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**Existing Building Survey and Feasibility Study
for the:**

**Erie County
Technical School**

8500 Oliver Road
Erie, Pennsylvania 16509

ECTS

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Erie County Technical School

Building Renovation and Expansion

Feasibility Study

2009-2010

Executive Summary

Introduction

For several years now, the joint operating committee, superintendents, and faculty and staff have been discussing the need to renovate the Erie County Technical School and Regional Skill Center. A building project would correct deficiencies in existing programs, expand facilities to accommodate new programs, and perhaps add classroom space so the school could change to a full-day comprehensive program (technical with academics). As part of the school's strategic plan in 2007, a goal and action plan were developed to conduct a feasibility study and to make a commitment to renovate and expand the facility.

In the following four sections, this executive summary presents the rationale for a renovation and expansion project at ECTS. The first section, *The Need*, identifies the functional issues the school is currently facing, with regard to facilities. The second section, *The Opportunities*, discusses what can be accomplished with this proposed building project. The third and fourth sections, *Brief Facilities History* and *Current Facilities Description*, provide historical and background information to support the decision-making process to move this study to an implementation stage.

The Need

1. Main campus building fully utilized

Space utilization at the technical school building is at capacity, in terms of both instructional and auxiliary space (office, conference, and storage areas). Even though the technical school has an interest in adding technical training programs, there is no space available. In fact, some laboratories are in spaces considered inadequate for their current use. The Tourism and Hospitality Management program only has access to a classroom. The Networking Technologies program is housed in a small classroom that was not designed for 'high-end' computer training.

In order to meet the growing need for classroom and office areas, the facilities department has converted several areas to different uses. As examples:

- a) A tiered auditorium (Room 18) was converted to a 'flat-floor' classroom
- b) A storage area (Room 14) was converted into a two-station office
- c) A classroom (Room 40) was converted to office space to accommodate alternative education faculty and staff; and
- d) Our Information Systems and Technology Manager uses an 'office suite' designed for a school nurse.

Based on current and projected enrollment patterns, regional workforce projections and state program closure requirements, we do not foresee laboratory space becoming available due to program changes. We have also used all of the space that could be converted to other uses without extensive costs. Each year we squeeze a few more things into existing spaces. We anticipate the demands will continue to grow on our instructional and auxiliary spaces.

It is worth mentioning that the Skill Center also has a high usage rate. Of the approximately 40,000 sq. ft. of space, 75% of that space is utilized for instructional purposes. The Skill Center houses RCI Dual Enrollment classes four days a week, and the career alternative education and Transition Center programs five days a week. Hours of operation are from 8:00 a.m. to 7:00 p.m. The remaining 10,000 sq. ft. is used as a storage area for the technical school and leased storage space to the Intermediate Unit.

2. Age & Condition of Infrastructure

The last renovation was completed in 1993. As a means of controlling costs for that \$6 million project, several key infrastructure items were not updated. The boilers, most HVAC units and the main electrical distribution system are from the 1969 installation. The exterior fascia is the original paint and now showing significant signs of rust. Some of the improvements in 1993 are now reaching the end of their life expectancy, or new technologies over the past 16 years are more efficient. The deficiencies noted here are explained more fully in the Tower Engineering Report.

As noted earlier, many programs are operating in spaces considered to be inadequate for effective instructional purposes. Tourism & Hospitality Management and Networking Technologies are new programs that were placed in classrooms in lieu of laboratories. In 1997, the Culinary Arts program was expanded from a single teacher program to a double teacher program. To accommodate the expansion, a production kitchen was used as an instructional kitchen. The accessory spaces like locker rooms are severely undersized for the number of students enrolled in the program. The Career Alternative Education program accepts middle school students in an area converted from a delivery/storage room into a classroom.

Small group interviews were conducted by Chris Coughlin, of Hallgren, Restifo, Loop and Coughlin, with all faculty and staff regarding their space and facility needs. Infrastructure

and space issues were identified during the interviews. Every program has some need to improve space or services. A compilation of those interviews can be found in the appendix.

3. Enrollment should grow

For the past several years, several hundred students have been ‘turned away’ from ECTS because the programs they were interested in had already met their enrollment capacity. Cosmetology, Health Assistant, Early Childhood Education, Metal Fabrication and Culinary Arts have each had more students interested in the program than there were seats available. The enrollment at ECTS could easily increase 100 students annually if we could increase the capacity in popular programs.

Campus enrollment could also increase if ECTS offered programs where significant student interest exists. Examples of programs that students are interested in but not available at ECTS include Natural Resources & Environmental Studies, Public Safety Services, Diesel Mechanics, Web Design & E-Commerce and Pre-Engineering. With just a minimal enrollment in these areas, the ECTS enrollment could increase another 100 students each year.

Finally, serving students whose plans include postsecondary education is constantly a challenge. Despite over 50% of ECTS students going on to postsecondary education, many families perceive ECTS as a ‘not-for-college’ school. There are also students we could serve whose career plans are incomplete. When more families see ECTS as the ‘best path’ to their careers, they could enroll. We must continue to design and deliver technical training programs so families perceive ECTS as a viable career preparation option. New programs, current programs in new spaces and new academic offerings will significantly improve our capability to attract and serve these students.

The Opportunities

Many of the opportunities associated with a building renovation and expansion have already been alluded to in previous sections. To present a comprehensive overview of the opportunities associated with this building project, the following list is provided. The specific opportunities include:

- 1. Build instructional areas for new programs to train for evolving, high priority occupations and expand program offerings to meet career aspirations of a broader spectrum of students.*

The new programs include:

- a. Health Technician Occupations and Pre-Nursing

- b. Computer and Internet-based Occupations
 - c. Engineering Occupations
 - d. Public Safety Services
 - e. Natural Resources & Environmental Sciences
 - f. Diesel Mechanics
2. *Create additional instructional space for oversubscribed programs to meet current student demand for career and technical education.*

In particular:

- a. Cosmetology
 - b. Early Childhood Education
 - c. Health Assistant
 - d. Metal Fabrication
3. *Create an instructional environment that allows for the integration of academic and technical instruction.*

In a feasibility study focus group conducted with the superintendents, one of the superintendents posed the question, "What would we build if we were starting from scratch?" The question dealt with a discussion about adding academic classes at the technical school, making it a comprehensive technical school, and allowing students to attend ECTS on a full-day basis. The consensus was that for many students, a comprehensive model would best serve their academic and technical education needs. If this kind of delivery model is adopted, additional classroom space will be needed to accommodate the core academic classes.

In a 2008 survey, students were asked, "If ECTS offered the academic classes of math, English, social studies and science, would you choose to attend ECTS all day?" Of just over 600 responses, 37% responded "Yes" and 34% responded "Maybe." Nearly 440 students expressed an interest in attending the technical school all day. This indicates a clear interest of many students to obtain their academic and technical education in a single setting.

By adopting a comprehensive delivery model, there is the potential for gains in academic and technical education achievement. There are also significant opportunities for districts to save on transportation and instructional costs.

4. *Create an instructional environment to fulfill the needs of the Regional Choice Initiative.*

For the participating school districts, the Regional Choice Initiative, and the dual enrollment program in particular, is a shining example of what can be accomplished collaboratively. Unfortunately, the RCI college-bound students use classrooms built in 1976 that were

intended for 'industrial and manufacturing' training. At the time, these classrooms met the need. These classrooms have had minimal updates and lack the infrastructure to support a 21st century instructional environment, especially one intended for college-level classes.

5. Create an instructional environment that meets the needs of alternative education programming.

Our alternative education program currently operates on a schedule different from our regular school hours, due in part to space availability. The unique student and instructional characteristics of this program call for unique classroom space. Both our high school and middle school programs overlap with the high school and adult education programs. They also use classrooms and laboratories in a second-hand fashion. Ideally, the alternative education program should operate in dedicated and isolated space from other programs.

6. Create an instructional environment to meet the needs of a technical/community college.

As the community discussion continues and the possibility grows of Erie County having a community college, there may be a need for classroom, laboratory, office space and a library for the college's operation. A preliminary proposal identified ECTS as a possible site for technical programs of the proposed community college. From a strategic perspective, renovations and expansion of the ECTS facilities could serve some or all of the facility needs of the proposed community college.

7. Project Reimbursable in 2012-2013

The Pennsylvania Department of Education reimburses school districts for approvable building projects. Under the 20-year rule, ECTS is eligible again for state reimbursement of a renovation and expansion project in 2012-2013. Per PlanCon guidelines, career and technical centers (CTC) typically have a higher reimbursement rate than secondary or elementary schools. There is also a higher reimbursement rate for movable equipment for CTCs.

A Brief Facilities History

1. Erie County Technical School

The Erie County Technical School was built in 1968. A consortium of 19 school districts authorized the construction. Its use remained consistent with its design for many years. In 1992-1993, a \$6 million expansion and renovation project was conducted. Unfortunately, little attention was given to infrastructure, most notably HVAC and electricity. Only a few program spaces were expanded.

In 1995, an addition was provided to the construction trades program, allowing for much needed indoor instructional space. An HVAC project was carried out in 1999, due to indoor air quality issues. The C-wing HVAC system was completely replaced along with renovations of the cafeteria and high school office systems.

Since 1999, no major building projects have been conducted at the school, although many have been discussed.

2. Regional Occupational Skill Center Building

The Skill Center was built in 1976 as a cooperative effort between the business and educational communities of Erie County. The bulk of the funding came from federal Appalachian funds and state school building authority funds. In a fund raising drive coordinated by the Manufacturers' Association of Northwest Pennsylvania, the local business community contributed \$750,000 toward the cost of building and equipping the facility.

The original design of the building was for manufacturing-oriented training. Over its history, the Skill Center has included the following technical training laboratories: Forging, precision machining, tool & die, industrial maintenance, welding and injection molding. The intended audience for the training conducted at the Skill Center has been adults and out-of-school youth. The training was available primarily on a full-time basis; however, the facility has been used extensively for part-time or customized technical training. It was very common for the facility to be used for 16 hours a day or more.

The use of the laboratories has changed somewhat over the years. The welding laboratory moved from its original location to a redesigned and renovated location within the building. The injection molding program has "shared" space in several of the laboratories, but never in a laboratory of its own.

In 1999, the Skill Center received an upgrade in the lighting and converted a fuel gas heating system to a natural gas heating system. The project was completed under an energy performance contract with Siemens. The project cost \$267,400 with a 10-year repayment schedule.

After a severe decline in the adult, fulltime enrollment, the Skill Center fulltime programs were discontinued and the facility was essentially closed down in 2000. The adult education division of the Erie County Technical School did use the facility sparingly for part-time evening classes in its schedule.

During the 2000-2001 school year, the Erie County Technical School used the facility for its Plastics Technologies program due to equipment requirements (size, utilities, etc.). In the 2001-2002 school year, the technical school added two new high school programs (Tourism

and Hospitality Management and Networking Technologies) and located them at the Skill Center with the Plastics Technologies program. Due to budget constraints and the high cost of facility operation, the three high school programs were moved to the high school during the 2002-2003 school year and the building sat vacant.

In 2003-2004, the building was leased to the Millcreek Township School District for use by its North Coast School, an alternative education program for high school students. The following year, 2004-2005, the participating school districts, through the Intermediate Unit leased the entire facility and used the classrooms for their Erie County Academy of Collegiate and Advanced Studies. The ECACAS offers collegiate credit classes for high school students.

Through its recent history, the Skill Center has received attention as the potential sight for other programs. The Joint Operating Committee considered renovating the classrooms and offices for additional use by the high school program. The Intermediate Unit considered renovating a portion of the building and converting some of the laboratory space into office space. Additionally, the Intermediate Unit also considered transforming some of the laboratory and classroom space into special education classrooms and a transition center.

Current Facilities Description

1. Land

The property encompasses 146 acres. The parcel is located at the "Five Points" intersection (Oliver, Hamot, and Flower Roads) and covers 146 acres. Both the Erie County Technical School and the Regional Occupational Skill Center are situated on this parcel.

2. Buildings

The Erie County Technical School was built in 1968. The original facility covered 93,000 sq. ft. and housed 16 vocational-technical programs. This building serves as the career and technical education department for 11 participating schools districts and serves students in grades 10, 11 and 12. It also serves the career and technical education needs for adults on a part-time, evening classes basis.

The Regional Occupational Skill Center was built in 1976. The two-story design includes four large-bay manufacturing laboratories and seven classrooms that can be subdivided into ten classrooms and covers 41,000 sq. ft. Three of the four laboratories measure approximately 5,000 sq. ft. each. The fourth laboratory measures approximately 11,000 sq. ft. Each of the laboratories has office and storage space. The classrooms range in size from 800 sq. ft. to 400 sq. ft. when subdivided. All of the classrooms are located on the second floor.

The facility also has a number of general-purpose offices and meeting rooms on the first floor. There is also a centrally located vending area and restrooms on the first floor. Two banks of lockers flank the vending/restroom area. The second floor also has a set of restrooms.

Access to the second floor is available through two staircases, one in the front of the building, and the other at the rear of the building. There is also an elevator located at the front of the building near the vending area.

Summary

Through its various programs and services, the Erie County Technical School touches the lives of over 1,800 youth and adults each year. Over its 41-year history it has provided first-rate career and educational opportunities to the Erie community. After years of working in spaces and under conditions that are 'not quite right,' operating programs in make-shift conditions, being unable to 'do things' in a different and better way, and unable to offer new programs and services—all due to space and facility limitations; the time has arrived for a facility improvement. The time and need have come to reposition the technical school to ensure it provides even better programs and services for the next 40 years.

By its many virtues, ECTS could do more to meet the needs of the community. But without a significant improvement in the facilities, ECTS will do little more than it does now. At a time when technical careers are in a position to provide outstanding opportunities for the workforce of tomorrow, it is time to ensure and expand the capability of the Erie County Technical School to play its role in career preparation and workforce development. There are but a few, if any, public venues in Erie County that teach middle school youth, high school students, college-bound students, and adults seeking technical training. The Erie County Technical School does that now, but it could do more.

This feasibility study calls on the 11 participating school districts, in particular the superintendents and school board members, to embrace the study's recommendations and support a plan to renovate and expand the Erie County Technical School.

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HRL & C Review

Introduction

The following survey and study was conducted to investigate the current condition of the Erie County Technical School and provide schematic plans and conceptual ideas for possible expansion. The study has been developed to assist the Erie County Technical School Operating Committee, Administration, Faculty and Community in the decision making process regarding the future utilization and arrangement of the educational facilities. The goal is to provide ways to make the building more efficient, reduce operating and maintenance costs and to make it flexible for its users.

The existing facilities have been reviewed by Architects and Engineers to determine their current condition. The facilities have also been examined to determine compliance with the most current codes in regards to ADA, heating, ventilation and lighting. Particular attention has been paid to energy efficiency due to current economic climate and the anticipated increase in utility costs.

Proposed plans contained in this document are schematic and show space allocations necessary for potential renovations that have been identified by the Administration, Faculty and Educational Consultant.

Building and Site

The existing one story masonry building was originally constructed in 1968. Renovations and additions occurred in 1986 to the Auto Mechanics Program. In 1992 the entire facility was renovated with new additions to the Auto Body Repair, Warehousing and Building Trades Programs. This project improved the parking/road infrastructure and included updates to the existing heating, plumbing and electrical systems. A HVAC Improvement project was implemented in 1999 that included the mechanical upgrades to the Culinary Arts, Office Area and the south east wing of the school.

The two-story Regional Skill Center was originally constructed in 1976 and has not had any major structural changes since it was built. Only minor modifications have been made to existing spaces to accommodate changes in educational programs.

Site Conditions

The level site on Oliver Road in Summit Township, Erie County, contains approximately 146 acres. The original site development included bituminous drives, parking areas, concrete sidewalks and play areas. Parking and drives were extended and enlarged in 1976 when the Regional Skill Center was built.

The existing drive to the East should be increased in width to accommodate buses and the paving in the rear parking lot should be replaced.

Current Building Size

Erie County Technical School (1977)
Regional Skill Center (1987)

110,000 s.f.
43,000 s.f.

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Structure

The original one-story, steel frame is built on concrete spread footings with a 4" thick concrete floor slab on grade. The 1 1/2" deep steel roof deck rests on steel joists approximately 72" on center. Walls are constructed of face brick and a concrete block backup. The overall structure system is in good condition.

Roof

Sections of the existing roof have been replaced over the years with an EPDM membrane and should have an average insulated R value of 21. The majority (90%) of the existing roof is out of warranty and it is suggested that if a renovation project is pursued it should be replaced with a 20-30 year roof. It is recommended that a roof hatch be added for roof access as well as tapered insulation and several more roof drains and scuppers to comply with the latest code.

Exterior Walls

The existing walls are in good condition and are constructed of face brick, concrete block and 2" thick insulation in the cavity. The existing metal fascia/soffit system, original to the building, is in fair to poor condition and needs to be replaced. Single pane exterior glass in the main corridors should be replaced with dual pane glass or replaced with an insulated panels to improve the exterior walls thermal value. The base of the existing single pane glass in the main corridors should be increased to prevent water/air infiltration as well as prevent any safety issues with the height.

Windows and Doors

The existing dual glazed windows are in good condition but many of the seals have failed and caused condensation in between the panes of glass. The existing windows should be replaced with more energy efficient windows. New windows with dual or triple pane glass with low E, argon filled panels should be considered to improve energy efficiency and comfort.

The entrances have existing doors and frames that are in fair condition. The existing doors and frames should be replaced with new and comply with current ADA requirements.

The interior doors and frames should be replaced with recessed openings to prevent doors from opening into areas of egress and of the proper width to comply with the most recent Code.

Building Organization

The building contains approximately 110,000 square feet and spatial organization is fair. Quiet areas are separated from noisy spaces but related activities need better grouping and public areas require improved supervision and monitoring. The building currently has classrooms, laboratories, one cafeteria and kitchen, a faculty room and three administrative areas.

The rooms used for math and theory classrooms were originally constructed as classrooms. Typical classrooms improvements are needed in particular new lighting, HVAC, ceilings, acoustics, doors, hardware, marker boards, smart boards, painting and floor finishes.

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Code Compliance

Although the existing school was code compliant when constructed, Code Compliance may be an issue if significant renovations and additions are made.

Pennsylvania and Summit Township requires that construction now be in conformance with the 2006 International Building Code. Under this Code, the present Occupancy Classification is considered an E Occupancy.

If a substantial renovation and/or addition is performed in the near future, the building must be in compliance with the 2006 International Building Code. Labor and Industry in Harrisburg would perform all of the necessary reviews.

If a renovation or addition is proposed, the storm water requirements of Summit Township will need to be reviewed. A Land Development Plan and Storm Water Management Plan would need to be submitted to the township.

ADA Summary

The route from the parking lot to the main entrance is accessible and accessible parking spaces are available. Some of the existing accessible parking spaces need to be revised to comply with the latest ADA Codes.

The interior route is also accessible and there are not any issues with stairs or elevators. Doors should be replaced with the proper width and appropriate hardware to meet ADA guidelines. New signage with Braille would be required to meet ADA guidelines. Toilet rooms would need to be revised to provide the proper turning radius and grab bars.

Energy Efficiency

A high performance school is energy efficient and environmentally friendly. These high performance features can positively impact the educational environment with "hands on" teaching tools and exposed systems. This would allow students to interact with their building environment and to provide knowledge for their own homes, businesses and careers.

Areas to be addressed would be daylighting, landscape, water conservation, energy efficient building shell, electrical systems, mechanical systems, environmentally friendly building products, indoor air quality, commissioning, energy education, recycling and waste management.

At a minimum, the LEED (Leadership in Energy and Environmental Design) checklist should be used as a guide to design a high performance educational facility. New codes dictate energy efficiency but following the LEED requirements would help take it a step further.

E C T S

Tower Engineering Review

Project Name: **Erie County Technical School**
Client: Hallgren Loop Restifo & Coughlin Architects
Date of Report: October 26, 2009

Subject: EXISTING BUILDINGS MECHANICAL REVIEW AND RECOMMENDATIONS

HVAC (Erie County Technical School): Currently in the administration office suite, the rooms have self-contained DX cooling and hot water heating packaged terminal air conditioner (PTAC) units. These units are noisy and cause overheating in the rooms, access to the units is limited and is difficult to maintain. A central air-handling unit (AHU) provides conditioning to the corridors and interior areas.

The main entrance is plagued with both a high solar load and wintertime weather that that collects snow. Both these issues are compounded by the fact that three groups of students enter and leave throughout the day and night. The Cafeteria is mechanically cooled. The kitchen appears to be adequately conditioned. Two original make up air (MUA) units provide make up air to the cafeteria. A Carrier AHU was installed in 1994. Kitchen hood duct needs some touch up welding. Student services needs a new DX cooling rooftop unit (RTU). The space should be heated with duct mounted hot water coil(s), because the owner does not want hot water on the roof.

Areas used for night classes need to have HVAC zoning to better condition just the spaces needed. Because the amount of classes and time vary, and that most classes have a specific location, decentralized conditioning in future renovations will serve these areas best. This will allow areas not used to be put in unoccupied mode to save energy. Use of CO2 monitors and occupancy sensors can automatically decrease HVAC operation during occupied mode. The DDC system can also be manually scheduled to put spaces in unoccupied mode per the semester's layout. A Johnson Controls Metasys system has been overlaid on this building with new controls covered by this system. Existing pneumatic controls control portions of the building.

The chiller installed in 1992 serving the center of the building has two out of four compressors that do not work. The spaces being served are the cafeteria, cosmetology and other core areas.

The theory room that is part of the welding classroom needs to be mechanically cooled to allow a better desk time educational experience. The welding collection exhaust fans in the shop area need to be outside or in a separate room to reduce noise in the welding classroom and allow the instructors to talk to the students. Some of the booths sizes are small. The welding machine needs to be away from entrance of booth to allow free passage. Some of the welders are out of the way because they were placed up on a shelf near the booth. This has been working out fine.

Corridors and Hallways are heating only. The Computer lab HVAC units linked to science 37. The two units are not working well together. Building Trades and construction room 43 have a dust collector system that wastes conditioned air to exterior.

The separate building that is off the building trades and construction room does not appear to have much heat but appears to be working for the intended purpose.

Masonry area: The existing hood at the block cleaning and masonry prep area needs to be replaced with an exhaust wall behind this location. This would pull the exhaust away from the face of students, rather than up past their face. Consideration should be given to renovating this system to see if the air can be filtered and re-circulate back into the area to save on conditioning costs.

Drafting covers two rooms with separate AHUs. The rooms are separately cooled. Auto Body Lab is similar to the welding area; the theory room here has no mechanical cooling. Consideration for cooling should be a part of future renovations. Auto Mechanic lab has a CO vehicle exhaust system. The new theory room has mechanical cooling unit on roof. RTU is gas heat with DX cooling. Two AHUs both provide cooling for the graphics room. The room gets a lots of sun.

Expected Life: An overall expected service life for the HVAC systems is hard to arrive at because some of the systems have been changed out over time to fit the needs of the educational program. All the original equipment remaining needs to be renovated because it has passed its useful service life. The central chiller system, Student Services RTU, and office PTAC unit need replaced or the affected HVAC systems redesigned toward another types of HVAC systems.

Recommendations: The building HVAC systems have been maintained very well over the years. The major issue facing the facility is keeping the HVAC systems upgraded to serve the ever-changing programs and services that the school provides. The chiller will need to either be serviced to replace two compressors, replaced in whole or the spaces currently served, handled by new HVAC systems. We support the use of more decentralized systems for all the areas that can see after hours activities. Because these programs don't always fill the complete school, unoccupied areas can go into night setback mode and save energy. Any central plant equipment that serves these terminal systems needs to have variable control to provide only the conditioning needed. The use of CO₂ monitors and occupancy sensors can decrease energy use during occupied modes. Options to replace the PTAC units in the administration area should be considered to provide a better work environment. If replacement units cannot be selected that will provide acceptable performance, a ducted systems should be designed for that area. The main entrance solar load will need to be closely reviewed. Supplemental cooling capabilities or architectural and or landscape features should be provided to maintain space during heavy solar load. Consideration of hydronic snowmelt should be included in any renovation project to provide safer travel at higher traffic walkways during the winter. Hydronic snowmelt provides labor free and chemical free clear sidewalks thought-out the day.

HVAC (Regional Skill Center): The HVAC system consists of components installed as part of the building's original 1977 construction as well as replacement components installed in 1999 as part of a performance contract.

The original (1977) HVAC system consisted of one rooftop multi-zone unit (AC-1) and six suspended heating and ventilating (H&V) units. AC-1 had integral cooling capability and provided heating through an oil-fired burner. This unit was located above the Industrial Maintenance shop and served the First Floor offices/entry as well as Second Floor classrooms and conference rooms. As a multi-zone unit, this unit has individual supply ducts that extend to each room having independent temperature control. The H&V units were originally suspended from the roof structure and provided heating and ventilation to the high-bay portions of the building as well as miscellaneous interior portions of the First Floor.

In 1998, five of the H&V units were removed and replaced with Cambridge direct-fired makeup air units as part of a Siemens performance contract. In addition, the original multizone unit (AC-1) was replaced with a new Carrier multi-zone unit having characteristics similar to the original unit.

The westerly facing classroom 215 has an exterior wall of glazing and is prone to overheating from the solar load.

Code Violations: Based upon the cooling/heating capability of the existing multi-zone unit (AC-1), it does not appear that the system was designed to introduce quantities of outside air sufficient to meet current code requirements.

Comparison to Current School Standards: With the exception of the limited areas served by multi-zone unit AC-1, the HVAC systems serving the remaining portions of the building lack cooling capability. Furthermore, these units lack the airflow capability to provide "free cooling" at times when the outdoor air temperatures are cool. Finally, the H&V units are controlled with a single thermostat (per unit).

Recommendations: Replace the existing HVAC system in its entirety to fit the planned usage. Install a Johnson Controls direct digital control (DDC) system that ties in with the existing DDC systems in the adjacent building. Given their age, the Regional Skill Center's mechanical systems are in good shape. For the most part, the existing systems are functional. To work to resolve the overheating of classroom 215. This area should be commissioned and balanced to ensure the original design intent is being met. If this does not resolve the issues, rebalancing of the Carrier multizone unit AC#1, and decreasing supply air from other part of the building that have excess airflow including corridors may provide

more cooling for room 215. Use of the installed occupancy sensors that control lighting to also setback the HVAC system per zone when spaces are unoccupied could provide more capacity for classroom 215.

PLUMBING & FIRE PROTECTION: The domestic water service entrance upon site visit seemed to be leaking. There is an existing reduced pressure backflow device. The gas fired domestic hot water system appears in good condition. Existing plumbing fixtures consist of wall-hung water closet with flush valve, wall-hung urinal with flush valve, wall-hung lavatory with center set faucet. The fixtures are in good to serviceable condition. The fixtures in the shop area typically are not ADA compliant. The gang toilet rooms do have ADA compliant fixtures in them. The wash fountains in the individual shops range in good to condition, to barely operable. This is dependant on the shops individual use of the fountain. The Building is currently not protected throughout by a fire protection sprinkler system. The auto body paint spray booth has a limited area system. The system connects to the yard main and comes in near the booth and serves the riser. There is currently natural gas service provided to this building. Storm sewers are located on property. Roof drains go down below grade to storm system. Storm inlets and area drains are located on the property. Sanitary sewers are located on property. There is currently a sewage treatment plant on-site. The kitchen does not have a grease trap and depending on the amount of renovation, one should be added. The hair wash sinks do not have hair traps.

Recommendations: Domestic water service leaks should be repaired.



Project Name:	Existing Erie County Technical School located at 8500 Oliver Road, Erie, PA
Tower Project Number:	A8097
Client:	Hallgren Loop Restifo & Coughlin Architects
Date of Building Survey:	September 5, 2008
Date of Report:	October 16, 2008
Author:	John C. West Jr., PE – Electrical Project Manager

Subject:	EXISTING BUILDING REVIEW AND RECOMMENDATIONS – ELECTRICAL
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POWER DISTRIBUTION

Expected Life

The average life of switchboards, transformers, panelboards, and wiring is approximately 40 years. Almost all of the distribution equipment in this building has surpassed its useful life. The only exception to this is the newer panelboards installed during the renovations in 1993. The 1967 vintage switchboard and panelboards are manufactured by Square D, which still has parts available for these pieces of equipment if needed (circuit breakers, etc.).

Recommendations

- Due to the age of almost all of the branch distribution equipment, except the panelboards installed during the 1993 renovation, it is recommended that all the distribution equipment be replaced with new as part of any renovation project. This would include upgrading the main switchboard to a slightly higher amp rating. Also, placing the switchboard in a separate room from the main boiler room will provide a cleaner environment for the equipment and restrict access to the equipment.
- Revising the electrical distribution in the building to create several sub-distribution points would be advised. These sub-distribution points would include a larger 480 volt panelboard with one larger transformer and one 208 volt distribution paneboard. The 208 volt distribution panelboard would then feed 208 volt branch panelboards in the lab spaces and classrooms. This type of distribution system would greatly decrease the number of transformers in the building. Decreasing the number of transformers will also help the Owner's overall electric consumption, since all transformers have an inherent loss, approximately 3% of their KVA rating.
- The existing secondary service feeders should be replaced with new as part of any renovation project.
- Most branch circuiting to light fixtures, receptacles, and HVAC equipment should not need to be replaced because it is only 15 years old, unless the architectural layout of a major renovation required that it be replaced.

EMERGENCY LIGHTING AND POWER SYSTEMS

Expected Life

The emergency generator, which was installed in the 1993, is still functioning and could continue to operate for several more years with proper maintenance.

Recommendations

- At a minimum, the natural gas emergency generator should be removed and relocated to a dedicated space to meet the requirements of NFPA 110.
- If a larger renovation project is undertaken, the Owner may prefer to include additional non-essential emergency loads that would cause the existing 15KW emergency generator to become overloaded. In this case, a larger emergency generator would be required. An outdoor unit would prevent the need to create a space inside the building for this equipment.

LIGHTING SYSTEMS

Expected Life

Most light fixtures can be expected to have a life span of approximately 20 years. Almost all the light fixtures are within this time frame however the energy efficiency of most of the fixtures is questionable.

Recommendations

- Because almost all fluorescent light fixtures in the building use T12 lamps, the replacement of the light fixtures in all areas should be considered in order to use more efficient fixtures with T8 or T5 lamps. The cost of removing the existing lamps and ballast in each light fixture to try to reuse the light fixture is usually not cost effective. Even though the light fixtures are only 15 years old, the cost of a new light fixture with new T8 lamps and electronic ballast vs. retrofitting the old housing is usually the same when labor is factored in.
- For a major renovation project, new lighting controls will need to be provided throughout the building in order to meet IECC requirements.

FIRE ALARM, INTERCOM, AND CLOCK SYSTEMS

Recommendations

- For a major renovation project, the fire alarm system should be replaced because most fire alarm system manufactures do not stock parts for fire alarm systems from a previous generation of equipment for too long. Fire alarm system devices should also be added to meet coverage patterns that are recommended by the system manufactures.
- The intercom and clock systems are not required to be replaced at this time if the systems are still working. But, if the Owner is experiencing any issues with these systems, it may be prudent to upgrade these systems to newer technology, such as IP addressed intercom systems and wireless clock systems.



Project Name:	Existing Regional Skill Center located at 8500 Oliver Road, Erie, PA
Tower Project Number:	A8097
Client:	Hallgren Loop Restifo & Coughlin Architects
Date of Building Survey:	September 5, 2008
Date of Report:	October 16, 2008
Author:	John C. West Jr., PE – Electrical Project Manager

Subject:	EXISTING BUILDING REVIEW AND RECOMMENDATIONS – ELECTRICAL
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POWER DISTRIBUTION

Expected Life

The average life of switchboards, transformers, panelboards, and wiring is approximately 40 years. Almost all of the distribution equipment in this building is still within the limits of its useful life. The only exception to this is the newer panelboards installed during recent localized renovations. The 1967 vintage switchboard and panelboards are manufactured by General Electric, which still has parts available for these pieces of equipment if needed (circuit breakers, etc.).

Recommendations

- Due to the age of almost all of the branch distribution equipment, except any panelboard installed during a recent renovation, it is recommended that all the distribution equipment be replaced with new as part of any renovation project. This would include replacing the main switchboard at the same amp rating. Also, relocating the main switchboard to a room that does not include the water heaters would be prudent and would restrict access to the equipment.
- Typical classroom design recommends that a minimum of eight (8) general-use duplex receptacles be located in each typical classrooms, two per wall (assuming four walls). In addition to the above-fore-mentioned receptacles, receptacles are required for the personal computers and the television. Additional receptacles may be required in the second floor classroom spaces to accommodate the Owner's needs.
- The existing secondary service feeders should be replaced with new as part of any renovation project.
- Most branch circuiting to light fixtures, receptacles, and HVAC equipment is original to the 1976 construction of the building and should be replaced. This would be especially true if the architectural layout of a major renovation required that it be replaced.

EMERGENCY LIGHTING AND POWER SYSTEMS

Expected Life

The battery units have an expected 10-year battery life. Based on the time of construction of this building, these battery lighting units have probably been replaced at some point already.

Recommendations

- At a minimum, existing emergency battery units and exit signs should be tested and malfunctioning units should be replaced.
- One option is to remove all the unit battery equipment and provide and a central battery inverter cabinet could be considered. The advantage to a central battery inverter cabinet is that when the Owner has to test all the battery equipment in the building to meet local ordinances, only one button has be pushed rather going around to each piece of battery powered equipment.
- New battery-powered exit signs should be installed to meet the requirements of IBC and any new architectural floor plans.
- In the event the Owner would prefer to include loads other than lighting, it would be necessary to install an emergency generator along with automatic transfer switches to transfer power from the normal utility source to the emergency source.

LIGHTING SYSTEMS

Expected Life

Most light fixtures can be expected to have a life span of approximately 20 years. Almost all of the light fixtures have exceeded this life span, even though the lamps and ballasts have been replaced in the past 10 years in most of the fluorescent light fixtures.

Recommendations

- Because almost all of the fluorescent light fixtures in the building are original, the replacement of the light fixtures in all areas should be considered. New light fixtures would utilize more efficient fixtures with T8 or T5 lamps. Because a lamp and ballast retrofit has already been done once, it would not be recommended to perform this action again.
- For a major renovation project, new lighting controls will need to be provided throughout the building in order to meet IECC requirements.

FIRE ALARM, INTERCOM, AND CLOCK SYSTEMS

Recommendations

- For a major renovation project, the fire alarm system should be replaced because most fire alarm system manufactures do not stock parts for fire alarm systems from a previous generation of equipment for too long. Fire alarm system devices should also be added to meet coverage patterns that are recommended by the system manufactures.
- The intercom and clock systems are not required to be replaced at this time if the systems are still working. But, if the Owner is experiencing any issues with these system, it may be prudent to upgrade these systems to newer technology, such as IP addressed intercom systems and wireless clock systems.



Project Name: Existing **Regional Skill Center** located at
8500 Oliver Road Erie, PA:
Tower Project Number: A8097
Client: Hallgren Restifo Loop & Coughlin Architects
Date of Building Survey: September 5, 2008
Date of Report: October 16, 2008
Author:

**Subject: EXISTING BUILDING REVIEW AND RECOMMENDATIONS –
PLUMBING and FIRE PROTECTION**

Regional Skill Center

- **Existing Water Service**

The domestic water service entrance upon site visit seemed to be leaking. There was water lying on the floor below the service.

The building has two existing water services. One is at a higher pressure but, from what building maintenance related, the pressure fluctuates, so the building was removed from this service. The water service the building is using now is at a lower pressure. But this is adequate to operate the building. The domestic water pressure booster system has been removed from service and sits in the unused in the mechanical room.

There is an existing reduced pressure backflow device on the service.

- **Domestic Hot water**

The system is served by 3 gas fired water heaters that seem to be in good working condition.

- **Plumbing Fixtures**

Existing plumbing fixtures consist of wall-hung water closet with flush valve, wall-hung urinal with flush valve, wall-hung lavatory with center set faucet. The fixtures are in good to serviceable condition. The fixtures in the shop area typically are not ADA compliant. The gang toilet rooms do have ADA compliant fixtures in them. The wash fountains in the individual shops range in good to condition, to barely operable. This is dependant on the shops individual use of the fountain.

- **Fire Protection**

The Building is currently not protected throughout by a sprinkler system. The auto body paint spray booth has a limited area system. The system connects to the yard main and comes in near the booth and serves the riser.

- **Gas System**

There is currently gas service provided to this building.

- **Storm System**

Storm sewers are located on property. Roof drains go down below grade to storm system. Storm inlets and area drains are located on the property.

- **Sanitary System**

Sanitary sewers are located on property. There is currently a sewage treatment plant on-site. Cleanouts are located throughout the building.

There are floor drains located throughout the building.

The kitchen does not have a grease trap and depending on the amount of renovation, one should be added.

The hair wash sinks do not have hair traps.

- **Recommendations**

Domestic water service: The leaks in the water service should be repaired.

Domestic Hot Water System: No action required.

If additional gas equipment is required, then it is recommended that the existing gas system be evaluated to determine if the existing system is capable of handling the additional demand.

Project Name: Erie County Vocational Technical School
Tower Project Number: A8097
Client: Hallgren, Loop, Restifo & Coughlin Architects
Author: James N. Kosinski, P.E.

Subject: GEOTHERMAL HVAC SYSTEM ADVANTAGES/DISADVANTAGES

Tower Engineering has provided engineering services for many past (and current) projects where a geothermal HVAC system was designed and installed. Most recently, we worked with HRLC in renovating/expanding the existing Millcreek Twp School District's JS Wilson Middle School. The JS Wilson project was designed to incorporate many sustainable features, including an efficient geothermal HVAC system.

To determine if the increased construction costs associated with a geothermal HVAC system would be justified, detailed energy calculations were performed in the JS Wilson project's early (conceptual and schematic) phases. These calculations indicated that the payback period would be attractive compared to conventional HVAC systems. At this time, there are a number of state and federal incentives that may be applicable. We recommend that consideration be given to the application of a geothermal HVAC system to any substantial renovation project at the Erie County Vocational Technical School.

A geothermal HVAC system is very similar to a water-source heat pump system (detailed description included in the Skill Center report). In lieu of including a central gas-fired boiler (for heat addition) and fluid cooler (for heat rejection), a geothermal system replaces these components with a ground-coupled heat exchanger.

A geothermal HVAC system makes use of multiple water-source heat pumps (WSHP) that would be installed throughout the building. Each WSHP uses a common closed loop condenser water piping network as the heat source when in the heating mode and as the heat sink when heat pumps operate in the cooling mode. In a building with various exposures, some units may operate in a cooling cycle while other units may simultaneously operate in the heating cycle. The "heating" units are removing heat from the water loop while the "cooling" units are adding heat.

Over time, predominant operation in either a heating or cooling mode will cause the loop water temperatures to drop (heating mode) or rise (cooling mode). In a conventional water-source heat pump system, the central boilers and fluid coolers maintain loop temperatures within tolerance limits. In a geothermal system, a series of vertical boreholes replaces central plant equipment (chillers, boilers, fluid coolers). The series of boreholes (ground coupled heat exchanger) is used to provide efficient means to maintain loop temperatures.

HVAC for each room having a unique heat gain/loss profile would be provided by a vertical water-source heat pump, providing for individual temperature control. Ventilation would be provided by a dedicated outside air system.

Advantages (compared to conventional system):

- Low energy use due to ground-coupled heat exchanger and heat recovery
- Good system reliability. If a compressor in a heat pump fails, the entire system does not shut down. The primary circulating pump is provided with a standby pump.
- Central cooling plant and heating plant not required.
- Architectural Impact – No mechanical room or outdoor space for heating plant, cooling plant, chiller and/or cooling tower.

Disadvantages (compared to conventional system):

- Higher construction cost compared to conventional system.
- Space required for ground-coupled heat exchanger

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Administration, Faculty & Superintendent Input

Meeting with Superintendents

Miscellaneous Comments

- Technical School with students of all abilities –both gifted and students with limitations
- Goal is to acquire a job or continue onto college
- Existing building is too small
- Use the existing Regional Skill Center to remodel or connect both buildings
- Appropriate for 21st century
- Provide space for Nano-technology
- Provide space for Bio-technology
- Special needs - instruction in class
- Very comprehensive program
- Design a building that teaches using rain water collection and solar panels
- Create an Industrial Education Park
- Provide educational opportunity
- Provide diversity
- Provide for alternative education, collegiate and transition for special needs
- Provide for flexibility and the future
- Ability to create flexible labs
- Interface between Technical School and Community College
- Flexibility very important and the ability to make changes easily
- Technology of tomorrow
- Access to Community College - morning, afternoon and night
- Earn Associate Degree before leaving high school
- Create link between Community College and school
- Do not duplicate services
- Make use of the existing building to keep expansion economical
- New face on Skill Center
- Build for future?
- Cosmetology needs additional space - cost for equipment, not construction
- Cost to maintain
- Cost of new construction and look at entire campus
- Utilities, cost and on-going maintenance
- Utilize Skill Center
- Connection between Tech School and Community College
- Major Asset to community
- Post secondary purpose
- Connector between two buildings - community use in center
- Foster idea of diversity - central hub around food - all buildings linked with cafeteria in building
- Enclosed connector
- Aesthetics of the Regional Skill Center
- Possibly move administration

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Meeting with Superintendents - continued

Miscellaneous Comments

- Community library?
- Connection to Erie County
- Community College, State Police, and 911 - design wing for forensic technology and security
- Full day programs?
- Address health and PE, build gymnasium?
- Is it possible to serve all students?
- Many students want to be here all day and for the year
- Comprehensive program
- ECTS it's own entity?
- Community College - 100% use of facility for summer and night usage
- East/west side location - would students be better served?
- Building capacity for morning, afternoon and night students
- Facility use needs to be answered
- Solicit EMTA to increase travel to ECTS from east side
- Adult education classes popular
- School gets a lot of traffic
- Offerings at night
- Internship credits - in 21st century
- A comprehensive Vo-Tech
- 15 students per classroom - smaller classes would be beneficial
- Renovate entire campus
- Need for grass roots input and survey
- Industry study
- Vision for this facility
- Uniquely positioned to drive Community College
- Utilize resources

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Interviews with Faculty

Electrical Engineering

- Concern for size and safety
- Electric supply and distribution - turn off electricity at panelboard
- Larger work area or redesign
- New tables are large
- No organization now, need full view of students
- Isolation of classroom/classroom with glass
- Computer work - generate diagrams
- 4 students at computer at one time
- More academic classes would be desirable
- Lab program currently insufficient

Facility Maintenance

- Sound proofing between two classrooms
- HVAC trainer equipment in room now
- Uses Smartboard for digital instruction
- LCD Projector with DVD ceiling mount - free up floor space
- Air conditioning - room gets hot (theory room)
- Start an HVAC program for more classes - contractor, Builders Association, etc.
- HVAC program - Add space, extension on back of building as big as recent could spark community interest.

Automotive Technology

- Lower lab needs new lighting
- Voice amplification - noisy area
- Stadium seating (portable risers) would be preferred
- Upper lab - area for trainers set up - lighting, brakes, etc. - break up into boards
- Disassembly of engines - flexible, move benches in and out
- Smartboard and LCD projector needed
- Theory Room too small (upper room in particular)
- Need air conditioning - lower area has air conditioning, upper does not
- Remove wall between upper and lower classrooms
- Improve sight lines - Need vision from one side to another
- Class fits local labor market
- Could be expanded - doors from one room to the next
- Need heavy truck program - CDL
- Equipment Operator Program - shovel, backhoe include with heavy diesel program
- Class open to adults - constant need
- Theory Room too small for 26 students - rearrange or redesign
- Fit with local needs - changing as requested
- Marketing

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Math

- Own classroom with computer access
- Need dedicated space
- Sharing classrooms does not work
- Every door needs to be recessed
- Need space for alternate education
- Need more technology - Smartboards
- Only two mobile labs - need more equipment

Metal Fabrication

- Lighting okay, acoustics need to be addressed
- Relocating exhaust on roof would help with acoustics
- All exhaust needs to be turned off now to have students hear
- Noise level too high inside room
- Fits local program
- Need larger booths and a larger area, 5'-0" or bigger for each booth
- Welding at back of both for cleaning purposes or off floor for sweeping underneath
- Project Technical School - energy independent, show community on cutting edge
- Construction by students, build as part of program
- Plasma cutter for interesting projects by students

Networking Technologies

- Small room, like theory layout, classroom oriented - focus on whiteboard
- Need larger lab - very small
- Need server racks
- Need storage, needs to be accessible
- Possible 2-3 year program
- Develop over 3 years
- Align well at national level, pay low locally
- Plenty of jobs at national level
- Hands on activities and labs
- Expand program to more than 1 year
- Advertise classes in labs
- Make students aware of other trades
- Offer more programs for diversity
- Marketing