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Rebuilding Holyoke: Revitalizing Urban Neighborhoods through Education and Engagement

Jason L. Newman
University of Massachusetts Amherst, newmanjl@yahoo.com

REBUILDING HOLYOKE:

REVITALIZING URBAN NEIGHBORHOODS THROUGH EDUCATION AND ENGAGEMENT

A Thesis Presented

By

JASON L. NEWMAN

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Approved as to style and content by:

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Kathleen Lugosch, Chair

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Max Page, Member

_____
William T. Oedel
Chair, Department of Art,
Architecture, and Art History

DEDICATION

To my family

for their continued love and support.

and

To my fellow colleagues

for their companionship on this journey

ACKNOWLEDGEMENTS

A special thank you to all the members of the Architecture + Design faculty. Working with you has been a tremendous experience. My colleagues and I have undoubtedly benefited from your insight, guidance, and dedication.

A special thank you to Kathleen Lugosch for her leadership and assistance over the past year.

ABSTRACT

REBUILDING HOLYOKE:
REVITALIZING URBAN NEIGHBORHOODS THROUGH EDUCATION AND ENGAGEMENT

MAY 2012

JASON L. NEWMAN

B.S., SUNY COLLEGE OF TECHNOLOGY AT ALFRED

M. Arch, UNIVERSITY OF MASSACHUSETTS AMHERST

Directed by: Kathleen Lugosch

In order for the green movement to be successful, it is necessary for society to be aware and to participate on all levels. Holyoke is a city of the working class and there are several vocational programs available offering job-specific training. Unfortunately, these programs pay little attention to the environmental issues associated with their trade; and, as issues of global warming are becoming more pertinent, the vocational curriculum remains disconnected.

To promote sustainable awareness and participation among vocational students in Holyoke, a new campus located in the downtown neighborhood will be introduced to the school system. In this new green vocational school, students from multiple disciplines will come together to engage in the sustainable practice of their trade. Given the decaying state of the downtown neighborhoods, the urban landscape will serve as a canvas for new ideas and projects. Through the collaboration of these vocations, students will be able to demonstrate their knowledge addressing real projects while contributing to the social and physical revitalization of downtown Holyoke.

PREFACE

In the Fall of 2010, I took a position working with the CONNECTIONS after school program within the Holyoke Public School system. This after school program provided students with a number of learning opportunities offered through a series of after school clubs. With a large percent of students struggling in their academic classes, the underlying purpose of the CONNECTIONS program was to use hands-on activities to supplement the lessons being taught in the classroom. I was brought on as a piloting instructor of the building design club at E.N. White Elementary School.

The building design club was being implemented at 4 public schools in Holyoke for the first time. In addition to teaching students about building design, my responsibilities as an instructor also included integrating math and problem solving into my lessons. Week after week, I deployed a series of lesson plans which communicated architecture, design, and mathematics. Hands-on activities, such as crafting small model houses, had no trouble fully engaging the students. Each student was eager to exercise their creativity and display their idea to the rest of the class. Defensive at times, many students developed a strong sense of ownership and pride over their project.

This sense of ownership was essential to implementing mathematics into my lessons. Students developed a dedication to this project. Each week, I was able to channel their enthusiasm towards mathematic investigations concerning the houses each student had constructed. As the club progressed, students became more interested in the details of their model houses. Questions arose such as: what is the square footage of the bedroom I designed? Is it bigger than this classroom? How tall would my project be in

real life? This allowed me to successfully implement lessons in scale and proportion, and the learning did not stop there.

These inquiries about the details of their projects had developed as a result of full engagement with their own creativity. Without allowing students to exercise their creativity in developing something physical they could feel ownership of, I do not believe I would have been nearly as successful in implementing math into my curriculum. Their sense of ownership fueled their motivations to know as much as they could about their project. At the conclusion of each session, we placed all of the projects in a line on the floor to create a collective streetscape. Each week the projects would get a little more detailed, and the experience of seeing this progression sparked an idea which later become the basis of a thesis topic.

Pairing student creativity with mathematics was very affective at an elementary level, but could this strategy be utilized at a different scales? The image of the collective student projects brought about the idea of applying this framework to a community. If I could teach elementary students about math through this creative process of building, could a more advanced educational program utilize this engaging process to revitalize a neighborhood? Furthermore, what would be the underlying lesson, or "the math" of such a program?

After studying the educational framework of Holyoke, the potential of a neighborhood in distress, and the critical lessons of our generation, I arrived at my proposal. This thesis presents research supporting the installation of a green vocational school in downtown Holyoke.

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COMMUNICATING SUSTAINABLE PRACTICE

The great design problem of our generation, a problem which no industry can escape, is the global energy crisis and the depletion of natural resources. At this critical point in time, architecture is enduring yet another transitional movement which will ultimately redefine many of the basic affairs from which we design. With buildings accounting for nearly forty percent of primary energy use in the United States, architects and engineers are continuously being asked to expand the borders of innovation in the interest of developing increasingly efficient building solutions. This reactionary movement has appropriately been named the Green Movement.

At the forefront of this reactionary movement are organizations such as the United States Green Building Council (USGBC), the Green Building Certification Institute (GBCI), and the Passive House Institute (PHI). These types of organizations subscribe to quantitative data and focus on the individual gains facilitated by highly efficient building technologies. In order to rate the efficiency of any one building, the USGBC developed the LEED certification system which evaluates buildings based on energy savings, water efficiency, CO2 emissions, and overall environmental impact. Since the inception of this certification system in 1998, the United States government has implemented over 60 billion dollars in tax incentives for owners and developers who chose to employ these principles of environmentally friendly design.[1] Over the past ten years, however, an increasing amount of evidence has shown that highly efficient buildings may not embody the answer to this great design problem; and, that we as a society are yet to discover the true meaning of sustainability.

With the establishment of organizations such as the United States Green Building Council (USGBC), it is apparent that the architectural profession has acknowledged the environmental impacts related to making and operating buildings. In fact, the conversation of green design has worked its way into many sectors of the design world including the production of household appliances, furniture, and automobiles. This demographic of professionals, however, is just a small fraction of a much bigger population. Architects, engineers, and designers may be the most educated on this topic, but we are not capable of solving this problem alone. What about the people who are not directly involved in the design profession? What about the much larger demographic of the working class?

As a consumer society, we subscribe to ideas such as LEED buildings and electric cars, without acknowledging the underlying purpose for which these energy efficient technologies were created in the first place. Green, energy efficient technologies do contribute to the forward progression of the green movement; however, their existence often portrays a vision that sustainability living can be achieved solely through the means of industry and design.[2] Sustainability is not a product that can be purchased: it is the practice of, and dedication to a particular way of living. In order for people to carry out this way of living, society must understand the basic fundamentals of sustainable practice.

Overall, the population is uneducated about the true meaning of sustainability. Instead of reevaluating our unsustainable lifestyles and taking a participatory role in the green movement, we rely on green technology to be sustainable for us. In an effort to carry this responsibility, building technologies are constantly evolving to achieve the

highest possible level of efficiency. This has lead to a series of unintended consequences, and as building technologies have become more technically advanced, the average user has become increasingly disconnected from them.

In order for the green movement to be successful, it is necessary for society to be aware and to participate on all levels. We can no longer assume that static and additive technologies can adequately address this great design problem for us. Highly efficient buildings most likely will become a significant contributor to the forward progression of the green movement at some point; however, the fundamental principles which will ultimately make a difference right now, lie within a much bigger idea of sustainability. The ultimate question then becomes: What is a reasonable goal for architecture right now; and, how does architecture properly fit into the big picture idea of sustainability?

Architects are in a position to educate society about the underlying principles of sustainable practice through interactive and informative building design. In terms of sustainability, no single element of society has undertaken a legitimist leadership role which engages humans in the processes of the green movement. Elements such as certified buildings and the automobile have made technological improvements with regard to efficiency and so on; however, these improvements are not making a positive overall difference: they are just being "less bad ."[3]

What society needs from architecture right now is a teacher. The green movement is a learning process and cannot be forced upon humans in its most complex and technologically advanced state. Sustainable practice must evolve into a hands-on and participatory experience which is integral to our daily lives. By engaging the user in simple methods of sustainable practice, architecture can begin to educate society about

the true meaning of sustainability starting with the basics; and, in doing so, take on a major leadership role as we progress into a sustainable oriented future.

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[1] United States Green Building Council. *Building Impacts, why build green?* 2010. www.usgbc.org/resources/presentations.htm (accessed March 8, 2011).

[2] Owen, David. *Green Metropolis.* New York: Penguin Group Inc, 2009.

[3] McDonough, William & Braungart, Michael. *Cradle to Cradle:Remaking the way we make things.* New York: North Point Press, 2002.

CHAPTER 2

TECHNOLOGY IS ONLY PART OF THE ANSWER

2.1 The Rationalist and The Arcadian

Essentially, society has become a spectator of the green movement. Most people support the forward thrust for energy efficiency, as long as it does not impede the convenience of our daily lives. We sit back and carry out our unsustainable practices, watching everything in our world adjust in order to try and correct a problem we created. When humans encounter a sustainable technology such as a green building, it is very easy for us to ignore the environmental impact of our actions, and place all of this responsibility on the architecture. Highly efficient buildings are merely tools in our forward thrust for sustainability, and even the most energy efficient building can become inefficient if it is continually subjected to users with irresponsible agendas.

According to Susannah Hagan, the meaning of the term "sustainable architecture" is not as clear cut as it may appear on the surface. In her book *Taking Shape: a new contract between architecture and nature,* Hagan presents two schools of thinking with regard to sustainable design: the Arcadian and the rationalist. The Arcadian is the intellectual thinker: an idealist who employs pre-industrial and traditional techniques for environmental architecture as a cultural expression. The rationalist is the engineer: one who implements high tech technologies emphasizing efficiency in the midst of quantitative data. Intellectual and technical innovations are equally possible, but not as yet equally present within sustainable architecture.[4]

By majority, the rationalist has strongly characterized the definition of sustainable architecture over the past 20 years. Organizations such as the USGBC and the Passive

House Institute strongly endorse the rationalist approach to energy efficiency, without acknowledging the underlying problems which would otherwise be addressed by the Arcadian. In many ways, the rationalist approach to sustainability can be justified, as our lifestyle as a species has lead to a continuous and seemingly unending depletion of our natural resources. It is an undisputable fact that the world is in desperate need for renewable energy and alternative fuel sources. However in terms of the green movement as it applies to all of society, the rationalist is only one small piece of a much larger equation.

2.2 Case Study: Nathaniel R. Jones Building

One of the most influential case studies supporting this notion is the Nathaniel R. Jones Federal Building located in Youngstown, Ohio. The project was managed by the General Services Administration (GSA), one of the leading federal agencies in the field of green design. The design process was strictly oriented towards meeting LEED certification standards. In the interest of achieving the highest level of energy efficiency, the building incorporated a number of new technologies and green design tactics. In order to significantly reduce electricity needs for lighting, 75 percent of occupiable space was able to be day lighted throughout hours of operation. Shading devices and a highly reflective roof membrane were designed to work in tandem with a state of the art, low energy heating and cooling system. Sixty percent of construction used locally produced materials, and 72 percent of construction waste was recycled. With a budget of 16 million dollars, this building was designed to be the pinnacle of green architecture. Upon completion in 2002, the building was quickly awarded LEED certification.[5]

Figure 1 - Nathaniel R. Jones Federal Building

Retrieved from: Aaron, P. "Photographs of Nathaniel R. Jones federal building." *Robert A.M. Stern Architects.* 2011. www.ramsa.com/projects-search (accessed 3 24, 2011).

Unfortunately, this building's actual energy performance fell far short of the projected energy performance level. In 2003, the USGBC returned to the Nathaniel R. Jones Federal Building in order to survey the operating energy use of the building: a survey that all LEED certified buildings must accommodate to maintain certification. At the conclusion of the survey, USGBC officials found that the building's performance failed to meet LEED standards by a significant margin. After further investigation, it was concluded that the discrepancy between the building's projected performance and the actual performance was not a result of malfunctioning technologies or poor design. The agent responsible for causing the inefficiency was the building users. On many occasions in the Nathaniel R. Jones Federal Building, lights were left on when articulated day lighting systems would have sufficiently lit the spaces. During warmer seasons, employees working in the building often left their office windows open after hours,

subjecting the building's state of the art heating and cooling system to work harder and longer balancing interior temperatures.

The Nathaniel R. Jones Federal Building is not an isolated incident. In a 2006 study performed by the USGBC, researching officials found that 53 percent of 121 buildings surveyed were not living up to their projected levels of performance.[6] This data is evidence that there is an apparent disconnect between green buildings and the average user. As spectators of the green movement, we place expectations of sustainability on things such as certified buildings, without placing any environmental responsibility on ourselves. Even if the user does acknowledge that a building is utilizing green technology such as solar panels or a green roof, the user is still unlikely to change their daily routine. This disconnection extends far beyond the building envelope, and reaches all sectors of the physical landscape. The keys to achieving sustainability lie not in technology, but in education and in social awareness.

Take the process of learning to drive a car for example. Learning to operate a car starts with receiving a learner's permit which puts you behind the wheel and gives you total control of a vehicle. Your actions behind the wheel, whether you step of the gas too hard or slam on the breaks violently, results in an appropriate response from your vehicle. The vehicle does not think, it only response to what you tell it to do. Most importantly, every new driver is accompanied by a knowledgeable and more experienced driver who is helping them to learn and grasp the fundamental principles of the road system and how to properly operate the vehicle.

With regard to the true meaning of sustainability, society is still a new driver who has its learner's permit. Unfortunately, instead of being gradually introduced to the basic

fundamentals, building users have been immediately thrown behind the wheel of the 'Ferrari' of green buildings. Innovative technology is not an advisory to the user's awareness of the green movement. Most green technologies are complex and do provide vast energy savings; however, when it comes to understanding function, the average user is often in way over their head.

2.3 The Big Picture Idea of Sustainability

In his book *Green Metropolis,* David Owen strategically deflates many of the myths surrounding sustainability, and proposes a new perspective for which we should approach an environmentally responsible living condition: Urbanism. Owen continually praises New York City due to its extreme density and diversity. Density, and the idea of living closer to necessary amenities, removes the shackles which confine most suburbanites to the automobile. In densely populated cities the city dweller is encouraged solely by the nature of the urban landscape to utilize 'greener' options such as mass public transportation. Owen also points out a number of issues surrounding the focus of energy efficient buildings and LEED. Owen criticizes technology based tactics by saying:

> "Because LEED is a "portfolio tool" -as I heard it described at an environmental conference intended mainly for developers, architects, and contractors - it tends to favor adding features over subtracting them (because adding features is the economic basis of the building industry)', and it tends to favor high-cost, complex solutions over common sense: computer-controlled shading systems rather than hand operated awnings or venetian blinds; integrated wind turbines rather than

smaller windows; rooftop cells rather than connection to an existing off site co-generation plant." [7]

In a city like Holyoke, Massachusetts, the simple methods and the things David Owen refers to as "common sense" are going to be the gestures of sustainability that make the ultimate difference. The economy of Holyoke cannot afford to deploy a number of green technologies into the urban landscape. However, if the downtown neighborhood can be reinvigorated as a residential area, Holyoke can then start to embrace the sustainable characteristics of density and living closer together. In fact, many of these things will happen naturally.

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[4] Hagan, Susannah. *Taking shape: A New Contract between Architecture and Nature.* New York: Architectural Press, 2001.

[5] Hughes, Timothy R. "New York Times, LEED and GSA: the ghost of LEED past?" *Virginia real estate, land use, and construction law.* 9 13, 2009. valanduseconstructionlaw.com (accessed April 24, 2011).

[6] Navarro, Mireya. "Some buildings not living up to green label." *New York Times*, August 31, 2009: A8.

[7] Owen, David. *Green Metropolis.* (New York: Penguin Group Inc, 2009), 231-232.

CHAPTER 3

EDUCATION AND SOCIAL CHANGE

3.1 Education is the First Step

Educating society is the most logical first step to progressing into a sustainable future. The problems associated with global warming are not going to be solved in our generation, and probably not in our children's generation either. This problem with all its complexity will undoubted continue to affect our world far into the future. It is essential that we start educating people to execute sustainable practice in a holistic fashion. We have waited far too long already to activate and engage society in this problem. The key to educating society about sustainability, is to bring the big picture idea down to a practical level. In order to achieve this, sustainable practice must be carefully integrated into a system which is integral to the user's daily life.

In the book *Social Learning Towards a Sustainable World*, edited by Arjen E.J. Wals, DaniellaTilbury elaborates on her ideas of learning based change. Tilbury speaks to the importance of 'learning by doing,' as well as the need to develop new learning approaches to sustainability. Personal discovery is one of the most effective ways of retaining knowledge. When participating in any hands-on learning processes, humans have a naturally tendency to explore and inquire the things we do not understand. When we do this, we often experience a personal discovery with the activity. These personal discoveries are essential to the process of learning based change.[8] They allow us to question the traditional models we have become accustomed too, and consider the alternative with an open mind. The following case studies displayed projects which aim to raise sustainable awareness through interaction with the built and natural environment.

3.2 Case Study: Green School, Bali, Indonesia

Figure 2 - Heart of School at Green School campus

Retrieved from: Green School. "Green School Gallery." *Green School.* 2012. http://www.greenschool.org/gallery/ (accessed April 25, 2011).

In South Central Bali, Indonesia, this social dilemma was addressed by John Hardy (a Canadian art enthusiast and founder of John Hardy Jewelry) through a synthesis of cultural interaction and sustainable achievement. In order to integrate sustainable education into the structure of present day education, John Hardy founded Green School in 2006: a completely sustainable campus which integrates structured classes with sustainable living practices. In many present day educational facilities, students are immediately separated from the natural world by concrete walls, strict institutional schedules, and a generic pre-determined educational structure. Green School, on the

other hand, aims not only to preserve the student's connection to nature, but strengthen it.[9]

In addition to standard classes such as math, language, history, and science, student participate in many cultural and green thinking classes with focus on ancient Balinese art, irrigation and farming, music, and bamboo building. In most non-traditional academic programs, student participate in projects and initiatives which become permanent installations and integral additions to the Green School campus. These academic programs not only teach students about sustainable building and nature, they also communicate a much greater message that we are in control of our environment, and our action will have an effect on it: for better, or for worse.

Figure 3 - Natural Classroom of Green School

Retrieved from: Green School. "Green School Gallery." *Green School.* 2012. http://www.greenschool.org/gallery/ (accessed April 25, 2011).

Figure 4 - Irrigation Farming

Retrieved from: Green School. "Green School Gallery." *Green School.* 2012. http://www.greenschool.org/gallery/ (accessed April 25, 2011).

The architecture of Green School is constructed using bamboo and tall grasses from the surrounding Bali forests, as well as recycled polymers, and well integrated energy systems. The campus is spread across 20 acres, using natural walking paths to connect academic and administration buildings with gardens and irrigation farming. Classrooms are spread across several buildings. Building containing no obstructive walls, allowing a natural breezes to flow throughout the spaces and providing a direct connection to nature at all times. Electricity is generated on site using a series of hydro-vortex's containing a turbine at the center. Water is channeled from natural rivers and streams into the vortex, resulting in a production of 50,000kwh day and night.[10] This system provides a reliable energy supply for the entire Green School; and, this technical development has shown promise as a potential solution for balancing Bali's overloaded electricity grid.

In addition to the inclusive influences of Green School on its students and users, the school has acted as a flagship of sustainability in South Central Bali. Since the opening of Green school in 2006, small green neighborhoods including housing, restaurants, and retail stores have began to emerge around Green School, and the micro-economy of the area has seen a positive upturn.

Green School in Bali, Indonesia, is a great example of a sustainable solution which is well integrated into an existing culture and society. It's presence has enhanced the population's awareness of sustainable practice, and many of the Green School initiatives have brought about positive changes in the area. Although Green School is a local idea and subscribes only to the infrastructure of Bali, the idea of a "sustainable school" which integrates sustainable living practices with education can be applied on a global level, and to multiple locations and economies.

3.3 Case Study: 60 Richmond. Toronto

As one of the most multicultural cities in the world, the urban landscape of Toronto includes a vast amount of traditional housing for mid to low level income immigrants. Since the late 1940's, this influx in population has lead to an increasing amount of dense residential neighborhoods on the periphery of the central downtown core. The majority of these neighborhoods are composed of mid rise residential housing developments. Unfortunately, many dense residential districts have fallen to a ghetto-like condition due to a decrease of commercial interest and an overall lack of any internal stimulus.

In 2005, the city of Toronto and the Toronto Community Housing Corporation (TCHC) developed a 10 year plan which would focus on the revitalization and rebuilding of these residential neighborhoods. The main objective of this initiative was to improve the character of these areas so that they could become true neighborhoods involving active sidewalks, mixed-use buildings, and accessibility to the surrounding urban fabric. In order to implement a live/work housing project located at 60 Richmond Street, the city of Toronto and the TCHC turned to sustainability as a programmatic system encouraging residents to participate in basic sustainable practices.[11]

Figure 5 - Photograph of Primary Facade at 60 Richmond

Retrieved from: Smith, Kristen. "Pug Awards: Housing Co-op and Royal Conservatory come to top." *Nation Post.* June 17, 2010. http://nationalpost.com (accessed April 27, 2011).

Completed in March 2010, the 60 Richmond live/work project includes 85 one to three bedroom apartments, and a street level restaurant with an instructional kitchen. A large amount of apartments are occupied by unionized hospitality workers who are employed by the restaurant and kitchen. To increase social awareness of sustainability, this project engages the user in basic methods of sustainable practice which are integral to the function of the street level restaurant. The sixth floor of the building hosts a roof garden which produces vegetables for the street level restaurant, and the restaurant in turn provides compost for the roof garden.[12] Although this system does not operate at 100 percent efficiency, it does enforce the reduce, reuse, recycle mentality. The garden is maintained by the building residents/employees; and, in doing so, begins to educate the users about basic principles of sustainability.

In addition to the participation of the user, this sixth floor roof garden is supported by a collaboration of intricate building systems. An extensive green roof system collects grey water into a cistern which is then used to irrigated the sixth floor produce garden. In order to support fresh air flow throughout the sixth floor gardens, the building form is designed to facilitate a passive ventilation system which also assists evaporative cooling processes. The building form also prevents direct sunlight into roof garden spaces.

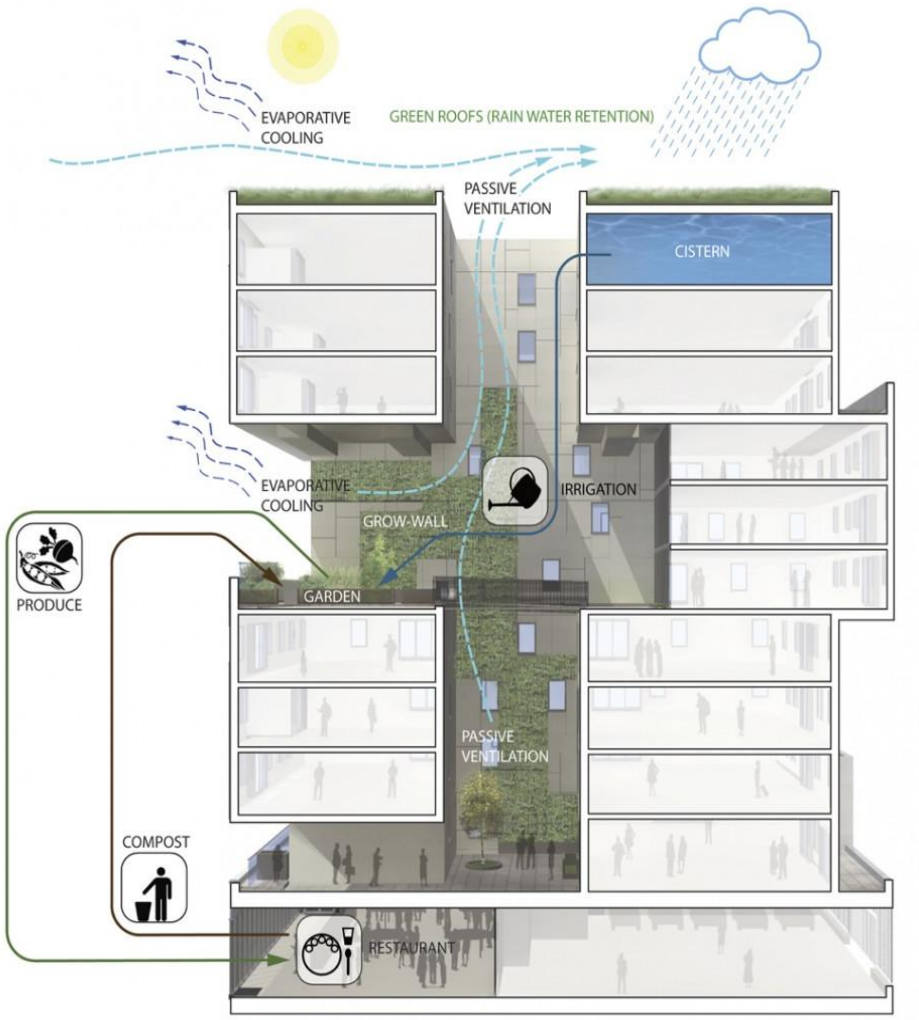

Figure 6 - Building Systems Diagram at 60 Richmond

Retrieved from: Kolleeny, Jane F. "60 Richmond." *Architectural Record*, July 2010: 94-96.

The materials used on the exterior facade support the highest level of thermal efficiency. A highly insulated rain screen cladding system eliminates thermal bridging. Heat loss is minimized using heat recovery systems in apartments and limited exterior glazing. A sophisticated mechanical system transfers heat gains from the south side of the building to the north, balancing the buildings overall temperatures. Overall, the building was been awarded platinum certification be the LEED certification system.[13]

Figure 7 - Interior Views of Central Passive Ventilation Shaft

Retrieved from: Kolleeny, Jane F. "60 Richmond." *Architectural Record*, July 2010: 94-96.

Although this building incorporates multiple complex technologies and system which optimize energy efficiency, it also promotes the big picture idea of sustainability by educating the user through interactive sustainable practices. In order to encourage less energy intensive transportation methods, the ground floor of this building incorporates a bike garage where residents can safely and securely house personal bicycles. Automobile parking is very limited.

This building is a great example of how architecture can start to usher in a new understanding of sustainability to society. The solution incorporates both simple understandable gestures, as well as complex energy efficient systems. The live/work condition promotes a sense of ownership and identity among residents, and the city of Toronto is using this building as a progressive model for future mixed use developments.

3.4 Case Study: Gary Comer Youth Center, Chicago

Figure 8 - Gary Comer Youth Center

Retrieved from: http://www.metropolismag.com/story/20061206/miracle-on-72nd-street (accessed March 5, 2011).

The American population has become almost completely disconnected from its food source. Currently, food accounts for approximately 1/3 of our environmental impact and dense urban conditions are the most significant contributor to this problem. In order to provide for its inhabitants, cities rely on mass production and an extensive shipping process to supply nearly all of its food. This process is extremely unsustainable. Shipping food from rural production sources into dense urban markets requires a great deal of energy from fossil fuels and un-renewable resources. At the end of this process, the average American meal will travel nearly 1,500 miles from production to plate. [14]

In an underprivileged neighborhood in Chicago, Illinois, this problem was addressed by John Ronan Architects through a sensitive integration of agriculture into

daily youth recreation. In order to increase sustainable awareness and reengage youth in the food production process, John Ronan Architects designed the Gary Comer Youth Center to incorporate a large intensive roof garden system capable of producing vegetables and herbs. The Youth Center was completed in 2008 to provide students with a fruitful, and educational after school environment.

John Ronan Architects designed this building with sensitivity to an evolving social progression. Unlike most community centers which eventually become outdated and unused, the Gary Comer Youth Center is highly adaptive to the changing needs of society. The 74,000 sq. ft. building program is dominated by flexible programmatic spaces which can adapt to accommodate a vast range of activities. A centralized flexible gymnasium provides adequate space for large scale functions, and can transform into a 600-seat performance venue using deployable seats and a mechanized 'hide-away' stage platform. Surrounding the central gymnasium are multiple bars of smaller flexible programmatic spaces occupying the first two levels. These smaller spaces are designed to accommodate intimate activities such as dance, art exhibition, exercise, and support groups.

The opportunity for students to interact with sustainability is introduced on the third level with a large intensive roof garden. This system also doubles as an extremely thermally efficient roof membrane for the gymnasium, helping to balance interior temperatures within the building. A two foot soil base provides plenty of room to grow various types of vegetables, herbs, flowers, and grasses. Vegetables which are produces in the garden are harvested by students, and replaced with new seedlings. Vegetables are then prepared on site by culinary students, and served in cafeteria.

Figure 9 - Aerial Photograph of Roof Garden

Retrieved from: Scott Shigley. (2010). *2010 ASLA Professional Awards.* Retrieved March 12, 2011, from American Society of Landscape Architects: www.asla.org/2010awards.

Figure 10 - Students Engaging with Urban Farming

Retrieved from: Scott Shigley. (2010). *2010 ASLA Professional Awards.* Retrieved March 12, 2011, from American Society of Landscape Architects: www.asla.org/2010awards.

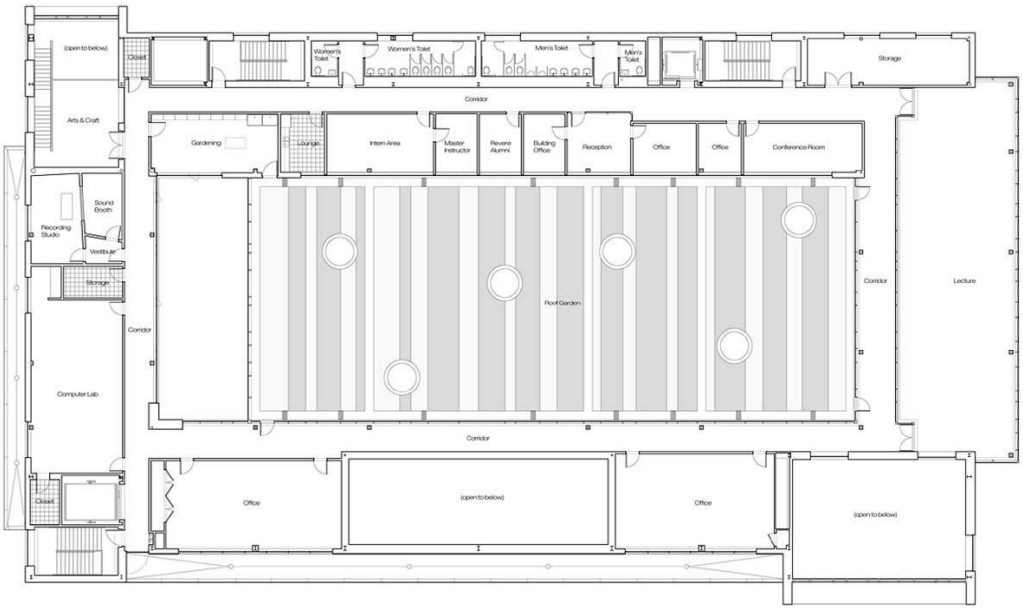

Figure 11 - Third Floor Plan at Gary Comer Youth Center

Retrieved From: John Ronan Architects. (2007). *Third Floor Plan.* Retrieved April 28, 2011, from Architecture Weekly: www.architecureweekly.com.

The intensive garden has also been used as an "outdoor classroom" for horticulture classes where students learn about, and participate in maintaining the various types of plantings which inhabit the garden. The interior space of the third level occupies the perimeter of the garden; however, nature and the green roof have a strong presences in interior spaces through extensive curtain wall glazing.[15]

The Gary Comer Youth Center does not encompass a large impact on the unsustainable nature of modern food processes; however, by engaging youth in the simplest form of the idea, the building can begin to increase sustainable awareness among youth and teens in the area. This design not only speaks to large scale food production, but also helps students to reevaluate the food choices they make on a daily basis. Americans, in addition to being uneducated about sustainability, often chose to partake in unhealthy diets. The roof garden gives youth and teens a healthier perspective about the

food they eat and how it is produced; and, in doing so, lays the foundation for a comprehensive understanding of sustainable food production.

What society needs from architecture right now is interaction and connection with the big picture idea of sustainability. A simple gesture can be embraced by the public at a principal level, resulting in an increase of sustainable awareness. The key to sustainability lies within the hands of society, and until the general public is educated about basic green principles, the green movement will continue to spin its wheels in the mud. The Green School in Bali and the Gary Comer Youth Center are great examples of this. By engaging the user in simple methods of sustainable practice, architecture can begin to educate society starting with the basics, and working towards the net-zero solution. Only once society is able to comprehend and carry-out the basic principles, can we truly progress towards a completely sustainable living condition.

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[8] Tilbury, Daniella. "Learning based change for sustainability: perspectives and pathways." In *Social learning towards a sustainable world*, by Arjen E.J. Wals, 117-133. Wageningen: Wageningen Academic, 2007.

[9] Hardy, John. *TED talks: My Green School Dream.* Performed by John Hardy. TED Global 2010, Oxford. July 2010.

[10] Hardy, John. *TED talks: My Green School Dream.* Performed by John Hardy. TED Global 2010, Oxford. July 2010.

[11] Kolleeny, Jane F. "60 Richmond." *Architectural Record*, July 2010: 94-96.

[12] Kolleeny, Jane F. "60 Richmond." *Architectural Record*, July 2010: 94-96.

[13] Kolleeny, Jane F. "60 Richmond." *Architectural Record*, July 2010: 94-96.

[14] Farr, Douglas. *Sustainable Urbanism; Urban design with nature.* New York: Whiley & Sons, 2007.

[15]Kessler, Grant. "Visiting the Gary Comer Youth Center's Rooftop Garden." *The Local Beet Chicago.* July 22, 2009. www.thelocalbeet.com (accessed April 15, 2011).

CHAPTER 4

REVITALIZING DOWNTOWN HOLYOKE

4.1 History of Downtown Holyoke

The uprising of Holyoke as an industrial city is greatly attributed to its unique interaction with the Connecticut River. About 1 1/2 miles above the landscape that would later form Holyoke, the Connecticut River runs about 60 feet above the elevation of the city. Before reaching the outskirts of the city, the water drops to the elevation of the city where it proceeds through a winding course around the city. This landscape created a tremendous opportunity to harness a great amount of hydropower using a multi-level canal system. In 1849, the construction of the Holyoke Dam as well as a three level canal system was completed. This system diverted water from the Connecticut River into the canal system. These canals ran between and under a number of textile mills equipped with water wheels - which were later converted to turbines to maximize efficiency. This remarkable system provided an abundant source of clean energy and water for the of clean energy textiles mills.[16]

During the era of the Paper Mill industry, Holyoke experienced its most vibrant and economically stimulating period ever. By 1897, the number of companies utilizing the hydro power canal system had grown to 21 companies, spread across 26 operating mills.[17] As the booming paper industry expanded, the need for local worker housing grew as well. The downtown neighborhoods were built and quickly populated by the mill worker and their families. During the time of industrial prosperity, the downtown neighborhoods remained an extremely vibrant urban living condition.

Between 1850 and the early 1900's, Holyoke encountered multiple waves of immigration. The Irish were first to arrive, fleeing Ireland after the potato famine in 1846. They were soon followed by the French, Germans, Italians, Polish, and Portuguese who arrived in the early 1900's.

Figure 12 - Main Street, Holyoke 1941

Photograph taken by John Collier, 1941; courtesy of the Office of War Information, Library of Congress. Retrieved from: Wistariahurst Museum. *Immigration and Migration to Holyoke.* May 31, 2008. wistariahurst.org/onlineexhibits/exhibit (accessed March 14, 2012).

During the 1920's, the economic depression created a great deal of financial difficulty for many of the paper mills in Holyoke. Between 1920 and the start of World War II, Massachusetts lost nearly 45 percent of its textile industry. A few mills were able to survive in part to military founded contracts, however, over 200 mills were forced to close.[18] This deindustrialization of New England had a significant effect of the textile industry in Holyoke; and, as industry started to degrade the neighborhoods did as well.

The final wave of immigrants to arrive in Holyoke were the Puerto Ricans, who arrived in the 1950's. Over the past 70 years, Holyoke has maintained a strong Latino

culture. In 2010, the US Census Bureau report 48 percent of Holyoke's population to be of Latino or Hispanic decent.[19]

4.2 Neighborhood Analysis & Existing Conditions

In recent years, the Veterans Park area has new development with the installation of the Holyoke Bus Station. The new 5.5 million dollar facility opens its doors in February of 2010. The station provides service to the Pioneer Valley Transportation Authority (PVTA) which offers bur routes locally and to surrounding areas of Holyoke. There are also a number of buses traveling to and from large cities such as Boston and New York. [20]

Figure 13 - Holyoke Bus Station, Maple Street

According to Mayor Michael J Sullivan, "More than 7,000 people per week, or more than 350,000 people per year, use the bus stop at this location, making it the second

most-used bus stop in Western Massachusetts."[21] The passengers utilizing this bus station arrive at the covered drop off point situated along maple street. This area of the downtown neighborhood does not provide a pleasant arrival experience. Upon departing the bus, passengers are greeted with a perspective dominated by plywood windows and chain link fences. Approximately 50 to 60 percent of the properties surrounding Veterans Park are either underdeveloped or vacant; and, many of the buildings surrounding the park are abandon. There is a series of commercial storefronts at the corner of Maple and Dwight Streets. With the bus station transporting such a high volume of passengers, this location would typically be considered a prime location for small local business. Unfortunately, these storefronts remain unoccupied and in rundown physical condition.

Figure 14 - Existing Conditions Surrounding Veterans Park

The area around Veteran's Park is not the only area in need of physical and social revitalization. A great deal of the residential neighborhood displays similar sign of desperation. Many residential structures (both single family and multi-family housing) are not being occupied due to their physical condition.

4.3 Potential for Student Engagement

Despite the physical desperation of the Veterans Park area and the rest of the residential neighborhoods, this particular area of the downtown neighborhood does have a number of infrastructural components which are capable of making positive contributions to revitalization. The implementation of the new bus station makes this area accessible to a vast amount of people near and far. St. Jerome's Catholic Church is located to the north of the park, and partially activates this area during services hours. The west corner of the park is anchored by the post office which also bring people to the area. The problem to be addressed now, is getting people to stay for awhile.

There are countless properties in the downtown area that would benefit from a green thinking vocational school. When business owners and developers are not investing in the area, and the majority of the housing stock remains unattractive to the buyer, a catalyst for change needs to come from somewhere. Allowing students to exercise their creativity on the existing landscape creates multiple positive opportunities. Not only will students be provide with hands-on training that is directly related to the real world practice of their trade, but the product of their efforts will reactivate the neighborhood. The following images identify properties in the downtown area which could serve as a canvas for student projects:

Figure 15: Potential Student Revitalization Projects

4.4 Site Selection

The site selected for the new green vocational school is located between Chestnut & Elm Streets, directly adjacent to Veterans Park. Prior to abandonment, this eastern half of this site served as the location of the Holyoke Catholic School. The school composed of three brick masonry buildings which maintain a prominent orientation towards Veterans Park. Unfortunately these buildings are negative impacting the area, as they are populated with plywood windows and chain link fences (see Figure xx).

Figure 16 - Existing Conditions of Catholic School Buildings

This site is situated between the downtown business and commercial zoning of high street, and the formal residential neighborhoods. Veterans Park serves as the meeting place of these two landscapes. This presents an ideal space for an educational

facility to be implemented in downtown Holyoke. It is a site that is accessible to residents who live in the neighborhood as well as the people who work in this area during the week. Adult education and GED programs located around High Street are in close proximity as well. The Public Library located on Chestnut Street as well, is located just 3 blocks southwest of the site. The library will serve as a great educational resource as well. The new green campus at Veterans Park will provide a means of collaboration between all of these educational systems.

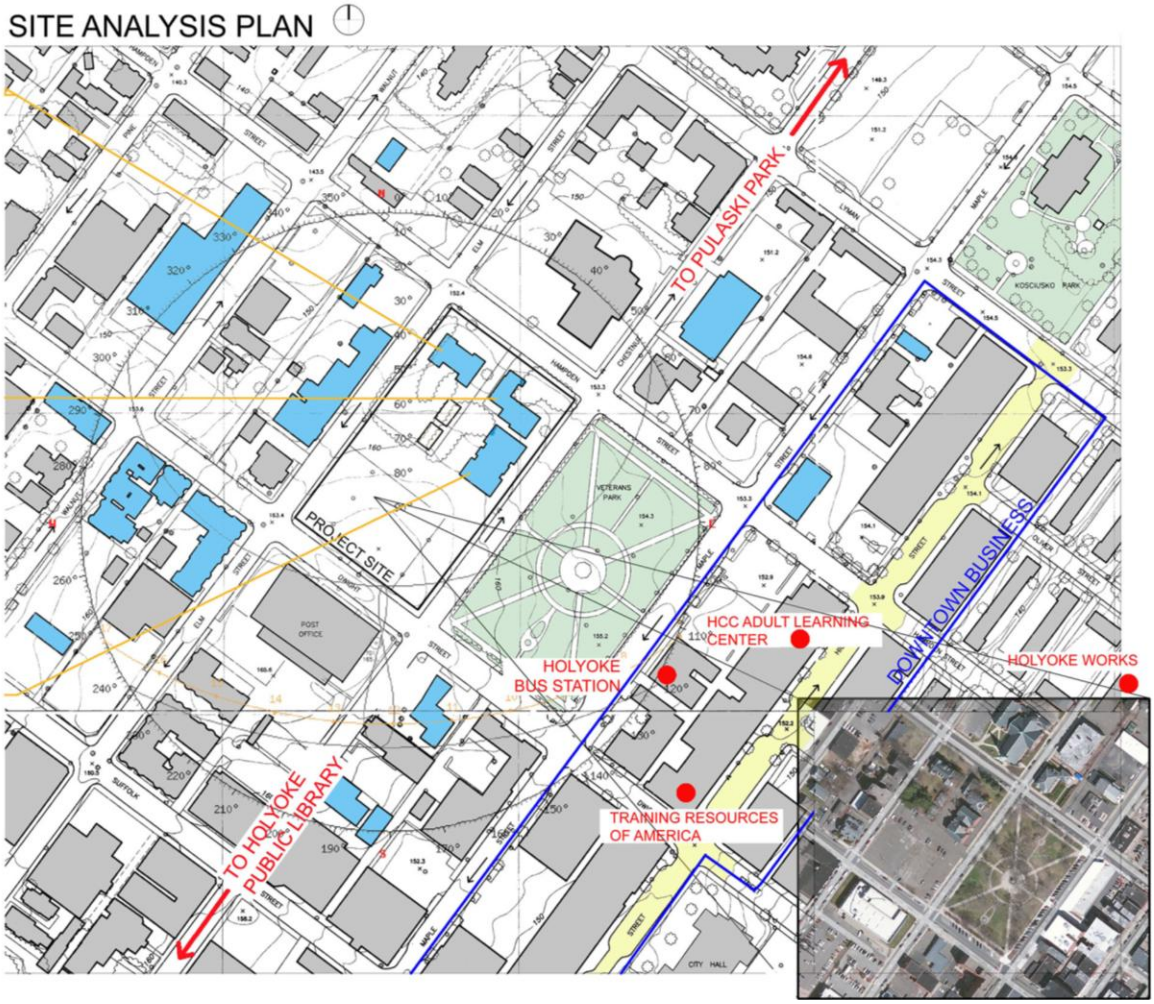

Figure 17 - Analysis Plan of Veterans Park Area

4.5 Site Forces & Diagramming

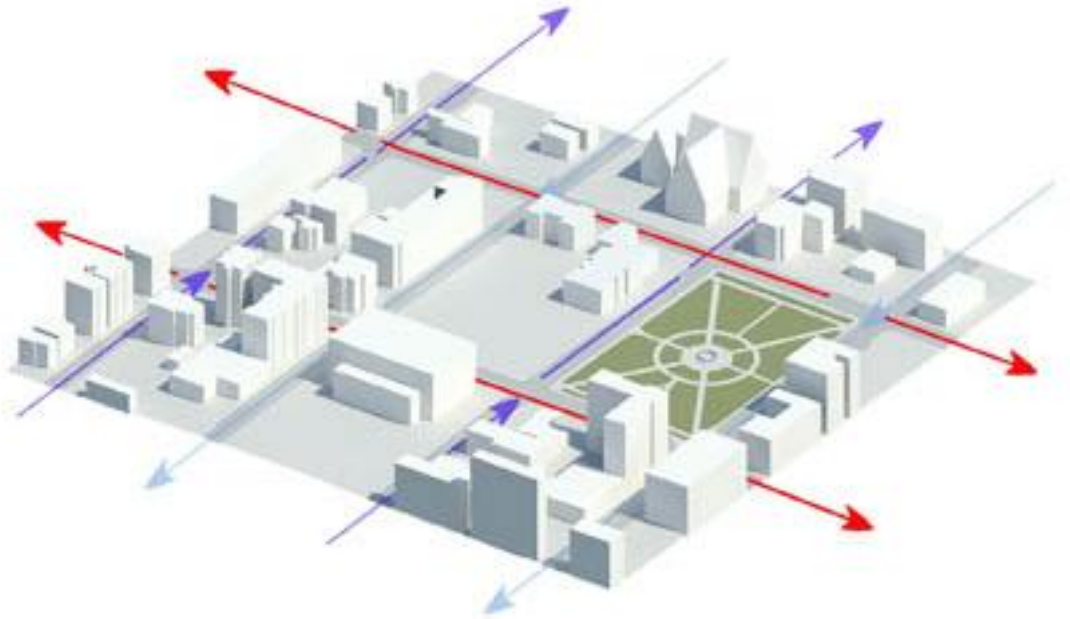

Figure 18 - Traffic Diagram

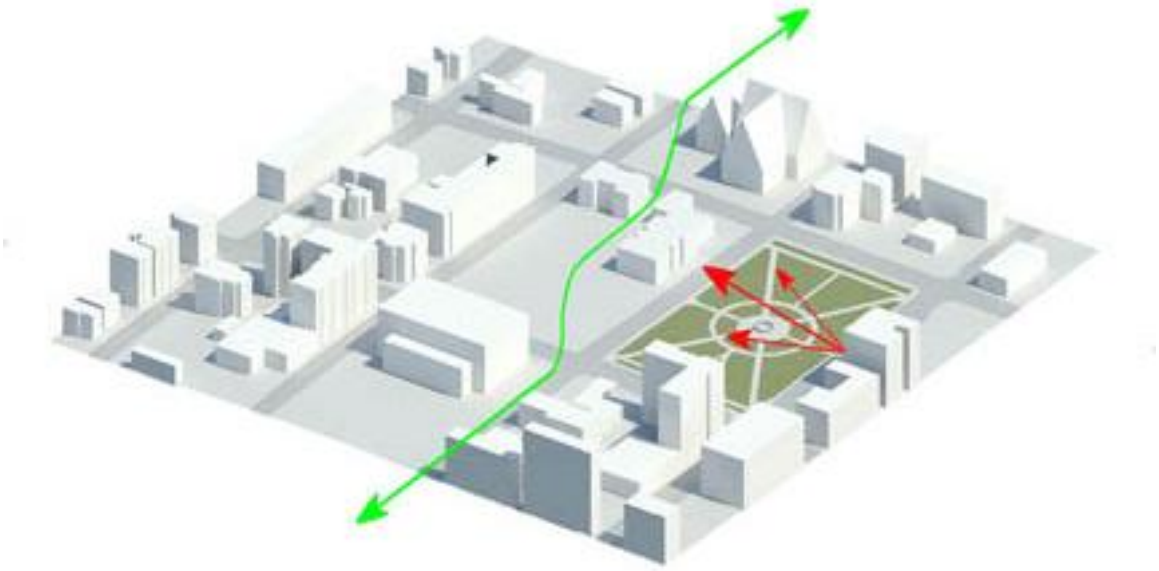

Figure 19 - Pedestrian Travel Diagram

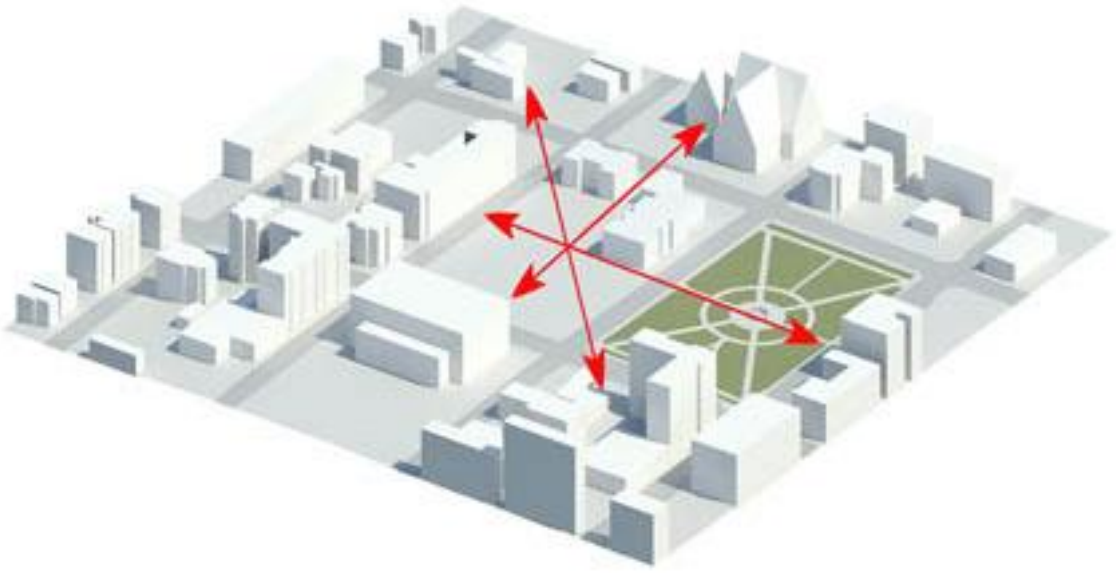

Figure 20 - View Corridors Diagram

Figure 21 - Enclosure of Veterans Park

[16] Everts, Louis H. *History of the Connecticut Valley in Massachusetts.* Philadelphia: L. H. Everts & Co., 1879.

[17] Hickey, John P. *The Holyoke Area Paper Industry 1899-1951.* Amherst, MA: University of Massachusetts, 1953.

[18] Wistariahurst Museum. *Immigration and Migration to Holyoke.* May 31, 2008. wistariahurst.org/onlineexhibits/exhibit (accessed March 14, 2012).

[19] Bueau, U.S. Census. *Holyoke, Massachusetts.* 2010. quickfacts.census.gov/qfd/states/25/2530840 (accessed February 12, 2012).

[20] Ross, Ken. "Groundbreaking ceremony held for new multipurpose bus station in Holyoke." *The Republican Newsroom*, January 26, 2009: 1.

[21] Ross, Ken. "Groundbreaking ceremony held for new multipurpose bus station in Holyoke." *The Republican Newsroom*, January 26, 2009: 1.

CHAPTER 5

THE NEW GREEN CAMPUS: ENGAGING SUSTAINABILITY

Figure 22 - Primary Facade towards Veterans Park

5.1 Education, Collaboration & Community

The Holyoke Public School system consists of 8 public schools, set in various suburban neighborhoods of Holyoke. Unfortunately, this public education network does not branch into the downtown neighborhood; and, a strong educational presence is absent from the urban landscape (see Figure xx). There are a number of GED and adult educational programs existing around the High Street area, and the Public Library serves as a great educational resource as well. Although, these facilities do not provide a "strong" educational presence due to the fact that people utilize these facilities on an individual basis. All members of the community can utilize these facilities and programs,

but people rarely utilize them together in a collaborative effort. Collaboration is an essential piece to the learning process, and working together will serve as a valuable quality in the process of sustainable learning and urban revitalization.

The new campus at Veteran's Park will seek to provide all of Holyoke with a place where education, collaboration, and community can evolve simultaneously. To do this, the campus will serve both the students of the surrounding educational systems, as well as the people of Holyoke. The school will employ a selected number of vocational curriculums, as well as offering evening programs for the entire community. Mixing adults and students in an educational environment will break the traditional separation in learning , and will encourage a sense of community and partnership across all age groups.

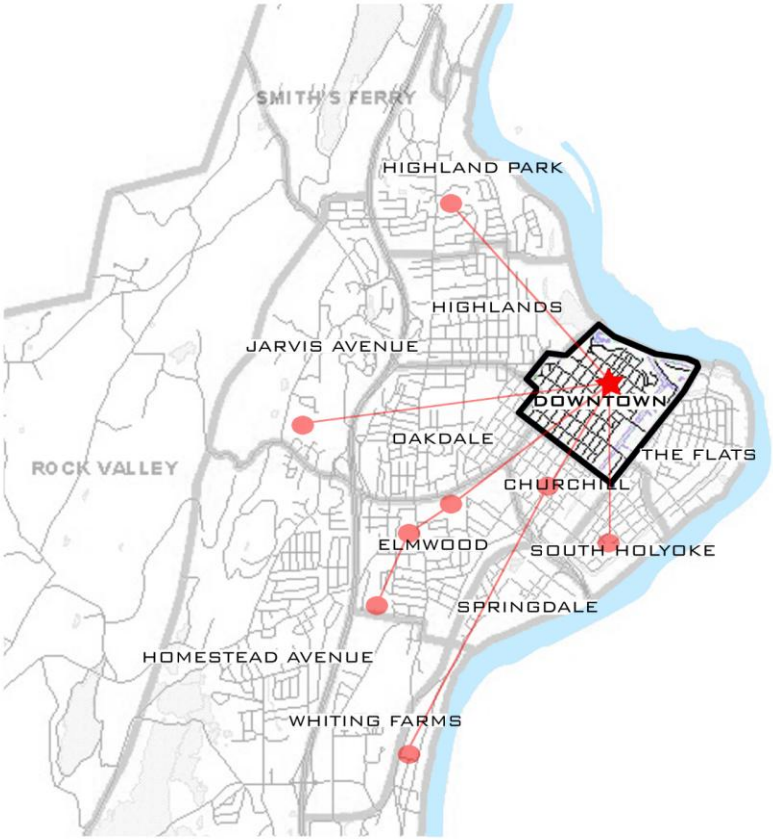

Figure 23 - Existing School System Diagram

5.2 Programming

As a campus shared by both surrounding public schools as well as the general public of Holyoke, finding an appropriate mix of programs was essential to making the project beneficial to the entire community. The downtown campus has a number of opportunities to engage the public. Given the prominent location relevant to Veterans Park, the campus will provide the first impression of downtown Holyoke for all those arriving by bus. With this in mind, there will be a focus to not only create lively educational facilities, but also to activate the outdoor areas in close proximity to the site. As a strategy of physical revitalization, the campus will need to provide programs that are relevant to rebuilding the downtown neighborhood as well.

In order to develop this program, an extensive study was conducted on the existing educational systems of Holyoke (see Figure 23). Holyoke is a city of the working class and there is a local demand for job-specific training. Unfortunately, traditional vocational programs pay little attention to the environmental issues associated with their trade; and, as issues of global warming are becoming more pertinent, the vocational curriculum remains disconnected. Potential vocational programs for the downtown campus were evaluated on three basic criteria:

1. Is there a demand for more of this type of training in Holyoke?
2. Can the traditional curriculum adopted to become a sustainable curriculum?
3. What potential does this Vocation have to rebuild the neighborhood?

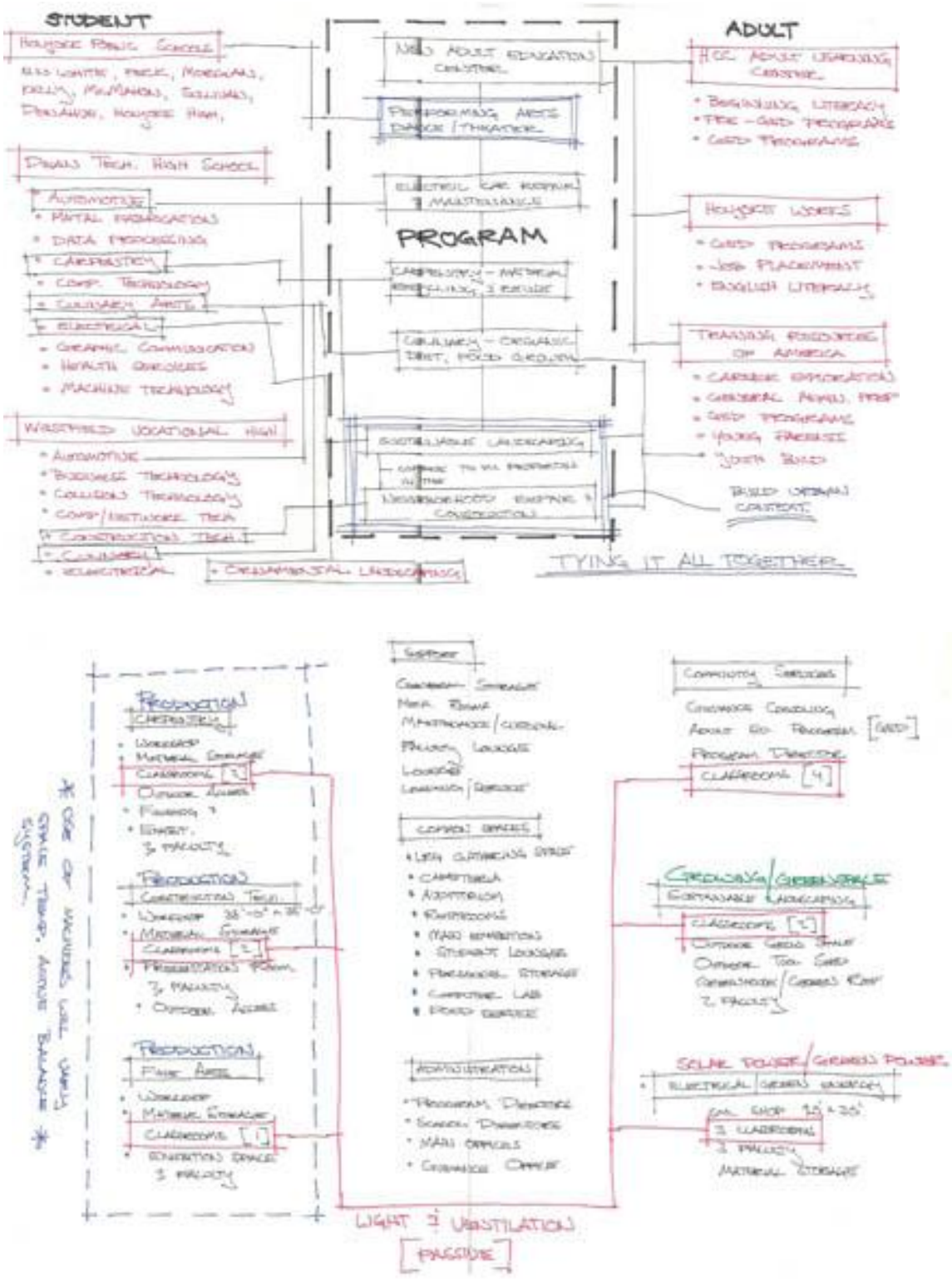

Figure 24 - Mapping Existing Educational Systems / Programming

The vocational programs chosen to inhabit the downtown were: carpentry, building technology and construction, fine arts, and sustainable landscaping. These vocations have the greatest potential to contribute to the physical rehabilitation of the urban landscape; and, all four programs can be used as vehicles for communicating sustainable practice.

There is a great opportunity for cross pollination of these trades through collaborative projects. In order to take on larger projects within the urban landscape, students will need to work together in a collaborative fashion. Forming project teams from multiple vocations will broaden the capabilities of any project team, and the projects will only benefit from a variety of perspectives and ideas. The following are examples of potential projects in the downtown neighborhood:

Figure 25 - Potential Project # 1

The above photograph shows an abandon mechanics garage. The structure occupies a small corner lot at the intersection of Hampden and Elm Streets. This site has the potential to be developed into a small farmers market for the neighborhood. The

structure can be converted to a small market, and vegetables could be grown in the space in front of the structure. A project such as this would employ a project team consisting of building technology and construction students, carpentry students, and sustainable landscape students.

Figure 26 - Potential Project # 2

The above photograph shows a vacant lot located at the intersection of Dwight and Walnut Streets. In the photograph, the space is being used by local children to catch with a baseball. Unfortunately, the surrounding buildings of this lot are quite depressing, and there is no barrier of any kind between this space and the traffic at the intersection. A potential project at this site might be to increase the quality and safety of this lot with recreational accommodations and strategic landscaping. A project such as this could employ students from sustainable landscaping, carpentry, and fine art vocational programs. There are a countless number of potential projects within the downtown area of Holyoke. Any combination of students in a project team is possible; and, the unlimited mixing of ideas will generate unique and creative additions to the urban landscape.

5.3 Addressing the Site

Figure 27 - Aerial Perspective of the Developed Downtown Campus

Veterans Park provides open space which is utilized for large gatherings such as the great Holyoke Block Party which is held annually. However, the Veterans Park area does not provide any intimate outdoor space for smaller gathering which may occur daily. The site aims to enhance the experience of the Veteran's Park area by introducing a new scale of urban that are not currently provided.

A majority of the city is located to the southwest of the site and many people will approach from this direction. The public Library is also located to the southwest on Chestnut Street, and students will be traveling to and from the school from this location as well. Playing off the geometry of the park, a long diagonal path extends from the corner of Dwight and Chestnut Streets to the main entrance of the new facility.

Figure 28 - Perspective Down Pedestrian Corridor Towards Post Office

Parallel to the facade of the new facility, a pedestrian corridor runs between the two existing buildings and under the extruded section of the workshop (see Figure 28). This exterior space will provide a new means of passage through the site. With activation in mind, the pathway is wide to encourage outdoor lessons, activities, and informal gatherings.

The heart of this facility will be the collaboration and production that occurs in the workshop space. To express the importance of this space, the workshop is extruded and cantilevered towards Veterans Park. A number of machines in the shop will be positioned behind the large expanse of glazing; and, when pedestrians arrive in Holyoke at the new bus station, this unique architectural gesture will communicate the message of rebuilding.

Figure 29 - Perspective Down Pedestrian Corridor Towards Post Office

On the northern side of the site, the new facility will enclose the street opposite an existing apartment building. This facade of the building utilizes a similar geometry as south facade (Veterans Park Side), except the scale of the facade elements has been reduced. By scaling down the architectural gestures of the southern facade, the building will communicate a sense of unity with the context, while maintaining a consistent architectural dialog through the site.

5.4 Adaptive Reuse of Existing Catholic School Buildings

Figure 30 - Existing Catholic School Buildings on Site

As a project dedicated to revitalizing the urban landscape, a major design goal was to reuse as many of the existing buildings on site as possible. The existing condition of the site contains 2 masonry school buildings, a rectory, and 2 small storage sheds. The large brick masonry school buildings are in decent condition and have the potential to be rehabilitated. Having been constructed approximately 80 years ago, these buildings will need to undergo a number of renovations.

The school house buildings in their current condition do not provide accessible means of entering the front of the building. There is a slight elevation change from the front of the building to the rear, and the first floor is elevated approximately 4 feet above grade. There is apparent damage to the windows, as they have been replaced with plywood, as well as the roofs. These problems allow for the two school buildings to increase their thermal efficiency by installing high performance windows and a new roofing system.

The two school buildings also utilize a similar construction method of masonry load bearing walls. This construction type places restriction on the programmatic functions which can be accommodated within the structure. Conveniently, these buildings were previously used as classrooms and the interior spaces are well scaled to once again be used as such.

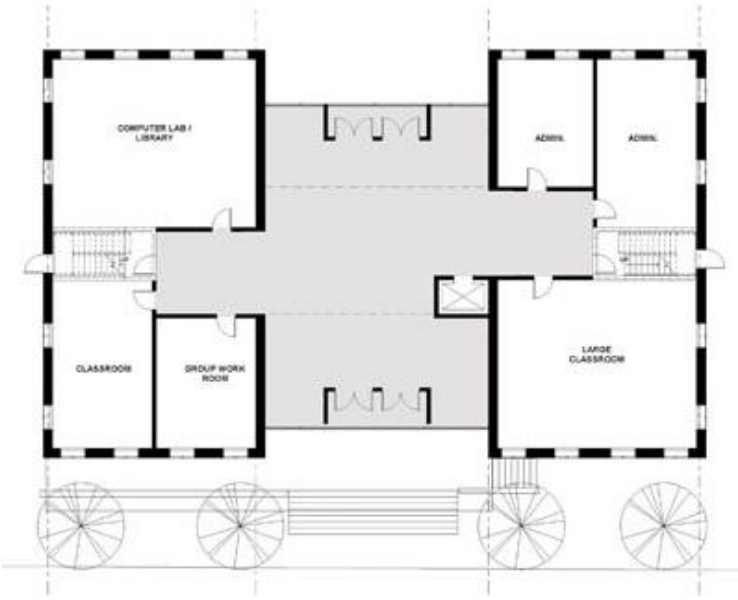

Figure 31 - Typical Existing School House Floor Plan

The major renovation to these buildings will occur in the central bays where the front and rear entrances are located. To cope with the need for accessibility in these buildings, as well as the opportunity to discard the religious aesthetic on the facades, the main central bay will be deconstructed and replaced with a contemporary atrium space. This space will include vertical circulation and an elevator. This will allow the existing buildings to relate to the new construction, and convey a sense of unity on the site.

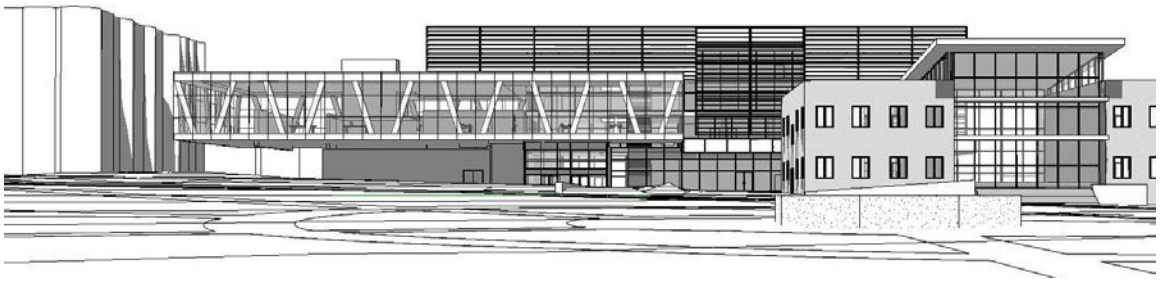

Figure 32 - Sketch View from Bus Station

5.5 Building Organization

Drawing from the success of the Gary Comer Youth Center, the new facility utilizes flexible space planning. Projects constructed in this facility are fairly spontaneous in the sense that they will vary from year to year. Because students will be working on real projects existing in the urban landscape, projects will rarely be repeated. The constantly changing needs of the production process will require a facility with flexible workspaces and plenty of storage. In programming this facility, many large production and communal spaces were designed to accommodate 2-3 different programs at any given time. In addition to the immediate need for flexibility, this type of space planning will also allow the facility to remain efficient over time. Although there is an

established curriculum for the project, that curriculum may not be relevant 10 years down the road. As educational programs shift and the needs of the downtown neighborhoods change over time, this facility will be able to adapt through the changeability of space (see Appendix A for Building Program).

Figure 33 - First Floor Plan

Figure 34 - Second Floor Plan

Figure 35 - Third Floor Plan

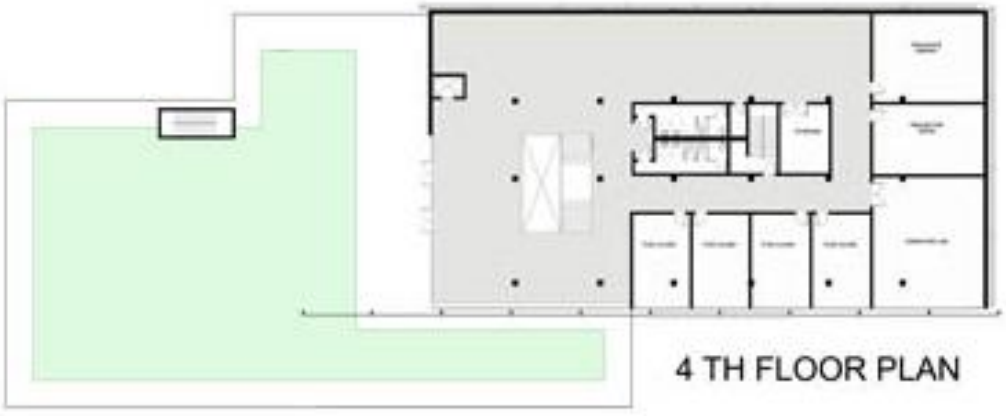

Figure 36 - Forth Floor / Roof Plan

The first floor of the new facility contains a number of communal spaces. A large student commons is located on the eastern corner of the plan. This space is very porous to the exterior courtyard which connects the new facility to the existing schoolhouse buildings. Directly adjacent to the student commons are the back of house and storage space. Having adjacent storage space allows the student commons to be change uses

quickly. If the school is planning to hold an exhibition in the evening, a small maintenance staff could move tables, chairs, and furniture to the back of house area quickly. The first floor also contains an auditorium and community rooms to accommodate small and large gatherings.

The second and third floors contain the majority of the production spaces. These spaces best display the purpose of the building. Approximately 50 percent of the second floor is occupied by the 1 1/2 story workshop. The workshop space is the central hub from which all the smaller production spaces work from. Production space is left as open as possible with fire separated where required. This large production space will be shared by all students enrolled in a vocational curriculum.

The other side of the second floor is populated by group workspaces ranging 300-600 square feet. These spaces are designed as flexible workspaces for project teams in need of permanent space. Ideally, teams would apply to the administration asking to be granted one of these group workspaces. If granted, the project team would have the ability to utilize this space for a negotiated length of time. Not only will this be more convenient for the project team, but it will also free up space in the main workshop. These group workspace provide sidelights next to the entrance so that those walking the corridors can see the projects at hand. The third floor is populated with flexible classroom spaces which can be utilized for instruction sessions.

The primary circulation of the building utilizes a centralized staircase. At the second and third floor, the staircase meets a lounge space with places for student to work on homework or relax. These lounges are a vertical extension of the student commons. Each lounge provide a unique experience with the workshop. The second floor provides

entry to the shop; however, the student can remain in the lounge and still view the activity of the shop through extensive glazing. The third floor lounge is surrounded by glazing towards the workshop as well. At this high elevation, the student is provided with a bird's eye view to the production spaces (see Figure 37).

Figure 37- Workshop Space with Second & Third Floor lounges

The fourth floor is completely separated from the shop and production spaces to provide a quiet workspace. Programs such as computer labs, library collections, and study rooms are located on this floor. Upon departing the stair case to enter this floor, the student is greeted with a large view to the roof garden over the main shop space. During the warmer seasons, student can enjoy quiet time on top of the workshop with a fantastic view towards Holyoke and the historic open square area.

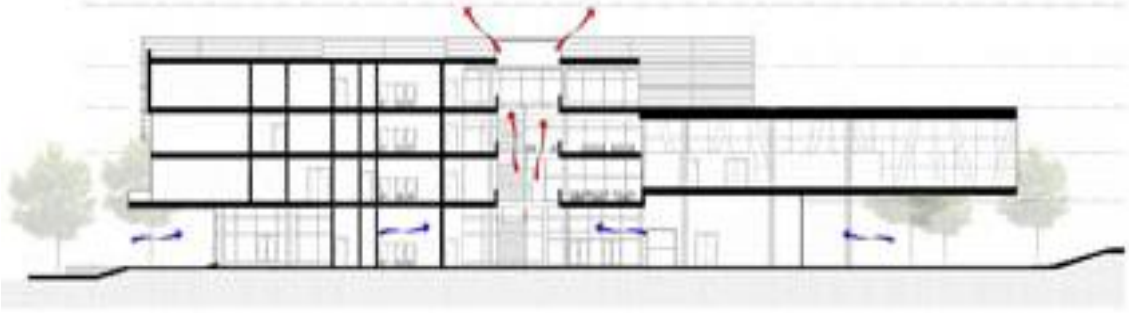

Figure 38 - Longitudinal Building Section

APPENDIX: BUILDING PROGRAM

SPACE	QUANTITY	SF/ROOM	TOTAL SF
COMMON SPACES			
LOBBY AREA	2	800	1600
DINNING/CAFETERIA	1	3000	3000
EXHIBITION HALL	1	1250	1250
STUDENT LOUNGE	4	800	3200
RESTROOMS	8	300	2400
PERSONAL STORAGE	N/A	N/A	0
			13450
SUPPORT SPACES			
GENERAL STORAGE	2	500	1000
MECHANICAL ROOMS	1	400	400
LOADING/SERVICE	1	400	400
KITCHEN	1	350	350
FOOD STORAGE	1	150	150
JANITOR'S CLOSETS	4	75	300
			2600
PRODUCTION			
GENERAL WORKSHOP	1	3500	3500
SECONDARY WORKSHOP	1	1250	1250
FINISHING ROOM	1	1000	1000
PRESENTATION ROOM	1	800	800
MATERIAL STORAGE	4	200	800
TOOLS STORAGE	2	150	300
SHOP OFFICE	2	250	500
			8150
CLASSROOM & OFFICES			
FACULTY OFFICES	15	250	3750
LRG CLASSROOMS	5	1200	6000
SML CLASSROOMS	8	750	6000
COMPUTER LABS	2	1000	2000
			17750

ADMINISTRATION			
PROGRAM DIRECTOR'S OFFICE	1	300	300
SCHOOL DORECTOR'S OFFICE	1	300	300
MAIN OFFICE	1	1000	1000
GUIDANCE	1	600	600
ADULT ED. OFFICE	1	600	600
FACULTY LOUNGE	1	1250	1250
			4050

TOTAL	
COMMON SPACES	13450
SUPPORT SPACES	2600
PRODUCTION	8150
CLASSROOM & OFFICES	17750
ADMINISTRATION	4050
SUB-TOTAL	**46000**
(x 1.2)	
GROSS NET AREA	**55200**

BIBLIOGRAPHY

Everts, Louis H. *History of the Connecticut Valley in Massachusetts.* Philadelphia: L. H. Everts & Co., 1879.

Farr, Douglas. *Sustainable Urbanism; Urban design with nature.* New York: Whiley & Sons, 2007.

Hagan, Susannah. *Taking shape: A New Contract between Architecture and Nature.* New York: Architectural Press, 2001.

Hardy, John. *TED talks: My Green School Dream.* Performed by John Hardy. TED Global 2010, Oxford. July 2010.

Hickey, John P. *The Holyoke Area Paper Industry 1899-1951.* Amherst, MA: University of Massachusetts, 1953.

Hughes, Timothy R. "New York Times, LEED and GSA: the ghost of LEED past?" *Virginia real estate, land use, and construction law.* 9 13, 2009. http://valanduseconstructionlaw.com (accessed April 24, 2011).

Kessler, Grant. "Visiting the Gary Comer Youth Center's Rooftop Garden." *The Local Beet Chicago.* July 22, 2009. www.thelocalbeet.com (accessed April 15, 2011).

Kolleeny, Jane F. "60 Richmond." *Architectural Record*, July 2010: 94-96.

McDonough, William & Braungart, Michael. *Cradle to Cradle:Remaking the way we make things.* New York: North Piont Press, 2002.

Navarro, Mireya. "Some buildings not living up to green label." *New York Times*, August 31, 2009: A8.

Owen, David. *Green Metropolis.* New York: Penguin Group Inc, 2009.

Ross, Ken. "Groundbreaking ceremony held for new multipurpose bus station in Holyoke." *The Republican Newsroom*, January 26, 2009: 1.

Tilbury, Daniella. "Learning based change for sustainability: perspectives and pathways." In *Social learning towards a sustainable world*, by Arjen E.J. Wals, 117-133. Wageningen: Wageningen Academic, 2007.

U.S. Census Bureau. *Holyoke, Massachusetts.* 2010. quickfacts.census.gov/qfd/states/25/2530840 (accessed February 12, 2012).

United States Green Building Council. *Building Impacts, why build green?* 2010. www.usgbc.org/resources/presentations.htm (accessed March 8, 2011).

Wistariahurst Museum. *Immigration and Migration to Holyoke.* May 31, 2008. wistariahurst.org/onlineexhibits/exhibit (accessed March 14, 2012).