Essex Police Facility Committee, Phase II
Final Report to the Selectboard
January 6, 2012

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Section I – Introduction/Executive Summary

In the spring of 2011, after receiving the report of the Essex Police Facility Committee (PFC-I), the Essex Selectboard determined a second phase was necessary. A 12-member citizen committee (Police Facility Committee II, or PFC-II) was formed that included seven of the eight members of PFC-I along with five new members. The committee was charged with completing three primary tasks:

1.) To explore energy efficiency and sustainable design in detail and make recommendations regarding building performance;
2.) To recommend a project delivery method;
3.) To further discuss the four sites identified in phase one and consider identifying a preferred alternative(s).

The following is the report of the work of PFC-II, completed over the course of 14 meetings and 18 weeks. The various sections of this report attempt to show in greater depth and detail how the tasks were completed and the recommendations arrived at. This report also represents a substantial investment in time and energy by citizens dedicated to finding potential solutions to the Essex Police Department's long-standing space, safety, and operational efficiency needs.

The overarching goal is to get the best building within the Town's limited financial resources. The recommendations in this and other sections of the report are offered with a sense of "balance" in mind – the goal is to achieve the type of building described while still being as sensitive as possible to the needs of the taxpayers who will fund it. Recommendations that add to the cost of the project at the front end are generally able to repay that initial investment well within the life of a general obligation bond (20 years) – and certainly within the life of the building (a minimum of 40 or 50 years). At the same time these recommendations are not intended to add unnecessary expenses to the project.

In summary, the members of PFC-II make the following recommendations to the Selectboard:

1.) To construct a facility capable of achieving no less than LEED Silver certification and able to meet energy efficiency targets – especially as they are related to insulation and the building envelope – established by the "Architecture 2030" initiative for 2020 (energy savings 80 percent greater than national averages for similar structures).
2.) To utilize construction management at risk (CM) or design-bid-build (DBB) as the project delivery methods best suited for this project, as they provide the necessary process and focus on qualifications, collaboration, owner involvement, transparency, and timing.
3.) To identify the Ehler's and IBM sites as preferred alternative sites and to remove the Torrey and Dousevicz properties from consideration at this time.

While focused primarily on the tasks identified by the Selectboard, members also discussed related topics, such as how to best inform the public about the project and when the appropriate time to put a building bond before the voters is. Please see Section V, "Other recommendations and considerations," for more information.

It is important to take a moment to revisit the reasons why a new police facility in Essex is being recommended. With less than 4,000 square feet of space spread inefficiently across parts of two stories at 81 Main Street and rental space in an office building, the 32 sworn officers and civilian employees of the Essex Police Department protect and serve the nearly 20,000 residents and thousands of others who work, shop, and play in Essex, Vermont's second largest community (by population).

A majority of police officers and employees work in less than 2,000 square feet at the main facility located in the aforementioned portion of the Municipal Building. The five employees comprising the detective bureau (four detectives and an administrative assistant) work in less than 2,000 square feet of leased space in an office building on Essex Way. Evidence storage and vehicle maintenance functions are located at a third site, more than three miles from 81 Main Street and nearly two miles from the detective bureau.

The Essex Police Department has occupied approximately the same amount of space for the past two decades, despite the fact that the number of employees has increased significantly and police needs have changed.

The space available for the Essex Police Department is not adequate and is an omnipresent challenge to operational efficiency, providing quality police services to the community, and the safety of police personnel and the public.

Section II – Energy efficiency and sustainable design

Task: To explore energy efficiency and sustainable design in detail and make recommendations regarding building performance.
PFC-II recommendation: To construct a facility capable of achieving no less than LEED Silver certification and able to meet energy efficiency targets – especially as they are related to insulation and the building envelope – established by the "Architecture 2030" initiative for 2020 (energy savings 80 percent greater than national averages for similar structures).

PFC-II's first step with regards to identifying energy efficient and sustainable design recommendations for a new police facility was to invest in its own education. A series of knowledgeable speakers, all with experience with energy efficient and sustainable building projects in Vermont supplemented a host of written materials (see Bibliography). That combination, along with much discussion by committee members, serves as the foundation from which PFC-II makes its recommendations.

The speakers, listed in the order they appeared before the committee, were:

- Ken Bean and Mike Stevens from the University of Vermont (UVM) – In recent years UVM has been engaged in a fairly aggressive building/rebuilding plan. The minimum standard to which UVM must build is LEED Silver. The Davis Center, which was the first student center in the United States to earn a LEED Gold certification for new construction; and the soon to be completed Rubenstein School of Natural Resources, which is slated to earn a LEED Platinum certification (the highest currently available), both exceed the minimum. More information regarding the LEED rating and certification system can be found below.
- Randy Smith, CFO of the Putney School in Putney, VT – The Putney School constructed a "net zero" fieldhouse, one of a growing number of facilities in Vermont built to that standard. Net zero energy buildings are designed to meet the building's energy needs primarily through two means: energy efficiency and the generation of energy by on-site renewable (solar, wind, etc.) systems. Through the combination of efficiency measures and on-site generation the Putney School's fieldhouse is designed to save or produce enough energy to cover its needs throughout the building's lifetime.
- Paul Duane, Efficiency Vermont – From the Efficiency Vermont website: "Efficiency Vermont provides technical assistance, rebates, and other financial incentives to help Vermont households and businesses reduce their energy costs with energy-efficient equipment, lighting, and approaches to construction and major renovation. Additionally, we partner extensively with contractors, suppliers, and retailers of efficient products and services throughout the state. We are operated by a private nonprofit organization, the Vermont Energy Investment Corporation, under an appointment issued by the Vermont Public Service Board." Efficiency Vermont personnel will be involved throughout the project as it advances.
- Andy Shapiro, Energy Balance, Inc. and member of the Vermont Energy Education Partnership – Andy Shapiro is an energy and green building design consultant who has worked on projects for NRG Systems, the State of Vermont, affordable housing organizations, and the Putney School. He is also the "Scientist-in-the-Classroom" for the Vermont Energy Education Partnership.

The acronym "LEED" appears throughout the committee's discussions and in most of the materials. LEED stands for "Leadership in Energy and Environmental Design," and is probably the best known environmentally sound, sustainable, and energy efficiency-focused certification program linked to the construction, renovation, and operation of all types of buildings in the United States.

Designed by the U.S. Green Building Council, LEED certifications are based on points earned for various components of a project. Points are earned across five broad categories: sustainable sites, water efficiency, energy and atmosphere, materials and resources, and indoor environmental quality. Those seeking certification may earn additional points for innovative design and regional priorities. For example, regional

priority points in the northeast can be earned by meeting renewable energy targets. There are currently four levels of certification, listed from lowest to highest: certified, silver, gold, and platinum.

Buildings capable of obtaining LEED certification or designed with energy usage in mind are becoming more common in Vermont. According to the U.S. Green Building Council, there were 32 LEED registered projects in Vermont as of April 2007. That number has likely increased, and the list does not take into account projects constructed to levels capable of achieving LEED certification but never certified, such as the new South Burlington police facility (LEED Silver capable). New buildings constructed to meet current basic code requirements in Vermont are often close to or capable of achieving LEED Silver certification, in addition to saving 50 percent more energy than a building built to standards that meet national averages.

LEED is not the only energy efficiency and sustainable design/certification system in existence, though it is arguably the most commonly used. Because of this, there is national and regional data available to assist in the evaluation of any costs associated with construction and certification. This data begins to dispel the myth of the "green premium," which is associated with the additional "up front" costs (i.e. initial construction costs) of energy efficiency and sustainable design. This is not to say that attempting to achieve a higher level of building design and performance would not have an associated increased cost up front, just that it is not as drastic as assumed – and that the payback and lifecycle costs may make the additional initial investment moot long before the bond is paid off.

A 2004 study done for the United States General Services Administration found that for LEED certifications, the "premium" ranges from 1 percent to 8 percent depending on the level of certification sought. By 2007, a study by San Francisco-based construction management consultants Davis Langdon found that when compared to similarly sized conventionally built structures there is, "no significant difference in average costs for green buildings." The proverbial bar has been steadily raised on code requirements, as energy-related elements once thought to be "add-ons" are now commonplace inclusions.

PFC-II discussed the advantages and disadvantages of seeking LEED certification in addition to designing and constructing to LEED Silver standards or higher. Certification presents the community with an opportunity to show the thought, work, and effort that went into the facility's design and construction; in fact LEED facilities are often trumpeted as economic development and quality of life assets (for the ability to attract or retain residents and companies that value energy efficiency and sustainable design) as well as a source of community pride. At the same time, certifications do add to the total project cost. The two speakers from UVM estimated that the certifications could add one percent to the project cost, mostly tied to documentation and the retention of a LEED accredited professional (to ensure the documentation is done correctly), with the figure varying depending on the level of certification sought.

In an open letter to PFC-II (see Appendix A), Steve Roy of Wiemann Lamphere suggested that the Town set an energy performance goal based on those established in the "Architecture 2030" challenge. Architecture 2030 is a global non-profit initiative involving architects, engineers, planners, scientists, academia and many others dedicated to addressing climate change through improvements in design, construction, and renovation in the building sector. The initiative has set targets for achieving the common standard of designing and building carbon neutral structures by 2030, as the building sector consumes nearly half of all energy produced in the United States and 77 percent of the electricity (according to the U.S. Energy Information Administration). A carbon neutral building is one that does not use fossil fuels to operate and does not emit greenhouse gases.

Current Architecture 2030 design goals call for buildings that achieve energy savings 60 percent greater than the national average, with 70 percent the 2015 target and 80 percent the 2020 target. The recommendation from Mr. Roy was to design and construct to the 2020 standard (80 percent energy savings when compared to the national average), and explore on-site renewable energy generation (specifically a photovoltaic solar array) – a move that could effectively make the police building a net zero facility.

Upfront investments in efficiency measures – such as increased insulation and tighter building envelopes – could pay off in as little as five years, according to Mr. Roy. That theme was oft repeated by speakers, and is based not on theory but rather on project experience. Focusing on reducing energy use and other conservation measures was highly encouraged as a primary goal, with the on-site generation of renewable energy a secondary goal (related to closing any performance and usage gap). If on-site generation of renewable energy is part of the final project, the Town is highly encouraged to seek grants, rebates, and all other incentives available to help offset the initial cost of construction.

Another common theme amongst the speakers was the importance of setting clear goals for the building's energy performance and sustainable design elements. A set of performance metrics would need to be developed to ensure goals and objectives are met.

The recommendations of PFC-II represent the broad goals of the project – to design and build the most energy efficient facility practicable that also meets the quality of life, operational, and safety needs of the police – translated into initial sets of objectives (no less than LEED Silver and specific energy use targets).

To assist in ensuring that the goals and objectives identified by the Town are all incorporated into the facility design and construction – and that appropriate strategies are outlined – PFC-II recommends that the Town retain an environmental design consultant (see Appendix B for more information on strategies, goals, and the role of the environmental design consultant).

The consultant would join the project team before the request for proposals (RFP) for building design is drafted so that he/she could assist with the drafting and

qualifications-based selections of the project team throughout the design aspect of the project. "Integration between design disciplines is an extremely powerful (and usually unrealized) tool in producing high performance buildings," wrote Andy Shapiro. The consultant gives the Town access to a necessary set of skills and experiences it does not have – and the energy savings that result should cover the addition to the project cost the consultant represents.

The environmental design consultant would ideally be affiliated with the project through the end of the first year of occupancy to measure the building's performance against its design and construction.

When exploring energy efficiency, nearly every resource and every speaker identified the need to invest heavily in the design phase. That investment is as much a human one as a financial one, as it is best to bring in the design and construction teams as soon as possible, if not at the same time.

"Buildings can no longer be broken down and designed as an assemblage of isolated components…Integrating the construction team into the project team is also highly desirable," wrote Peter Morris of Davis Langdon in a 2007 article in the Pension Real Estate Association (PREA) Quarterly. "Many sustainable design features can be defeated or diminished by poor construction practices."

The Town is not in the regular business of constructing public facilities. To achieve the energy performance goals outlined in this report, an integrated approach is not only desirable but also necessary. This includes the integration of highly qualified outside professionals – such as the aforementioned environmental design consultant, commissioning agents, an envelope specialist, and a LEED accredited professional (if certification is sought) – into the project. This approach can also create an environment where efficiencies are possible, in that the each party can offer suggestions that assist in bringing the project in on time and on budget.

Commissioning is of particular importance, in that it is a prerequisite to LEED certification and, according to Mr. Shapiro provides, "a secondary check on mechanical, controls and electrical commissioning, to see that systems are operating consistent with the environmental goals." Commissioning is an operational performance review for acceptance of the various building systems.

Sustainability goals are met, in part, through the energy goals established throughout. For example, basic LEED criteria requires a focus on and the inclusion of sustainable resources and materials, attention to indoor environment quality, reductions in water use, and site selection and management. A building that requires less energy to operate, heat, and cool is one that is ultimately more sustainable and responsible than a building designed and constructed without energy efficiency and sustainability in mind. See Appendix C for a list of PFC-II's Energy Performance Goal Recommendations

Advanced buildings require more sophisticated control systems. The design process should make the systems as user friendly, accessible, and intuitive as possible. Responsible stewardship of this asset is an absolute must. Key maintenance and operations costs need to be identified. Those costs, along with others, can be better estimated when the computer-based energy modeling of the building and its subsystems is performed and augmented following the first year of operation and occupancy monitoring.

Section III – Project delivery method

Task: To recommend a project delivery method.
PFC-II recommendation: To utilize construction management at risk (CM) or design-bid-build (DBB) as the project delivery methods best suited for this project, as they provide the necessary process and focus on qualifications, collaboration, owner involvement, transparency and timing.

The recommendation on project delivery has always been tied to determining which method is the most appropriate given building performance and design goals, siting, and project budget.

PFC-II focused on three methods: design-bid-build (DBB), design-build (DB), and construction management at risk (CM). All three have been used by public entities for successful public infrastructure projects in Vermont, and a number of committee members (in addition to the speakers) have professional experience working in and with some or all of them. Each method is described in greater detail below and, in many cases, in the documents listed in the bibliography.

In a paper titled, "Choosing the Best Delivery Method for Your Project," the Construction Management Association of America (CMAA) lists the following as "key considerations" when selecting a project delivery method:

- Budget
- Design
- Schedule
- Risk assessment
- Owner's level of expertise

Using those considerations and the desire for an integrated, collaborative, and transparent process, the committee ultimately recommended using either CM or DBB as the project delivery method. Knowledgeable Town staff should make the ultimate determination based upon method suitability when the time for selection comes. Police facility design is highly specialized, with certain aspects, notably energy performance goals, security and communications, requiring extra attention and details.

The three methods are summarized in greater detail below:

Design-bid-build (DBB)

Design-bid-build is often referred to as the "traditional" method local government uses for managing capital projects such as buildings. It is a linear model requiring that each task be completed before a new task starts. The process begins with the solicitation and selection of a design firm; moves to and through the design phase; proceeds from there to the solicitation via a publicly advertised competitive bid process and selection of a construction entity (using the completed designs, drawings, specifications, etc. from the design phase to arrive at their submitted bid); and ultimately to the construction of the facility.

The linear nature and relatively elongated timeline provide access to the process for the owner in both the design and construction phases. Because design is completed before the construction contracts are even completed, the owner has some confidence in the project cost. DBB has a timeline that is generally the longest of the options available, and with construction projects time equals money (in the form of increased project costs).

DBB requires the execution of two contracts: one with the design entity and one with the construction entity. The two contract, multi-phase nature of DBB can provide a modified system of checks and balances, as the design and construction entities each have their own respective contracts with the owner. That same two contract set up can also produce an adversarial relationship between the design and construction entities, requiring an owner to assume the role of referee rather than focusing on project guidance.

A potential challenge with the DBB model is the need to ensure it is integrated and collaborative. Accommodations can be made that insert the necessary outside professionals and other desired process. DBB was viewed favorably as a project delivery method by PFC-II, as it allows for a great deal of owner involvement and transparency.

Construction Management at Risk (CM)

CM is similar in a number of respects to DBB. The owner has an independent relationship with both the design and construction entities; unlike DBB both entities are part of the project process from very early on. A contractor is often involved following the completion of the schematic design phase, which occurs before the design development phase. A benefit of this collaboration is that it aligns the various entities around the owner's facility goals early, and provides a framework through which the CM entity may offer ideas in the design phase that benefit the owner related to constructability, material selection, and so on.

The process begins with the solicitation and selection of both the design and construction teams. Because selection is not done solely on the basis of project price, emphasis is placed on each entity's ability to perform and experience with the work required.

The CM serves as a representative of the owner during design (for a flat fee), a role that is abandoned during the construction phase when the CM transforms into the general

contractor. One of the "risks" involved for the CM is that the entity selected is responsible for the oversight of each subcontract relationship, the selection of whom the owner can and does play a role.

Before design is fully completed the CM firm and owner work on establishing a guaranteed maximum price (GMP). The CM firm accepts responsibility for delivering the project to the owner within the GMP established.

PFC-II felt that CM offered the greatest potential for the owner to be involved. The ability to incorporate various outside professional elements (such as the environmental design consultant and a "clerk of the works") is a perceived strength. Another advantage is the shifting of the selection process for design and construction to a framework based more on qualifications than simply on the lowest cost. The drafting of the various contracts must be done with great care, and should include someone experienced with the such documents to supplement Town staff's role. Standard contract documents created by the American Institute of Architects and supplied by the project architect would be available and are recommended.

Design-build (DB)

Design-build is a more compact project delivery process than DBB or CM. Instead of two separate contracts (one with the design entity and one with the construction entity), the owner contracts with one entity to perform both the design and construction work.

The arrangement between the design and construction teams varies. For example, a contractor may take on the responsibility of finding a design partner or partners; or a firm may have both the design and construction functions available "in-house."

The process begins with the solicitation and selection of a design-build entity. Because the design and construction components are part of the same contractual arrangement different phases of the project overlap, creating a more compact timeline with the potential to produce financial savings for the owner.

There are two major disadvantages to DB for the Town. The first is that DB does not have the built in checks and balances that both DBB and CM include. The second is that DB often works best for owners who are knowledgeable and experienced with the construction of buildings (such as housing developers or universities) – something the Town does not have, as it does not construct public facilities with any regularity.

Other considerations

An additional choice the Town may make for a project delivered via any of the methods included here is to identify a separate "clerk of the works" to serve as the Town's representative throughout the process to ensure that construction is proceeding in a manner that meets the Town's expectations. The clerk of the works, among other tasks, ensures that contract documents are followed, is present for material and systems testing,

and generally keeps the owner informed throughout the construction phase. When selecting the clerk of the works, the emphasis should be placed on finding the right individual/entity for the task, one that combines the necessary experience and professional qualifications.

The clerk of the works would be separate from the additional personnel identified in the energy section of the report, such as the environmental design consultant, envelope specialist, or other commissioning agents.

Town Purchasing Policy

The Town's most recently updated version of its purchasing policy leaves open the possibility of utilizing all methods of project delivery included in this document. The policy is clear that bids are required – and a bid process is an integral part of the project management and delivery methods described within.

While price is certainly a significant factor in determining bid awards, it is by no means the only factor. For example, the policy reads that bids, "shall be evaluated based on the requirement set forth in the specifications, ***which may include criteria such as quality, workmanship, delivery, and suitability for a particular purpose***" (emphasis added).

In the section on award, the policy further states that bids will be awarded to, "the lowest responsible and responsive bidder whose bid meets the requirements and criteria set forth in the specifications."

Design and CM services are solicited through a qualifications-based selection process that is mostly silent on costs. Scope and costs are negotiated after selection.

The policy contains provisions for waivers of criteria that must be outlined in a written rationale.

Section IV – Police Facility Siting

Task: To further discuss the four sites identified in phase one and consider identifying a preferred alternative(s).
PFC-II recommendation: To identify the Ehler's and IBM sites as preferred alternative sites and to remove the Torrey and Dousevicz properties from future consideration.

The phase one report identified four site finalists that met the lot size requirements established in the 2010 Wiemann Lamphere report. The report called for a single story police facility with a building footprint of nearly 18,000 square feet, or a two-story facility with a building footprint of approximately 13,000 square feet. Depending on the number of stories, the site itself would need to be a minimum of either 1.65 or 1.8 acres.

The four site finalists (listed in the final order of ranking in the phase one report) are:

1.) Ehler's land, 74 and 76 Upper Main Street/Route 15;

2.) IBM, 145 Maple Street/Route 117;
3.) The Torrey property, 18 River Road/Route 117;
4.) Dousevicz/Town Meadow, abutting Carmichael Street on one side and Route 15 on the other.

The parcels were identified during a long process that began with the 7,600 taxable properties on the grand list (which includes Town and Village properties) and 10 sites submitted to the committee during a public request for information. The list was winnowed down to the 251 open one-acre parcels and 78 existing buildings of 15,000 square feet or more before further being refined into eight semifinalists. The four listed above advanced through each of the rounds in phase one and into phase two. Additional sites were not actively sought or identified during phase two because of the extensive effort to identify the most appropriate sites during phase one.

In ranking the sites, PFC-II members primarily used the criteria established by PFC-I. In addition to the ability to achieve the energy performance and sustainability goals recommended by PFC-II, parcels were ranked with the following four criteria in mind:

- Access (particularly to the major routes such as VT15, VT2A, VT289, and VT117);
- Location (proximity or access to population centers, activities, schools, and potential hazards);
- Intangibles (a myriad of considerations, including natural features, room for expansion, etc.);
- Neighborhood Suitability (how a police facility "fits in" with adjacent land uses).

The rankings are based on the subjective evaluation of the criteria by the 12 members of PFC-II.

PFC-II met with owners and representatives of the four sites. Those discussions allowed committee members to become acquainted or reacquainted with the sites as well as to ask questions directly. After incorporating what was learned throughout phase two about energy efficiency and sustainability, and reviewing the materials from phase one, the members of PFC-II ranked the four sites again.

This time rankings were done to indicate site preference, with a one representing an individual's top choice(s) and the other numbers representing rank relative to the top choice. The two lowest total scores (indicating the committee's preference) belonged to Ehler's and IBM, as is seen in the table below.

Ehler's	**IBM**	**Torrey**	**Dousevicz**
18	***26***	***48***	***35***

All four properties are viable in that they meet the minimum requirements established in the Wiemann Lamphere report. Throughout phases one and two the Ehler's and IBM sites continually scored the most favorably.

Ehler's and IBM remain at the top of the list due in large part to one of the great axioms of real estate: location, location, location.

The Ehler's space sits at the crossroads of Vermont Routes 15 and 289 (a.k.a. the "Circ") in what is very nearly the geographic center of Essex – ensuring that a great number of residents are easily, quickly, and efficiently accessible in an emergency situation. The site is less than two miles (1.75) from Five Corners. The land is not in a floodplain and is a significant distance away from the rail lines that bisect parts of Essex and often contain rail cars hauling hazardous materials. The site's owners are in the process of connecting to municipal water and sewer (the lot is inside the Town sewer core), removing one of the more significant challenges identified during the first phase. Finding the appropriate access management configuration (curb cuts, signalization, emergency pre-emption signalization, etc.) is paramount, given the heavy traffic volumes along the two corridors generally and especially during peak morning and afternoon commute periods. The unknowns associated with the development of neighboring parcels are a concern, as development could add to the access management challenges identified above. There are no zoning issues.

The IBM location sits within a 2-mile radius of a significant portion of the Essex population. Access to the major routes connecting at the Five Corners (Vermont Routes 2A, 15, and 117) is readily obtained (8/10 of a mile), and the southern terminus of the Circ is approximately 1.5 miles away. While access management is less of an issue than the Ehler's site given the ability to utilize multiple curb cuts, enhance current signalization (emergency and regular), and have authorized 24/7 access to and through the IBM campus, the location is less centralized than the Ehler's site. It is a more "discrete" site, in that there are fewer immediately located conflicting users and no identified challenges created by potential future development on neighboring lots. Municipal and other utilities are easily accessible, and site appears to be readily developable. The IBM site, along with the Ehler's site, is large enough to allow the potential installation of on-site renewable energy generation equipment. The proximity to both IBM and the railroad are cause for concern – though an accident is statistically unlikely, it is a possibility that must be taken into consideration. There are no zoning issues.

The Torrey and Dousevicz properties were determined to have issues that eliminated them from consideration in this report. Though both sites met the requirements established in the Wiemann Lamphere report, the locations presented challenges with regards to space, access management (curb cuts, parking, etc.), and compatibility of use (i.e. the potential for conflicts with neighbors or other users, such as the foot and vehicular traffic possible in the Town Meadow area). The size of both sites would also make the addition of on-site renewable energy facilities such as a photovoltaic solar array more difficult. Potential expansion of the facility for police or other users could also be hampered by the size of each lot, though there would be the ability to expand upwards by increasing building height.

All four site owners and representatives are heartily applauded for the dedication and patience exhibited throughout what has already been a lengthy process. The willingness not only to wait, but to also make themselves available to the committee as needed, is and has always been greatly appreciated.

Section V – Other recommendations and considerations

It is important to ensure that the operational adjacencies identified in the Wiemann Lamphere report are fully incorporated into the facility's design. The operational adjacencies ensure the efficient, effective, and safe operations of the various law enforcement functions. The committee's scope of work establishes the report as its baseline, and committee members encourage the Selectboard to formally adopt the report as its project baseline should this project continue to advance.

Establishing a timeline for the next steps is another important task. A draft timeline (see Appendix D) is attached to this report and offers suggestions on those next steps and when they may occur. The timeline builds to and from the previously identified potential bond vote in November 2012. PFC-II also recommends the creation of a committee dedicated to public education and information efforts. Making sure that voters understand all of the components of the project – and not solely the final price – is essential.

Cost and financing

With two phases of committee work now complete, one challenge remains: ascertaining exactly what a new police facility for Essex costs. Using the Wiemann Lamphere report as a guide, various ranges can be derived from the estimates for everything from construction to inflation to the upfront costs of achieving certain energy and sustainability goals. The experience of others, notably South Burlington, offers another potential figure, though it is one tied to that individual situation and not transferrable on its own.

Putting together detailed, accurate figures on the total costs – for construction and building lifecycle both – is an integral part of the next steps. There is information in Section II of this report about the potential costs associated with meeting energy performance goals, but the ranges represent estimates.

The discussion on cost leads to discussions on financing the project. Traditionally, municipalities seek authorization from voters for a general obligation bond obtained through the Vermont Municipal Bond Bank. Interests rates are currently favorable for borrowing, a scenario which helps lower the overall cost to taxpayers. Financing is a topic that the Selectboard must wrestle with as the project advances, and is not part of the recommendations included in this report.

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**The reading materials listed above do not include materials committee members obtained and reviewed on their own.*

Project Delivery Methods

"Primer on Project Delivery," provided by a joint committee of the American Institute of Architects and the Associated General Contractors of America, 2004.

"Understanding Project Delivery Methods," power point presentation by Michael Kenig, Chair, the Associated General Contractors of America Project Delivery Committee, March 21, 2007.

"Choosing the Best Delivery Method for Your Project," prepared by the Construction Management Association of America (CMAA).

"Project Delivery Systems: Pro vs. Con – Design-Bid-Build vs. CM@Risk vs. Design-Build," Maurice R. Masucci, PE, Hill International, Inc. for the Construction Management Association of America (CMAA) Southern California Chapter.

"Best Practices in Project Delivery Management," James C. McMinimee, PE and Shari Schaftlein, et al, October 2009. Prepared for the American Association of State Highway and Transportation Officials.

Websites of note

Town of Essex – www.essex.org
U.S. Green Building Council – www.usgbc.org
Efficiency Vermont – www.efficiencyvermont.com
Vermont Green Building Network – www.vtgbn.org
Construction Management Association of America – www.cmaanet.org
Architecture 2030 – www.architecture2030.org
The Putney School – www.putney.com

APPENDIX A

Wiemann Lamphere ARCHITECTS

An open letter to the Essex Police Facility Committee:
December 5, 2011

Thank you for taking the time to consider all of the options for a new Police Facility in Essex very carefully. As your Committee discusses the design standards for the new Facility, I would like to offer my thoughts on sustainability. As you are well aware, there are many third party certifications that could be achieved to determine a level of "sustainability" for buildings. LEED provides a framework for achieving points in five major categories. A certification for LEED does not necessarily mean the building will outperform others in terms of energy use. I suggest a specific energy use target be chosen to determine how efficient the facility should be. Wiemann Lamphere Architects has adopted the "2030 Challenge" as our defined goal for energy efficiency. If you are not aware of the 2030 Challenge, it is a global program that sets defined targets for energy savings until the year 2030 at which time buildings should reach carbon neutral. This program outlines nationwide average energy use levels for specific types of buildings, including police stations. The national average for police stations is considered to be 78kBtu/sf/yr. There are specific target energy saving levels for years leading up to 2030, which are shown on the included site energy use handout. Currently, the goal would have us designing projects to save 60% from the national average. Sounds great but, to put this in perspective, a building in Vermont simply following code is in the range of 50% savings from the national average. This energy use value is quantified by calculating (computer modeling) what the site energy intensity is for the building and site based on a "per square foot" value. Basically it is how much energy the building requires for heating, cooling, lighting and all power using fixtures combined. The included form can assist you in determining the energy intensity level you feel would be the most appropriate.

My recommendation would be to require the building to have an 80% reduction in energy use from the national average. 70% is the 2015 goal and 80% is the 2020 goal. Given this is a municipal project and energy efficiency has a payback, the higher goal seems appropriate. This would mean the new facility would have a target energy use of 15.6 kBtu/sf/yr. This efficiency range is achievable at a reasonable long term cost, given proper solar exposure and design. Recent projects of ours have been able to super insulate to this level and realize great savings with paybacks under 5 years. Long term financial value is certainly more important than first cost of a project, especially when the long term costs are funded by taxpayers. A building of superior construction will last a very long time and when done properly will cost far less during its life span if it is super insulated, not to mention the carbon reduction. With an 80% energy reduction target as a building requirement, the facility will achieve lasting value. I would encourage an additional step of using onsite energy production to accomplish the remaining 20% energy requirement, making the building zero net energy use. This cost will add to the first cost but, once again, will have a definable payback period which will likely be less than the bond length and certainly less than the building's life. I strongly believe in making zero net energy buildings today, as they CAN be done within a reasonable long term budget. There is no need to wait for 2030. My own personal residence is designed to this level and I encourage everyone to consider this as their goal as well. Thank you for considering this important decision carefully.

Sincerely,

Steven M. Roy

Steven M. Roy, AIA, LEED AP
Vice President, Wiemann Lamphere Architects

525 Hercules Drive I Suite Two I Colchester, VT 05446 I Phone: 802.655.5020 I Fax: 802.655.6567 I wiemannlamphere.com

2030 CHALLENGE Targets: U.S. National Averages

U.S. Averages for Site Energy Use and 2030 Challenge Energy Reduction Targets by Space/Building Type[1]

From the Environmental Protection Agency (EPA): Use this chart to find the site fossil-fuel energy targets

Primary Space / Building Type[2]	Available in Target Finder[3]	Average Source EUI[4] (kBtu/Sq.Ft./Yr)	Average Percent Electric	Average Site EUI[4] (kBtu/Sq.Ft./Yr)	2030 Challenge Site EUI Targets (kBtu/Sq.Ft./Yr)				
					50% Target	60% Target	70% Target	80% Target	90% Target
Administrative / Professional & Government Office	✓					today	2015	2020	2025
Education		170	63%	76	**38.0**	30.4	22.8	15.2	7.6
College / University (campus-level)		280	63%	120	**60.0**	48.0	36.0	24.0	12.0
K-12 School	✓								
Food Sales		681	86%	225	**112.5**	90.0	67.5	45.0	22.5
Convenience Store (with or without gas station)		753	90%	241	**120.5**	96.4	72.3	48.2	24.1
Grocery Store / Food Market	✓								
Food Service		786	59%	351	**175.5**	140.4	105.3	70.2	35.1
Fast Food		1306	64%	534	**267.0**	213.6	160.2	106.8	53.4
Restaurant / Cafeteria		612	53%	302	**151.0**	120.8	90.6	60.4	30.2
Health Care: Inpatient (Specialty Hospitals, Excluding Children's)		468	47%	227	**113.5**	90.8	68.1	45.4	22.7
Hospital (Acute Care, Children's)	✓								
Health Care: Long Term Care (Nursing Home / Assisted Living)		225	54%	124	**62.0**	49.6	37.2	24.8	12.4
Health Care: Outpatient		183	72%	73	**36.5**	29.2	21.9	14.6	7.3
Clinic / Other Outpatient Health		219	76%	84	**42.0**	33.6	25.2	16.8	8.4
Medical Office	✓								
Lodging		194	61%	87	**43.5**	34.8	26.1	17.4	8.7
Dormitory / Fraternity / Sorority	✓								
Hotel, Motel or Inn	✓								
Mall (Strip Mall and Enclosed)		271	71%	107	**53.5**	42.8	32.1	21.4	10.7
Office	✓								
Bank / Financial Institution	✓								
Public Assembly		143	57%	66	**33.0**	26.4	19.8	13.2	6.6
Entertainment / Culture		265	63%	95	**47.5**	38.0	28.5	19.0	9.5
Library		246	59%	104	**52.0**	41.6	31.2	20.8	10.4
Recreation		136	55%	65	**32.5**	26.0	19.5	13.0	6.5
Social / Meeting		102	57%	52	**26.0**	20.8	15.6	10.4	5.2
Public Order and Safety		189	57%	90	**45.0**	36.0	27.0	18.0	9.0
Fire Station / Police Station		157	56%	78	**39.0**	31.2	23.4	15.6	7.8
Courthouse	✓								

national average

suggested goal range

Data Source: U.S. Environmental Protection Agency; U.S. Energy Information Administration

Service (Vehicle Repair / Service, Postal service)		150	63%	77	**38.5**	30.8	23.1	15.4	7.7
Storage / Shipping / Nonrefrigerated Warehouse		56	56%	25	**12.5**	10.0	7.5	5.0	2.5
Self-storage		12	44%	4	**2.0**	1.6	1.2	0.8	0.4
Non-refrigerated Warehouse	✓			1	**0.5**	0.4	0.3	0.2	0.1
Distribution / Shipping Center		90	61%	44	**22.0**	17.6	13.2	8.8	4.4
Refrigerated Warehouse	✓								
Religious Worship		83	52%	46	**23.0**	18.4	13.8	9.2	4.6
Retail Store (Non-mall Stores, Vehicle Dealerships)		191	67%	82	**41.0**	32.8	24.6	16.4	8.2
Retail Stores	✓								
Other[5]		213	56%	104	**52.0**	41.6	31.2	20.8	10.4
Secondary Space / Building Type[2]									
Ambulatory Surgical Center	✓								
Computer Data Center	✓								
Garage	✓								
Open Parking Lot	✓								
Swimming Pool	✓								
Residential Space / Building Type[6,7]									
Single-Family Detached		76.6	-	43.8	**21.9**	17.5	13.1	8.8	4.4
Single-Family Attached		70.7	-	43.7	**21.9**	17.5	13.1	8.7	4.4
Multi-Family, 2 to 4 units		93.2	-	58.2	**29.1**	23.3	17.5	11.6	5.8
Multi-Family, 5 or more units		99.4	-	49.5	**24.8**	19.8	14.9	9.9	5.0
Mobile Homes		153.2	-	73.4	**36.7**	29.4	22.0	14.7	7.3

Notes

1. This table presents values calculated from the Energy Information Administration in the Commercial Building Energy Use Survey (CBECS), conducted in 2003; using the Environmental Protection Agency's Table 1: 2003 CBECS National Average Source Energy Use and Performance Comparisons by Building Type.

2. Space/Building Type use descriptions are taken from valid building activities as defined by the Energy Information Administration in the Commercial Building Energy Use Survey (CBECS), conducted in 2003.

3. A "✓" indicates that this Space/Building Type is included in Target Finder. On the input page, use the 2030 Challenge EnergyReduction Target option and select 50%.

4. The average Source EUI and Site EUI are calculated in kBtu/Sq.Ft./Yr as weighted averages across all buildings of a given space type in the CBECS 2003 data set.
Source Energy is a measure that accounts for the energy consumed on site and the energy consumed during generation and transmission in supplying energy to the site.
Converting Site to Source Energy:
Source Energy values are calculated using a conversion for electricity of 1 kBtu Site Energy = 3.34 kBtu Source Energy; a conversion for natural gas of 1 kBtu Site Energy = 1.047 kBtu Source Energy; a conversion factor for district heat of 1 kBtu site energy = 1.40 source energy and a conversion factor for fuel oil of 1 kBtu site energy = 1.01.

5. Other: For all building types not defined by the list above, these buildings may choose to use the performance benchmark categorized by "other". Note that this category is not well defined therefore source energy use varies greatly with source EUI ranging over 1500 kBtu/Sq.Ft. As categorized by EIA, "other" may include airplane hangers, laboratory, crematorium, data center, etc.

6. Energy Information Administration (EIA), U.S. Residential Energy Intensity Using Weather-Adjusted Primary Energy by Census Region and Type of Housing Unit, 1980-2001, Table 8c.

7. Energy Information Administration (EIA), U.S. Residential Energy Intensity Using Weather-Adjusted Site Energy by Census Region and Type of Housing Unit, 1980-2001, Table 6c.

EUI: Energy Use Intensity

Data Source: U.S. Environmental Protection Agency; U.S. Energy Information Administration

Trevor Lashua

From: Steve Roy <SRoy@wiemannlamphere.com>
Sent: Wednesday, December 07, 2011 2:09 PM
To: Trevor Lashua
Subject: RE: Essex Police Facility Energy Goals

Hi Trevor,

I'd be happy to make some estimates and provide some recent examples.

Our initial report identifies a single story building of about 18,000 square feet which will be what I use for comparison now. First, I will compare this police station to two recent fire station buildings we did which have good envelopes and very basic mechanical systems.

First example is "Maple Street Fire Station" in Waterbury. Here we used a double wood stud wall system and filled the walls with 11 ¼" dense pack cellulose insulation. Windows are triple pane commercial fiberglass units, which are less expensive than aluminum commercial windows and twice the R-value. The ceiling is insulated to R-66 using cellulose (code R-38). At this station, the added envelope costs are for extra wall framing, added insulation thickness in walls, roof and windows. This cost adds up to $28,915 for a 6,330 square foot building. ($4.57 per square foot). Modeling shows this envelope will save $6,400 in propane per year for a 4.5 year payback. It should be considered that Propane is an expensive fuel to heat with, but natural gas was not an option for this building. For Essex, natural gas is a possibility and will have an effect on payback, perhaps reducing it to a 10 year payback.

Second example is "Main Street Fire Station" in Waterbury. This building is a steel frame structure. Code dictates walls to have R-7.5 continuous insulation and R-13 cavity insulation. We increased those to R-12.6 and R-19 respectively. Windows are the same R-5 fiberglass windows and roof insulation is R-38 continuous insulation (code R-24). Envelope improvements added $19,750 for a 12,600 square foot building (Just $1.57 per square foot) Much of the value in this system is achieved because there is no extra labor involved, it is just thicker materials being installed. This building is modeled to save $11,100 with a payback of two years. Again this figure uses propane and that payback would be slower with natural gas.

Third example is a different scale, but improved envelope and a significant expense for onsite solar hot water and PV production added 20% to the cost of my house to achieve net zero energy use. No fossil fuel connections.

Using the Essex Police facility estimate of 18,000 sf and budget of 3.8 million construction cost, lets improve the envelope for $6 per square foot (more than either example) and add $108,000 in added insulation. Based on previous modeling, I would estimate this to be 60% better than code and approaching the thermal properties necessary to get to 80% target savings. Lighting, solar exposure and design will play the remaining role for

energy savings. Lighting controls have very low payback periods, and designing with the sun in mind comes at no cost for construction.

If the building reaches a goal of 15.6 kBtu/sf/yr, an 85 kW PV system would purchase all energy for the project. Budgeting $5 per watt, a pv system would cost $415,000 before incentives or rebates. At a minimum, federal pays for 30% leaving $290,500 in up front cost. At 15 cents per kWh, the savings per year on electricity would be $12,750. GMP pays 6 cents additional for each kWh produced for another $5,100 in savings. At this cost, the payback at todays electricity cost is roughly 16 years.

Wiemann Lamphere installed a 10kW pv system in the beginning of 2011 for our own offices. The initial cost was $72,000. After all incentives and a 25% grant we received, the final cost to us was under $20,000 and this covers 36% of a 5,000 sf office. Short payback. Wish we had put 3x the panels!

With a $400,000 investment in excellent envelope and PV system, the Police facility would perform exceptionally well for just an 11% initial cost increase. Big dollars can be spent on sophisticated systems and other "sustainable" attributes, but might not necessarily have a payback. First thing is to lower energy use with envelope improvements and maximize the use of the sun.

Sorry for the long email, but hopefully these examples serve well that initial investment does pay back.

Steven Roy
A.I.A., LEED AP

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Creative Sustainable Solutions

From: Trevor Lashua [mailto:tlashua@ESSEX.ORG]
Sent: Wednesday, December 07, 2011 12:19 PM
To: Steve Roy
Subject: RE: Essex Police Facility Energy Goals

Hi Steve,

I've been thinking about the letter a bit in the past two days, especially in relation to the two questions that tend to emerge during committee discussions: cost (upfront and lifecycle) and payback. Your letter gives one example of as little as five years on the payback end, as well as illuminating that a building simply built to code achieves the 50% target.

Recognizing that each project is different - is there a ballpark figure (project total for this size facility or percent increase above building to code, average payback, etc.) or range we could use as a starting point? We're trying not to focus solely on cost, but as a municipal project, it is certainly one of the factors that can have a direct impact on a bond vote. The length of time for payback could positvely impact the willingness to spend a little more on the upfront costs. It's a harder thing to pinpoint as a recommendation without knowing, at least roughly, what it all means from a financial perspective. Thanks in advance for any insight you can offer - it is greatly appreciated.
-T

From: Steve Roy [mailto:SRoy@wiemannlamphere.com]
Sent: Monday, December 05, 2011 3:07 PM
To: Trevor Lashua
Subject: xxxx Possible SPAM xxxx RE: Essex Police Facility Energy Goals

Wiemann Lamphere ARCHITECTS

Perfect. Thank you very much.

Steven Roy
A.I.A., LEED AP

525 Hercules Drive, Suite 2
Colchester, Vermont 05446

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Fax: 802.655.6567

e-mail: SRoy@wiemannlamphere.com
website: *http://wiemannlamphere.com*

From: Trevor Lashua [mailto:tlashua@ESSEX.ORG]
Sent: Monday, December 05, 2011 2:57 PM
To: Steve Roy
Subject: RE: Essex Police Facility Energy Goals

Thanks Steve. I'm just about to send the committee members the agenda for this Thursday and will include it as an attachment, so you're timing is spot on.

Regards,
-Trevor

From: Steve Roy [mailto:sroy@wiemannlamphere.com]
Sent: Monday, December 05, 2011 2:58 PM
To: Trevor Lashua
Subject: Essex Police Facility Energy Goals

Wiemann Lamphere ARCHITECTS

Mr. Lashua,

Attached please find a letter for the Essex Police Facility Committee regarding my recommendation for determining and setting energy goals. I am unsure how to get it to the entire committee directly and felt you may be the appropriate person to help distribute if that is ok. If not, please direct me to another location. If there are any questions, feel free to contact me.

Thank you for your time,

Steven Roy
A.I.A., LEED AP

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Creative Sustainable Solutions

Essex Police Facility Committee II

Energy Performance Goal Recommendations

- **Process**
  - Select a Design Firm with proven track record of buildings with superior energy use characteristics combined with good occupant satisfaction.
  - Treat the Design, Constructions and Commissioning of the building as a "whole" system. Make sure that the personnel (Design, General Contractor and Sub-Contractors) are operating as a team with clear goals of who, what, where and when during all phases of building acquisition.
  - Make sure that energy modeling (prediction and sub-system allocation), envelope integrity supervision including testing, sub-system commissioning including measurements and post commissioning measurements including 1st year consumption are included as tasks in the building planning.
    - Make sure to include the specialized electrical loads and heat from the police department discrete electrical powered devices. E.G. radios, computer systems, chargers, etc.
  - Translate environmental goals into measurable objectives early in the design (schematic) phase so that discrete strategies are assigned to individual components of the building system, e.g. top, sides, floor and openings all might have different "R" values but in the integrated whole they meet the required heat loss or gain for the structure while in operation.
  - Town's representative has to be involved and have a "green" attitude.
- **Goals**
  - Assign 16 Kbtu/sqft/yr as the challenge target for building energy use.
    - This is a modest and attainable goal that is approximately a 60% better than today's "code" building.
  - Evaluate the investment costs, incentives, the payback periods and savings for on-site energy capture (thermal and/or photovoltaic) to generate the same amount of energy as above (on an annual basis).
    - Require the energy modeling task provider to project future gas and electric cost for the proposed building for the expect life of the building.
    - Demonstrate the incremental annual costs versus savings at 5 year increments over the project life of the building
    - The "positive business case" for the community would demonstrate the benefits of being "net-zero".

Sustainable Design Standard Recommendations

- **Impact of Building on Site**
  - Transportation

        - Make the building visible to the public from frequently traveled routes
        - Make the building accessible to public transportation, bike and pedestrian paths
        - Encourage biking to work, e.g. bile racks and showers
        - Provide ability to charge electric vehicles
    - Parking
        - Consider police and employee vehicle parking and building access in building basement
            - This can significantly reduce the hard surface site requirements of the site for storm water run off and heat absorption
            - This could provide the additional security for police activities w/o the cost and appearance of ground level fencing
    - Footprint
        - Two story structure could reduce footprint and may have some energy savings and better access to natural light than single story (above basement)
        - Horizontal Surfaces, e.g. parking surfaces, roofs and landscape, should be reflective, vegetative or for energy capture
    - Landscape
        - Low or no maintenance landscaping with good appearance
        - Tree selection should be providing shade in summer and light in winter
        - All storm water should be retained and treated on site
- **Building Durability**
    - Materials
        - Exterior materials should be integral with energy goals
        - Exterior surfaces should require no painting or staining
        - 50 year life expectation
    - Furnishings
        - Building budget should include new furniture and fixtures
- **Indoor Environment Quality**
    - Lighting
        - Maximum use of opportunities for daylight
            - Reflective louver/shades in high windows
            - Use of penetrations on Roof to provide interior lighting
            - Daylight shift work activities to the south side of the structure and/or reduce vertical partitions when possible
        - Use automatic lighting control based on both occupancy and amount of natural lighting
            - Provide manual override
            - Provide capability for task lighting
    - Air

- Energy recovery air systems used to bring fresh air into the building taking into account of air hazard sources at exterior, e.g. emergency generator location.
    - Air quality monitoring inc. CO2 to automatically maintain minimum standards (of fresh air)
    - Provide outside air thru recovery system to compensate for building exhaust function to minimize negative air pressure in building
- Use no or low emitting (VOC) materials in building interior surfaces, fixtures and furniture.
    - Prior to commissioning except for testing do not use the HVAC systems
    - After commissioning, plan on a "whole house" fresh air exchange period (flush) prior to building occupancy
- Air filters should have a Micro-particle Performance Rating of 1000 or better
    - This is better than the typical furnace or AC filter and may require more frequent replacement or larger size filters.
    - The benefit is lower building cleaning requirements, odor reduction; reduce transmission of dust, pollen, mold spores and smoke and a more pleasant (and healthier) working environment.
- Because we will be dealing with a "tight building", humidity should be controlled all season within a range of 30-60% RH.
    - There is a comfort trade off between temperature and moisture in the air, e.g. at higher levels of humidity the average person is comfortable at lower temperatures as well as the opposite.
    - In Air Cooling, the Latent Heat, e.g. moisture, is removed and the Sensible Heat, e.g. lowering the temperature, occurs concurrently.
        - In super insulated buildings there is frequent occurrence of to much air cooling capacity that results in not enough moisture removal.
        - One of the more frequent problems in air cooling systems is fouling of the evaporator coils with foreign material that leads to mold growth and poor access to and maintenance of the condensate pans and plumbing.
            - These problems can be mitigated by good access for maintenance to the air handler evaporator and good filtering on the return air stream

- Surface colors
    - Engage an interior designer with proven color skills for color selection of the surfaces.

- Color palette has a proven effect on mood, light reflection and building interior appearance.

- **Operating and Maintenance Costs**
  - Indoor water consumption
    - No or low-flow fixtures
      - Auto controlled faucets
      - Dual Flush water closets
    - Energy recapture in "grey water"
    - Water heating or tempering should come from energy recovery first and solar heating 2nd
    - Provide for vehicle washing and cleaning in building planning
  - Systems
    - "Net Metering" of major system electrical usage
    - An "all electric" design has the potential to simplify the number of system in the building when considered in light of the super insulation of modern structures, can take maximum advantage of heat pumps for heating or cooling and gives the building the best option to be "net zero". With trends in Vermont energy supply sourcing and fossil fuel pricing, all electric may be the lowest cost future energy source.
    - Use control systems based on "open source" code to avoid being locked into specific manufacturer maintenance contracts.
    - Plan on investing in a maintenance contract that includes all building systems.
    - Emergency generator (natural gas) should be able to carry the entire building load including HVAC.
  - Cleaning
    - Invest in Central Vacuum system for low noise for the 24 hour operation and to improve air quality and cleaning results.
    - Use hard horizontal and vertical surfaces in common and traffic areas for ease of maintenance. Replaceable soft materials (e.g. carpet tiles) on horizontal surfaces in offices for sound absorption and comfort.
- **Certification**
  - US Green Building Council certification would add to the Town attractiveness. LEED (Leadership in Energy and Environmental Design) status would be a draw to the community along with the other quality of life issues. If the recommendations in this document are followed, the Essex Police Facility could easily be LEED Silver or higher.

APPENDIX C

Environmental Building

And the Role of the Environmental Design Consultant

Andrew M. Shapiro, Energy Balance, Inc.
160 White Rock Dr. #1 Montpelier VT 05602 - 802.229.5676
andy@energybalance.us

A new building presents a great opportunity to reconnect ourselves and our daily lives inside the building to the natural flows of the planet. We must clearly articulate this connectedness, and then learn enough to celebrate it in something as concrete as a building. With concerted teamwork, commitment and focus, we can create wonderful buildings that meet our intentions.

The role of the environmental design consultant is to provide guidance and technical expertise along this path -- a clear, consistent voice during the process of design, construction and commissioning of a building for:

- indoor environmental quality
- operating and maintenance costs
- building durability
- environmental impact of the building

While these issues are the concern of all of the design team, adding the environmental consultant to this process helps keep these issues in focus during the complex process of getting a building built. The environmental consultant helps sort out the environmental goals for the building, assists in translating these into design elements and systems, and tracks their proper implementation through the design and construction process.

1. Define the environmental "goals" for the building. Work with the client to develop a clear, written statement of broad environmental goals to be adopted by the client. This process is best undertaken before the schematic design phase of the project. *Example goal: highly efficient use of energy.*

2. Translate goals into "objectives", which include **metrics** to see if goals are being met. *Example objective: Use less than 50% less energy than the energy code prescribes.* The LEED rating system provides a set of metrics that can be useful.

3. Develop a list of very specific "strategies" to meet each objective. Each of these are discussed and preliminarily analyzed, resulting in a candidate set of options that are put on the table for further analysis. *Example strategy: Insulate walls with 12" and roof with 18" cellulose insulation.* The options need to be in place as soon as possible during schematic design, so all members of the design team can be considering the effects that these options have on structural system, siting, daylighting, electric lighting, HVAC and other factors.

4. "Whole Think." Assist the design team in looking at the building as a whole system, and at all design strategies within that context. Integration between design disciplines is an extremely powerful (and usually unrealized) tool in producing high performance buildings. Identify **Who Does What, Where and When in the building**. These define the loads – heating, cooling, ventilation, lighting, equipment, water and waste. First reduce loads as much as practical, then identify the resources available to meet each load and **thoughtfully match resources to loads**.

5. Assist in design team selection. Utilize performance-based interview techniques to select architects AND engineers and unusual team members, such as daylighting and building science consultants. Check experience of occupants in their buildings.

6. Analyze strategies. Each specific material, system and/or approach is identified and discussed with the whole design team. Some strategies may be rejected as impractical with others evaluated on the basis of cost and impact on the building project, usually including computer-based modeling. Present the practical options, with advantages and disadvantage of each, including costs and savings where appropriate. Energy items require computer modeling.

7. Provide input to and review of plans and specs for consistency with the environmental goals and objectives. Specs, plans and details must be checked when they are in draft form, and final documents are checked again for inclusion of any recommended changes. Provide details as needed.

8. Show up. Participate in construction meetings, inspect and train subs as needed. The desire to maintain momentum often leads to changes or deletions that can have serious impacts on the project.

9. Commission *everything*, including the envelope of the building. Provide a secondary check on mechanical, controls and electrical commissioning, to see that systems are operating consistent with the environmental goals. Commission other items as needed.

10. Track the first year of occupancy, including energy usage, system performance and occupant reactions to the building, to see how the building performs over time. Buildings typically don't work perfectly "out of the box" and it is important to make operational adjustments early to insure occupant satisfaction and to realize energy saving potential

Energy Balance, Inc.

160 White Rock Dr. #1 Montpelier, VT 05602
andy@energybalance.us
(802) 229-5676 522-0165 (c)

To: Essex Town Public Safety Planning Committee

From: Andy Shapiro

Subject: Notes on Questions from Committee

Date: November 30, 2011

As we ran out of time at the meeting I attended, you asked me to follow up with answers to the remaining questions. I hope I have answered your questions. Please let me know if you have further questions or if you need clarification on any of these responses. Thank you for having me at your meeting to speak with you.

1. What is the percentage up-cost for doing a very energy efficient, very green building?
    a. It depends on where you are starting, but we have seen costs from just a couple percent increase up to 10% or more, if you are including expensive items such as a photovoltaic system. This is *very* dependent on what you are calling your "base case" against which you are comparing.

2. What is the percentage up-cost for high performance building design consulting
    a. ½ to 1% of construction costs. Also note that the design process can be a bit more than typical, as we are asking the design team to be more careful about all aspects of design. However, there are now architects and engineers for whom this is standard practice, so design fees are usually competitive.

3. What energy sources would you suggest to reach "net zero?"
    a. First conserve as much as possible in the building – if you are looking at net zero, you want to do all conservation that is cheaper than installing PV's to meet the same load.
    b. Second, recover as much energy as possible; e.g., heat recovery ventilation; drainwater heat recovery.
    c. Then, photovoltaics (PV) are needed to meet electrical loads. Heating loads can be met by heat pumps (either ground- or air-source), in which case you need more PV to meet the heating requirements. Another option is wood pellet boilers for heating needs – less expensive to install, more expensive to operate. Solar hot water heating is very helpful if you have a hot water load, such as showers,

cooking, vehicle cleaning.

4. How mature are these technologies?
    a. All are in the market already. Infrastructure to deliver and service has been building for the last decade or more, so there are enough suppliers to bid on projects.

5. How do you measure building efficiency?
    a. Before it is built, by energy modeling and comparing a benchmark, such as total energy use per year per sq.ft., to other high performance or typical buildings
    b. To keep a net zero building on track, it is very helpful to build in some system metering, such as energy used for heat, hot water, lights, fans, pumps, etc., so that if there are issues, you have some diagnostic tools at hand. This metering is not very expensive.

6. What approach would you use to educate the public? Why bother with all the extra effort?
    a. I would model the energy usage of a typical building and then a high performance and a net zero building, and show the public the difference in operating costs over 30 years. This should be accompanied by cost estimates for each, so the public can see the value. This requires a bit more design and costing work up front, but can be well worth it. More up front work is typical for high performance building projects, to settle issues before the design gets totally firmed up.
    b. It can be helpful to make explicit, with numbers, the reduction in risk to the community of sharp increases in fuel costs, which we have seen quite recently.
    c. I would have tours of great buildings in the area, such as NRG
    d. A slide show of good buildings might be useful.
    e. Talk about other benefits – besides energy costs -- of a "Green" building: low or zero carbon emissions, a healthy working environment, higher productivity in high quality indoor environments, setting an example, etc.

7. What are crucial considerations for the process of getting a good high performance building?
    a. Critical ingredients: clear goals, enough time for design and for construction, enough money for a good building, a "Green Champion" on the owner's team who is connected to the checkbook, and a design team focused on your performance goals.
    b. Please see also the attached note I wrote on my thoughts on process (which I sent you some time back also.)
    c. The design team selection will be your most critical decision. You want a team with experience in this area, you want to visit buildings of candidate teams, you want to speak with owners after they have occupied these buildings to talk about how it was to work with the design team.
    d. As important are clear intentions, clearly laid out for the design team to work with.
    e. When costs are on the table, be sure all the costs are on the table. Energy

considerations often are asked to pay for themselves, while expensive architectural features are not.

8. What is the maintenance difference between a typical building and a high performance building?
    a. A good high performance building will have its maintenance requirements matched to the owner's ability to manage it. That said, many, but not all, buildings these days require a maintenance contract. This cost should be investigated up front and be part of a pro forma operating budget that you require the design team to produce.
    b. Systems that wring more energy out of fuel, systems that recover heat, systems that are smart -- all are more complex than systems years ago that did not do these things. So more sophisticated maintenance is expected than for typical buildings. However, these smarter systems now have track records, so during design, the designers can select the more robust of these systems.
    c. Computer-based building automation systems are very typical now for buildings of the size you are contemplating and can be powerful allies. They do require a facilities person that is already familiar with these or has the skills to be able to get familiar with them, in order to take advantage of the enormous power they offer for maintenance. They can tell you when maintenance needs to be done, when certain systems are not functioning properly, and, if you have energy monitoring, they can track energy usage over time of systems, so you can see if there are issues that manifest in excess energy use. I prefer "open source" systems that the facility operator can manage, and even re-program, as opposed to closed systems that require expensive personnel from the controls company to make even small changes.

Post-PFC-II project timeline – Bond vote based on "budget" scenario.

- **January 2012** – Committee presents report, recommendations to the SB.
- **January-March 2012** – Selectboard reviews report, solicits input from other committees/commissions (if applicable), votes whether or not to proceed. Sets project budget and goals.
- **March 2012** – Through RFP or other applicable process, land prices are solicited from the owners/representatives of the Ehler's and IBM properties.
- **April 2012** – Land prices reviewed by Selectboard, staff authorized to negotiate potential purchase price for selected parcel.
- **April 2012** – Contact established with Vermont Municipal Bond Bank. Staff begins the work of putting together the financing package.
- **May 2012** – RFP published for environmental design consultant.
- **June 2012** – Environmental design consultant selected. Work begins on design and construction management/contractor RFPs. Additional outside assistance acquired as needed.
- **June, July, and August 2012** – Work continues on design and construction management/contractor RFPs, with goal to finalize no later than the end of September. Presentation of RFPs to Selectboard to follow bond vote.
- **August 2012** – Public education/information team assembled, begins work.
- **September 2012** – Public education/information team presents eight-week plan (week of September 10th to bond vote November 6th). Plan implemented upon approval.
- **September and October 2012** – Hold all necessary public hearings for bond vote and/or events scheduled as part of the public education/information plan.
- **October 2012** – Selectboard votes to place bond question on November ballots.
- **November 6th 2012** – Bond Vote.
- **November 2012** – Present RFPs to Selectboard for authorization to publish. Publish upon affirmative vote and end of bond vote appeal period.
- **December 2012** – Appeal period ends. Assemble building committee, to consist of the following members: _____
- **February 2013** – RFP responses returned and opened. Reviewed by staff to ensure compliance with RFP process and all other applicable guidelines, forwarded to building committee for review.
- **March 2013** – Building committee reports recommendations to Selectboard, firms are selected and contracts awarded.
- **April 2013** – Design phase begins, to include building committee (and all other necessary Town staff), environmental design consultant, design team, CM firm. RFP for LEED AP published, if LEED AP not part of design team or role performed by environmental design consultant and certification is sought.
- **April 2014** – Design work completed and presented to Selectboard. Contractor has already been selected (due to use of CM method). Construction begins. This presumes all permitting and review is completed during the design year.
- **October-November 2014** – Construction is completed; police begin regular full-time occupancy of the facility.

*Need to slot in envelope specialist and commissioning agents.
**Does not include corresponding timeline or process for renovation of 81 Main Street.

LEED for New Construction and Major Renovation 2009
Project Scorecard

Project Name:
Project Address:

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

Yes	?	No			
			Water Efficiency	10	Points
Y			Prereq 1 **Water Use Reduction,** 20% Reduction	Required	
			Credit 1.1 **Water Efficient Landscaping,** Reduce by 50%	2	
			Credit 1.2 **Water Efficient Landscaping,** No Potable Use or No Irrigation	2	
			Credit 2 **Innovative Wastewater Technologies**	2	
			Credit 3 **Water Use Reduction**	2 to 4	
			30% Reduction	2	
			35% Reduction	3	
			40% Reduction	4	

			Energy & Atmosphere	35	Points
Y			Prereq 1 **Fundamental Commissioning of the Building Energy Systems**	Required	
Y			Prereq 2 **Minimum Energy Performance:** 10% New Bldgs or 5% Existing Bldg Renovations	Required	
Y			Prereq 3 **Fundamental Refrigerant Management**	Required	
			Credit 1 **Optimize Energy Performance**	1 to 19	
			12% New Buildings or 8% Existing Building Renovations	1	
			14% New Buildings or 10% Existing Building Renovations	2	
			16% New Buildings or 12% Existing Building Renovations	3	
			18% New Buildings or 14% Existing Building Renovations	4	
			20% New Buildings or 16% Existing Building Renovations	5	
			22% New Buildings or 18% Existing Building Renovations	6	
			24% New Buildings or 20% Existing Building Renovations	7	
			26% New Buildings or 22% Existing Building Renovations	8	
			28% New Buildings or 24% Existing Building Renovations	9	
			30% New Buildings or 26% Existing Building Renovations	10	
			32% New Buildings or 28% Existing Building Renovations	11	
			34% New Buildings or 30% Existing Building Renovations	12	
			36% New Buildings or 32% Existing Building Renovations	13	
			38% New Buildings or 34% Existing Building Renovations	14	
			40% New Buildings or 36% Existing Building Renovations	15	
			42% New Buildings or 38% Existing Building Renovations	16	
			44% New Buildings or 40% Existing Building Renovations	17	
			46% New Buildings or 42% Existing Building Renovations	18	
			48% New Buildings or 44% Existing Building Renovations	19	
			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	
			Credit 3 **Enhanced Commissioning**	2	
			Credit 4 **Enhanced Refrigerant Management**	2	
			Credit 5 **Measurement & Verification**	3	
			Credit 6 **Green Power**	2	

Yes ? No

LEED for New Construction and Major Renovation 2009
Project Scorecard

Project Name:
Project Address:

Yes	?	No		
			Materials & Resources	13 Points
Y			Prereq 1 **Storage & Collection of Recyclables**	Required
			Credit 1 **Building Reuse**	1 to 3
			Credit 1.1 _____ Maintain 55% of Existing Walls, Floors & Roof	1
			Credit 1.2 _____ Maintain 75% of Existing Walls, Floors & Roof	2
			Credit 1.3 _____ Maintain 95% of Existing Walls, Floors & Roof	3
			Credit 1.4 **Building Reuse,** Maintain 50% of Interior Non-Structural Elements	1
			Credit 2.1 **Construction Waste Management,** Divert 50% from Disposal	1
			Credit 2.2 **Construction Waste Management,** Divert 75% from Disposal	1
			Credit 3.1 **Materials Reuse,** 5%	1
			Credit 3.2 **Materials Reuse,** 10%	1
			Credit 4.1 **Recycled Content,** 10% (post-consumer + ½ pre-consumer)	1
			Credit 4.2 **Recycled Content,** 20% (post-consumer + ½ pre-consumer)	1
			Credit 5.1 **Regional Materials,** 10% Extracted, Processed & Manufactured Regionally	1
			Credit 5.2 **Regional Materials,** 20% Extracted, Processed & Manufactured Regionally	1
			Credit 6 **Rapidly Renewable Materials**	1
			Credit 7 **Certified Wood**	1

Yes	?	No		
			Indoor Environmental Quality	15 Points
Y			Prereq 1 **Minimum IAQ Performance**	Required
Y			Prereq 2 **Environmental Tobacco Smoke (ETS) Control**	Required
			Credit 1 **Outdoor Air Delivery Monitoring**	1
			Credit 2 **Increased Ventilation**	1
			Credit 3.1 **Construction IAQ Management Plan,** During Construction	1
			Credit 3.2 **Construction IAQ Management Plan,** Before Occupancy	1
			Credit 4.1 **Low-Emitting Materials,** Adhesives & Sealants	1
			Credit 4.2 **Low-Emitting Materials,** Paints & Coatings	1
			Credit 4.3 **Low-Emitting Materials,** Flooring Systems	1
			Credit 4.4 **Low-Emitting Materials,** Composite Wood & Agrifiber Products	1
			Credit 5 **Indoor Chemical & Pollutant Source Control**	1
			Credit 6.1 **Controllability of Systems,** Lighting	1
			Credit 6.2 **Controllability of Systems,** Thermal Comfort	1
			Credit 7.1 **Thermal Comfort,** Design	1
			Credit 7.2 **Thermal Comfort,** Verification	1
			Credit 8.1 **Daylight & Views,** Daylight 75% of Spaces	1
			Credit 8.2 **Daylight & Views,** Views for 90% of Spaces	1

Yes	?	No		
			Innovation & Design Process	5 Points
			Credit 1.1 **Innovation in Design:** Provide Specific Title	1
			Credit 1.2 **Innovation in Design:** Provide Specific Title	1
			Credit 1.3 **Innovation in Design:** Provide Specific Title	1
			Credit 1.4 **Innovation in Design:** Provide Specific Title	1
			Credit 1.5 **Innovation in Design:** Provide Specific Title	1
			Credit 2 **LEED® Accredited Professional**	1

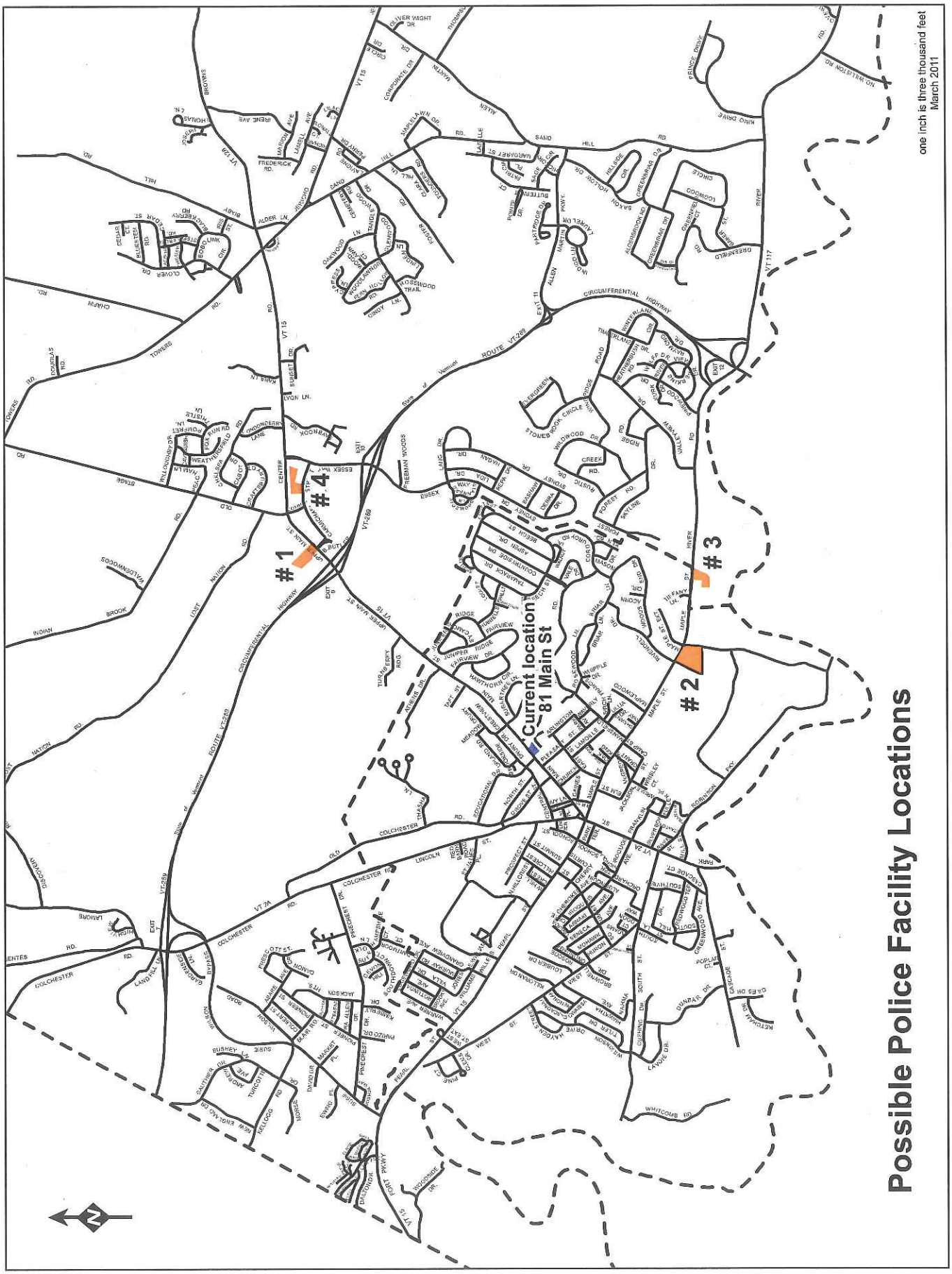
Yes	?	No		
			Regional Priority Credits	4 Points
			Credit 1.1 **Regional Priority Credit:** Region Defined	1
			Credit 1.2 **Regional Priority Credit:** Region Defined	1
			Credit 1.3 **Regional Priority Credit:** Region Defined	1
			Credit 1.4 **Regional Priority Credit:** Region Defined	1

Yes	?	No		
			Project Totals (Certification Estimates)	110 Points

Not Certified

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

APPENDIX F


Possible Police Facility Locations
one inch is three thousand feet
March 2011
Current location
81 Main St
1
2
3
4
N