is unknown. See Figure P4: Septic Tank Cover

According to the Township Sewer Enforcement Officer, the perc rate of the soil in which the current septic system is located is not adequate. This is due primarily to the proximity of the septic system to low lying wet areas, including the nearby stream, and the makeup of the soil in the drainage area.

Most of the sanitary piping is concealed below the floor or above the ceiling. Exposed piping at the urinal in the men's toilet room is ABS plastic. Some vent piping located above the ceiling is PVC plastic. There is an observed plumbing system vent, terminating through the building side wall.

The sanitary system seems marginal, below normal usage during the normal work week. On weekends, especially during the summer months, the indoor toilet room facilities are allowed to be used by the public. Reports have indicated that at the beginning of each week, there are periodic performance issues with the existing septic system.

C. Plumbing Fixtures

All of the plumbing fixtures appear to be 'vintage' and do not have current water saving characteristics. The urinals in the men's toilet room are quick release turn knob type valves. Lavatories are wall hung with cross arm type faucets. Water closets are flush tank types. There are no ADA fixtures. See Figure P5: Plumbing fixture sample

No electric water cooler is present in the building. No janitor's sink is located in the building.

D. Fire Suppression

There are no fire suppression systems present in the building. The water service can not support this type system.

6. Electrical

A. Power

A two hundred amp, 240/120V, single phase service is provided to the Halfmoon Township Municipal Building via an over head feed. The utility company is Allegheny Power, who has provided a utility owned, single-phase meter located on the outside of the building. See Figure E1: Overhead electrical service along Municipal Lane and
Figure E2: Telephone, data, and electrical meter along Municipal Lane

The electrical service feeds into the meter, a Schlumberger # D200 J5SD 200 amp rated meter that is connected to the 200 amp single phase panel, located in the Council Chambers. A 100A panel is sub-fed from the 200A Panel. Both panels extend branch circuits throughout the building. Romex wiring is used to feed most branch circuits throughout the building. See Figure E3: Panelboards in the Community Room

The building has been provided with adequate numbers of outlets to meet typical needs. The majority of the receptacles are standard duplex devices. However there are some dedicated, isolated ground receptacles indicated by an orange cover. The orange receptacles are used for the computers in the open office area.

All of the receptacles are grounded type. This means the ground pin is separately insulated and leads directly to the panel board instead of being grounded to all the other grounds, metal boxes, and conduit in the room connected to the same circuit.

A 20A 240V Nema 6-20R receptacle serves the air conditioner in the multipurpose room.
See Figure E4: Community Room air conditioner. There is also an air conditioner located in the community room.

The hot water heater is connected to a 40A 240V circuit on the panel board. See Figure E5: Water heater in women's bathroom.

Again Romex cable is used throughout the building to feed the branch circuits serving the electrical power and lighting distribution. See Figure E6: Romex cable throughout attic space.

The existing service entrance is not large enough per National Electric Code (NEC) The wiring (type NM)

of the existing building is not compliant with the NEC. The wiring methods are no longer allowed per the

NEC for this type of construction.

Receptacles are code compliant.

No devices are mounted at ADA heights.

B. Interior Lighting

The Multipurpose Room, Office Vestibule, Conference Room, Manager's Office, Open Office, and File Room are illuminated by 2'x4' fluorescent fixtures containing four 40W T12 lamps each. See Figure E7: 2'x4' Linear Fluorescent Fixture

Lighting in the Women's Bathroom, Entry Foyer and Rec Storage Room is provided by 2'x2' fluorescent fixtures containing two 40W T12 U lamps per fixture. See Figure E8: 2'x2' Fluorescent Fixture

The Conference room has one wall mounted occupancy sensor in the corner of the room.
See Figure E9: Occupancy sensor located in conference room

Four feet long, single tube T-12 fixtures are used in the Storage Room. The tubes are exposed, and unprotected. See Figure E10: 1'x4' Fluorescent Fixture in Supply Room.

Emergency lighting is provided. The units, which has a built in battery charger that provides a low voltage charge to a built in battery, is wall mounted, near the ceiling. The emergency light is powered through a duplex receptacle. See Figure E11: Emergency Light Fixture.

The following is a list of existing fixtures. All tubes are 40 watt, T-12.

Fixture Type	Qua.	Lamps/Fixture	Watts/Lamp	Total Watts
2'x4' Linear Fluor.	26	4	40	4160
1'X4' Wall Wash	2	1	40	80
2'x2' Fluorescent	4	2	40	320
1'X4' Linear Fluor.	2	1	40	80
			Total Watts	**4640**

EXISTING ILLUMINANCE VALUES			
Space	Average (fc)	Max: Min	IESNA (fc)
Conf. Rm.	58.6	3.1:1	30
Entry Foyer	18.4	2.4:1	10
File Room	74	2.0:1	50
Manager's Office	77	2.3:1	50
Men's Restroom	10.7	1.4:1	5
Women's Restroom	18.7	1.8:1	5
Multi-Purpose Rm.	93.4	4.3:1	50
Office Supplies	9.1	1.6:1	30
Office Vestibule	45.5	2.1:1	10
Open Office	100.6	2.3:1	50
Storage	19.6	2.4:1	30
Notes: 1. Illuminance values calculated at 2'-6" A.F.F.			

Under current industry accepted lighting level recommendations, all critical illluminance values exceed IESNA recommendations throughout the building, The only rooms that do not exceed recommendations are not critical areas, being the two spaces used for storage.

Light fixtures are not International Energy Conservation Code (IECC) code compliant. The current light fixtures do not meet current energy codes because they don't allow the occupant to uniformly reduce the fixture by at least 50 percent.

No light switches were observed to be mounted at ADA heights.

C. Exterior Building Lighting

The community room is an assembly area that is visited by larger groups not necessarily familiar with the floor plan. Life safety features, such as emergency exits become critical in this area. There are an emergency light fixture and a wall pack light fixture mounted outside of the entry foyer door. See Figure E12: Community Room Exit.

At the front of the building, outside the main entry vestibule, there is a floodlight and an emergency light fixture mounted next to the multipurpose room door. See Figure E13: Front Entrance Exterior.

D. Sports Field Lighting

A separately metered, 400A panel located outside of the building provides power to the lighting system for an adjacent baseball field.

The underground feeder routing for this panel is unknown. Its source is also unknown.

A Musco lighting control panel is mounted directly beside the panel board. See Figure E14- Ball Field Electrical Meter, Panel and Lighting Controller.

6. Special Systems

Data and voice service are available at each of the computer workstations, with outlet boxes mounted on the walls.

There is currently no fire suppression system present in this building.Sprinklers are not required for this application. Per IEBC 704.2.2 the building in occupancies A and B are not required to have a fire sprinkler system since the building's fire area is 12,000 square feet and the fire area has an occupant load of less than 300.

There is no fire alarm system. A fire alarm system is not required.

There is no security system. There is no security camera system.

There is no built in sound or microphone system.

7. Handicapped Accessibility

The current standard for handicapped accessible site and building elements in the Commonwealth of Pennsylvania are the statewide Uniform Construction Code (UCC), the International Building Code (IBC) - 2009, The International Existing Building Code (IEBC) - 2009 and the ICC/ANSI A117.1-2003. Basically, the UCC, the IBC and the IEBC tell you what has to be accessible and the ICC/ANSI A117.1-2003 tells you how to make it accessible. The following analysis of existing handicapped accessibility features associated with the existing municipal building is undertaken with these design standards in mind.

Existing handicapped accessibility to the building from the parking lot does not meet current standards. The quantity of assigned accessible parking spaces appears to be adequate. However, the construction, markings and signage required of and at accessible parking spaces are deficient or non- existent as follows:

a. The accessible parking spaces and access aisles are to be constructed of a smooth, solid material (such as asphalt or concrete) and not gravel as is the case for most of the existing assigned accessible parking spaces. Also, the accessible parking spaces and access aisles are not to be steeper than a 1:48 slope. The parking spaces are to be a minimum of 8 feet wide with access aisles a minimum of 5 feet wide. Also, at least one accessible space must be assigned to van use. The van space must be 11 feet wide with a 5 foot wide access aisle or 8 feet wide with an 8 foot wide access aisle.

b. The access aisles are to be properly marked with paint stripes and each of the accessible parking spaces are to properly identified with the appropriate signage.

c. The pathway from the access aisles to the building is also to be constructed of a smooth, solid with a slope not exceeding 1:20. Any slope over 1:20 must be treated as a ramp, cannot exceed a slope of 1:12 and meet the provisions of ramp construction as outlined in ICC/ANSI A117.1-2003.

d. All door lock and/or latch set operators must be of an approved lever type and not a knob. Most, if not all, of the existing door lock and latch sets would need to be replaced.

e. Doors need to swing open to allow a clear opening dimension of 32". 36" wide doors achieve this clearance. A pair of doors must contain two 36" wide leaves or, if an existing pair of doors is 5 feet wide, 1 active leaf that is 36" wide and an inactive leaf that is 24" wide. Most of the existing doors are of adequate width. However, clear maneuver floor space is not always provided at each door. This is more a product of fixtures, furnishings and equipment intruding into the required clear maneuver floor space and not due to the actual construction of the doors and the adjacent walls.

f. The existing toilet rooms do not meet current accessibility requirements and would need to be rebuilt in order to achieve the proper clearances and mounting heights required of accessible plumbing fixtures and toilet room accessories.

8. Media & Communication Facilities

The existing media and communication facilities within the existing municipal building can be broken down into two areas, The Multi-Purpose Room and The Municipal Offices. The Multi-Purpose Room contains no built-in media and communication facilities. Equipment must be brought in for any presentations requiring multi-media such as, but not limited to, films, videos or computer presentations such as Power Point. There is a white board for marker presentations, an easel and a small television/VCR stand but no television or VCR.

There is no sound system, phone service, projectors and screens or internet service provided in the Multipurpose Room.

C-Net, a local broadcaster of government meetings and proceedings brings their own video and sound equipment into the building to film and broadcast public meetings. They also provide the microphones that are placed on the tables in front of the presiding township officials as well as at the podium used for public comment and presentation.

The Municipal offices are equipped with phone and internet services as well as specialized communication devices, such as fax machines and "walkie talkies" to communicate to township employees in the field. There is a television with cable service located in the Conference Room.

In summary, it would appear that the existing media and communication facilities in the Municipal Offices are adequate for the present time. However, the existing media and communication facilities in the Multi-

Purpose Room are practically non-existent requiring the set up of specialized equipment brought in from an outside source to support the most basic modern, electronic presentations.

Section III- Summary of Workshops & Analysis of Options

SECTION III A- SUMMARY OF WORKSHOPS

In order to determine the goals of the Township management and supervisors as they applied to the subject of this report, three workshops were held between the Township management and supervisors and the professionals. The goals of these workshops were as follows:

Review and explain the Project Options that would be analyzed in the report.
Review any outside funding sources that could apply to the Project Options.
Assemble feedback from the township management and supervisors concerning the pros and cons of the existing municipal building.
Prepare a preliminary program for a new municipal building that would be used in the analyses of Project Options Three, Four and Five.
Explain the concept of LEED certification and develop a checklist that could be used to determine LEED certification eligibility to be included in the analysis of Project Options Four and Five. The workshop schedule was as follows:

WORKSHOP ONE (Thursday, May 19, 2011)

- Project introduction and review of project options.
- Preparation of funding options.
- Preparation of preliminary building programs
- Preparation of LEED checklist.

WORKSHOP TWO (Thursday, June 9, 2011)

- Review of project options and building programs.
- Review of funding options.
- Review of schematic space allocations and floor plan abstracts.
- Review of LEED checklist

WORKSHOP THREE (Thursday, July 14, 2011)

- Final review of building programs, LEED checklist, funding options and schematic plans.

The workshop agendas are included in the Appendices.

The information gathered during these workshops served as a basis for the analysis of the project options which follow.

SECTION III B- DESCRIPTION OF OPTIONS

OPTION ONE- REUSE THE EXISTING BUILDING WITH NO ADDITIONS

This option will analyze renovations to address the following:

- Improve handicap accessibility.
- Improve energy efficiency.
- Improve exiting and life safety issues
- Update media/ communication facilities.
-

OPTION TWO- REUSE THE EXISTING BUILDING WITH ADDITIONS

This option will analyze renovations to address the following:

- Improve handicap accessibility.
- Improve energy efficiency.
- Improve exiting and life safety issues
- Update media/ communication facilities.

This option will also analyze additions to address the following:

- Enlarge the Multi-Purpose Room.
- Add a separate Meeting Room.
- Add support services such as a kitchen, coat room, toilet rooms and storage rooms.
- Enlarge current office area.

The following three options address the construction of a new municipal office building:

OPTION THREE- Construct a new building with no LEED consideration.

OPTION FOUR- Construct a new building with use of LEED approaches to energy conservation but with no official LEED certification.

OPTION FIVE- Construct a new building with official LEED certification.

Each option will be presented individually and in a similar format. Each option analysis will contain the pros and cons associated with that option as well as preliminary opinions of probable budget amounts.

SECTION III C- ANALYSIS OF OPTIONS

OPTION ONE- REUSE THE EXISTING MUNICIPAL BUILDING WITH NO ADDITIONS

General Code Issues

This option assumes that the existing municipal building will remain and that no new municipal building will be constructed. It also assumes that the existing municipal building will retain its current size, shape and functions. The only work that would be done to the existing building under this Option One would be upgrades required to bring the existing building into current code compliance with respect to handicap accessibility, energy efficiency, and exiting and life safety issues. In addition, updates to media/communications facilities will be addressed as they apply to C-Net broadcasts and in-house multi-media presentations.

At the time this building was constructed it is assumed that it was constructed under the provisions of the Pennsylvania Department of Labor and Industry Fire and Panic Regulations and possibly the provisions of the BOCA building code as well. Since then Pennsylvania has adopted the Uniform Construction Code which includes the International Building Code, the International Existing Building Code and numerous other codes which fall under the purview and authorship of the International Building Council (IBC). The IBC codes are reissued on a three year basis and the codes current at the time of the writing of this report are dated 2009. The next code release is expected for 2012.

A code review was conducted using the provisions of the International Existing Building Code-2009 (IEBC) and The International Building Code -2009 (IBC).The initial code review of the existing building reveals that it is divided into two occupancy classifications- A-3 Assembly (Meeting Room) and B-Business (township business offices, toilet rooms, building foyer and storage). Because these are considered non-separated occupancies, the most restrictive provisions of Chapter 9 Fire Protection Systems and the most restrictive allowances for height and area for the type of construction of the building in accordance with Section 503.1. What this means is as follows.

The least restrictive construction classification as it pertains to required rated fire separations and fire resistive materials is Type "5B" which the IBC describes as being "that type of construction in which the structural elements, exterior walls and interior walls are of any materials permitted by this code. " While this gives us more freedom in material selections and less restrictive fire protection assemblies (none are required), it does restrict us in the maximum size of building. Using Section 503.1 and Table 503 we find that the most restrictive occupancy is the "A-3" which limits us to a one story building no taller than 40 feet and no larger than 6,000 sq. ft. in floor area. While this is irrelevant to Option One it will become important in the Option Two analysis which follows. This information is presented here in that it establishes a basis for the analyses of both Options One and Two.

Once we have established occupancy classifications and construction type we establish occupancy loads. That is, how many people will be expected to occupy the building? This is based on calculations and criteria set by code for each occupancy classification. In the case of the assembly occupancy we have three choices. The occupancy load is based on the areas of the Meeting Room (1,035 sq. ft.) and the Business Area (1,356 sq. ft.) as follows:

Meeting Room (1,035 sq. ft.)

Standing (no tables and chairs) - 5 sq. ft. per person= 207 people
Chairs only- 7 sq. ft. per person= 148 people
Tables and Chairs- 15 sq. ft. per person= 69 people

Business Area (1,356 sq. ft.)

100 sq. ft. per person= 14 people

Given the amount of furniture located in the meeting room, the lack of storage space and the nature of activities which occur in the room, it is safe to say that the "Standing" and "Chairs Only" option occupancies will probably

not occur. However, there might be occasions where more people than the 69 shown in the "Tables and Chairs option may be present. It is my opinion that it would be prudent to plan on a maximum capacity of between 69 and 148 people using the average of 108 people for the purposes of this code analysis. Including the Business Area, the total occupancy load to be used for the rest of this code analysis will be 108 plus 14 which totals 122 people.

Using this number we determine the required plumbing fixtures. The required number and type of plumbing fixtures is again based on code required calculations using the occupancy load of each occupancy type. We take the total for each occupancy, divide it by two and assign the resulting numbers to the number of men and women.

A-3 Assembly 108/ 2= 54 men and 54 women

Required plumbing fixtures:	Water Closets (Toilets)	men-	1 per 125= 1
		women-	1 per 65= 1
	Lavatories (Sinks)	men-	1 per 200= 1
		women-	1 per 200= 1
	Drinking Fountain		1 per 500 = 1
	Service Sink		1 required

B Business 14/2= 7 men and 7 women

Required plumbing fixtures:	Water Closets (Toilets)	men-	1 per 25 (first 50)= 1
		women-	1 per 25 (first 50)= 1
	Lavatories (Sinks)	men-	1 per 40 (first 80)= 1
		women-	1 per 40 (first 80)= 1
	Drinking Fountain		1 per 100 = 1
	Service Sink		1 required

What does this mean? First of all the drinking fountains and the service sink (janitor's sink) can double up for both occupancies which means we only need one of each for the whole building. It could also be reasonably argued that the total occupancy capacity allows for only one water closet and lavatory for each of the Men's and Women's Rooms since most Meeting Room activities occur while the office area is closed. However, it has been mentioned in the past that the existing toilet facilities are not adequate if there is a "full house" in the Meeting Room regardless of whether the office area is opened at the same time or not. Since the code dictates a minimum number of required plumbing fixtures, adding fixtures is perfectly acceptable. In this case, this can be done one of three ways and they all involve accessibility

Handicapped Accessibility

Note that, as per the IBC, not all spaces need to be accessible to the handicapped. However none of the types and uses of spaces in the existing municipal building fit the accessibility exemptions lilted in the IBC. The two Storage Rooms and the File Room are currently not accessible due to the amount of and manner in which materials and furnishings occupy the spaces. They provide valuable, if less than adequate, storage space. To make them accessible would reduce their storage capacity considerably. And where would the displaced material go? In the end it would add the clutter in existing spaces not designed for or capable of absorbing the overflow.

As per the IEBC, Any renovations to existing spaces that, at very least, include the removal of and replacement or covering of existing materials, elements, equipment or fixtures using new materials, elements equipment or fixtures that serve the same purpose must make the effected space(s) and the accessible path of which they are a part accessible to a cost limit of 20 percent of the cost of the renovations. While the 20 percent limitation usually has the effect of not making an entire building accessible, it would be recommended to make a public building such as this municipal building as handicapped accessible as possible. This would be in the best interest of the staff and the citizens of the township. It would not only make the building more user friendly but also limit the township's liability to federal civil rights lawsuits brought against the township for not having a completely accessible building.

Neither of the existing toilet rooms meets current standards for handicapped accessibility. Even if no plumbing fixtures were added, extensive renovations would need to be undertaken to bring the existing toilet rooms up to the

current accessibility standards. If just one new toilet were added to each existing toilet room, the room sizes would have to be expanded significantly to accommodate the new toilet partitions and clear floor spaces required by code. The IEBC has a provision that allows for the addition of a family or assisted-use accessible toilet room where it is determined that it is technically infeasible to modify existing toilet rooms to make them accessible. The assisted-use toilet room is a single user toilet room where a family member or companion can assist the handicapped person with the use of the toilet facilities in privacy. So the three existing toilet room renovation alternates are as follows:

Alternate 1- Renovate the existing toilet rooms to make them accessible but keep one toilet and one sink in each toilet room. This is a feasible option since the space exists to do it. (See 1/E-3).

Alternate 2- Renovate existing toilet rooms by adding one accessible toilet stall and alter or replace the existing sink to be accessible. This would be infeasible since the space does not exist to do this without losing storage and or office capacity within the existing size limits of the building.

Alternate 3- Leave existing toilet rooms as they are and add one assisted use, accessible toilet room. (See 2/E-3).

The existing toilet room renovations and the addition of the new dual height accessible drinking fountain are the most extensive accessibility improvements required under Option One. The remaining required accessibility improvements within the building would consist of the following:

Multi- Purpose Room- Provide an accessible dais or table with a microphone for public comment and presentations. If an audio amplification system is installed, install an assistive listening system.

Township Office Foyer- Provided an accessible service counter 36" long and 34" high max. A modification of the existing swing leaf counter to the dimensions listed above would provide the accessible counter.
Lower thermostats to bring them within accessible reach range limitations.
Change all door hardware to lever operated handles rather than knobs.
Rearrange fixtures, furniture and equipment to provide proper floor clearances at both sides of doors.
Provide accessible tactile signage at exits and toilet rooms.
If a sound amplification system is installed, provide an assisted listening system.

On the exterior of the building the following accessibility improvements need to be made:

Those spaces designated as being accessible need to be clearly marked with lane markers and signs. In addition the spaces and the striped loading lanes need to be on hard pavement such as concrete or asphalt and the slope of the pavement needs to be no steeper than 5%. One spot needs to be reserved for van parking. All spots need to be a minimum of 8 feet wide, the loading lanes need to be a minimum of 5'feet wide and the van accessible loading lane needs to be 8 feet wide minimum.
The path from the accessible parking spots to the front door needs to be a hard surface such as concrete or asphalt and the slop of the path cannot be steeper than 5%. If it is steeper than 5% then an accessible ramp with handrails needs to be installed.

Energy Efficiency

In meetings it has been stated that the building is very drafty and that the windows especially are a major source of heat loss and discomfort. While it was not possible to determine the type and thickness of wall insulation, the ceiling insulation is fiberglass batt which lays directly above and on the suspended ceiling system. This is always a source of heat loss as the ceiling is opened for repairs or running wires and cables, the insulation batts are moved to the side and very rarely are they returned to their original spot leaving gap for heat to escape into the unheated attic space and out the gable vents.

Center County, Pennsylvania is listed in the International Energy Conservation Code (IECC) as being in a 5A climate zone. The "u" and "R" factors which follow are those that the IECC requires based on the 5A climate zone.

The existing windows do not appear to be double glazed nor thermally broken. It is recommend that all the windows be replaced with new thermally broken, double glazed, low "E" windows and that the perimeter edges be sealed with a flexible sealant. Maximum u factor for the windows would be u= .55.

The existing doors may not be insulated. Even if they are, weather-stripping needs to be installed or replaced and door sweeps installed at the bottom of the doors. If the doors are not insulated they should be replaced with new insulated doors. Maximum u factor for the doors would be u= .80.

The building envelope insulation needs to be improved. While it might be easy enough to replace the batt insulation in the ceiling with the required R-38 insulation, the wall insulation is another story completely. Current code requires that the insulation between the studs be a minimum of R-13 and that continuous insulation be installed on the outside of the walls to a minimum of R-5.6. This is for new construction and I don't foresee a requirement in the IEBC for renovations of the type being proposed in Option One for forcing the installation of new ceiling or wall insulation, it would be prudent to replace what can be done economically in the interest of lower utility bills.

The IECC requires that a limit be set for the amount of wattage that can be assigned to the building lighting. Town halls are limited to 1.1 watts per square foot. The existing building is 2402 sq. ft. x 1.1= 2642 watt lighting allowance. As described in "Section II- Description of Existing Conditions", the total wattage of the existing lighting is 4640 watts.

The existing interior building lighting is 1998 watts over the allowable limit. In order to reduce lighting wattages to acceptable ranges several things can be done:

Replace the existing 2 x 4 (4) bulb T-12 fixtures with new 2 x 4 (3) bulb T-8 fixtures which each use 96 watts and replace the 2 x 2 and 1 x 4 fixtures with 32 watt compact fluorescent fixtures. Ther total wattage of the new lighting package is as follows:

(3) tube 2 x 4 T-8 32 watt bulb fluorescent- fixture total 24 x 96 watts=	2304 watts
Compact fluorescent 32 watt fixture- fixture total 7 x 32 watts=	224 watts
Total watts=	2528 watts

Exiting and Life Safety Issues

Neither the A-3 nor the B occupancies meet the criteria of their respective occupancies in the IBC which require the installation of an automatic sprinkler system, or a manual or automatic fire alarm system. Based upon the occupancy load of 122 people and no sprinkler system being installed, the maximum travel distance to an exit cannot exceed 200 feet. This building is not large enough for this to even become an issue.

A-3 and B occupancies with a maximum occupancy load of 49 are allowed to have only one exit. The Meeting Room has occupancy load greater than 49 but it has two exits. The B occupancy has an occupancy load lower than 49 and, therefore, can have only one exit which it does.

The existing exit components are of sufficient width to accommodate the occupancy load of the existing building.

The emergency lighting and exit components need to be improved. All exits and paths to exits need to be marked with lighted exit signs on an emergency power circuit and all exits need to be illuminated in the interior and exterior with emergency lighting that is either battery powered or attached to an emergency power circuit.

The double door serving as a second means of egress from the meeting room needs to open onto a path that leads away from the building to the nearest thoroughfare. This path needs to be of solid material such as concrete or asphalt and cannot slope more than 5%.

Mold Issues- Repairs could by undertaken to seal all exterior sources of moisture penetration. However, this will not solve the mold and mildew problem. The Multi-Purpose Room and the adjacent Entry Foyer are finished with wood

paneling. It is likely that the mold and mildew are growing on the existing insulation and the inside face of the wall paneling. Only a complete removal and replacement of the existing vapor barrier(s), wall insulation and wall finishes, and a complete chemical wash down of the remaining wall components can have any chance of eliminating the mold and mildew problem. This is not an easy repair. It can be very costly and will create a disruption to the uses of the building that may not be tolerable.

However, the particular molds growing in the walls could pose serious health issues to those people using the spaces in question. The office staff has already noted headaches and mild breathing difficulties which they did not experience before the mold was discovered. Immediately retaining the services of a certified mold and mildew inspection and abatement service is strongly recommended to determine the level, if any, of health hazard posed by the mold and mildew.

Media and Communication Facility Upgrades

The Municipal Offices are presently are barely adequately equipped with media and communication facilities. Improvements that might be recommended at this time are upgrades to current internet, phone and cable television services and perhaps the installation of a wireless communication network in the offices and the rest of the building if currently available in the area.

The Multi-Purpose Room, on the other hand, could benefit from a complete investment in presentation equipment including, but not limited to, multi-media computer projectors and screens, hard wiring for C-Net broadcast equipment, assistive listening systems (only if an audio amplification system is installed) and internet service (as mentioned above, a wireless system would be preferred).

Mechanical, Electrical and Plumbing

ASHRAE, an industry accepted standards organization includes special standards for items such as energy consumption and acceptable ventilation practices. The ASHRAE energy code, ASHRAE 90.1 is referenced many times in the International Building code, as well as the International Energy Conservation Code, two required codes for this building. ASHRAE 62, the ventilation standard is an accepted practice for healthy ventilation practices in commercial and institutional buildings. The building codes allow alternative code compliance paths that follow ASHRAE standards. The IMC does not readily address the use of operable windows for ventilation. ASHRAE 62 does. It states that if the operable windows are required for the introduction of fresh air to meet the ventilation rates, then the windows should be able to be used in all weather conditions, at all times of the year.

The existing building is considered an 'engineered metal building.' It is several years old and nearing the end of its useful life. This building appears to have been expanded at some time. Typically, this type of structure requires at least 5% (and probably 10%) additional heating and cooling capacity to properly condition the space, when compared to a building built to current energy standards. Essentially, although more economical to purchase, metal buildings typically cost more to operate and require larger HVAC systems to condition.

Make up air would be required to be provided for the exhausts systems, if these spaces are altered. Additionally, some or all of the existing exhaust fans discharge into the attic, which is detrimental to the building surfaces, can make the insulation perform poorly (resulting in higher energy bills) and is potentially hazardous to the building occupants.

This discharge condition must be corrected to be compliant with current (and probably future) codes.

Currently there is no outdoor air introduced into the building spaces, so the building is dependent upon operable windows for fresh air. Under IMC, existing systems do not need to be updated, but where new HVAC systems are added, or where HVAC systems are altered, outdoor air will need to be brought in and properly filtered and tempered. Apart from the men's restroom, all exhaust fans are operable. The exhaust fan in the storage room is unnecessarily loud, and would require maintenance. There is no means to recover energy from the toilet room exhaust air streams.

Although meeting the needs for the current installation, the single phase service entrance offers limitations when selecting or adding other equipment to the building. The service places a limitation on the maximum motor and air

conditioning unit size that can be provided for this building. The power panels, receptacles and the rest of the existing power systems are marginal for the existing installation. Per NEC 220 the service entrance will need to be upgraded to a larger size, because the existing service is only 200 amps.

Type NM wiring is not permitted to be used in Business occupancy per NEC 334.10. All newly installed electrical equipment and wiring relating to work done in any work area shall be comply with the NFPA 70.

More efficient lighting sources are available in the current market. In order to be compliant with the International Energy Conservation Code (IECC), the light fixtures will need to be replaced with more efficient fixtures to reduce the power density of the building to 1.1 watt per square foot. LED exit signs will need to be added at all of the exits. Additional emergency lighting will need to be added to the building for proper illumination of the means of egress. - The current light fixtures don't meet IECC 505.2.2.1. Each individual office space is required to have a manual control that shall also allow the occupant to reduce the connected lighting load in a reasonably uniform illumination pattern by at least 50 percent.

Depending on the size of the existing septic tank, another tank or a larger tank may be required to accommodate a larger number of occupants. The existing drainage field might have some hidden condition issues. Current IPSDC requires that all drainage fields include inspection pipes for maintenance purposes. Currently there are no inspection pipes. If the septic tank size is increased, the drainage field will also need to be expanded.

The plumbing fixtures do not meet current potable water consumption standards. Also, the fixtures are marginally meeting ADA requirements. A water cooler is required under current codes. The same is true for a janitor's sink. Neither of these is currently present. The residential style water heater could not be used in a commercial building under current codes. The water heater does not include either a drain pan or a floor drain near the relief valve discharge. The tank is not strapped to a wall to prevent tip over.

Special Systems

Code does not require sprinklers for this building. Even if one were desired, the water service currently supplying this building cannot support a fire suppression system.

IFC 2009 section 907.2.1 does not require a manual fire alarm system with a pull station within 5 feet of the exits, because the occupant load is under 300 people. Although a fire alarm system is not required, it is recommended that one be installed, with manual fire alarm pull stations, phone connection to fire alarm panel, smoke detectors and annunciation devices.

Lightning protection is not required, but highly recommended.

OPINION OF PROBABLE CONSTRUCTION COST FOR
OPTION ONE- REUSE THE EXISTING MUNICIPAL BUILDING WITH NO ADDITIONS

Basic Building Code Upgrades-	$ 15,000.00 to $35,000.00
Handicapped Accessibility-	$ 45,000.00 to $60,000.00
Energy Conservation and Efficiency-	$ 60,000.00 to $85,000.00
Life Safety Issues-	$ 10,000.00 to $20,000.00
Media and Communication Facility Upgrades-	$ 15,000.00 to $40,000.00
Subtotal-	$145,000.00 to $240,000.00
Design and Permitting Fees (15%)-	$ 22,000.00 to $36,000.00
Total=	$167,000.00 to $276,000.00

Note- The cost to remove and replace the finishes form both sides of the exterior walls in order to improve the energy efficiency of the building envelope and mitigate the mold problem is included once on the "Energy Conservation and Efficiency" cost line.

PROS AND CONS

PROS

- The existing municipal building and its location are familiar to township employees and citizens.
- The cost to renovation the existing municipal building is the least expensive of the five options.
-Although not necessarily designed for a modern, typical municipal office building, the current HVAC systems are in good operating condition. The individual room air conditioning systems provide simple, single room control in the rooms where they are located. And, the window air conditioning units are fairly new, and appear to be in working order.
-The same holds true for the electric heaters. They provide better overall temperature control because there are more of them and they cover more rooms. The heating units are also fairly new and appear to be in good working order.
-The existing domestic hot and cold water plumbing systems appear to be operating properly. There are no known problems. The domestic water heater is nearing the end of its useful life, but still seems to operate correctly and reliably.
-All of the existing receptacles are a grounded type and therefore will not need to be replaced.

CONS

-The existing municipal building is aging quickly and poorly.
-The building envelope does not provide adequate insulation nor is it weather tight.
-The building has mold problems in the interior walls as a result of water leakage. Rainwater runoff runs towards the building from the parking lot.
-The functions of township government and the fixtures, furnishings and equipment necessary to administer those functions have outgrown the size and layout of the existing building.
-Apart from the men's restroom, all exhaust fans are operable. The exhaust fan in the storage room is unnecessarily loud, and would require maintenance. There is no means to recover energy from the toilet room exhaust air streams.
-Although meeting the needs for the current installation, the single phase service entrance offers limitations when selecting or adding other equipment to the building. The service places a limitation on the maximum motor and air conditioning unit size that can be provided for this building. The power panels, receptacles and the rest of the existing power systems are marginal for the existing installation.
-Type NM wiring is not permitted to be used in Business occupancy per NEC 334.10. All newly installed electrical equipment and wiring relating to work done in any work area shall be comply with the NFPA 70.
-Per NEC 220 the service entrance will need to be upgraded to a larger size, because the existing service is only 200 amps.
-More efficient lighting sources are available in the current market.
-In order to be compliant with the International Energy Conservation Code (IECC), the light fixtures will need to be replaced with more efficient fixtures to reduce the power density of the building to 1.1 watt per square foot. LED exit signs will need to be added at all of the exits. Additional emergency lighting will need to be added to the building for proper illumination of the means of egress. Lightning protection is not required, but highly recommended.
-The current light fixtures don't meet IECC 505.2.2.1. Each individual office space is required to have a manual control that shall also allow the occupant to reduce the connected lighting load in a reasonably uniform illumination pattern by at least 50 percent.
-Depending on the size of the existing septic tank, another tank or a larger tank may be required to accommodate a larger number of occupants.
-The existing drainage field might have some hidden condition issues. Current IPSDC requires that all drainage fields include inspection pipes for maintenance purposes. Currently there are no inspection pipes. If the septic tank size is increased, the drainage field will also need to be expanded.
-The plumbing fixtures do not meet current potable water consumption standards. Also, the fixtures are marginally meeting ADA requirements.
-A water cooler is required under current codes. The same is true for a janitor's sink. Neither of these is currently present.

-The residential style water heater could not be used in a commercial building under current codes. The water heater does not include either a drain pan or a floor drain near the relief valve discharge. The tank is not strapped to a wall to prevent tip over.
-There are no modern communications or video systems for areas such as the Council Chambers.
-There are no ADA friendly sound system components, available in Council Chambers.
-Computer power systems are non-existent. Data ports are only available in the office space, with none available in the Council Chambers. No wireless connectivity exists.
-The existing building is considered an 'engineered metal building.' It is several years old and nearing the end of its useful life. This building appears to have been expanded at some time. Typically, this type of structure requires at least 5% (and probably 10%) additional heating and cooling capacity to properly condition the space, when compared to a building built to current energy standards. Essentially, although more economical to purchase, metal buildings typically cost more to operate and require larger HVAC systems to condition.

OPTION TWO- REUSE THE EXISTING MUNICIPAL BUILDING WITH ADDITIONS

General Code and Program Issues

This option assumes that the existing municipal building will remain and that no new municipal building will be constructed. It also assumes that the existing municipal building will be added onto in such a way that will bring it close to the size and functions of a new municipal building as outlined in "The New Building Schematic Program" listed in Option Three below. This option includes all of the suggested improvements and renovations recommended in Option One plus an addition which includes the following:

- Enlarge the Multi-Purpose Room.
- Add a separate Meeting Room.
- Add support services such as a kitchen, coat room, toilet rooms and storage rooms.
- Enlarge current office area.
-

While the renovations to the existing building fall under the regulations found in The International Existing Building Code-2009 (IEBC), the addition is considered new construction and is subject o the regulations found in The International Building Code -2009 (IBC). As was the case for Option 1, Option 2 assumes a mixed use, non-separated occupancy (A-3 Assembly and B-Business) with a construction classification of Type "5B" (one story, 40 feet high maximum and 6,000 sq. ft. maximum floor area). Refer to Drawing A-1 in the Appendices.

The addition shown on Drawing A-1 and developed for this Option 2 analysis would add 2,724 sq. ft. to the existing building resulting in a total of 5,335 sq. ft. of space. 2,253 sq. ft. would be "A3- Assembly" occupancy and 1,939 sq. ft. would be "B-Business" occupancy. The remaining 1,143 sq. ft. are spaces primarily supporting the "A-3" occupancy and exterior wall thicknesses and, therefore, is not counted towards the occupancy load calculation. The occupancy load is as follows:

"A3- Assembly (2,253 sq. ft.)

Standing (no tables and chairs) - 5 sq. ft. per person= 451 people
Chairs only- 7 sq. ft. per person= 322 people
Tables and Chairs- 15 sq. ft. per person= 151 people

Business Area (1,939 sq. ft.)

100 sq. ft. per person= 20 people

While the addition provides a storage space for excess table and chairs from both meeting rooms, the nature of activities which occur in the meeting rooms would still warrant an occupancy load based on tables and chairs at the least and chairs only at the most. As in the Option 1 analysis an average based on 151 and 322 people was used resulting in an occupancy load of 237 people. Including the Business Area, the total occupancy load to be used for the rest of this code analysis will be 237 plus 20 which totals 257 people.

Using this number we determine the required plumbing fixtures. The required number and type of plumbing fixtures is again based on code required calculations using the occupancy load of each occupancy type. We take the total for each occupancy, divide it by two and assign the resulting numbers to the number of men and women.

A-3 Assembly 237/ 2= 119 men and 119 women

Required plumbing fixtures:	Water Closets (Toilets)	men-	1 per 125= 1
		women-	1 per 65= 1
	Lavatories (Sinks)	men-	1 per 200= 1
		women-	1 per 200= 1
	Drinking Fountain		1 per 500 = 1
	Service Sink		1 required

B Business 20/2= 10 men and 10 women

Required plumbing fixtures:	Water Closets (Toilets)	men-	1 per 25 (first 50)= 1
		women-	1 per 25 (first 50)= 1
	Lavatories (Sinks)	men-	1 per 40 (first 80)= 1
		women-	1 per 40 (first 80)= 1
	Drinking Fountain		1 per 100 = 1
	Service Sink		1 required

Drawing A-1 shows enlarged toilet rooms that contain the required number and type of plumbing fixtures for the enlarged. The Women's Room has two toilets and one lavatory. One of the toilet stalls is accessible as is the lavatory. The Men's Room has one toilet, one urinal and one lavatory. While two toilets are required for the Men's Room, the code allows for urinals to be substituted for no more than 50% of the required number of toilets. All fixtures in the Men's Room are accessible. A janitor's closet has been added between the toilet rooms containing a service sink and a water heater located above the service sink. A dual height accessible drinking fountain has been added to the Building Lobby.

Handicapped Accessibility

The existing toilet room renovations and the addition of the new dual height accessible drinking fountain are the most extensive accessibility improvements required under Option 2. The remaining required accessibility improvements within the building would consist of the following:

Meeting Room- Provide an accessible dais or table with a microphone for public comment and presentations.
Township Office Foyer- Provided an accessible service counter 36" long and 34" high max. A modification of the existing swing leaf counter to the dimensions listed above would provide the accessible counter.
Lower thermostats to bring them within accessible reach range limitations.
Change all door hardware to lever operated handles rather than knobs.
Rearrange fixtures, furniture and equipment to provide proper floor clearances at both sides of doors.
Provide accessible tactile signage at exits and toilet rooms.
If a sound amplification system is installed, provide an assisted listening system.

Since the addition would be treated as new construction, the entire addition would be designed and constructed to meet all the applicable requirements for accessibility outlined in the IBC-2009.

On the exterior of the building the following accessibility improvements need to be made:

Those spaces designated as being accessible need to be clearly marked with lane markers and signs. In addition the spaces and the striped loading lanes need to be on hard pavement such as concrete or asphalt and the slope of the pavement needs to be no steeper than 5%. One spot needs to be reserved for van parking. All spots need to be a minimum of 8 feet wide, the loading lanes need to be a minimum of 5'feet wide and the van accessible loading lane needs to be 8 feet wide minimum.
The path from the accessible parking spots to the front door needs to be a hard surface such as concrete or asphalt and the slop of the path cannot be steeper than 5%. If it is steeper than 5% then an accessible ramp with handrails needs to be installed.

Energy Efficiency

With an addition of this size, removing all of the interior and exterior finish materials for the existing exterior walls to replace them with vapor barriers and insulation materials to bring them in compliance with current energy code requirement would be prudent. Against the total cost of the addition and renovation, the cost to remedy the existing walls would not seem as prohibitive in Option 2 as it might seem in Option 1. This would also be a good opportunity to include replacing existing windows and exterior doors, resealing of window and door perimeters, re-gasketing exterior door edges and removing and replacing the existing batt insulation in the ceilings with a more efficient and code compliant horizontal insulation system to the scope of the project.

It would also be prudent to remove all of the existing lighting fixtures and replace them with more efficient lighting fixtures to bring the building into compliance with the current code required maximum lighting wattage allowance. Town halls are limited to 1.1 watts per square foot. The total building is 5,067 sq. ft. x 1.1= 5,573 watt lighting allowance. This can easily be achieved by using (3) tube 2 x 4 T-8 32 watt bulb fluorescent fixtures and/or compact fluorescent 32 watt fixtures.

Exiting and Life Safety Issues

Neither the A-3 nor the B occupancies meet the criteria of their respective occupancies in the IBC which require the installation of an automatic sprinkler system, or a manual or automatic fire alarm system. Based upon the occupancy load of 257 people and no sprinkler system being installed, the maximum travel distance to an exit cannot exceed 200 feet. No travel distance to an exit exceeds 200 feet in this enlarged building. However, in the interest of public safety and to eliminate a dead end corridor in the office area, the existing exits have been maintained as such and new exists have been added to the meeting rooms and office area. The existing exit components are of sufficient width to accommodate the occupancy load of the existing building.

The emergency lighting and exit components need to be improved. All exits and paths to exits need to be marked with lighted exit signs on an emergency power circuit and all exits need to be illuminated in the interior and exterior with emergency lighting that is either battery powered or attached to an emergency power circuit.

The double door serving as a second means of egress from the meeting room needs to open onto a path that leads away from the building to the nearest thoroughfare. This path needs to be of solid material such as concrete or asphalt and cannot slope more than 5%.

The removal of the existing exterior wall finishes to upgrade the insulation and vapor barriers also presents a perfect opportunity to address the mold issue in the existing exterior walls as well.

Media and Communication Facility Upgrades

The upgrades suggested for Option 2 regarding media and communication systems and devices are identical to those proposed for Option 1.

Mechanical, Electrical and Plumbing

If an addition is built onto the existing building, it is recommended that new HVAC systems be put in place to serve the entire building. Proper outdoor air and exhaust shall then be installed to provide for a cleaner, healthier environment. The exhaust fans should be modified to exhaust through the roof, and an exhaust fan should be installed in the women's restroom as well.

Buildings over 5,000 square feet are required to have automatic lighting shutoff through a lighting control panel or occupancy sensors, which might apply if an addition is made onto this building, or if a new building is constructed.

If it is found that the existing septic tank is not sized adequately for a larger occupancy, a new tank should be installed. The drainage field will need to be enlarged as well to serve the larger septic tank. It is possible that the drainage field will have to be moved if adequate space does not exist to expand the current field. However, there are no other location options for a new septic drainage field and the existing drainage field cannot be expanded.

Code does not require sprinklers for this building. Even if one were desired, the water service currently supplying this building cannot support a fire suppression system.

OPINION OF PROBABLE CONSTRUCTION COST FOR
OPTION TWO- REUSE THE EXISTING MUNICIPAL BUILDING WITH ADDITIONS

Renovations to the Existing Building	
Basic Building Code Upgrades-	$ 15,000.00 to $35,000.00
Handicapped Accessibility-	$ 55,000.00 to $75,000.00
Energy Conservation and Efficiency-	$ 40,000.00 to $65,000.00
Life Safety Issues-	$ 10,000.00 to $20,000.00
Media and Communication Facility Upgrades-	$ 25,000.00 to $50,000.00
Renovation Subtotal-	$145,000.00 to $245,000.00
Building Addition-	$327,000.00 to $409,000.00
(2,724 sq. ft.@ $120.00 to $ 150.00/ sq. ft.)	
Construction Subtotal-	$472,000.00 to $654,000.00
Design and Permitting Fees (15%)-	$ 71,000.00 to $ 98,000.00
Total=	$543,000.00 to $752,000.00

Notes- The cost to remove and replace the finishes form both sides of the exterior walls in order to improve the energy efficiency of the building envelope and mitigate the mold problem is included once on the "Energy Conservation and Efficiency" cost line. The cost to remove and replace those existing finishes is reduced since the entire rear wall of the existing building will be removed in order to construct the new addition.
The cost to enlarge the existing bathrooms to accommodate the new plumbing fixtures is reflected in the increase in prices on the "Handicapped Accessibility" line.
The cost for media and communication facility upgrades was increased to allow for the expansion of recommend new systems into the addition.

PROS AND CONS

PROS

-An enlarged and renovated municipal building provides the space and organization which the current building alone does not and cannot provide. As a result, the "con" from Option One which states "The functions of township government and the fixtures, furnishings and equipment necessary to administer those functions have outgrown the size and layout of the existing building" is eliminated.
- The existing municipal building and its location are familiar to township employees and citizens.

CONS

-Except as described above, all of the other "cons" listed in Option One are applicable to Option Two.
-Option Two is three times more expensive than Option One.
-Septic drainage filed capacity and location limitations prevent the expansion of the existing building.

OPTION THREE- CONSTRUCT A NEW BUILDING WITH NO LEED CONSIDERATION

The end result of Option 3 is a new municipal building that is designed and constructed according to the requirements of the Halfmoon Township Zoning Ordinance, the State Uniform Construction Code, The International Building Code, The International Energy Conservation Code and any additional codes referenced in the Uniform Construction Code and the International Building Code. The International Code Council issues new codes on a three year cycle. At the time of the writing of this report, the 2009 codes are in effect. It is anticipated that a new municipal building would be built under the codes in effect during the next code cycle which begins in 2012.

For the purposes of this report the site for a new municipal building would be located in Autumn Park and the general building program and the size, type and arrangement of spaces can be found on the New Building Area and Adjacency Plan located in the report appendix and as listed below:

NEW BUILDING SCHEMATIC PROGRAM

BUILDING EXTERIOR GROSS AREA= 4,777 SQ. FT.
PHASE 3 BUILD OUT= 546 SQ. FT.
TOTAL BUILDING EXTERIOR GROSS AREA= 5,323 SQ. FT.

A. MEETING AREA 31'-0" X 55'-0" (1,705 SQ.FT.)

- A1. LARGE CONFERENCE ROOM: 30'-0" X 35'-0" (1,050 SQ. FT.)
- A2. SMALL CONFERENCE ROOM: 18'-0" X 30'-0" (540 SQ. FT.)

B. RECEPTION AREA 16'-0" X 36'-0" (576 SQ.FT.)

- B1. ENTRY VESTIBULE: 7'-0" x 16'-0" (112 SQ. FT.)
- B2. RECEPTION: 16'-0" X 16'-0" (256 SQ. FT.)
- B3. LIBRARY/ CONFERENCE: 12'-0" X 16'-0" (192 SQ. FT.)

C. OFFICE AREA 39'-0" X 49'-0" + 4'-0" X 25'-0" (1,911 SQ. FT.)

- C1. STAFF MEN: 8'-0" X 10'-0" (80 SQ. FT.)
- C2. STAFF WOMEN: 8'0" X 10'-0" (80 SQ. FT.)
- C3. WOMEN: 10'-0" X 12'-0" (120 SQ. FT.)
- C4. MEN: 7'-0" X 12'-0" (84 SQ. FT.)
- C5. OFFICE VESTIBULE: 8'-0" X 12'-0" (96 SQ. FT.)
- C6. MAP ROOM: 8'0" X 12'-0" (96 SQ. FT.)
- C7. STAFF LOCKERS: 4'-0" X 8'-0" (32 SQ. FT.)
- C8. JANITOR'S CLOSET: 4'0" X 4'-0" (16 SQ. FT.)
- C9. STAFF BREAK ROOM: 10'-0" X 12'-0" (120 SQ. FT.)
- C10. FILE ROOM/ STORAGE: 12'0" X 20'-0" (240 SQ. FT.)

C11. COPY CENTER: 4'-0" X 12'-0" (48 SQ. FT.)

C12. OPEN OFFICE: 12'0" X 16'-0" (192 SQ. FT.)

C13. (4) OFFICES @ 10'-0" X 12'-0" (120 SQ. FT.)= 480 SQ. FT.

The Autumn Park site, the New Building Schematic Program and the New Building Area and Adjacency Plan will be the basis for Options Four and Five as well. The new building would be built with an unfinished section of the office interior space as part of the Phase 1 construction. As the need arose to build those offices, they would be constructed in Phase 2. If more office space was neede, it would be added as an addition in Phase 3.

LEED, which stands for "Leadership in Energy and Environmental Design", will be explained in Option Four.

The new building would be a single story with a concrete slab on grade floor. During workshops the possibility of adding a partial basement was discussed under the office area and the possibility of using the building as an emergency shelter for the community was also suggested. Both of those optional program items are included in this analysis.

A new municipal building would, by necessity of code requirements, be designed and constructed to be fully handicapped accessible, meet a minimum standard for energy efficiency in all of its systems, components and assemblies and be to meet required exiting and life safety standards. The level to which media and communications equipment and systems are included in the scope of a new building is driven by the needs of Halfmoon Township. However, there are code requirements that are associated with certain media and communication systems that would be included in the design and construction of the new municipal building as well.

The addition of a partial basement to the program of the new building was considered to allow for more storage space for records that, by law, must be kept for a certain period of time before they can be discarded. For the purposes of this report the area considered for this partial basement would be located under the Business occupancy and it would be considered part of the Business occupancy. The approximate size of the basement would be 2,000 sq. ft. Because it is less than 3,000 sq. ft. and located directly below an accessible level it does not have to be on an accessible level which means it does not require the installation of an elevator. An elevator could be installed to facilitate the transportation of documents from one floor to another but it would not be required by code. The basement would only require one exit since the basement would have an occupancy load of less than 49 people and a travel distance to the exit of less than 75 feet. One stairway connecting the basement to the first floor would be required.

As discussed in the workshops, if the new municipal building were to function as a shelter, it was estimated that it needed to provide shelter of a minimum of three days for at least 100 people. The use of the building as an emergency shelter has a ripple effect on the design and construction of the new municipal building.

The structural provisions of the IBC-2009 as they pertain to seismic design requires that buildings be classified into one of four structural occupancy categories with I having the least stringent structural requirements and IV having the most stringent structural requirements. The following uses would put a building in structural occupancy Category IV:

- Fire rescue, ambulance and emergency vehicle garages
-Designated earthquake, hurricane or other emergency shelters
-Designated emergency preparedness, communications and operations centers or other facilities required for emergency response.

As a result the design and construction of the new municipal building would be required to incorporate all of the applicable structural code requirements pertaining to Classification IV.

Emergency power in the form of a generator, or generators, and a fuel source for same would need to be included in the design and construction of the new municipal building as well. The facility to store provisions in the form of food and bedding and possibly spare clothing and the facility to provide shelter users with basic hygiene and

nutrition would also need to be included in the design and construction of the new municipal building. Given the storage needs of a community shelter, it would be prudent at this time to keep the partial basement in the new building program.

All mechanical, electrical and plumbing systems in a new building would be designed and built to current code standards for energy efficiency and handicapped accessibility. In Addition, the possibilities of installing energy saving systems, such as a geothermal heating and cooling system and photovoltaic solar panels, increased with a new building and would only be limited by soil and ground water conditions and initial cost concerns..

OPINION OF PROBABLE CONSTRUCTION COST FOR
OPTION THREE- CONSTRUCT A NEW BUILDING WITH NO LEED CONSIDERATION

Site improvements-	$ 300,000.00 to $ 500,000.00
Building cost without a basement-	$ 800,000.00 to $1,070,000.00
5,323 sq. ft. @ $150.00 to $200.00/sq. ft.)	
Design and permitting fees (15%)-	$ 165,000.00 to $ 236,000.00
Site and building cost total-	$1,265,000.00 to $1,806,000.00

Additional cost with a basement but no elevator-	Add $ 60,000.00 to $ 80,000.00	
(2,000 sq.ft. @ $30.00 to $40.00/sq. ft.)		
Additional cost with a basement and with an elevator-	Add $ 140,000.00 to $ 180,000.00	
(2 stop holeless hydraulic @ $80,000.00 to $100,000.00)		
Building cost with building as a shelter Add 15 to 25%		

Minimum opinion of probable construction cost $ 1,265,000.00
(No basement, no elevator, no shelter)

Maximum opinion of probable construction cost $ 2,480,000.00
(With basement, elevator and shelter)

Note- Additional costs include design and permitting fees.
Phase 3 was included to compare maximum construction costs.

PROS AND CONS

PROS

-Option Three eliminates the "cons" listed in Options One and Two.
-Option Three provides for a modern, up to date, code complaint building designed to meet current and future township needs.
-Option Three contains provisions for the new municipal building to be used as a short term community emergency shelter.

CONS

-The new building location may not be as familiar and/or convenient to township residents as the existing location.
-Option Three is more two to three times more expensive than Option Two.

OPTION FOUR- CONSTRUCT A NEW BUILDING WITH USE OF LEED APPROACHES TO ENERGY CONSERVATION BUT WITH NO OFFICIAL LEED CERTIFICATION

The analysis of Option Four will be based on the same planning criteria as outlined for a new building in Option Three above. Added to the program for Option Four would be the inclusion of LEED principles of energy conservation and building environment design without achieving actual LEED certification for the project.

First, what is LEED? As stated in Option Three, LEED stand for "Leadership in Energy and Environmental Design". LEED is a certification program started and administered by the Green Building Council to promote the design, construction and maintenance of sites and buildings with regard to energy conservation, environmental responsibility and healthy living and working environments.

LEED certification is a public acknowledgement that the parties responsible for the design, construction and funding of the building project desired to construct their project in an environmentally responsible way and, in doing so, met the certification requirements of the Green Building Council to achieve that end. The LEED (Leadership in Energy and Environmental Design) rating system was developed by the US Green Building Council (a not for profit, non-governmental agency) to provide a standard by which to determine just how "green" a building is. It provides third party verification similar to a UL listing.

There are three aspects to be considered in the design and construction of a LEED building: energy efficiency, effect on the global environment, and the environmental quality inside the building, for those who will be occupying the space.

LEED Certification is based on eight prerequisites, all of which are required to be accomplished for any level of certification but have no point value, and a series of credits, which are assigned varying point values based on their effect on the environment in terms of pollution, greenhouse gas emissions, global warming, etc.

The credits are broken down into four categories: Sustainable Sites, Water Efficiency, Materials and Resources and Indoor Environmental Quality; and two "bonus" categories: Innovation & Design and Regional Priorities.

Various levels of LEED certification can be achieved. Like similar systems, the higher the level you wish to achieve, the more stringent the requirements are to achieve that level. LEED certification levels are based on the number of points achieved: Certified, Silver, Gold and Platinum. There is a degree of correlation between the level of LEED achieved and the initial cost of a building, however, this is usually offset by a greater reduction in operating and maintenance costs.

Projects hoping to obtain LEED certification are filed with the Green Building Council at the start of the design process. A LEED Checklist, which states the level of LEED certification that the project team is hoping to obtain and a list of the points that the team will try to accumulate in order to achieve the desired level of certification. The project progress is then monitored by the Green Building Council which determines if the project has indeed met the criteria to be considered LEED certified.

While LEED certification has become a very recognizable and laudable community achievement, especially for public construction projects like a new municipal building, it is not always possible to achieve the level of LEED certification desired or to achieve LEED certification at all. However, there is no reason why the principles and concepts required for LEED certification cannot be incorporated in to a project without going through the official LEED certification process if the budget allows for their incorporation.

Option Four presents just such a case. In Option Four it is assumed that the principles of LEED design have been implemented into the project as far as is feasible without actually pursuing official LEED certification.

LEED Certification for the Halfmoon Township Building

As discussed elsewhere, many different aspects must be implemented for a building to be Leadership in Energy and Environmental Design (LEED) certified or, if we consider this as the industry standard, for a building to be considered 'green.' Many different strategies could be considered for this building. One of the forces that drives design (both mechanical and electrical) is building size. From an engineering standpoint, we can offer guidance that can be used in determining whether the existing building is renovated and expanded, or if a new building is

considered. However, the township supervisors and their constituents will ultimately determine what HVAC, plumbing and electrical features will exist in this building.

Part of the LEED design will require a reduction in the predicted energy consumption for the new (or renovated building) compared to a typical building of similar usage and containing a certain type of typical HVAC system. This comparison between systems really is dependent upon the proposed type of HVAC system and is not determined until it is time to design the building. Ultimately, it is imperative that the new building does not consume more than a certain amount of energy in the HVAC, lighting, power and plumbing systems. The energy consuming systems are partially defined by the windows, walls, floors, doors ad roof of the existing or new building.

Today's code requirements require a fairly efficient building that is not very drafty. A LEED building requires an even more efficient building, with more insulation, and better placed (or fewer) windows, etc. It will definitely require more efficient HVAC and lighting systems than the current building uses, just to meet minimum energy efficiency requirements. The existing building does not support any of these energy efficient characteristics.

Similar requirements hold true for the architectural features. Essentially, an entirely new insulated 'skin' will be required to be added to the existing building to meet these energy savings requirements.

The new HVAC systems do not need to be defined at present. In fact, the new systems will really be defined when the LEED aspects of the building design are developed. HVAC systems could range from ground water coupled water source heat pumps to air to air heat pumps. There could be a single unit with multiple thermostats or the space could be conditioned with multiple mini-split units. Maybe some spaces might not be cooled at all; natural ventilation could be provided to meet summertime needs, similar to the existing building.

The plumbing system will require extensive revisions, compared to the existing systems. A significant reduction in water usage will be required. None of the existing fixtures or faucets can be re-used or re-fitted to meet these requirements, except for the wall hung lavatories. These fixtures will require new faucets.

Electrically, the biggest changes would involve the lighting systems and how they are controlled. None of the existing fixtures in the existing building could or should be reused. The same holds true for the switching. LEED and the current energy efficiency code will require a complete revision to all of the building lighting and its control strategies. Power systems, specifically what are called plug loads, are not really affected by LEED. The equipment, such as computers, appliances, refrigerators, printers, etc. are affected. Plug load equipment needs to be Energy Star rated.

Advantages of LEED certification for Halfmoon Township

a. Having the Township's building LEED certified is good "P.R." The Township has a certain level of responsibility toward its constituents to be good stewards of the environment. By setting the example it is always hopeful that others will follow the lead and do the same.

b. A LEED certified building is designed to be more energy efficient and environmentally friendly than typical buildings of similar size and usage. It is also designed to provide a more pleasant atmosphere in which the users of the building live, work or play.

b. There are certain funds (grants and/or low interest loans) available to the Township that are dependent on LEED certification.

Disadvantages of LEED certification for Halfmoon Township

a. While LEED Certification is attainable for just about any building, there are situations in which it is really not practical or sensible to renovate to that extent. In evaluating the existing Township building for its renovation potential, the architects and engineers also considered what might be required in order to bring the existing facility up to LEED standards. The existing township building is currently so far removed from an energy efficient and environmentally friendly building, that in order to accomplish LEED certification, it would be necessary to basically "start from scratch." This is particularly true in terms of the building envelope (walls and ceiling/roof) and its mechanical and electrical systems, which together must exceed the requirements of ASHRAE 90.1 for energy savings by 10% and achieve a water savings of 20% as prerequisites to LEED certification. The site is also constrained by its existing boundaries (including a stream) and facilities (parking lot and ball fields.)

b. If the main purpose of achieving LEED certification is to acquire grant money or a low interest loan, the Township needs to be cautious to make sure that the higher level of design and construction required by LEED will not cost more than the grant or loan is worth.

Conclusion

a. As a result of the workshop discussions and research performed for the feasibility study, it has been determined that LEED Certification should be considered only for new construction. LEED certification for the new building would be less difficult to attain. The site is more appropriate, and the new building envelope, HVAC systems, plumbing systems and building materials can be selected for energy efficiency and environmental compatibility in a more cost effective manner.

Implementation

a. Like codes, the LEED rating system changes periodically in order to stay ahead of advances in technology and standard practices. Thus, what is currently required for LEED certification may become more stringent or require more creativity in the future. Attached in the Appendices is a current LEED checklist showing the credits and prerequisites required to achieve LEED certification at this time. The credits have been marked as "yes," "no" or "maybe" based on the likelihood of their being accomplished for this particular project at this particular site if the project were started today.

b. The following is an overview of some of the ways in which these credits and prerequisites could be accomplished:

1.) Sustainable Sites

a.) The site engineer would provide the site contractor with an erosion and sedimentation control plan, which assures that soils disturbed by construction do not wash away into nearby streams.

b.) Disturbance to the site would be limited in order to protect existing natural habitat. As much of the site that can be would be restored to a vegetated state that encourages wildlife. A rain garden and/or nature walk might be part of the new site design.

c.) There is public transportation available to this site and methods would be employed to encourage employees and visitors to the site to use the bus system, bike, carpool, or use low-emitting and fuel efficient vehicles to get there.

d.) The parking lot would only be as large as is required by code and could be made of pervious materials that reduce excessive runoff in heavy rains and also help to reduce the "heat island effect."

e.) Roofing material would be specified in a color that has a high SRI (solar reflectance) also to help reduce the "heat island effect."

f.) Exterior lighting would be designed so as not to "pollute" the night sky, while still considering issues of security and safety.

2.) Water Efficiency

a.) The use of potable water would be reduced through the use of low flow toilets and other plumbing fixtures.

b.) A rainwater capture system could be implemented to capture rainwater from the roof and use it to flush toilets, water landscape plantings, and possibly even to wash township vehicles.

3.) Energy & Atmosphere

a.) The building will be designed to a level of energy efficiency that exceeds the standards of ASHRE / IESNA 90.1. "Building energy simulation modeling" would be performed to project the level to which this could be accomplished based on the mechanical and electrical systems specified for the new building.

b.) A commissioning agent would evaluate the building's mechanical and electrical systems and building envelope to assure that they have been installed and are operating according to the

architect and engineers' designs. This provides a layer of "checks and balances," which helps to assure that the building will continue to perform according to the projected levels of energy efficiency.

c.) HVAC systems would be specified that use minimal quantities of refrigerant and of a type that is less harmful than the CFC refrigerants found in older equipment.

d.) A photovoltaic water heating system might be included for domestic water (for washing hands and dishes, and possibly showering.)

4.) Materials and Resources

a.) A plan for the collection of recyclables is already in place for the Township and a drop off location is conveniently located on another part of this same site.

b.) Construction materials would be specified for their sustainability. This includes materials with a high recycled content, materials that are made from rapidly renewable plants such as bamboo or wheat, and repurposed materials such as old barn siding being used to build new casework or desks made out of old doors.

c.) Wood products would be Forest Stewardship Council (FSC) certified to prove that the trees were harvested in an environmentally conscientious manner.

c.) Construction materials would, whenever possible, be harvested or extracted, and manufactured within 500 miles of the site of the new building.

d.) The specifications would require the contractors to have a plan in place to divert as much of the construction waste as possible from the landfill.

5.) Indoor Environmental Quality

a.) Materials such as paints, coatings and sealants, carpeting and adhesives, and particle boards would be specified to have low levels of VOC's (volatile organic compounds.)

b.) There would be no smoking inside the building, nor within 25 feet of the entrance, including during construction.

c.) The contractors would be required to protect the HVAC and other building systems from dust, debris and moisture, according to SMACNA guidelines. A building flush-out or IAQ (indoor air quality) testing would be performed before the building is occupied, to assure that indoor air quality is satisfactory.

e.) Ventilation would be designed to exceed the standards of ASHRAE 62.1-2004. The HVAC system might include monitors to increase ventilation when CO^2 levels reach unacceptable levels (particularly in the large assembly space.)

g.) Entryways would include walk-off mats to reduce the amount of pollutants carried into the building on shoes

h.) Areas where fumes could potentially be produced (such as the janitor's closet) would be exhausted, negatively pressurized and have walls that extend to the deck so that the fumes would not escape to other areas of the building.

i.) Lighting and HVAC systems would be designed to provide the building occupants with as much individual control as possible.

j.) HVAC systems would be designed to ASHRAE standards of thermal comfort. A follow up survey of the building occupants one year after occupancy would help to assure that systems are continuing to perform as designed an originally installed.

l.) Interior spaces would be designed to provide the occupants with as much daylight and views to the outdoors as possible, while considering that too much glass might create glare or cause energy inefficiency.

6.) Innovation & Design

a.) Including a LEED Accredited Professional on the design team would achieve one extra point.

b.) The design team would look for opportunities to include other innovations that are not already covered by the LEED credits described above.

7.) Regional Priority

a.) "Bonus" points can be achieved for accomplishing credits considered a priority for this region (based on zip code.) Priority Credits for this region are as follows: SSCr4.4, SSCr5.1, SSCr6.1, WECr1 Opt. 1, WECr2, EACr2-1%.

b. The architects and engineers will usually increase their typical design fees to account for the time required to provide the additional design and calculations required by the LEED certification process. Studies show that this is in the range of 5% to 9%. For a building of this size and scope 5% is probably a more reasonable amount.

OPINION OF PROBABLE CONSTRUCTION COST FOR
OPTION FOUR- CONSTRUCT A NEW BUILDING WITH USE OF LEED APPROACHES TO ENERGY CONSERVATION BUT WITH NO OFFICIAL LEED CERTIFICATION

Studies show that the increase in construction cost to achieve LEED certification for a building of this size is approximately 10%.

Using the cost opinions outlined in Option Three we can see that achieving LEED standards without actually attaining LEED certification can result in the following increases to project costs.

Basic Site and building cost opinion total without LEED concepts-		$1,265,000.00 to $1,806,000.00
Additional cost for construction- (10%)	Add-	$ 127,000.00 to $ 181,000.00
Additional cost for professional design fees- (5% of total project cost)	Add-	$ 70,000.00 to $ 99,000.00
Total cost opinion of basic building with LEED concepts-		$1,500,000.00 to $ 2,086,000.00

The cost to add the basement, elevator and shelter should not result in the same increase in construction costs and professional design fees as outlined above. It would be reasonable to add 5% to the cost of the basement and the elevator and 2% to the cost of the shelter function.

Additional cost with a basement but no elevator- Add $ 63,000.00 to $ 84,000.00
(2,000 sq.ft. @ $31.50 to $42.00/sq. ft.)
Additional cost with a basement and with an elevator- Add $ 147,000.00 to $ 189,000.00
(2 stop holeless hydraulic @ $84,000.00 to $105,000.00)
Building cost with building as a shelter Add 17 to 27%

Minimum opinion of probable construction cost $ 1,500,000.00
(No basement, no elevator, no shelter)

Maximum opinion of probable construction cost $ 2,890,000.00
(With basement, elevator and shelter)

Note- Additional costs include design and permitting fees.
Phase 3 was included to compare maximum construction costs.

PROS AND CONS

PROS

-Option Four eliminates the "cons" listed in Options One and Two.
-Option Four provides for a modern, up to date, code complaint building designed to meet current and future township needs that is more energy efficient and provides a healthier work environment than Option Three.
-Option Four also contains provisions for the new municipal building to be used as a short term community emergency shelter.
-Option Four decreases monthly utility and operating expenses by implementing LEED principles and concepts of energy conservation..
-Option Four does not require the additional costs for filing the project with the Green Building Council.

CONS

-The new building location may not be as familiar and/or convenient to township residents as the existing location.
-Option Four is more expensive than Option Three.
-Because LEED certification is not achieved, funding options to help pay for the energy efficient upgrades in Option Four will not be available.

OPTION FIVE- CONSTRUCT A NEW BUILDING WITH OFFICIAL LEED CERTIFICATION.

The analysis of Option Five will be based on the same planning criteria as outlined for a new building in Option Three above. Added to the program in this Option Five would be the inclusion of the official LEED certification process.

There are funding options available to municipalities who are trying to achieve energy and resource conservation in their construction projects, whether they are new buildings or renovations of existing buildings. More and more LEED certification is one of the requirements to receive particular outside sources of funding assistance.

DCED Alternative and Clean Energy Program

a. In researching funding opportunities available to the Township for a renovation or new construction project, the most likely, viable option appears to be the Alternative and Clean Energy Program made available through the PA Dept. of Community and Economic Development. The Program Guidelines for this fund are attached in the Appendices

b. A telephone conversation with a DCED representative provided the following additional information:

   a.) "Political Subdivisions" are eligible for grants of up to 10% of the project or $2 million, whichever is less. They are also eligible for low interest loans of up to $5 million or 50% of the project, whichever is less.

   b.) The board of the Commonwealth Financing Authority, who evaluates the applications and hands out the money, meets every other month on the 13th, and an application needs to be in their office 60 days beforehand to have it reviewed at the meeting. So, the Township would need to get the application in by November 13th to be reviewed at December's meeting or by December 13th to be reviewed at January's meeting, etc.

   c.) They (DCED) will continue to offer funding until the money runs out - they started with $165 million. As of August, they had given away $70 million, and thus had $95 million left in the fund.

3. The greatest challenge to acquiring this funding is that the design and construction for the project, whether renovation or new construction, must achieve LEED (Leadership in Energy and Environmental Design) certification at the Gold level.

   a.) LEED certification at any level would be much easier to achieve for a new building than a renovation of the existing facility. This is largely due to the fact that LEED certification at the Gold Level requires a tight building envelope and highly energy efficient mechanical and electrical systems.

   b.) Many of the requirements for LEED certification, such as high quality HVAC systems, and materials with high recycled content are elements that the Township would want to incorporate into their building whether or not they attempt LEED certification.

   c.) Designing the building to LEED standards may add up-front cost to the project, however, many times these elements also have excellent payback associated with reduced operating and maintenance costs.

   d.) The Township and the design team will needs to assess whether or not the funding offsets the costs associated with LEED certification.

   e.) In order to have adequate information to make this assessment and also to provide sufficient information to the DCED for the application, the project will probably need to be developed into a schematic design.

Fees

a. Fees for LEED project registration and certification are based on square footage. Current (September 2011) fees for LEED certification (increased annually on Jan 1.) for a building of this size are as follows:

$ 900.	Registration Fee
$ 2,000.	Design Phase Review
$ 500.	Construction Phase Review
$ 3,400.	Total

OPINION OF PROBABLE CONSTRUCTION COST FOR
OPTION FIVE- CONSTRUCT A NEW BUILDING WITH OFFICIAL LEED CERTIFICATION.

Studies show that the increase in construction cost to achieve LEED certification for a building of this size is approximately 10%.

Using the cost opinions outlined in Option Three we can see that achieving LEED standards without actually attaining LEED certification can result in the following increases to project costs.

Basic Site and building cost opinion total without LEED concepts-		$1,265,000.00 to $1,806,000.00
Additional cost for construction- (10%)	Add-	$ 127,000.00 to $ 181,000.00
Additional cost for professional design fees- (5% of total project cost)	Add-	$ 70,000.00 to $ 99,000.00
Total cost opinion of basic building with LEED concepts-		$1,500,000.00 to $ 2,086,000.00

The cost to add the basement, elevator and shelter should not result in the same increase in construction costs and professional design fees as outlined above. It would be reasonable to add 5% to the cost of the basement and the elevator and 2% to the cost of the shelter function.

Additional cost with a basement but no elevator- (2,000 sq.ft. @ $31.50 to $42.00/sq. ft.)	Add $	63,000.00 to $ 84,000.00
Additional cost with a basement and with an elevator- (2 stop holeless hydraulic @ $84,000.00 to $105,000.00)	Add $	147,000.00 to $ 189,000.00
Building cost with building as a shelter Add 17 to 27%		

Using the grant funding source amount of 10% and adding the $4,000.00 LEED Certification fee we can make the following adjustments to the opinion of probable construction cost for Option Five:

Minimum opinion of probable construction cost $ 1,500,000.00- $150,000.00 + $4,000.00= $1,354,000.00
(No basement, no elevator, no shelter)

Maximum opinion of probable construction cost $ 2,890,000.00- $ 289,000.00 + $4,000.00= $2,604,000.00
(With basement, elevator and shelter)

Note- Additional costs include design and permitting fees.
Phase 3 was included to compare maximum construction costs.

PROS AND CONS

PROS

-Option Five eliminates the "cons" listed in Options One and Two.
-Option Five provides for a modern, up to date, code complaint building designed to meet current and future township needs that is more energy efficient and provides a healthier work environment than Options Three and possibly Option Four.
-Option Five allows for funding options to be applied in order to help offset the costs for obtaining LEED certification.
-Option Five also contains provisions for the new municipal building to be used as a short term community emergency shelter.
-Option Five has the potential to not be as expensive as Option Four.

CONS

-The new building location may not be as familiar and/or convenient to township residents as the existing location.

Section IV- Conclusions & Recommendations

OPTION ONE- REUSE THE EXISTING BUILDING WITH NO ADDITIONS

If we are just comparing the cost opinions of the five options then it would appear that Option One would be the option to recommend. However, it is not that simple. The existing municipal building has seen a lot of use and is showing the wear and tear of that use. As is the case with many older engineered metal buildings, it is aging quickly and poorly. In order to improve the energy efficiency of the building envelope and mitigate the current mold problem too much of the existing building would have to be dismantled to make the effort worth the cost. And this only addresses two categories of required renovations. It does not address handicapped accessibility, other life safety and energy efficiency issues and media and communication systems. In addition, the existing on-site septic system is operating at its capacity and the ability to expand it is severely limited, and possibly prohibited, by the existing site drainage limitations.

The disruption to the day to day management of the township that would be caused by the extensive renovations recommended for Option One would be intolerable.

It is obvious, even from casual observation that the existing building does not provide the space required to operate and manage a growing modern township. The township offices are overloaded with furniture and equipment. There is no room to expand or accept other township functions into the existing space. A larger and better organized facility is recommended.

OPTION TWO- REUSE THE EXISTING BUILDING WITH ADDITIONS

Considering an addition to the existing building only compounds the problem. Similar renovations to the existing building envelope would have to undertaken as in Option One. The addition requires that more extensive interior renovations happen to the existing building to accommodate the new or enlarged functions of the building. The existing septic system could not accept the increase in required capacity to accommodate the additional occupancy load and frequency of use. While Option Two does provide the township with a larger and better organized building, the cost to reach that goal and the disruption to the management of the township during construction operations would not be worth the effort.

The existing municipal building has served its purpose but it has reached the end of its effective life span. Continuing to use it as a municipal building as outlined in Options One and Two is not recommended.

The building could be torn down and its foundations used as the basis for a new recreational building (with a light septic system load requirement, a picnic pavilion or an equipment storage shed.

OPTION THREE- CONSTRUCT A NEW BUILDING WITH NO LEED CONSIDERATION

If reusing the existing municipal building is not recommended, then the logical conclusion is that the construction of a new municipal building is recommended. While a new building will cost more than an existing building, the end result will be a new, modern building designed specifically for current and future township functions and built to stringent code requirements for life safety, handicapped accessibility and energy efficiency. Constructing the building at a new site will allow current township functions to continue to operate uninterrupted and making the transfer from the old building to the new building quicker and easier.

It is also recommended that the partial basement be added to accommodate current and future storage needs and that, budget permitting, the additional use of the new municipal building as a community shelter be added to the project program as well.

OPTION FOUR- CONSTRUCT A NEW BUILDING WITH USE OF LEED APPROACHES TO ENERGY CONSERVATION BUT WITH NO OFFICIAL LEED CERTIFICATION

Building a new building with LEED considerations, but without attaining actual LEED certification, would only be recommended if not all of the goals on the LEED checklist could not be achieved or if the additional costs associated with obtaining LEED certification were prohibitive. Preliminary analysis of the LEED checklist prepared for this report indicates that the goals to obtain LEED certification are reasonable and could be achieved. There are funding options available to help offset the costs of obtaining LEED certification that would not be available if LEED concepts were incorporated into a project without actually obtaining LEED certification. As a result, pursuing Option Four is not recommended as an approach over actual LEED certification.

OPTION FIVE- CONSTRUCT A NEW BUILDING WITH OFFICIAL LEED CERTIFICATION

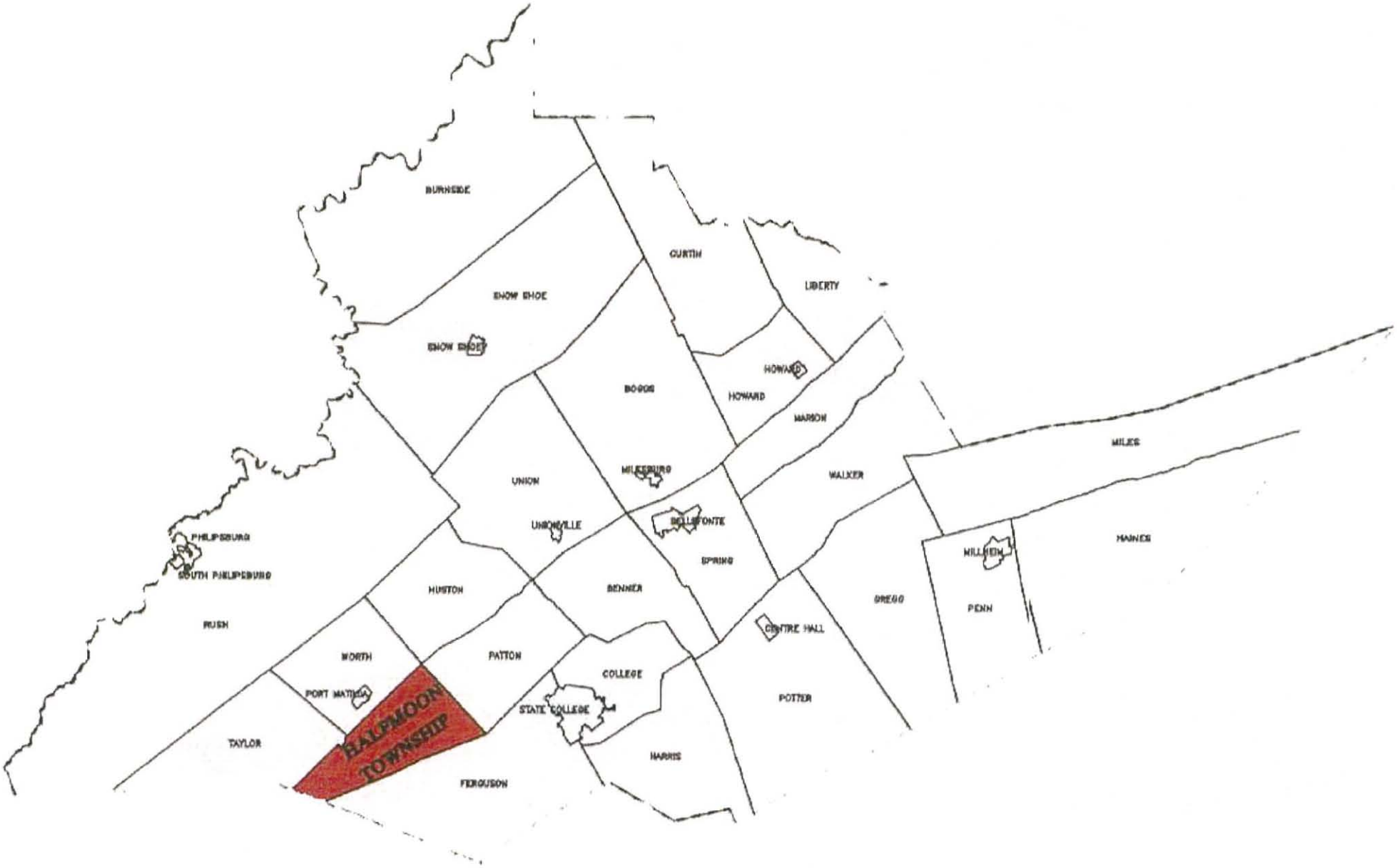
If funding options and life cycle and utility cost projections make obtaining LEED certification for a new building an economically attractive proposition, then Option Five is the recommended option for this project. A very energy efficient building that provides a healthy and pleasant environment in which to conduct township business and activities would serve a valuable community service for many years.

Section V- References

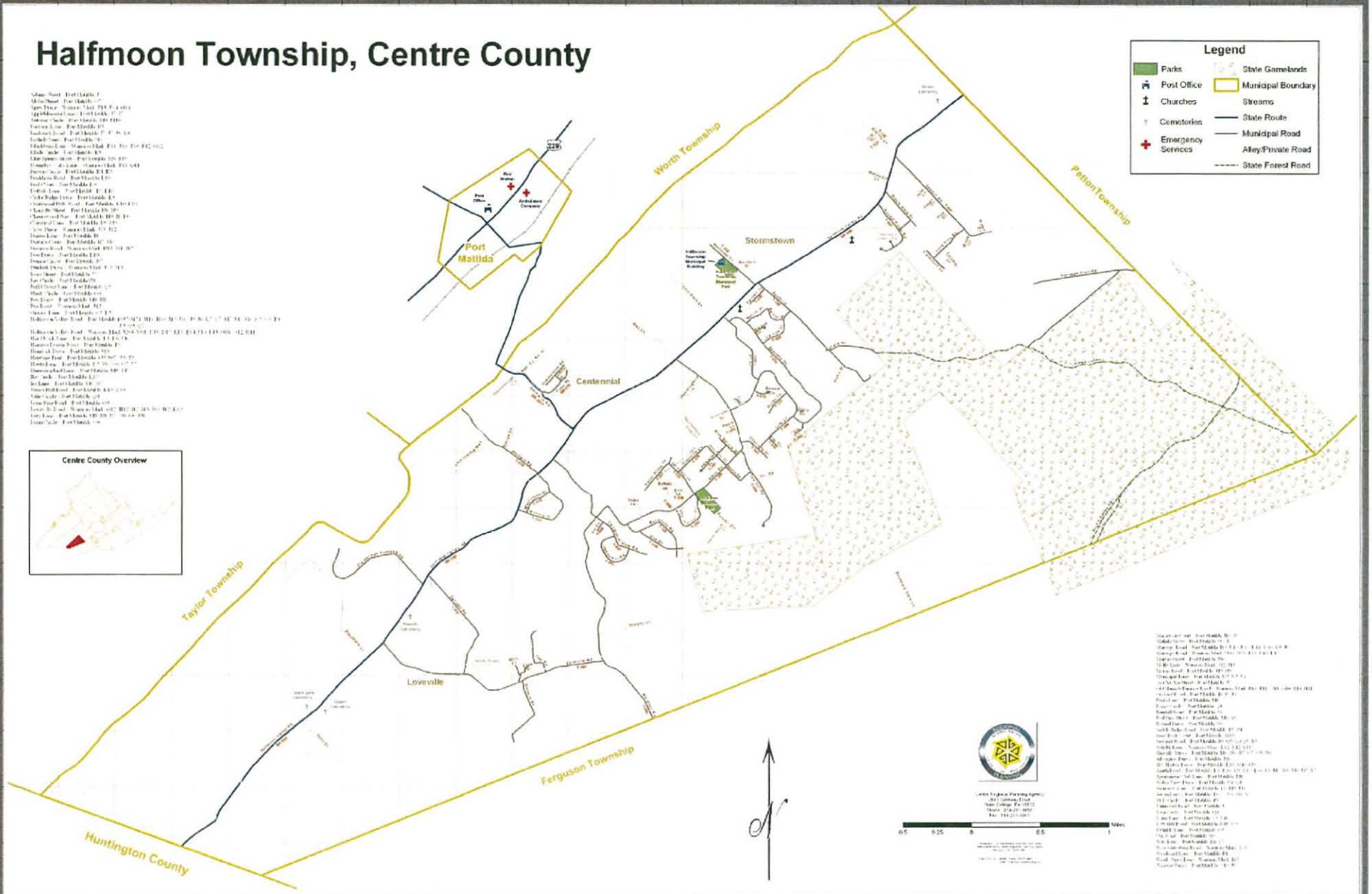
The Commonwealth of Pennsylvania Uniform Construction Code
The International Building Code- 2009
The International Existing Building Code- 2009
The International Energy Conservation Code-2009
The International Mechanical Code- 2009
The International Plumbing Code-2009
ICC/A117.1-2003
NFPA 70
NEC
ASHRAE
The Green Building Council

Section VI- Appendices

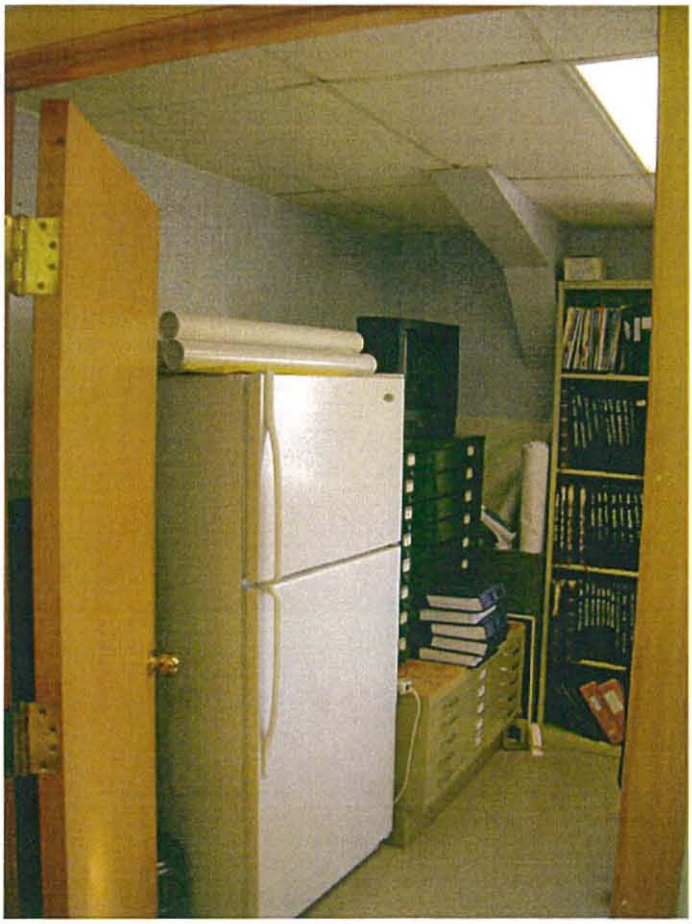
-County Map
-Halfmoon Township Map
-Existing Conditions Photographs
-E-1 Existing Floor Plan
-E-2 Existing Reflected Ceiling Plan
-E-3 Alternate Toilet Room Plans
-A-1 Option Two Floor Plan
-A-2 New Building Area and Adjacency Plan
-LEED Checklist
-Funding Option Supporting Material


BURNSIDE
CURTIN
LIBERTY
SNOW SHOE
SNOW SHOE
BOGGS
HOWARD
HOWARD
MARSH
MILES
UNION
MILESBURG
WALKER
UNIONVILLE
BELLEFONTE
PHILIPSBURG
SOUTH PHILIPSBURG
SPRING
MILLHEIM
MAINES
HUSTON
BENNER
GREGG
PENN
RUSH
CENTRE HALL
NORTH
PATTON
COLLEGE
PORT MATILDA
STATE COLLEGE
POTTER
HALFMOON TOWNSHIP
TAYLOR
HARRIS
FERGUSON

Halfmoon Township, Centre County



HALFMOON TOWNSHIP EXISTING MUNICIPAL BUILDING
CONFERENCE ROOM



HALFMOON TOWNSHIP EXISTING MUNICIPAL BUILDING
CONFERENCE ROOM

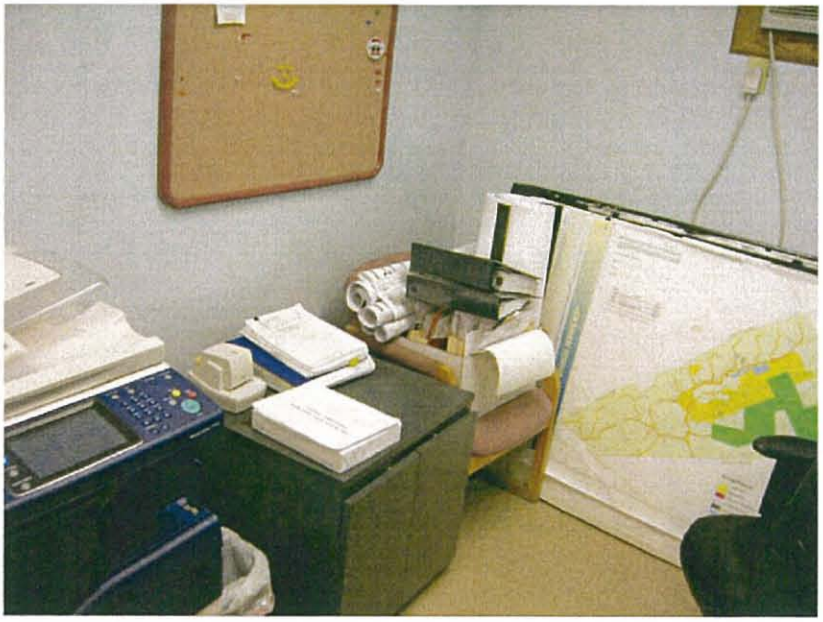
HALFMOON TOWNSHIP EXISTING MUNICIPAL BUILDING

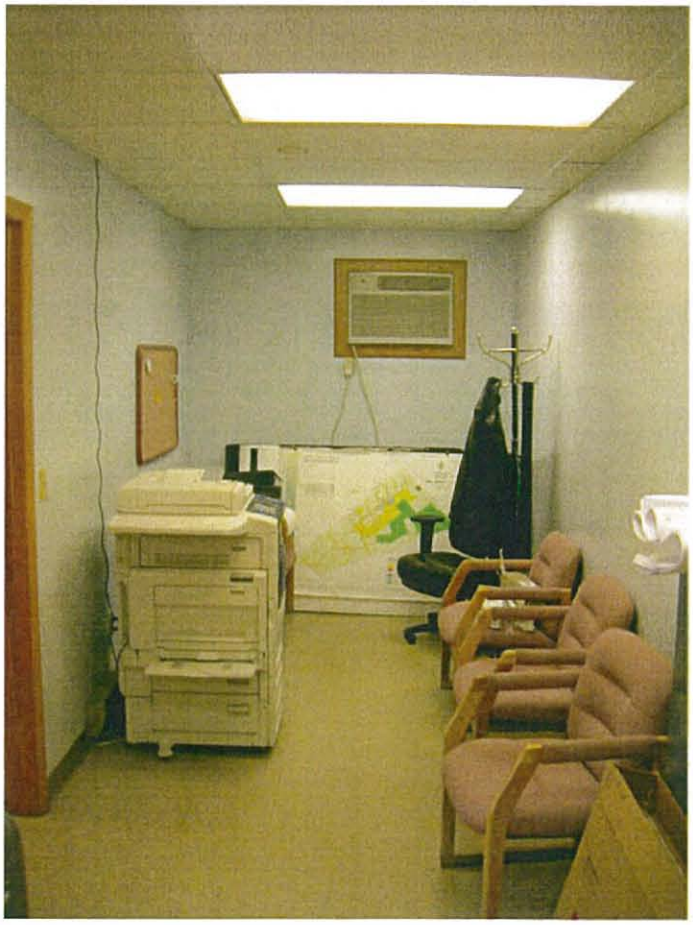
FILE ROOM

HALFMOON TOWNSHIP MUNICIPAL BUILDING
TOWNSHIP MANAGER'S OFFICE

HALFMOON TOWNSHIP MUNICIPAL BUILDING

COPY CENTER





HALFMOON TOWNSHIP MUNICIPAL BUILDING
OPEN OFFICE

HALFMOON TOWNSHIP MUNICIPAL BUILDING
TOWNSHIP OFFICE FOYER

HALFMOON TOWNSHIP MUNICIPAL BUILDING

MEN'S ROOM

HALFMOON TOWNSHIP MUNICIPAL BUILDING
WOMEN'S ROOM

HALFMOON TOWNSHIP MUNICIPAL BUILDING
WATER HEATER ALCOVE

HALFMOON TOWNSHIP MUNICIPAL BUILDING

BUILDING FOYER

HALFMOON TOWNSHIP MUNICIPAL BUILDING
STORAGE

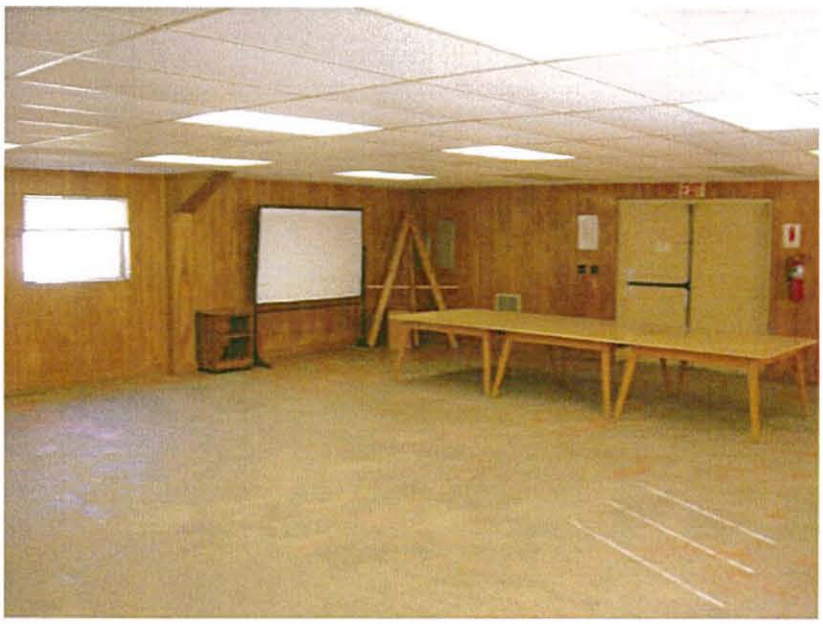
HALFMOON TOWNSHIP MUNICIPAL BUILDING

REC STORAGE

HALFMOON TOWNSHIP MUNICIPAL BUILDING

MULTI-PURPOSE ROOM

HALFMOON TOWNSHIP MUNICIPAL BUILDING
MULTI-PURPOSE ROOM



HALFMOON TOWNSHIP MUNICIPAL BUILDING
MULTI-PURPOSE ROOM CHAIR AND TABLE STORAGE

HALFMOON TOWNSHIP MUNICIPAL BUILDING
MULTI-PURPOSE ROOM CHAIR AND TABLE STORAGE

HALFMOON TOWNSHIP MUNICIPAL BUILDING

BUILDING EXTERIOR- FRONT

HALFMOON TOWNSHIP MUNICIPAL BUILDING

BUILDING EXTERIOR- FRONT

HALFMOON TOWNSHIP MUNICIPAL BUILDING

BUILDING EXTERIOR- SIDE AND REAR

HALFMOON TOWNSHIP MUNICIPAL BUILDING
DAMAGE TO EXTERIOR SIDING

HALFMOON TOWNSHIP MUNICIPAL BUILDING
DAMAGE TO EXTERIOR SIDING

Figure H1: Typical Electric Wall Heater, Cover Removed

Figure H2: Thru-Wall Air Conditioning Unit

Figure H3: Exhaust Fan, Cover Removed

Figure P1: Water Service Entrance In Men's Room

Figure P1: Sanitary Fresh Air Intake

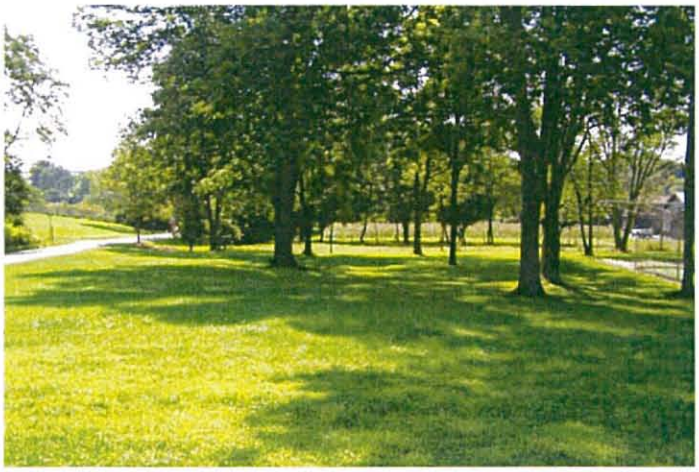


Figure P2: Drainage Field

Figure P3: Septic Tank Cover

Figure P4: Plumbing Fixture Sample

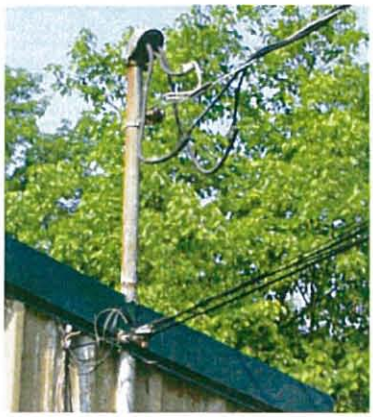


Figure E1: Overhead electrical service along Municipal Lane

Figure E2: Telephone, Data, and Electrical Meter along Municipal Lane

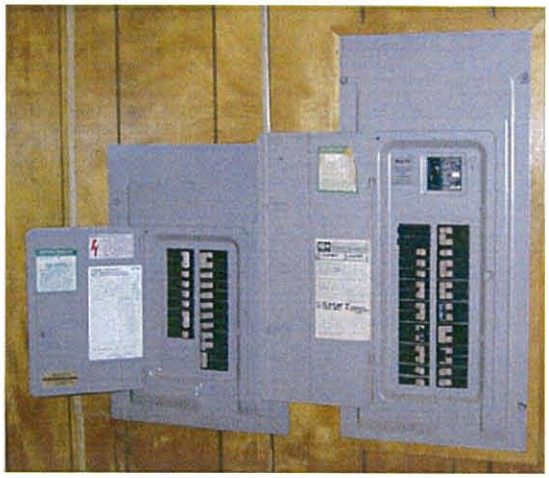


Figure E3: Panelboards in the Community Room

Figure E4: Community Room Air Conditioner.

Figure E5: Water Heater in Women's Bathroom.

Figure E6: Romex Cable Throughout Attic Space.

Figure E7: 2'x4' Linear Fluorescent Fixture

Figure E8: 2'x2' Fluorescent Fixture

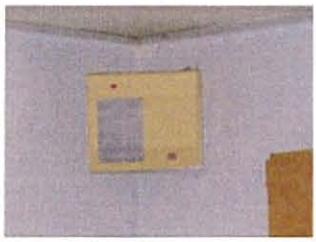


Figure E9: Occupancy Sensor Located in Conference Room

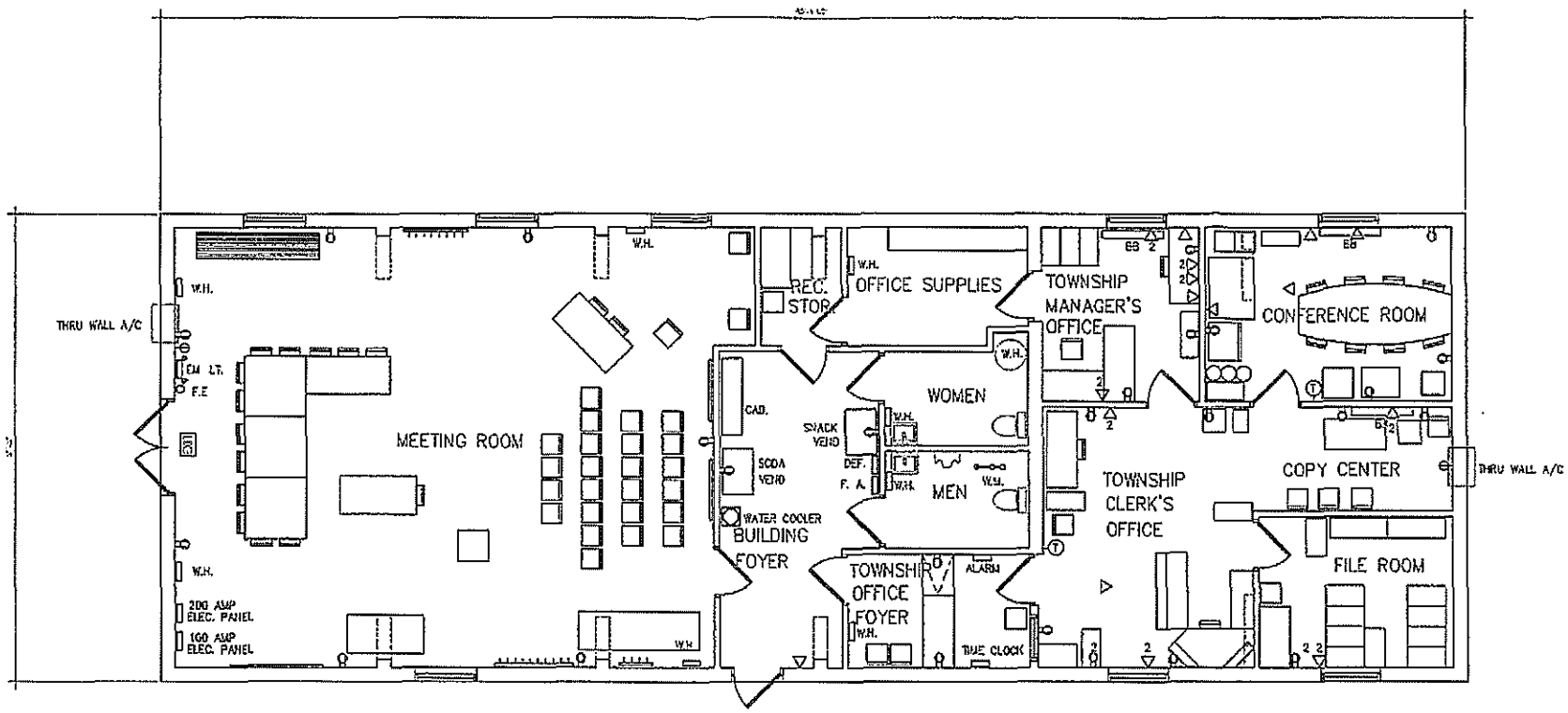
Figure E10: 1'x4' Fluorescent Fixture in Supply Room

Figure E11: Emergency Light Fixture

Figure E12: Community Room Exit

Figure E13: Front Entrance Exterior

Figure E14: Ball Field Electrical Meter, Panel and Lighting Controller



1 / E-1

FIRST FLOOR PLAN

SCALE: 1/8" = 1'-6"

PLAN SYMBOLS LEGEND

- DUPLEX OUTLET
- DEDICATED CIRCUIT
- THERMOSTAT
- PHONE/DATA OUTLET
- F.E. FIRE EXTINGUISHER
- W.H. ELECTRIC WALL HEATER
- EB ELECTRIC BASEBOARD HEATER
- EXIT LIGHTED EXIT SIGN
- EM. LT. EMERGENCY LIGHT
- W.H. WATER HEATER
- W.M. WATER METER

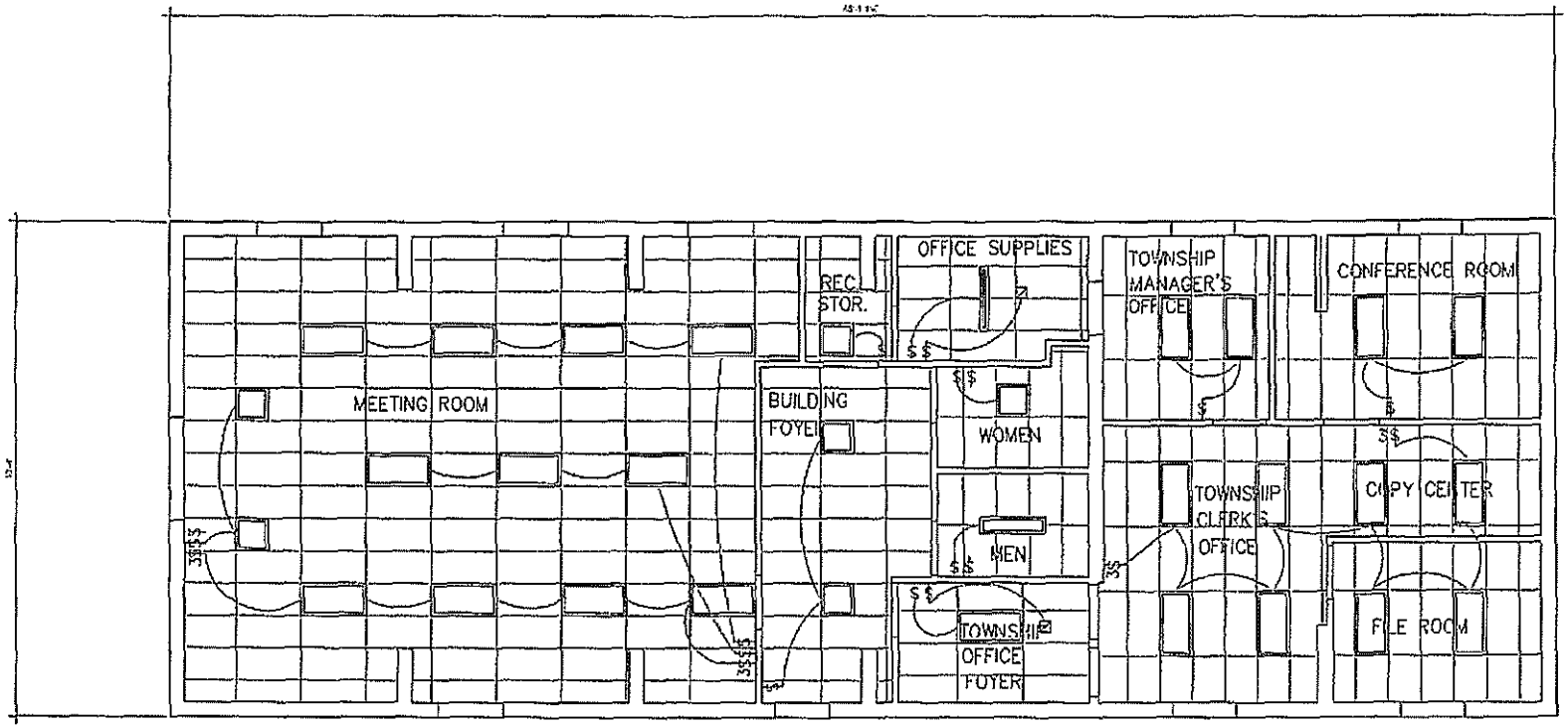
HALFMOON TOWNSHIP MUNICIPAL BUILDING
100 Municipal Lane Port Matilda, Pennsylvania

MICHAEL J. SIGGINS ARCHITECT
560 Hillside Drive State College
Pennsylvania 16803
(814)-360-8250 mksiggins@comcast.net

E-1

PROJECT NO : 11005

DATE: 11-22-11



1 / E-2 EXISTING REFLECTED CEILING PLAN
SCALE: 1/8" = 1'-0"

SYMBOLS LEGEND

- 2X4 FLOUR. LIGHT
- 2X2 FLOUR. LIGHT
- 1X4 FLOUR. LIGHT
- 6" X 4' FLOUR. LIGHT
- EXHAUST FAN
- LIGHT SWITCH
- 3-WAY LIGHT SWITCH

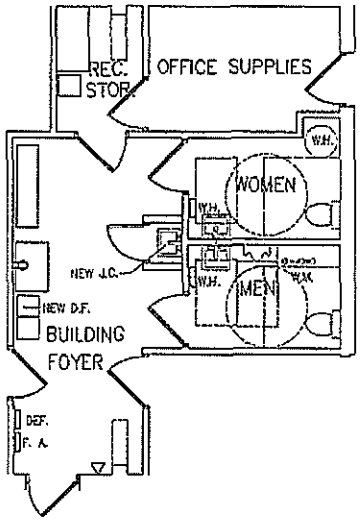
HALFMOON TOWNSHIP MUNICIPAL BUILDING
100 Municipal Lane Port Matilda, Pennsylvania

MICHAEL J. SIGGINS ARCHITECT
560 Hillside Drive State College
Pennsylvania 16803
(814)-360-8250 mksiggins@comcast.net

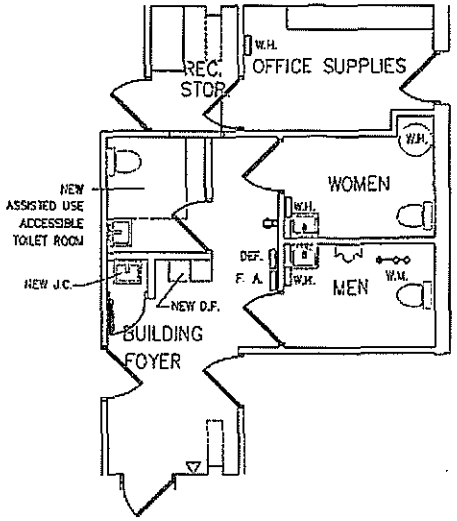
E-2

PROJECT NO · 110

DATE: 11-22-11

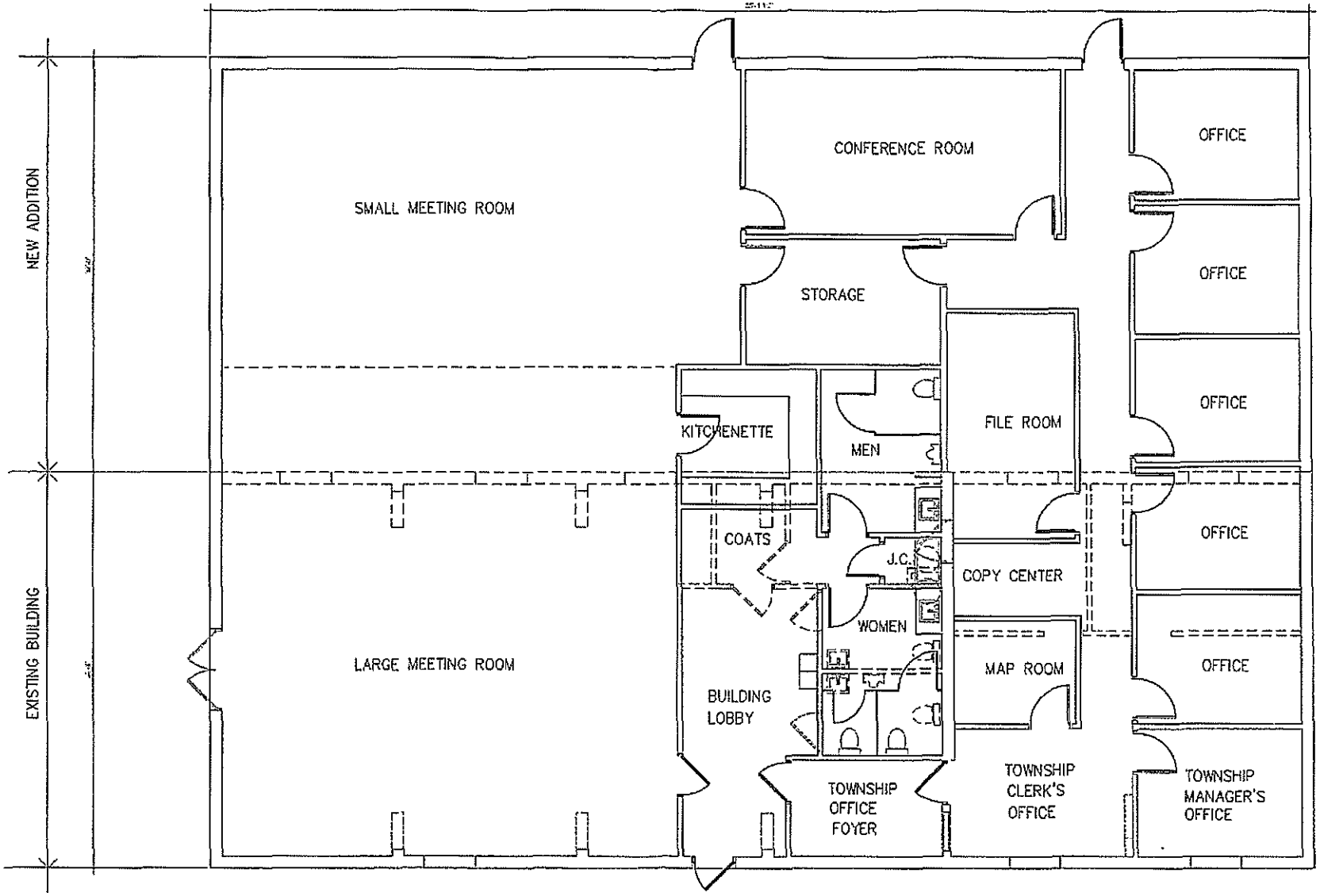


1 / E-3 TOILET ROOM-ALT. 1 PLAN
SCALE: 1/8" = 1'-0"



2 / E-3 TOILET ROOM-ALT. 2 PLAN
SCALE: 1/8" = 1'-0"

HALFMOON TOWNSHIP MUNICIPAL BUILDING 100 Municipal Lane Port Matilda, Pennsylvania	MICHAEL J. SIGGINS ARCHITECT 560 Hillside Drive State College Pennsylvania 16803 (814)-360-8250 mksiggins@comcast.net	E-3 PROJECT NO : 1100 DATE: 11-22-11



FLOOR PLAN
Option 2– Existing Building With Addition

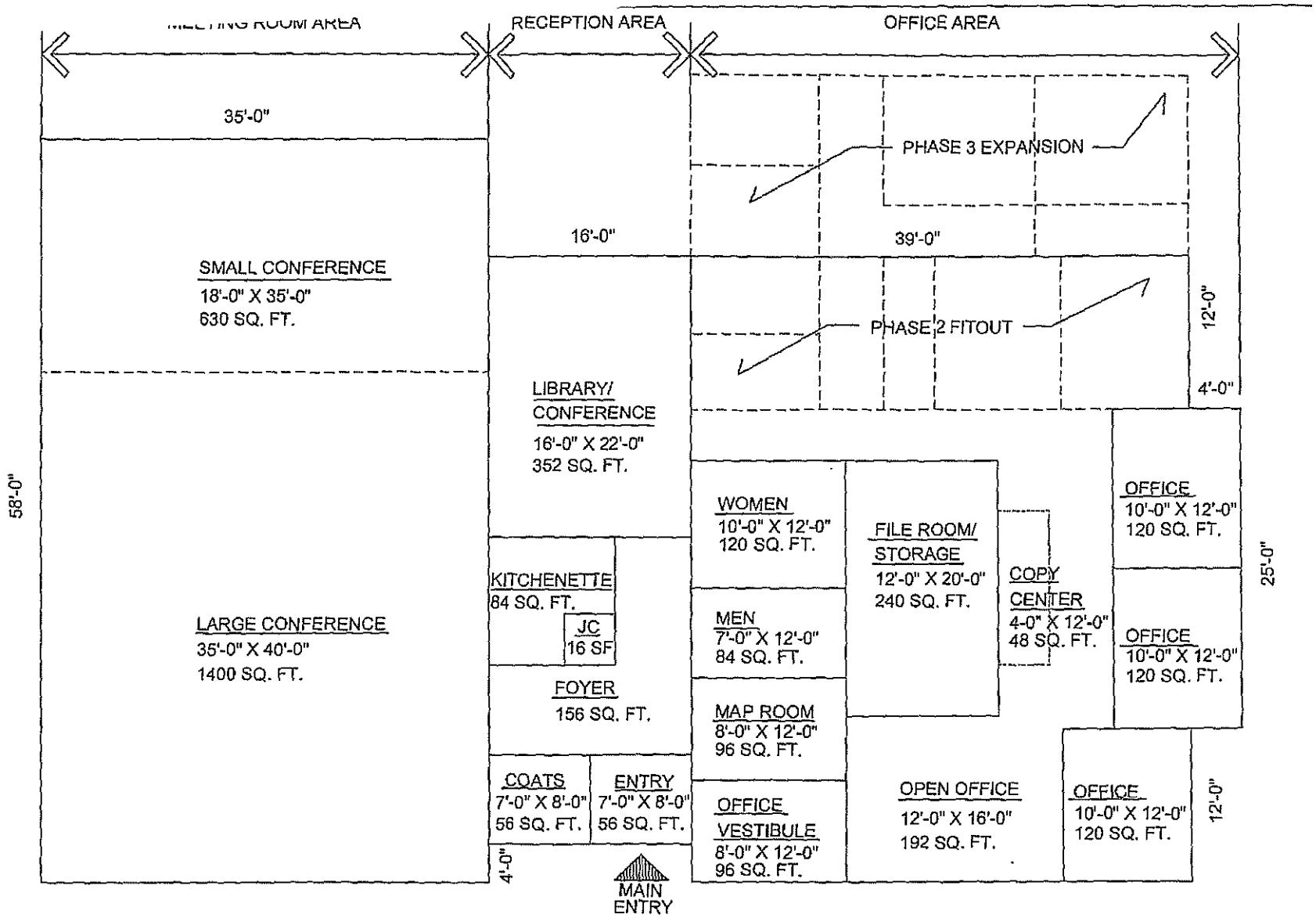
HALFMOON TOWNSHIP MUNICIPAL BUILDING
100 Municipal Lane Port Matilda, Pennsylvania

MICHAEL J. SIGGINS ARCHITECT
560 Hillside Drive State College
Pennsylvania 16803
(814)–360–8250 mksiggins@comcast.net

A–1

PROJECT NO : 1100

DATE: 11–22–11



NEW BUILDING AREA AND ADJACENCY PLAN	MICHAEL J. SIGGINS ARCHITECT 560 Hillside Drive State College Pennsylvania 16803 (814)-360-8250 mksiggins@comcast.net	A-2
HALFMOON TOWNSHIP MUNICIPAL BUILDING 100 Municipal Lane Port Matilda, Pennsylvania		PROJECT NO : 11005 DATE: 11-22-11

LEED 2009 for New Construction and Major Renovation
Project Scorecard

Project Name:
Project Address:

Yes	?	No			
14	0	6	**SUSTAINABLE SITES**		**26 Points**
Y			Prereq 1	**Construction Activity Pollution Prevention**	Required
1			Credit 1	**Site Selection**	1
		5	Credit 2	**Development Density and Community Connectivity**	5
		1	Credit 3	**Brownfield Redevelopment**	1
	6		Credit 4.1	**Alternative Transportation** - Public Transportation Access	6
1			Credit 4.2	**Alternative Transportation** - Bicycle Storage and Changing Rooms	1
3			Credit 4.3	**Alternative Transportation** - Low-Emitting and Fuel-Efficient Vehicles	3
2			Credit 4.4	**Alternative Transportation** - Parking Capacity	2
1			Credit 5.1	**Site Development** - Protect or Restore Habitat	1
1			Credit 5.2	**Site Development** - Maximize Open Space	1
1			Credit 6.1	**Stormwater Design** - Quantity Control	1
1			Credit 6.2	**Stormwater Design** - Quality Control	1
1			Credit 7.1	**Heat Island Effect** - Nonroof	1
1			Credit 7.2	**Heat Island Effect** - Roof	1
1			Credit 8	**Light Pollution Reduction**	1

Yes	?	No			
10			**WATER EFFICIENCY**		**10 Points**
					4
Y			Prereq 1	**Water Use Reduction**	Required
4			Credit 1	**Water Efficient Landscaping**	2 to 4
				Reduce by 50%	2
				No Potable Water Use or Irrigation	4
2			Credit 2	**Innovative Wastewater Technologies**	2
4			Credit 3	**Water Use Reduction**	2 to 4
				Reduce by 30%	2
				Reduce by 35%	3
				Reduce by 40%	4

Yes	?	No			
11	10	11	**ENERGY & ATMOSPHERE**		**35 Points**
Y			Prereq 1	**Fundamental Commissioning of Building Energy Systems**	Required
Y			Prereq 2	**Minimum Energy Performance**	Required
Y			Prereq 3	**Fundamental Refrigerant Management**	Required
1	7	5	Credit 1	**Optimize Energy Performance**	1 to 19
				Improve by 12% for New Buildings or 8% for Existing Building Renovations	1
				Improve by 14% for New Buildings or 10% for Existing Building Renovations	2
				Improve by 16% for New Buildings or 12% for Existing Building Renovations	3
				Improve by 18% for New Buildings or 14% for Existing Building Renovations	4
				Improve by 20% for New Buildings or 16% for Existing Building Renovations	5
				Improve by 22% for New Buildings or 18% for Existing Building Renovations	6
				Improve by 24% for New Buildings or 20% for Existing Building Renovations	7
				Improve by 26% for New Buildings or 22% for Existing Building Renovations	8
				Improve by 28% for New Buildings or 24% for Existing Building Renovations	9
				Improve by 30% for New Buildings or 26% for Existing Building Renovations	10
				Improve by 32% for New Buildings or 28% for Existing Building Renovations	11
				Improve by 34% for New Buildings or 30% for Existing Building Renovations	12
				Improve by 36% for New Buildings or 32% for Existing Building Renovations	13
				Improve by 38% for New Buildings or 34% for Existing Building Renovations	14
				Improve by 40% for New Buildings or 36% for Existing Building Renovations	15
				Improve by 42% for New Buildings or 38% for Existing Building Renovations	16
				Improve by 44% for New Buildings or 40% for Existing Building Renovations	17
				Improve by 46% for New Buildings or 42% for Existing Building Renovations	18
				Improve by 48%+ for New Buildings or 44%+ for Existing Building Renovations	19
2	1	4	Credit 2	**On-Site Renewable Energy**	1 to 7
				1% Renewable Energy	1
				3% Renewable Energy	2
				5% Renewable Energy	3
				7% Renewable Energy	4
				9% Renewable Energy	5
				11% Renewable Energy	6
				13% Renewable Energy	7
	2		Credit 3	**Enhanced Commissioning**	2
2			Credit 4	**Enhanced Refrigerant Management**	2
	3		Credit 5	**Measurement and Verification**	3
		2	Credit 6	**Green Power**	2

LEED 2009 for New Construction and Major Renovation
Project Scorecard

Project Name:
Project Address:

Yes	?	No			
3		4	**MATERIALS & RESOURCES**		14 Points
Y			Prereq 1	**Storage and Collection of Recyclables**	Required
		3	Credit 1.1	**Building Reuse** - Maintain Existing Walls, Floors and Roof	1 to 3
				Reuse 55%	1
				Reuse 75%	2
				Reuse 95%	3
		1	Credit 1.2	**Building Reuse** - Maintain Interior Nonstructural Elements	1
1	1		Credit 2	**Construction Waste Management**	1 to 2
				50% Recycled or Salvaged	1
				75% Recycled or Salvaged	2
	2		Credit 3	**Materials Reuse**	1 to 2
				Reuse 5%	1
				Reuse 10%	2
1	1		Credit 4	**Recycled Content**	1 to 2
				10% of Content	1
				20% of Content	2
1	1		Credit 5	**Regional Materials**	1 to 2
				10% of Materials	1
				20% of Materials	2
	1		Credit 6	**Rapidly Renewable Materials**	1
	1		Credit 7	**Certified Wood**	1
Yes	?	No			
15			**INDOOR ENVIRONMENTAL QUALITY**		15 Points
Y			Prereq 1	**Minimum Indoor Air Quality Performance**	Required
Y			Prereq 2	**Environmental Tobacco Smoke (ETS) Control**	Required
1			Credit 1	**Outdoor Air Delivery Monitoring**	1
1			Credit 2	**Increased Ventilation**	1
1			Credit 3.1	**Construction Indoor Air Quality Management Plan** - During Construction	1
1			Credit 3.2	**Construction Indoor Air Quality Management Plan** - Before Occupancy	1
1			Credit 4.1	**Low-Emitting Materials** - Adhesives and Sealants	1
1			Credit 4.2	**Low-Emitting Materials** - Paints and Coatings	1
1			Credit 4.3	**Low-Emitting Materials** - Flooring Systems	1
1			Credit 4.4	**Low-Emitting Materials** - Composite Wood and Agrifiber Products	1
1			Credit 5	**Indoor Chemical and Pollutant Source Control**	1
1			Credit 6.1	**Controllability of Systems** - Lighting	1
1			Credit 6.2	**Controllability of Systems** - Thermal Comfort	1
1			Credit 7.1	**Thermal Comfort** - Design	1
1			Credit 7.2	**Thermal Comfort** - Verification	1
1			Credit 8.1	**Daylight and Views** - Daylight	1
1			Credit 8.2	**Daylight and Views** - Views	1
Yes	?	No			
1		2	**INNOVATION IN DESIGN**		6 Points
	3	2	Credit 1	**Innovation in Design**	1 to 5
				Innovation or Exemplary Performance	1
				Innovation or Exemplary Performance	1
				Innovation or Exemplary Performance	1
				Innovation	1
				Innovation	1
1			Credit 2	**LEED® Accredited Professional**	1
Yes	?	No			
4			**REGIONAL PRIORITY**		4 Points
4			Credit 1	**Regional Priority**	1 to 4
				1 Regionally Defined Credit Achieved (SSCr4.4)	1
				1 Regionally Defined Credit Achieved (SSCr5.1)	1
				1 Regionally Defined Credit Achieved (SSCr6.1)	1
				1 Regionally Defined Credit Achieved (WECr2)	1
Yes	?	No			
58	29	23	**PROJECT TOTALS (Certification Estimates)**		110 Points

Certified: 40-49 points Silver: 50-59 points Gold: 60-79 points Platinum: 80+ points

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DEPARTMENT OF COMMUNITY
& ECONOMIC DEVELOPMENT

Alternative and Clean Energy

Program Guidelines | March 2010

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Department of Community
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George E. Cornelius, Secretary

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Attachment I **High Performance Building Standards**

Attachment II **Letter of Intent**

Section I – Statement of Purpose

The Alternative and Clean Energy Program (the Program) provides financial assistance in the form of grant and loan funds that will be used by eligible applicants for the utilization, development and construction of alternative and clean energy projects in the Commonwealth. The Program is administered jointly by the Department of Community and Economic Development (DCED) and the Department of Environmental Protection (DEP), under the direction of the Commonwealth Financing Authority.

Section II – Eligibility

A. Eligible Applicants

The following applicants are eligible for grants/loans:

1. **A Business** – a corporation, partnership, sole proprietorship, limited liability company, business trust, or other commercial entity approved by the Commonwealth Financing Authority. The term shall also include not-for-profit entities.

2. **An Economic Development Organization** – a nonprofit corporation or association whose purpose is the enhancement of economic conditions in their community.

3. **A Political Subdivision** – A municipality, county, or school district.

B. Eligible Project Costs

1. Funds may be used for any of the following **Clean Energy Project** costs:

   a. Costs associated with the construction or renovation of a High Performance Building including: building construction costs; the acquisition of land and buildings, rights-of-way, and easements; the clearing and preparation of the land; planning, designing, and modeling work; registration and certification of the project; commissioning and enhanced verification of building performance. (See Attachment I for High Performance Building Standards)

   b. The site preparation of a business park consisting exclusively of certified High Performance Buildings including: the construction of water and sewer lines, storm water systems, excavation, construction of access roads, parking facilities, pipelines, transformers and utility transmission lines, traffic control devices and engineering.

   c. Installation of equipment for use by an eligible applicant to facilitate or improve energy conservation or energy efficiency (including but not limited to heating, lighting, and cooling equipment). Energy Star rated equipment is required if the type or class of equipment being installed is rated under the Energy Star Program (refer to www.energystar.gov). The Authority may participate in establishing pools of funding by leveraging investments from private sector financial institutions to help accomplish the CFA's energy conservation goals.

d. Installation of an alternative energy system which produces energy from sources defined under the Alternative Energy Portfolio Standards Act of 2004 including but not limited to waste coal, biomass, wind energy, geothermal technologies, clean coal technologies, waste energy technologies, large-scale or low-impact hydro, biologically derived methane gas, fuel cells, coal mine methane, or by-products of the pulping and wood manufacturing process in a new or existing building.

e. Replacement or enhancement of an existing energy system that utilizes nonrenewable energy with an energy system that utilizes alternative energy (as defined in 1d. of this section).

f. Modification of the contract terms of an energy service project by a political subdivision pursuant to a new energy savings contract (ESCO) with a qualified provider under the Guaranteed Energy Savings Act (GESA) of 1996. The PA Department of General Services manages the GESA program for the Commonwealth, and maintains a list of qualified providers on their website (www.dgs.state.pa.us).

g. Preparation of plans, specifications, studies, surveys, and energy audits necessary or incidental to facilitating or developing an eligible project.

h. Administrative costs of the applicant to administer a Program grant. Administrative costs include advertising, legal and audit costs, as well as documented staff expenses. Administrative costs shall not exceed 3% of the Program grant or loan.

Ineligible cost include, but are not limited to fees for securing other financing, interest on borrowed funds, refinancing of existing debt, and cost incurred prior to the approval of CFA financing.

2. Funds may be used for the construction or development of an **Alternative Energy Production Project** including:

a. A facility that produces or distributes energy from sources defined in the Alternative Energy Portfolio Standards Act of 2004 including but not limited to waste coal, biomass, wind energy, geothermal technologies, clean coal technologies, municipal solid waste energy technologies, large-scale or low-impact hydro, biologically derived methane gas, fuel cells, coal mine methane, or by-products of the pulping and wood manufacturing process.

b. A facility that manufactures or produces alternative fuels. The term "alternative fuels" shall include ethanol, biodiesel, or any other alternative fuel approved by the authority.

c. A facility that manufactures or produces products, including component parts that provide alternative energy (as defined in subparagraph a. of this section) or alternative fuels (as defined in subparagraph b. of this section).

d. The purchase and installation of equipment used for the manufacturing of component parts of alternative energy or alternative fuel production systems.

e. A facility that manufactures or produces products, including component parts that improve energy efficiency or conserve energy.

f. A facility used for the research and development of technology to provide alternative energy sources or alternative fuels.

g. A project for the development or enhancement of rail transportation systems that deliver alternative fuels or high efficiency locomotives.

h. Preparation of plans, specifications, studies, and surveys, necessary or incidental to facilitating or developing an eligible project.

i. Administrative costs of the applicant to administer a Program grant. Administrative costs include advertising, legal and audit costs, as well as documented staff expenses. Administrative costs shall not exceed 3% of the Program grant or loan.

Section III – Program Requirements

A. Matching Funds Requirement

Matching funds means any new public or private investment in the proposed project made by an eligible applicant. Eligible applicants must provide evidence of a commitment of matching funds at the project site. The amount of the matching investment required must be at least $1 for every $1 of Program funds awarded by the CFA.

B. Other Requirements

1. **Conflict of Interest Provision**
   An officer, director, or employee of an applicant who is a party to or has a private interest in a project shall disclose the nature and extent of the interest to the governing body of the applicant, and may not vote on action of the applicant concerning the project, nor participate in the deliberations of the applicant concerning the project.

2. **Nondiscrimination**
   No assistance is awarded to an applicant under this program unless the applicant certifies to the Authority that they shall not discriminate against any employee or against any person seeking employment because of race, color, handicap, national origin, age, or sex. All contracts for work to be paid with program assistance must contain the Commonwealth's official nondiscrimination clause.

3. **Project Records**
   The applicant must maintain full and accurate records with respect to the project and must ensure adequate control over related parties in the project. The Authority requires access to such records, as well as the ability to inspect all work, invoices, materials, and other relevant records at reasonable times and places. Upon request of the Authority, the applicant must furnish all data, reports, contracts, documents, and other information relevant to the project.

4. **Pennsylvania Prevailing Wage Act**
   All or a portion of the construction work associated with the project may be subject to the Pennsylvania Prevailing Wage Act, as determined by the Pennsylvania Department of Labor & Industry. It is the responsibility of the funding recipient to ensure that the Pennsylvania Prevailing Wage Act is followed if applicable.

5. **Proof of Notification**
   The applicant must provide proof that the county and host municipality or municipalities have been notified about the intended project.

6. **Project Audit**
   For projects receiving grant funds in excess of $100,000, an audit from a Certified Public Accountant (CPA) licensed in Pennsylvania listing all project costs must be submitted to DCED within 90 days after expiration of the grant. In the opinion section of the audit, a statement shall be made certifying that Commonwealth funds were disbursed in accordance with the terms of the grant agreement.

7. **Guideline Provisions**
   The Alternative and Clean Energy Program guidelines may be modified or waived by the CFA unless otherwise required by law.

8. **Post Construction Verification Requirement for High Performance Projects**

   a. Upon substantial completion of project, applicant must submit a copy of credits submitted to USGBC, NGBS or GBI for review/ acceptance.

   b. Applicants for small business, new construction or major renovation projects must submit final documentation that performance standards have been met, as follows:

      (1) Verification of LEED NC Version 3 and GBI Green Globes registration.

      (2) Copy of LEED NC Version 3 and GBI Green Globes Certificate at project completion and final LEED NC Version 3 and GBI Green Globes Checklist.

C. Fees

The Commonwealth Financing Authority charges a $100 non-refundable application fee for the Alternative and Clean Energy Program applications made payable to *the Commonwealth Financing Authority*. Application fee is due at the time of submission. There is a commitment fee on all approved loans. The commitment fee is 1% of all approved loan amounts, capped at $10,000.

Section IV – Grants, Loans and Guarantees

A. Loans

1. **Loan Amount**

   a. The maximum amount of any loan for any alternative energy production or clean energy project shall not exceed $5 million or 50% of the total project cost, whichever is less. The maximum loan amount for a geothermal system will not exceed $3 per square foot of space to be served by the system or $5 million, whichever is less. The CFA will consider loan requests over $5 million for projects that will significantly impact the Authority's goals to leverage private sector investments and to encourage alternative energy production and energy conservation in the Commonwealth.

   b. The maximum amount of any loan for a manufacturer of alternative and/or clean energy generation equipment or components shall not exceed $35,000 for each new job projected to be created by the business within three years after approval of the loan. If the manufacturer fails to create the projected number of jobs within three years, the Authority may require the interest rate to be increased by 3% for the remaining term of the loan.

   c. All eligible applicants may apply for loans for eligible projects except that political subdivisions may not apply for Alternative Energy Production Projects as defined in Section II B, 2.

   d. Maximum loan for a High Performance Building shall not exceed $5 million or 50% of the total eligible building construction/renovation costs, whichever is less.

2. **Repayment Term**
   Loans may be amortized over a period not to exceed 25 years or the useful life of the asset, whichever is less and will be repaid over a period not to exceed 10 years. Loans for energy conservation or energy efficiency projects (including geothermal systems) as defined in Section II, B, 1, c of these guidelines will have a 10 year amortization.

3. **Interest Rate**
   The interest rate for the loan will be fixed at the time of approval of the loan. The interest rate for energy conservation or energy efficiency projects is 1%. Interest rates for other eligible projects are subject to change based on market conditions. The current interest rate is posted on the www.newPA.com website.

4. **Security**
   All loans are to be secured by a lien on the asset financed. The Authority may require additional security as necessary, including but not limited to, a pledge of additional assets or securities or dedicated revenues.

B. Grants

1. The maximum amount of any grant for any alternative energy production or clean energy project shall not exceed $2 million or 50% of the total project cost, whichever is less. The CFA will consider grant requests over $2 million for projects that will significantly impact the Authority's goal to leverage private investment and encourage alternative energy production and energy conservation in the Commonwealth.

2. The maximum amount of any grant for a manufacturer of alternative and/or clean energy generation equipment or components shall not exceed $10,000 for every job projected to be created by the business within three years after approval of the grant. If the manufacturer fails to create the projected number of jobs, the Authority may require the full amount of the grant to be repaid.

3. The maximum grant amount for an Energy Savings Contract (ESCO) shall not exceed $500,000.

4. Political subdivisions are eligible to apply for grants only for Clean Energy Projects as defined in Section II B, 1. Businesses and non-profit economic development organizations are eligible to apply for grants only for Site Preparation Projects as defined in Section II B.1.b. of these guidelines and Alternative Energy Production Projects.

5. The maximum grant amount for a High Performance Building is $2 million or 10% of the total eligible building construction/renovation costs, whichever is less.

6. The maximum amount for any grant that will be used solely for planning and feasibility studies shall not exceed 50% of the total cost of such planning or feasibility studies or $175,000, whichever is less. Grants may be used to pay for any eligible project costs as defined in Section II of these guidelines.

   Due to the significant energy savings and the brief pay back period associated with most energy conservation and energy efficiency projects as defined in Section II, B, 1, c. of these guidelines, the Authority will not approve grant requests for these projects.

C. Guarantee

The Authority may award grants to applicants that would serve as a guarantee for the financing in the project. The Guarantee is subject to the following conditions:

1. The grant will be in the form of a standby letter of credit and issued directly to the company/developer.

2. The grant funds may only be drawn upon in the event the company defaults on its financing and there is a deficiency in collateral for the lending institution to collect upon. The grant will pay up to 75% of the deficiency.

3. The term of the grant will not be more than 5 years.

4. The amount of the grant shall not exceed $5 million.

Section V – Application Process

A. Application Procedures

To apply for funding, the applicant must submit the electronic on-line Department of Community and Economic Development Single Application for Assistance located at www.esa.dced.state.pa.us. Once submitted, please print ten (10) copies of the application, and send with the required supplemental information (please see Appendix I of these guidelines) via US Mail along with the signature page. Please reference the Web ID number on any documents sent with the signature page. Applications must be received at least 60 days prior to the next scheduled Authority meeting at which Alternative and Clean Energy program applications will be considered. An application review schedule for the Authority meetings can be found on the www.newPA.com website.

B. Application Evaluation

All applications for financial assistance will be reviewed by the Department of Community and Economic Development and the Department of Environmental Protection under the direction of the CFA to determine eligibility and competitiveness of the proposed project. Projects will be evaluated using the appropriate criteria from the following list of evaluation criteria for the various types of eligible projects:

1. The level of non-CFA matching investment in the project.
2. The technical and financial feasibility of the project.
3. Energy savings generated or peak load reduced by the project.
4. Conventional energy displaced by the deployment of the alternative energy production project.
5. The amount of alternative energy or alternative fuels produced by the project.
6. The number and quality of the jobs to be created or preserved in Pennsylvania by the project including construction jobs.
7. The financial need of the project.
8. The capital efficiency of the project.
9. Project readiness.
10. The level to which the project exhibits principles of sound land and water use.
11. Environmental benefits arising from the project including the creation of allowances that can be used to facilitate additional economic development in the region.
12. The nation and state of origin of equipment/components used in the project.

C. Procedures for Accessing Funds

1. Upon approval of an application by the Authority, a commitment letter will be issued to the applicant explaining the terms and conditions of the loan or grant. The commitment letter must be signed and returned to the Authority within 45 days of the date of the commitment letter or the offer may be withdrawn by the Authority.

2. Following the acceptance of an offer by the applicant, a loan closing will be scheduled and, if applicable, a grant agreement will be sent to the applicant for execution. In the case of a grant and loan combination involving an unrelated private developer, the Authority will contract directly with the applicant for the grant funds and will enter into separate loan documents between the Authority and the private developer. The applicant shall obtain the services of a professional engineer or architect licensed in Pennsylvania who will certify to the Authority during construction that the expenses were incurred and were in accordance with the plans approved by the Authority. The Authority will release funds to the applicant at not less than 30-day intervals, with a maximum of twelve disbursements over the life of the project.

3. For High Performance Building Projects, the application must be submitted prior to final building permit issuance and preferably in pre-design or schematic design.

4. Funds will be disbursed following the post construction verification that performance standards have been met. See post construction verification requirements.

Section VI – Program Inquiries

Program inquiries should be directed to:

PA Department of Community and Economic Development
Center for Business Financing – Site Development Division
Alternative and Clean Energy Program
Commonwealth Keystone Building
400 North Street, 4th Floor
Harrisburg, PA 17120-0225

Telephone: (717) 787-7120
Fax: (717) 772-3581
E-mail: ra-dcedcbf@state.pa.us.

These guidelines can also be accessed online at www.newPA.com.

Appendix I – Supplemental Information

Alternative and Clean Energy Program

In addition to completing the Department of Community and Economic Development Single Application for Assistance, please include the following items when applying for a loan/grant under the Alternative and Clean Energy Program:

Exhibit 1: Provide a description of the project and project user which discusses all of the following: (a) a brief executive summary describing the project; (b) the specific location of the site and project characteristics, such as the total acreage and/or square footage of the project; (c) any characteristics of the area in which the site is located that demonstrate a need for economic development; (d) the historical and proposed use of the site; (e) the specific costs and improvements to be paid for with Program funds; (f) the experience of the project user, including a discussion of previous projects completed; (g) the estimated start and end dates of construction; (h) the number of construction jobs, spinoff jobs and net new full-time jobs to be created and/or preserved by the project; (i) a description of how the project will reduce reliance on conventional energy resources; (j) the estimated energy benefits and the method used to reach the estimate; (k) the estimated environmental benefits of the project such as tons of air emissions avoided (sulfur dioxide, ozone precursors, mercury, and CO2 or other greenhouse gases), water consumption avoided, avoided waste products, and the method used to reach the estimate; (l) impacts on the availability and price of energy resources and; (m) if the project will generate electricity, whether there are interconnection, net metering, and/or power purchase agreements in place; (n) the nation and state of origin of any equipment used in the alternative and clean energy project; and (o) if the project is an energy savings contract, describe the financing details on the ESCO, including the anticipated length and the payback period.

Exhibit 2: Funding commitment letters from all other project funding sources, if applicable (including equity commitments). Letters should include the term, rate, and collateral conditions, and must be signed and dated.

Exhibit 3: A statement of the amount and type of assistance requested. If requesting a loan, a description of the proposed repayment terms.

Exhibit 4: Attach financial statements of the business, parent company, and any other proposed guarantors, if any, for the last three years of operation. Financial statements should include balance sheets, income statements, cash flow statements, and notes to financials. Start-up companies must provide three years projected financial statements. For public sector or non-profit applicants, provide the most recent audited financial statements of the applicant. Financial statements should include balance sheets, income statements, and notes to financials.

Exhibit 5: For loans, identify the collateral that will be offered to the CFA as security for the loan. If the proposed collateral is real estate, provide two completed as-is appraisals or one appraisal prepared by either a Member of American Institute of Real Estate Appraisers (MAI) or a PA State Certified Appraiser. The appraisals must be no more than six months old. If a personal guarantee is being offered as security, attach personal financial statements for the proposed guarantor and their spouse. The personal financial statements should not be more than six months old and must be signed.

Exhibit 6: A color-coded map or plot plan detailing the location of the project, overlaid with the corresponding zoning of the project area.

Exhibit 7: A statement as to the estimated cost of the project. The estimate must be prepared by an engineer, architect, or other qualified professional and should be accompanied where appropriate by copies of the signed bids/quotations, contractor estimates, or sales agreements that verify project cost estimates.

Exhibit 8: A projected cash flow analysis, which includes all expenses and revenues covering the period of time from project commencement through full repayment of the loan.

Exhibit 9: A letter from the appropriate planning agency certifying that the proposed project is in compliance with the comprehensive land use plans and zoning and subdivision codes.

Exhibit 10: For public sector applicants, provide a resolution duly adopted by the applicant's governing board formally requesting the grant/loan, designating an official to execute all documents, describing briefly the project scope, and identifying the grant amount requested per year (see Appendix II for a Sample Resolution).

Exhibit 11: For High Performance Building applicants, provide a letter identifying the standards to be met. See sample letter Attachment II.

Send 10 copies of completed application with all supplemental information and attachments to:

PA Department of Community and Economic Development
Center for Business Financing – Site Development Division
Alternative and Clean Energy Program
Commonwealth Keystone Building
400 North Street, 4th Floor
Harrisburg, PA 17120-0225

If you have any questions on completing the application, please call the Center for Business Financing at (717) 787-7120.

Appendix II – Authorized Official Resolution

Be it RESOLVED, that the _____ (Name of Applicant) of _____ (Name of County) hereby request an Alternative and Clean Energy Program grant and/or a loan of $_____ at a _____ % rate and _____ year term from the Commonwealth Financing Authority to be used for _____.

Be it FURTHER RESOLVED, that the Applicant does hereby designate _____ (Name and Title) and _____ (Name and Title) as the official(s) to execute all documents and agreements between the _____ (Name of Applicant) and the Commonwealth Financing Authority to facilitate and assist in obtaining the requested grant/loan.

I, _____, duly qualified Secretary of the _____ (Name of Applicant), _____ (Name of County) _____, PA, hereby certify that the forgoing is a true and correct copy of a Resolution duly adopted by a majority vote of the _____ (Governing Body) at a regular meeting held _____ (Date) and said Resolution has been recorded in the Minutes of the _____ (Applicant) and remains in effect as of this date.

IN WITNESS THEREOF, I affix my hand and attach the seal of the _____ (Applicant), this ____ day of ____, 20___.

_____
Name of Applicant

_____
County

_____
Secretary

ATTACHMENT I
COMMONWEALTH OF PENNSYLVANIA - HIGH PERFORMANCE BUILDING STANDARDS
Department of General Services
Consensus Final 9.11.09

Residential New Construction

To qualify as a High Performance Building under this program, a residential new construction project must meet all of the following:

1. Must achieve at least Gold Certification under the USGBC LEED for Homes rating system, or at least Gold Certification under the National Green Building Standard, ICC 700-2008.

2. Evidence of meeting the LEED or the NGBS standard must be provided through independent third-party verification, which shall include blower door testing. Building Envelope Performance Criteria: 5 ACH50 (air changes per hour at 50 pascals). Envelope leakage shall be determined by a certified rater using a RESNET-approved testing protocol. Independent third-party verification will be conducted by an agency or entity having no direct affiliation or financial interest with the applicant, program or system being evaluated.

3. Under either rating system, must meet the criteria for each of the following standards:

   A. **Building Orientation for Solar Design**
   LEED ID 1.5 *OR* NGBS 704.3.1.1

   LEED ID 1.5
   Design the home such that all of the following requirements are met:
   (1) The glazing area on the north-and south-facing walls of the building is at least 50% greater than the sum of the glazing area on the east- and west-facing walls.
   (2) The east-west axis of the building is within 15 degrees of due east-west.
   (3) The roof has a minimum of 450 square feet of south-facing area that is oriented appropriately for solar applications.
   (4) At least 90% of the glazing on the south-facing wall is completely shaded (using shading, overhangs, etc.) at noon on June 21 and unshaded at noon on December 21.

   OR NGBS 704.3.1.1
   Building orientation, sizing of glazing, and design of overhangs are in accordance with all of the following:
   (1) The long side (or one side if of equal length) of the building faces within 20 degrees of true south.
   (2) Vertical glazing area is between 5 and 7 percent of the gross conditioned floor area on the south face.
   (3) Vertical glazing area is less than 2 percent of the gross conditioned floor area on the west face, and glazing is ENERGY STAR compliant or equivalent.
   (4) Vertical glazing area is less than 4 percent of the gross conditioned floor area on the east face, and glazing is ENERGY STAR compliant or equivalent.
   (5) Vertical glazing area is less than 8 percent of the gross conditioned floor area on the north face, and glazing is ENERGY STAR compliant or equivalent.

(6) Skylights, where installed, are in accordance with the following:
   (a) shades and insulated wells are used, and all glazing is ENERGY STAR compliant or equivalent
   (b) horizontal skylights are less than 0.5 percent of finished ceiling area
   (c) sloped skylights on slopes facing within 45 degrees of true south, east or west are less than 1.5 percent of finished ceiling area
(7) Overhangs or adjustable canopies or awnings or trellises provide shading on south-facing glass for the appropriate climate zone in accordance with Table 704.3.1.1.
(8) The south face windows have a SHGC of 0.40 or higher.
(9) Return air or transfer grilles/ducts are in accordance with Section 704.4.5.

B. Site Selection
LEED LL 2 and LL 3.2 and/or LL 3.3 *OR* NGBS 503.8(1)

LEED LL 2
Do not develop buildings, built structures, roads or parking areas on portions of sites that meet any of the following criteria:
(1) Land whose elevation is at or below the 100-year floodplain as defined by FEMA.
(2) Land that is specifically identified as habitat for any species on federal or state threatened or endangered lists.
(3) Land within 100 feet of any water, including wetlands as defined by U.S. Code of Federal Regulations 40 CFR, Parts 230-233 and Part 22, and isolated wetlands or areas of special concern identified by state or local rule, or land within distances given in applicable state or local regulations, whichever is more stringent. New wetlands constructed as part of stormwater mitigation or other site restoration efforts are exempt from this part of the requirement.
(4) Land that prior to acquisition for the project was public parkland, unless land or equal or greater value as parkland is accepted in trade by the public landowner (park authority projects are exempt).
(5) Land that contains "prime soils", "unique soils", or "soils of state significance", as identified in state Natural Resources Conservation Service soil surveys. Verification of soil types should be conducted by the project civil engineer, wetlands, engineer, or biologist. If no project team member is qualified to verify this requirement, follow the steps laid out in the LEED for Homes Reference Guide. Sites that are previously developed are exempt from this requirement.

OR NGBS 503.8(1) (Lot Design)
Environmentally sensitive areas are avoided.

C. Erosion Control during Construction
LEED SS Prerequisite 1.1 *OR* NGBS 503.3 and 504.3

LEED SS Prerequisite 1.1
Prior to construction, design and plan appropriate erosion control measures. During construction, implement these measures. Erosion control measures must include all of the following:
(1) Stockpile and protect disturbed topsoil from erosion (for reuse).

(2) Control the path and velocity of runoff with silt fencing or comparable measures.
(3) Protect on-site storm sewer inlets, streams, and lakes with straw bales, silt fencing, silt sacks, rock filters, or comparable measures.
(4) Provide swales to divert surface water from hillsides.
(5) If soils in a sloped area (i.e., 25%, or 4:1 slope) are disturbed during construction, use tiers, erosion blankets, compost blankets, filter socks and berms, or some comparable approach to keep soil stabilized.

OR NGBS 503.3 (Lot Design)

On-site soil disturbance and erosion are minimized by one or more of the following:

(1) Construction activities are schedule to minimize length of time that soils are exposed.
(2) Utilities are installed using one or more alternative means:
    (a) tunneling instead of trenching
    (b) use of smaller (low ground pressure) equipment or geomats to spread the weight of construction equipment
    (c) shared utility trenches or easements
    (d) placement of utilities under paved surfaces instead of yards
(3) Limits of clearing and grading are demarcated on the plan.

and NGBS 504.3 (Lot Construction)

On-site soil disturbance and erosion are minimized by one or more of the following:

(1) Limits of clearing and grading are staked out.
(2) "No disturbance" zones are created using fencing or flagging to protect vegetation and sensitive areas from construction activity.
(3) Sediment and erosion controls are installed and maintained in accordance with the storm water pollution prevention plan, where required.
(4) Topsoil is stockpiled and stabilized for later use to establish landscape plantings.
(5) Soil compaction from construction equipment is reduced by distributing the weight of the equipment over a larger area (laying lightweight geogrids, mulch, chipped wood, plywood, OSB, metal plates, or other materials capable of weight distribution in the pathway of the equipment).
(6) Disturbed areas that are complete or to be left unworked for 21 days or more are stabilized within 14 days using methods as recommended by the EPA, or in the approved storm water pollution prevention plan, where required.
(7) Soil is improved with organic amendments and mulch.
(8) Utilities are installed using one or more alternative means (e.g., tunneling instead of trenching, use of smaller equipment, use of low ground pressure equipment, use of geomats, shared utility trenches or easements).

D. Minimize Disturbed Area of Site
LEED SS 1.2 *OR* NGBS 503.1

LEED SS 1.2

Where the site is not previously developed:

(1) Develop a tree or plan preservation plan with "no-disturbance" zones clearly delineated on drawings and on the lot. Any "no-disturbance" zones must also be protected from parked construction vehicles and building material storage. Soils

compacted by vehicles or stored materials can cause major difficulties in establishing any new landscaping; and

(2) Leave undisturbed at least 40% of the buildable lot area, not including area under roof. Only softscapes can be counted toward this credit; projects cannot receive credit for preserving preexisting hardscapes, such as driveways.

OR

Where the site is previously developed:

(1) Develop a tree or plant preservation plan with "no-disturbance" zones clearly delineated on drawings and on the lot. Any "no-disturbance" zones must also be protected from parked construction vehicles and building material storage. Soils compacted by vehicles or stored materials can cause major difficulties in establishing any new landscaping; and

(2) Rehabilitate the lot by undoing any previous soil compaction, removing existing invasive plants, and meeting the requirements of SS 2.2 Landscaping.

OR NGBS 503.1

Natural resources are conserved by one or more of the following:

(1) A natural resources inventory is completed under the direction of a qualified professional.

(2) A plan is implemented to conserve the elements identified by the resource inventory as high-priority resources.

(3) Items listed for protection in the resource inventory plan are protected under the direction of a qualified professional.

(4) Basic training in tree or other natural resource protection is provided for the on-site supervisor.

(5) All tree pruning on-site is conducted by a Certified Arborist.

(6) Ongoing maintenance of vegetation during construction is in accordance with TCIA A300.

E. Surface Water Management, Permeable Lot – 100%
LEED SS 4.1 *OR* NGBS 503.4 (1), (2) and (3)

LEED SS 4.1

Design the lot such that at least 100% of the built environment, not including area under roof, is permeable or designed to capture water runoff for infiltration on-site. Area that can be counted toward the minimum includes the following:

(1) Vegetative landscape (e.g., grass, trees, shrubs).

(2) Permeable paving, installed by an experienced professional. Permeable paving must include porous above-ground materials (e.g., open pavers, engineered products) and a 6-ince porous subbase, and the base layer must be designed to ensure proper drainage away from the home.

(3) Impermeable surfaces that are designed to direct all runoff toward an appropriate permanent infiltration feature (e.g., vegetated swale, on-site rain garden, or rainwater cistern).

OR NGBS 503.4 (1), (2) and (3) (Lot Design)

(1) Natural water and drainage features are preserved and used; and

(2) A storm water management plan is developed and implemented that minimized concentrated flows and simulates flows found in natural hydrology (e.g., vegetative swales, French drains, wetlands, drywells, and rain gardens); and
(3) All or a percentage of impervious surfaces are minimized and permeable materials are used for driveways, parking areas, walkways, and patios. (Greater than 75% of the site shall be permeable.)

F. Water Reuse, Rainwater Harvesting System – 75%
LEED WE 1.1 *OR* NGBS 801.8

LEED WE 1.1
Design and install a rainwater harvesting and storage system (including surface runoff and/or roof runoff) for landscape irrigation use or indoor water use. The storage system must be sized to hold all the water from a 1-inch rainfall event (equivalent to 0.62 gallons per square foot of roof area used for capture), taking into consideration the size of the harvest system (i.e., 75% of total roof area).

OR NGBS 801.8
Rainwater collection and distribution is provided.
(1) Rainwater is collected and used.; and
(2) Rainwater is distributed using a renewable energy source or gravity.

G. Very High Efficiency Fixtures and Fittings
LEED WE 3.2 *OR* NGBS 801.4(2)(b), 801.5.1(2) and 801.6(2)

LEED WE 3.2
Meet the following requirements by installing very high efficiency fixtures or fittings.
(1) The average flow rate for all lavatory faucets must be ≤ 1.5 gpm OR lavatory faucets must meet the U.S. EPA WaterSense specification and be certified and labeled accordingly; and
(2) The average flow rate for all showers must be ≤ 1.75 gpm per stall; and
(3) The average flow rate for all toilets must be ≤ 1.1 gpf.

OR NGBS 801.4(2)(b)
All showerheads are in compliance with 1.6 to less than 2.0 gpm.

and NGBS 801.5.1(2)
Water-efficient lavatory faucets with 1.5 gpm or less maximum flow rate when tested at 60 psi in accordance with ASME A112.18.1 are installed for all lavatory faucets.

and NGBS 801.6(2)
A water closet is installed with an effective flush volume of 1.28 gallons or less when tested in accordance with ASME A112.19.2 (all water closets) and ASME A112.19.14 (all dual flush water closets), and is in accordance with EPA WaterSense *Tank-Type High-Efficiency Toilet.*

H. Exceptional Energy Performance – HERS 50 max.
LEED EA 1.2 *OR* NGBS 702.2(3)

LEED EA 1.2
Exceed the performance of ENERGY STAR for Homes (by achieving a 50 on the Home Energy Standards (HERS) Index).

OR NGBS 702.2(3)
Energy efficiency features are implemented to achieve energy cost performance that exceeds the 2006 ICC IECC by 50%. A documented analysis using software in accordance with ICC IECC, Section 404, or ICC IECC Section 506.2 through 506.5, applied as defined in the ICC IECC, is required.

I. **Construction Waste Reduction**
LEED MR 3.2 *OR* NGBS 603.3, 605.2 and 605.3

LEED MR 3.2
Reduce or divert waste generated from new construction activities from landfills and incinerators to a level below the industry norm. Use either of two options:

(1) Reduced construction waste. Generate 2.5 pounds (or 0.016 cubic yards) or less of net waste (not including waste diverted for reclamation or recycling) per square foot of conditioned floor area.
(2) Increased waste diversion. Divert 25% or more of the total material taken off the construction site from landfills and incinerators.

Note: Land clearing and demolition waste (e.g., from removal of existing structures on the site) should not be counted in this calculation.

OR NGBS 603.3
Facilitation for sorting and reuse of scrap building material (e.g., provide a central storage area or dedicated bins).

and NGBS 605.2
On-site recycling measures following applicable regulations and codes are implemented, such as the following:

(1) Materials are ground or otherwise safely applied on-site as soil amendment or fill. A minimum of 50 percent (by weight) of construction and land-clearing waste is diverted from landfill; or
(2) Alternative compliance methods approved by the PA DEP.

and NGBS 605.3
Construction materials (e.g., wood, cardboard, metals, drywall, plastic, asphalt roofing shingles, or concrete) are recycled offsite.

J. **ENERGY STAR with Indoor Air Package**
Complete all the requirements of the U.S. Environmental Protection Agency's ENERGY STAR with Indoor Air Package (IAP).

K. **Basic Operations Training**
LEED AE Prerequisite 1.1 *OR* NGBS 1001.1 and 1002.1

LEED AE Prerequisite 1.1

Provide the home's occupant(s) with the following:

(1) An operations and maintenance manual or binder that includes all the following items:
   - (a) The completed checklist of LEED for Homes features.
   - (b) A copy of each signed Accountability Form.
   - (c) A copy of the durability inspection checklist.
   - (d) The product manufacturer's manuals for all installed equipment, fixtures, and appliances.
   - (e) General information on efficient use of energy, water, and natural resources.
   - (f) Operations and maintenance guidance for any LEED for Homes-related equipment installed in the home, including:
     1. space heating and cooling equipment;
     2. mechanical ventilation equipment;
     3. humidity control equipment;
     4. radon protection system;
     5. renewable energy system; and
     6. irrigation, rain water harvesting, and/or graywater system.
   - (g) Guidance on occupant activities and choices, including the following:
     1. cleaning materials, methods, and supplies;
     2. water-efficient landscaping;
     3. impacts of chemical fertilizers and pesticides;
     4. irrigation;
     5. lighting selection; and
     6. appliance selection.
   - (h) Educational information on "green power".

(2) A minimum one-hour walkthrough of the home with the occupant(s), featuring the following:
   - (a) Identification of all installed equipment.
   - (b) Instruction in how to use the measures and operate the equipment.
   - (c) Information on how to maintain the measures and equipment.

OR NGBS 1001.1

A building owner's manual is provided that includes the following, as available and applicable.

(1) A green building program certificate or completion document.

(2) List of green building features (can include the national green building checklist).

(3) Product manufacturer's manuals or product data sheet for installed major equipment, fixtures, and appliances. If product data sheet is in the building owners' manual, manufacturer's manual may be attached to the appliance to the appliance in lieu of inclusion in the building owners' manual.

(4) Information on available local utility programs that purchase a portion of energy from renewable energy providers.

(5) Explanation of the benefits of using energy-efficient lighting systems (e.g., compact fluorescent bulbs, light emitting diode (LED)) in high-usage areas.

(6) A list of practices to conserve water and energy.

(7) A diagram showing the location of safety valves and controls for major building systems.

(8) Maintenance checklist.
(9) List of common hazardous materials often used around the building and instruction for proper handling and disposal of these materials.
(10) Information on organic pest control, fertilizers, deicers, and cleaning products.
(11) Information on native landscape materials and/or those that have low-water requirements.
(12) A narrative detailing the importance of maintenance and operation in retaining the attributes of a green-built building.

and NGBS 1002.1

Building owners/occupants are familiarized with the green building goals and strategies implemented and the impacts of the occupants' practices on the costs of operating the building. Training is provided to the responsible party(ies) regarding all equipment operation and control systems. Systems include, but are not limited to the following:

(1) HVAC filters
(2) Thermostat operation and programming
(3) Lighting controls
(4) Appliances and settings
(5) Water heater settings
(6) Fan controls

Residential Major Renovation

To qualify as a High Performance Building under this program, a residential major renovation project must meet all of the following:

1. Must achieve at least Gold Certification under the USGBC LEED for Homes rating system, or at least Gold Certification under the National Green Building Standard, ICC 700-2008 (Green Building Path).

2. Evidence of meeting the LEED or the NGBS standard must be provided through independent third-party verification, which shall include blower door testing. Building Envelope Performance Criteria: 5ACH 50 (air changes per hour at 50 pascals). Envelope leakage shall be determined by a certified rater using a RESNET-approved testing protocol. Independent third-party verification will be conducted by an agency or entity having no direct affiliation or financial interest with the applicant, program or system being evaluated.

3. Under either rating system, must meet the criteria for each of the following standards:

   A. **Minimize Disturbed Area of Site**
   LEED SS 1.2 *OR* NGBS 503.1 - See above

   B. **Surface Water Management, Runoff from Roof**
   LEED SS 4.3 *OR* NGBS 503.4 (1), (2) and (3)

   LEED SS 4.3
   Design and install one or more of the following runoff control measures:
   (1) Install permanent stormwater controls (e.g., vegetated swales, on-site rain garden, dry well, or rainwater cistern) designed to manage runoff from the home.
   (2) Have the site designed by a licensed or certified landscape design or engineering professional such that all water runoff from the home is managed through an on-site design element.

OR NGBS 503.4 (1), (2) and (3) (Lot Design)
   (1) Natural water and drainage features are preserved and used; and
   (2) A storm water management plan is developed and implemented that minimized concentrated flows and simulates flows found in natural hydrology (e.g., vegetative swales, French drains, wetlands, drywells, and rain gardens); and
   (3) All or a percentage of impervious surfaces are minimized and permeable materials are used for driveways, parking areas, walkways, and patios. (Greater than 75% of the site shall be permeable.)

   C. **Water Reuse, Rainwater Harvesting System – 75%**
   LEED WE 1.1 *OR* NGBS 801.8 - See above

   D. **Very High Efficiency Fixtures and Fittings**
   LEED WE 3.2 *OR* NGBS 801.4(2)(b), 801.5.1(2) and 801.6(2) - See above

   E. **Exceptional Energy Performance – HERS 65 max.**
   LEED EA 1.2 *OR* NGBS 702.2(3)

LEED EA 1.2
Exceed the performance of ENERGY STAR for Homes (by achieving a 65 on the Home Energy Standards (HERS) Index).

OR NGBS 702.2(3)
Energy efficiency features are implemented to achieve energy cost performance that exceeds the 2006 ICC IECC by 35%. A documented analysis using software in accordance with ICC IECC, Section 404, or ICC IECC Section 506.2 through 506.5, applied as defined in the ICC IECC, is required.

F. **Construction Waste Reduction**
LEED MR 3.2 *OR* NGBS 603.3, 605.2 and 605.3 - See above

G. **ENERGY STAR with Indoor Air Package**
See above

H. **Basic Operations Training**
LEED AE Prerequisite 1.1 *OR* NGBS 1001.1 and 1002.1 - See above

Small Business New Construction

To qualify as a High Performance Building under this program, a small business new construction project must meet all of the following:

1. Must achieve at least Gold Certification under the USGBC LEED NC Version 3 rating system or at least three globes under the GBI Green Globes rating system for New Construction. If certification is sought under Green Globes instead of LEED, it is required that the applicable LEED criteria be met as identified below. The required LEED criteria should meet or exceed the corresponding Green Globes criteria as noted.

   NOTE: References identified below as "GG X.X" refer to the Green Globes Design for New Buildings and Retrofits, *Rating System and Program Summary,* dated December 2004.

2. Evidence of meeting the LEED or the GG standard must be provided through independent third-party verification. Independent third-party verification will be conducted by an agency or entity having no direct affiliation or financial interest with the applicant, program or system being evaluated.

3. Under either rating system, must meet the criteria for each of the following standards:

   A. **Construction Activity Pollution Prevention**
   LEED SS Prerequisite 1 (Meets or exceed GG B.2)

   LEED SS Prerequisite 1
   Create and implement an erosion and sedimentation control plan for all construction activities associated with the project. The plan must conform to the erosion and sedimentation requirements of the 2003 EPA Construction General Permit OR local standards and codes, whichever is more stringent. The plan must describe the measures implemented to accomplish the following objectives:
   (1) To prevent loss of soil during construction by stormwater runoff and/or wind erosion, including protecting topsoil by stockpiling for reuse.
   (2) To prevent sedimentation of storm sewers or receiving streams.
   (3) To prevent pollution of the air with dust and particulate matter.
   The EPA's construction general permit outlines the provisions necessary to comply with Phase I and Phase II of the National Pollutant Discharge Elimination System (NPDES) program. While the permit only applies to construction sites greater than 1 acre, the requirements are applied to all projects for the purposes of the prerequisite.

   GG B.2
   Provide a drainage, and erosion/sediment control plan that includes measures such as limiting grading, leaving steeper slopes undisturbed, avoiding soil compaction, and providing vegetative ground cover. Include measures for the construction stage.

   B. **Site Selection**
   LEED SS 1 (Meets or exceeds GG B.1)

LEED SS 1

Do not develop buildings, hardscape, roads or parking areas on portions of sites that meet any of the following criteria:

(1) Prime farmland as defined by the U.S. Department of Agriculture in the United States Code of Federal Regulations, Title 7, Volume 6, Parts 400 to 699, Section 657.5 (citation 7CFR657.5).

(2) Previously undeveloped land whose elevation is lower than 5 feet above the elevation of the 100-year flood as defined by the Federal Emergency Management Agency (FEMA).

(3) Land specifically identified as habitat for any species of federal or state threatened or endangered lists.

(4) Land within 100 feet of any wetlands as defined by the U.S. Code of Federal Regulations 40 CFR, Parts 230-233 and Part 22, and isolated wetlands or areas of special concern identified by state or local rule, OR within setback distances from wetlands prescribed in state or local regulations, as defined by local or state rule or law, whichever is more stringent.

(5) Previously undeveloped land that is within 50 feet of a water body, defined as seas, lakes, rivers, streams and tributaries that support or could support fish, recreation or industrial use, consistent with the terminology of the Clean Water Act.

(6) Land that prior to acquisition for the project was public parkland, unless land of equal or greater value as parkland is accepted in trade by the public landowner (park authority projects are exempt).

GG B.1

(1) Demonstrate on the site plan, how any portion of the site identified as being a wetland or wildlife corridor, agricultural land, parkland, or an area notable for its scenic beauty, will be fully preserved. Carry out all required environmental assessments.

(2) Select a site which meets one of the following criteria:
   - (a) An existing serviced site.
   - (b) Existing minimum development density of 60,000 sq. ft./acre.
   - (c) Remediate, previously contaminated site.

(3) Minimize the disturbance of undeveloped areas of the site. Minimize the area of the site for the building, parking, and access roads, and locate new buildings on previously disturbed parts of the site. Preserve significant trees and natural slopes to maintain the existing direction of groundwater flow. Map all the existing site vegetation.

C. Stormwater Design: Quantity Control
LEED SS 6.1 (Edited) (Meets or exceeds GG B.3)

LEED SS 6.1 (Edited)

CASE 1. Sites with Existing Imperviousness 50% or Less

Implement a stormwater management plan that prevents the post-development peak discharge rate and quantity from exceeding the predevelopment peak discharge rate and quantity for the 1- and 2-year 24-hour design storms.

CASE 2. Sites with Existing Imperviousness Greater Than 50%
Implement a stormwater management plan that results in a 25% decrease in the volume of stormwater runoff from the 2-year 24-hour design storm.

GG B.3
Provide a stormwater management plan to prevent damage to project elements, including vegetation, on both the project site and those adjacent to it. Include an engineering design of the site drainage pattern, including volume calculations and site management strategies. Aim for no increase in run-off. Or, if the site already consists of more than 50% impervious surface in its pre-development state, aim for a reduction of 25% in storm water run-off.

D. Stormwater Design: Quality Control
LEED SS 6.2 (Meets or exceeds GG B.3)

LEED SS 6.2
Implement a stormwater management plan that reduces impervious cover, promotes infiltration and captures and treats the stormwater runoff from 90% of the average annual rainfall using acceptable best management practices (BMPs). BMPs used to treat runoff must be capable of removing 80% of the average annual postdevelopment total suspended solids (TSS) load based on existing monitoring reports. BMPs are considered to meet these criteria if:

(1) They are designed in accordance with standards and specification from a state or local program that has adopted these performance standards, OR
(2) There exists infield performance monitoring data demonstrating compliance with the criteria. Data must conform to accepted protocol (e.g., Technology Acceptance Reciprocity Partnership [TARP], Washington State Department of Ecology) for BMP monitoring.

GG B.3
See above.

E. Reduce Water Consumption by 40%
LEED WE 3 (Meets or exceeds GG D.1)

LEED WE 3
Employ strategies that in aggregate use 40% less water than the water use baseline calculated for the building (not including irrigation). Calculate the baseline according to the table under WE Credit 3: Water Use Reduction in LEED 2009 for New Construction and Major Renovations.

GG D.1
Achieve one of the following water performance targets:

Offices	Less than 1.5 m^3/m^2/year
	Less than 1.0 m^3/m^2/year
	Less than 0.5 m^3/m^2/year
MURBs	Less than 300 m^3/apartment/year
	Less than 150 m^3/apartment/year

Less than 50 m^3/apartment/year

F. **Innovative Wastewater Technologies**
LEED WE 2 (Meets or exceeds GG D.2 and D.3)

LEED WE 2
OPTION 1 – Reduce potable water use for building sewage conveyance by 50% through the use of water-conserving fixtures (e.g., water closets, urinals) or nonpotable water (e.g., captured rainwater, recycled graywater, on-site or municipally treated wastewater). OR
OPTION 2 – Treat 50% of wastewater on-site to tertiary standards. Treated water must be infiltrated or used on-site.

GG D.2
(1) Increase water-efficiency through the use of the following technologies:
  (a) Low flush toilets (less than or equal to 6 liters)
  (b) Water-saving fixtures on faucets (7.5 L/min) and showerheads (9.0 L/min)
  (c) Urinals with proximity detectors or waterless urinals where applicable
  (d) Other appliances such as water efficient (H-axis) washing machines + low water dishwashers (38 L) where applicable
(2) Where applicable, install features to minimize the consumption of make-up water for wet-cooling towers.

GG D.3
(1) Where feasible, integrate a graywater collection, storage and distribution system to collect, store, treat and redistribute laundry and bathing effluent for toilet flushing, irrigation , janitorial cleaning, cooling and car washing.
(2) Where feasible, integrate a biological waste treatment system for the site and building such as peat moss drain fields, constructed wetlands, aerobic treatment systems, solar aquatic waste systems (or living machines), and composting or ecologically-based toilets.

G. **Enhanced Commissioning**
LEED EA Prereq. 1 and EA Credit 3 (Meets or exceeds GG A.3)

LEED EA Prerequisite 1
Implement, or have a contract in place to implement, the following additional commissioning process activities in addition to the requirements of EA Prerequisite 1: Fundamental Commissioning of Building Energy Systems and in accordance with the LEED Reference Guide for Green Building Design and Construction, 2009 Edition:
(1) Prior to the start of the construction documents phase, designate an independent commissioning authority (CxA) to lead, review and oversee the completion of all commissioning process activities.
  (a) The CxA must have documented commissioning authority experience in at least 2 building projects.
  (b) The individual serving as the CxA:
    i. Must be independent of the work of design and construction.

ii. Must not be an employee of the design firm, though he or she may be contracted through them.

iii. Must not be an employee of, or contracted through, a contractor or construction manager holding construction contracts.

(c) The CxA must report results, findings and recommendations directly to the owner.

(2) The CxA must conduct, at a minimum, 1 commissioning design review of the owner's project requirements, basis of design, and design documents prior to the mid-construction documents phase and back-check the review comments in the subsequent design submission.

(3) The CxA must review contractor submittals applicable to systems being commissioned for compliance with the owner's project requirements and basis of design. This review must be concurrent with the review of the architect or engineer of record and submitted to the design team and the owner.

(4) The CxA or other project team members must develop a systems manual that gives future operating staff the information needed to understand and optimally operate the commissioned systems.

(5) The CxA or other project team members must verify that the requirements for training operating personnel and building occupants have been completed.

(6) The CxA must be involved in reviewing the operation of the building with operations and maintenance (O&M) staff and occupants within 10 months after substantial completion. A plan for resolving outstanding commissioning-related issues must be included.

LEED EA 3

Implement, or have a contract in place to implement, the following additional commissioning process activities in addition to the requirements of EA Prerequisite 1: Fundamental Commissioning of Building Energy Systems and in accordance with the LEED Reference Guide for Green Building Design and Construction, 2009 Edition:

(1) Prior to the start of the construction documents phase, designate an independent commissioning authority (CxA) to lead, review and oversee the completion of all commissioning process activities.

(2) The CxA must have documented commissioning authority experience in at least 2 building projects.

(3) The individual serving as the CxA:

(a) Must be independent of the work of design and construction.

(b) Must not be an employee of the design firm, though he or she may be contracted through them.

(c) Must not be an employee of, or contracted through, a contractor or construction manager holding construction contracts.

(d) May be a qualified employee or consultant of the owner.

(4) The CxA must report results, findings and recommendations directly to the owner.

(5) The CxA must conduct, at a minimum, 1 commissioning design review of the owner's project requirements basis of design, and design documents prior to the mid-construction documents phase and back-check the review comments in the subsequent design submission.

(6) The CxA must review contractor submittals applicable to systems being commissioned for compliance with the owner's project requirements and basis of design. This review must be concurrent with the review of the architect or engineer of record and submitted to the design team and the owner.

(7) The CxA or other project team members must develop a systems manual that gives future operating staff the information needed to understand and optimally operate the commissioned systems.
(8) The CxA or other project team members must verify that the requirements for training operating personnel and building occupants have been completed.
(9) The CxA must be involved in reviewing the operation of the building with operations and maintenance (O&M) staff and occupants within 10 months after substantial completion. A plan for resolving outstanding commissioning-related issues must be included.

GG A.3
(1) Engage an independent Commissioning Authority.
(2) Provide "Design Intent" and "Basis of Design" documentation.
(3) Include commissioning requirements in the Construction Documentation.
(4) Develop a Commissioning Plan.

H. Fundamental Refrigerant Management
LEED EA Prerequisite 3 (Meets or exceeds GG F.2)

LEED EA Prerequisite 3
Zero use of chlorofluorocarbon (CFC)-based refrigerants in new base building heating, ventilating, air conditioning and refrigeration (HVAC&R) systems. When reusing existing base building HVAC equipment, complete a comprehensive CFC phase-out conversion prior to project completion.

GG F.2
(1) Select refrigeration systems that avoid the use of ozone-depleting substances (ODS) and potent industrial greenhouse gases (PIGGs).
(2) Select refrigerants that have an ozone-depleting potential (ODP) equal to zero, or at a minimum, less than 0.05.
(3) Ensure the air-conditioning system complies with the requirements of the Federal Halocarbon Regulations under CEPA and the Safety Code for Mechanical Refrigeration ASHRAE 15-1994.

I. Optimize Energy Performance – 40%
LEED EA 1 (Meets or exceeds GG C.1)

LEED EA 1
Demonstrate a 40% improvement in the proposed building performance rating compared with the baseline building performance rating. Calculate the baseline building performance rating according to the building performance rating method in Appendix G of ANSI/ASHRAE/IESNA Standard 90.1-2007 (with errata but without addenda) using a computer simulation model for the whole building project.

GG C.1
Achieve a rating of 87% under the Energy Star Target Finder program.

J. **Measurement & Verification**
LEED EA 5 (Meets or exceeds GG requirement to use EPA ENERGY STAR Target Finder)

LEED EA 5
Develop and implement a measurement and verification (M&V) plan consistent with Option D: Calibrated Simulation (Savings Estimation Method 2) or Option B: Energy Conservation Measure Isolation, as specified in the International Performance Measurement & Verification Protocol (IPMVP) Volume III: Concepts and Options for Determining Energy Savings in New Construction, April 2003. The M&V period must cover at least 1 year of post-construction occupancy. Provide a process for corrective action if the results of the M&V plan indicate that energy savings are not being achieved.

K. **Storage and Collection of Recyclables**
LEED MR Prerequisite (Meets or exceeds GG E.7)

LEED MR Prerequisite 1
Provide an easily-accessible dedicated area or areas for the collection and storage of materials for recycling for the entire building. Materials must include, at a minimum: paper, corrugated cardboard, glass, plastics and metals.

GG E.7
Provide adequate handling and storage facilities for future occupants to recycle materials and compost organic waste.

L. **Construction Waste Management: Divert 50% From Disposal**
LEED MR 2.1 (Meets or exceeds GG E.6)

LEED MR 2.1
Recycle and/or salvage nonhazardous construction and demolition debris. Develop and implement a construction waste management plan that, at a minimum, identifies the materials to be diverted from disposal and whether the materials will be sorted on-site or comingled. Excavated soil and land-clearing debris do not contribute to this credit. Calculations can be done by weight or volume, but must be consistent throughout. The minimum percentage debris to be recycled or salvaged is 50%.

GG E.6
Develop and implement a construction, demolition and renovation waste management plan.

M. **Minimum Indoor Air Quality Performance**
LEED IEQ Prerequisite 1 (Meets or exceeds GG G.1)

LEED IEQ Prerequisite 1
Meet the minimum requirements of Sections 4 through 7 of ASHRAE Standard 62.1-2007, Ventilation for Acceptable Indoor Air Quality (with errata but without addenda). AND

CASE 1 – Mechanically Ventilated Spaces
Mechanical ventilation systems must be designed using the ventilation rate procedure of the applicable local code, whichever is more stringent.
CASE 2 – Naturally Ventilated Spaces
Naturally ventilated buildings must comply with ASHRAE Standard 62.1-2007, Paragraph 5.1 (with errata but without addenda).

GG G.1

(1) Avoid entraining pollutants into the ventilation air path by:
    (a) Positioning air intakes and outlets at least 10 m apart, and inlets and not downwind of outlets.
    (b) Locating inlets more than 20 m from major sources of pollution and at least the minimum recommended distances from lesser sources of pollution.
    (c) Protecting air intakes openings.
    (d) Specifying ventilation lining that will avoid the release of pollution and fibers into the ventilation air path.
(2) Provide ventilation in accordance with ANSI/ASHRAE 62-2001
(3) Verify that the ventilation system provides effective air exchange (that the outdoor air delivered to the space actually reaches the occupants)
(4) Monitor indoor air quality either with CO2 monitoring or electronic airflow monitoring
(5) Provide a mechanical ventilation system that has the capability of flushing-out the building with 100% outside air at ambient temperatures above 0 ° C
(6) Provide mechanical ventilation in enclosed parking areas
(7) Specify personal controls over the ventilation rates, or, in naturally ventilated buildings, operable windows or trickle vents on windows
(8) Specify a minimum filter efficiency of 65% arrestance, or 40% atmospheric dust-spot efficiency for air distributed to occupied spaces

N. Environmental Tobacco Smoke Control
LEED IEQ Prerequisite 2

LEED IEQ Prerequisite 2
Prohibit smoking in the building. Prohibit on-property smoking within 25 feet of entries, outdoor air intakes and operable windows. Provide signage to allow smoking in designated areas, prohibit smoking in designated areas or prohibit smoking on the entire property.

Small Business Major Renovation

To qualify as a High Performance Building under this program, a small business major renovation project must meet all of the following:

1. Must achieve at least Gold Certification under the USGBC LEED NC Version 3 rating system or at least three globes under the GBI Green Globes rating system for New Construction. If certification is sought under Green Globes instead of LEED, it is required that the applicable LEED criteria be met as identified below. The required LEED criteria should meet or exceed the corresponding Green Globes criteria as noted.

   NOTE: References identified below as "GG X.X" refer to the Green Globes Design for New Buildings and Retrofits, *Rating System and Program Summary,* dated December 2004.

4. Evidence of meeting the LEED or the GG standard must be provided through independent third-party verification. Independent third-party verification will be conducted by an agency or entity having no direct affiliation or financial interest with the applicant, program or system being evaluated.

2. Under either rating system, must meet the criteria for each of the following standards:

   A. **Construction Activity Pollution Prevention**
   LEED SS Prerequisite 1 (Meets or exceed GG B.2) - See above

   B. **SS Credit 5.1 Site Development: Protect or Restore Habitat**
   LEED SS 5.1 (Meets or exceeds GG B.1)

   LEED SS 5.1
   Restore or protect a minimum of 50% of the site (excluding the building footprint) or 20% of the total site area (including building footprint), whichever is greater, with native or adapted vegetation.

   GG B.1
   (1) Demonstrate on the site plan, how any portion of the site identified as being a wetland or wildlife corridor, agricultural land, parkland, or an area notable for its scenic beauty, will be fully preserved. Carry out all required environmental assessments.
   (2) Select a site which meets one of the following criteria:
      (a) An existing serviced site.
      (b) Existing minimum development density of 60,000 sq. ft./acre.
      (c) Remediate, previously contaminated site.
   (3) Minimize the disturbance of undeveloped areas of the site. Minimize the area of the site for the building, parking, and access roads, and locate new buildings on previously disturbed parts of the site. Preserve significant trees and natural slopes to maintain the existing direction of groundwater flow. Map all the existing site vegetation.

C. **Stormwater Design: Quantity Control**
LEED SS 6.1 (Edited) (Meets or exceeds GG B.3) – See above

D. **Stormwater Design: Quality Control**
LEED SS 6.2 (Meets or exceeds GG B.3) – See above

E. **Reduce Water Consumption by 35%**
LEED WE 3 (Meets or exceeds GG D.1)

LEED WE 3
Employ strategies that in aggregate use 35% less water than the water use baseline calculated for the building (not including irrigation). Calculate the baseline according to the table under WE Credit 3: Water Use Reduction in LEED 2009 for New Construction and Major Renovations.

GG D.1
Achieve one of the following water performance targets:

Offices	Less than 1.5 m^3/m^2/year
	Less than 1.0 m^3/m^2/year
	Less than 0.5 m^3/m^2/year
MURBs	Less than 300 m^3/apartment/year
	Less than 150 m^3/apartment/year
	Less than 50 m^3/apartment/year

F. **Innovative Wastewater Technologies**
LEED WE 2 (Meets or exceeds GG D.2 and D.3) - See above

G. **Enhanced Commissioning**
LEED EA Prereq. 1 and EA Credit 3 (Meets or exceeds GG A.3) - See above

H. **Fundamental Refrigerant Management**
LEED EA Prerequisite 3 (Meets or exceeds GG F.2) - See above

I. **Optimize Energy Performance – 30%**
LEED EA 1 (Meets or exceeds GG C.1)

LEED EA 1
Demonstrate a 30% improvement in the proposed building performance rating compared with the baseline building performance rating. Calculate the baseline building performance rating according to the building performance rating method in Appendix G of ANSI/ASHRAE/IESNA Standard 90.1-2007 (with errata but without addenda) using a computer simulation model for the whole building project.

GG C.1
Achieve a rating of 84% under the Energy Star Target Finder program.

J. **Measurement & Verification**

LEED EA 5 (Meets or exceeds GG requirement to use EPA ENERGY STAR Target Finder) – See above

K. Storage and Collection of Recyclables
LEED MR Prerequisite (Meets or exceeds GG E.7) - See above

L. Construction Waste Management: Divert 50% From Disposal
LEED MR 2.1 (Meets or exceeds GG E.6) - See above

M. Minimum Indoor Air Quality Performance
LEED IEQ Prerequisite 1 (Meets or exceeds GG G.1) - See above

N. Environmental Tobacco Smoke Control
LEED IEQ Prerequisite 2 - See above

ATTACHMENT II

[Applicant Letterhead]

Date
Applicant Name
Applicant Address
Applicant Address
Applicant City, PA, Zip Code

Project Name
Project Address
Project Address
Project City, PA, Zip Code

To the Board Members of the Commonwealth Financing Authority:

[APPLICANT NAME] is requesting financial assistance under the Commonwealth Financing Authority's (CFA) for a High Performance Building under the Alternative Clean Energy (ACE) Program. The **[PROJECT OR BUILDING NAME]** is located at **[ADDRESS]** in the Commonwealth of Pennsylvania, and will comply with all required CFA ACE program guidelines and will achieve one of the following standards or higher:

- ☐ USGBC LEED Gold
- ☐ GBI Green Globes, Three Globes
- ☐ NGBS Gold Certification

The **[APPLICANT NAME]** will utilize the **[NAME AND VERSION OF RATING SYSTEM]** in the design and construction of the building. We fully understand and agree with all terms and conditions of the Alternative Clean Energy Program, hereby acknowledging that if the above listed level of certification, or higher, is not achieved **[APPLICANT NAME]** will not receive CFA funding under this program.

_____ _____

Applicant Signature Date