

# Big Picture School Facilities Design and Construction Step-by-Step Guide

## Table of Contents

Introduction	2
Orientation	3
Design principles	3
Design qualities	4
Integrated design process	4
Flow Chart	6
Step-by-step: Design and Construction Phases	7
Introduction	7
Education program design	8
Funding and politics	9
Design committee selection	10
Site selection and land acquisition	11
Architect selection	13
Design	13
Programming	13
Schematic design	21
Design development and construction documents	23
Furniture, equipment and color selection	28
Construction management team selection	31
Bidding and negotiation	32
Site work	33
Construction	33
Commissioning and move-in	34
References	35

## Introduction

*We shape our buildings: thereafter, they shape us.*  
- Sir Winston Churchill

The Big Picture Company uses innovative architectural designs to enhance student learning. Big Picture School facilities translate our philosophy of educating one student at a time through real-world learning and community engagement into physical environments. Replacing traditional school designs that are made up of long corridors of isolated rooms, Big Picture Schools accommodate individual needs and are organized around the relationships that foster learning.

### **Integrated Design Process**

Big Picture Schools use an integrated design process that involves all of the stakeholders throughout the project. The educators, architect, construction company, students, community members and politicians gather regularly for discussions and design studios. The buildings are living examples of The Big Picture education philosophy, as students are involved in all phases of the project, from analyzing community needs and assets, to interning with the architect and construction company.

### **Building Community**

The Big Picture Company creates schools that integrate student learning with community life. By doing meaningful work at their internship sites and at school, students develop a sense of belonging both in the school building and in the context of the larger community. In turn, Big Picture Schools are community centers. The schools assess the needs of the neighborhood and make new programs and services available to local families and organizations.

Big Picture facilities strive to integrate physically with the community, blending in with the scale and style of surrounding neighborhood buildings. There are no fences or barriers that separate the schools from the community.

### **Building in Flexibility**

Inside Big Picture Schools, spaces are designed to support the students' real-world work outside of school. There are quiet, comfortable places for independent research and reflection; bright, active rooms for project and group work; and warm, welcoming spaces for family and community involvement. Thus, students have a choice of work environments that accommodate different types of projects and learning styles.

Big Picture Schools build flexibility and autonomy directly into their facilities by utilizing floor-to-ceiling movable walls and modular furniture. When a school building is flexible, the teaching and learning that occur there can evolve as the students grow, the school progresses and the world changes.

Big Picture Schools are places where learning is connected, where everyone is known, where a sense of community is nurtured, and where a sense of place is found.

## Orientation

**Design Principles** – Ideally, the physical space of any school is designed after, and in service of the program of the school. Form should follow function. The design of Big Picture schools is based on the following features of the program (Bingler, Littky, Washor, 1996):

- **Personalization** – *Meeting individual needs*
  - Design human-scaled buildings, where teachers and students convene and work. Small size encourages students and teachers to get to know one another well, both intellectually and personally.
  - Organize rooms based on working relationships, instead of departments and subject matter
- **Following Interest** – *Accommodating student exploration of a variety of interests*
  - Facilitate connections between the school and outside resources in the community.
  - Provide a variety of room types for various kinds of work and diverse work styles.
- **Authentic Learning** – *Supporting real work*
  - Support learning that takes place all over the city. Enable real and virtual connections locally and globally.
  - Create an advanced technology infrastructure that is easy to use and connected with homes, businesses and the community.
- **Community-building** – *Fostering a strong sense of community*
  - Provide spaces for several levels of community: from Learning Team meetings, to group work to whole-school gatherings.
- **Public Design and Diversity** – *Listening to the end users*
  - Reflect the needs and desires of this diverse community in the school design.
  - Host public community, staff and student design meetings to assess needs.
- **Community Partnership** – *Integrating the school and its community*
  - Build new facilities to satisfy community needs, and ensure their availability to the community from early morning to late evening. Likewise, students and teachers use existing community resources, which new school facilities do not duplicate.
  - Design buildings to blend in with the scale of the surrounding neighborhood.
- **Ownership** – *Sharing responsibility for taking care of facilities*
  - Students and adults of the school community take partial responsibility for the security and maintenance.
  - All Big Picture School community members learn protocols of sharing space and resources.
- **Flexibility** – *Continuously adapting to the educational program*
  - To support the changing programs and functions of the school, build flexibility into the design.
  - Utilize moveable walls and modular furniture
- **For All Students** – *Making facilities user-friendly for everyone*
  - Ensure accessibility to students and adults with physical and learning disabilities.
- **National Education Leadership** – *Creating models for education reform*
  - Plan to host professional development and telecommunications activities nationally and internationally.

**Design Qualities** – The design of a Big Picture school should be guided by the question, “What is best for students?”

**Overall goals:**

- **Design inviting environments**
  - Rooms should be warm and professional
  - The scale of the buildings and individual rooms should feel appropriate for its function
  - Avoid connotations of a traditional, institutional “school”
- **High Performance Building**
  - Create healthy buildings for user comfort and environmental safety
  - Use high performance building goals set by the Department of Energy (National Best Practice Manual):
    - Site-sensitive Planning
    - Indoor Air Quality
    - Thermal Comfort
    - Visual Comfort
    - Acoustic Comfort
    - Security and Safety
    - Ecosystem Protection
    - Energy Efficiency and Day-lighting
    - Water Efficiency
    - Materials Efficiency
- **Use high quality materials and furnishings**
  - In a school environment, quality counts
  - Consider life-cycle costs, not just the first-cost

**Integrated Design Process** – The design and construction of schools is complex. The following strategies will help you succeed in building facilities that support the Big Picture educational program.

**Strategies:**

- **Question tradition.** The standard procedures and regulations are not as standard as the bureaucrats think. Develop the habit of asking, “Who says so?”
- **Design to change the system.** The more innovative the design from the traditional mental model, the greater the chance of the design will succeed.
- **Obtain political approval.** Get political approval of the programmatic design. Once the system approves the programmatic design, the rest of the system is pushed to build what has been approved.
- **No Backsliding.** Stick to your vision of the design and not fall back on the traditional mental model. Lead the process and learn the difference between compromising and caving in.
- **Involve all stakeholders.** Insure the voices of the entire community are heard including students, parents and community members.

- **Line-up angels.** Organize business, community and political allies to support the design and construction process. There are times when the educators do not have the clout or authority to lead or make decisions.
- **Select an insightful architect.** Hire an architect that understands the programmatic design and treats your project as an important innovation.

## Flow Chart

<b>Design and Construction Flow Chart</b>
<b>School</b>
Education program
Funding and politics
<b>Design Committee (including school)</b>
Design committee selection
Site selection and land acquisition ----->
Architect selection
Design ----->
Furniture, equipment and color selection---->
Construction management company selection
Construction Management--->
Commissioning
<b>Architectural Team</b>
Design: programming, schematic design development and construction documents----->
Furniture, equipment and color selection---->
Construction Management----->
Commissioning
<b>Construction Management Company</b>
Bidding and Negotiation----->
Site Work
Construction----->
Commissioning

# Step-by-step: Design and Construction Phases

## Introduction

### Strategies for the whole design and construction process:

- **Be persistent.** Commit to staying on and leading the project from “conception to birth” through all of the design processes. Stay involved and take the lead to resolve the political, economic and social issues that inevitably come up in the translation process.
- **Spend time differently.** Traditional design and building processes are set up to spend more time and more money on oversight. The strategy is to spend less time to get more innovation by spending more time on the creative design process and less on oversight.
- **Infuse design process with Big Picture School philosophy.** Choose people to work with that will have students involved – Architect, State employees, Construction companies, etc.
- **Work with community liaisons** - Educators need the political support of members of the community, including the business community, to make politicians and administrators listen to new innovative school designs and then allow the system to bend and flex.

### Forces at Work (Washor, 2002):

As you begin the design process, understanding the political, social, and economic forces will help you to be more effective.

#### **Forces acting on the design process:**

**Political.** The design process encompassed the interaction of numerous individuals and government offices, each with their own policies and protocols. The lead members of each committee overseeing specific aspects of the processes tend to revert to political solutions to resolve issues and move the process along.

**Social.** The relationships among the several individuals, groups, agencies, and organizations produce a complex set of voices about the design. There are few established protocols for engaging stakeholders in a sustained partnership.

**Economic.** School facilities design and construction are heavily influenced by concerns for cost. Traditional measures and processes guide efficiency and productivity forces.

#### **Tensions affecting the design process:**

**Purposes.** The educational program design process has as its principal goal the advancement of student learning while the facilities design process had as its principal goals efficiency and durability.

**Regulation vs. Innovation.** The innovative program design challenge many features of traditional schools and schooling; many of these features are embedded in regulations. A similar situation exists with respect to facilities design. Regulations impede innovation.

**Standard Operating Procedures vs. Adaptation.** The educational and architectural design processes have become calcified with standard operating procedures. It is difficult to adapt these processes to accommodate new program designs.

## **Impediments of building facilities for innovative educational programs:**

- The strong attraction to the traditional mental model of schools by many of the constituents.
- The long length of time to design and build educational facilities.
- The lack of understanding of the programmatic design on the part of politicians, and state regulators such as fire inspectors and building and educational code inspectors.

## **Education Program Design**

### **Background:**

- Educational facilities can enhance the learning that takes place inside the school.
- Big Picture Schools integrate with their neighborhood to serve as community centers as well as schools.

### **Planning:**

- **Assess community needs and assets**
  - Meet with community members, staff, students, and parents to decipher which types of facilities would be the greatest value to the school and neighborhood community.
  - Examples:
    - Fitness center
    - Health center
    - Performance center
    - Media center
    - Kitchen facilities
    - Community college
    - Business incubator space
    - Rock climbing wall
  - The political support of the community, including the business community, helps make politicians and administrators listen to new innovative school designs.

### **Strategies:**

- **Obtain political approval.** Educators must get political approval of the programmatic design. The innovation drives change in the system. Once the system approves the programmatic design, the innovation drives change then, the rest of the system is pushed to build what has been approved.
- **Design to change the system.** The more innovative the design from the traditional mental model, the greater the chance of the design will succeed. Also, as exemplified by the Napster phenomenon, the more innovative the design the greater the chance of the design changing the system rather than the system changing the design.
- **Plan and do simultaneously** - Educators must plan but also live in the innovation as they are waiting for the school to be built. Don't wait for the building to start the program but rather start the program without the building.

## Case Study: The Metropolitan Regional Career and ,

It became clear to the co-directors of Big Picture Company that if The Met was to become a school and not remain a program, the next step would have to be to enroll students and start without a building. This made the school real and put pressure on the system to expedite a very slow and tedious facilities design and construction process.” (Washor, 2002)

## Funding and Politics

### Background:

- Usually, the school district will provide some form of space for a new school unless it is a charter.
- **Planning steps:**
  - Read and print facilities information packet for the decision makers to get a sense of what is needed for a Big Picture School.
  - Packet (link): Introduction, BPS design and construction costs, room types and square footage, floor plans of existing BPS
  - Research ALL possibilities for funding sources:
    - Federal bonds
    - State bonds
    - Local bonds
    - Corporate funding
    - University funding
    - Grant and rebate programs – national and local
    - Example: Massachusetts Technology Collaborative gives \$100,000-\$500,000 Green School Initiative Grants to help build green schools in Massachusetts.
- **Strategies:**
  - **Long-term budgeting.** It takes an average of seven years to design and construct school facilities. Pro-rate bond funds at the beginning of the project to ensure there are ample funds to complete the project. Assume that there will be an increase of 5% of costs for each year of the project.
  - **No Backsliding.** Educators must stick to their vision of the innovative program design and not retreat to the traditional mental model of schools. They must lead the process. They must learn the difference between compromising and caving in.
  - **Question tradition.** The standard operating procedures and the regulations of a system are not as standard or as regulatory as the bureaucrats think. Develop the habit of asking, “Who says so?” when being challenged on the innovation.
  - **Line-up angels.** Educators will need business, community and political allies support the translation process. There are times when the educators do not have the clout or authority to lead or make decisions.
  - **Consider Life-cycle costs.** Compare design prices including first cost (design and construction), maintenance and utilities.
    - **Typical life-cycle costs for buildings**
      - 11% Construction
      - 14% Financing
      - 25% Alterations
      - 50% Operation and maintenance
      - Negligible – Design fee (where costly mistakes are made)

## Case Study:

### The Metropolitan Regional Career and Technical Center, Providence, RI (1996-2002)

**Design and construction costs**

**Total square footage:** 85,000sqft

#### Program:

- Four small schools (110 students each)
  - Individual, two-story buildings
- Fitness Center
  - Includes regulation-size gymnasium, rock climbing wall, cardiovascular and weight training equipment, locker room facilities and juice bar
- Media and Performance Center
  - Includes black-box theater, video recording suite, audio recording suite, Internet radio station and café
- School-based Health Center
- Kitchen
  - Commercial grade facilities prepares lunch for 700 and caters events

#### Cost per square foot:

Providence, RI: \$159/SF (includes site development and construction costs)  
Detroit, MI: \$120/SF (same program constructed by The Granger Group)

#### Other costs:

	<i>Amount (in dollars)</i>
Land acquisition	0.9 million
Architectural fees	1 million
Furniture and equipment	2.3 million

## Design Committee Selection

### Background:

The design committee is the group of decision-makers (or representatives for the decision makers) for your facilities project. The members of the committee will vary by individual project.

### Strategies:

- **Be prepared.** Get to know each committee member's motivation for building the school, who and how the decisions get made and the history of the relationships among involved parties.
- **Develop a common language.** Develop and use a common language with new terms describing the physical design coming out of the innovative programmatic design that all constituencies use.
- **Create an open-door policy.** Invite students, staff and community members to attend the meetings and have their voices heard.

## **Case Study: The Metropolitan Regional Career and Technical Center, Providence, RI**

### **Design Committee structure**

A committee was set up to approve all design features and these would be taken monthly to the State Board of Regents for final approval. This committee consisted of members from the Rhode Island Department of Education (including The Metropolitan Regional Career and ), State Administration and State Properties, Big Picture, and State Board of Regents. Other state agencies that were part of the process at appropriate times included State Policy, Budget, Purchasing, and Environmental Management. (Washor, 2002)

## **Site Selection and Land Acquisition**

### **Background**

#### **Planning:**

- Community needs assessment
- How site could be connected to community
- Research ALL possibilities of sites for school:
  - Local district building
  - Public space from other municipalities (museums, libraries, stadiums, etc.)
  - Corporate space
  - All available land
    - Be innovative! Look at space defined for another purpose– may need to invent process specifically schools – State can change normal procedure
    - Difficult to acquire land – regulations for schools are strict

#### **Strategies:**

Consider the following features:

- Access to public transportation and sidewalks
- Close to potential student resources and internships: university, hospital, retail, etc.
- Near a park/green space
- Opportunity to meet/connect/ be a part of the urban experience
- School clusters/campus – what will give you opportunities to create: town square, keep neighborhood intact, green space, college campus feel...
- Avoid sites that are: prime agricultural land, in flood zone, habitat for endangered species, parkland, high in toxicity

**Case Study: The Metropolitan Regional Career and Technical Center, Providence, RI**

**RFP Review Committee for Land Acquisition**

Committee members:

- Rhode Island Department of Education (RIDE) accountant
- RIDE - Associate Director of Career and Technical Education
- RIDE - Director of Career and Technical Education
- RIDE – lawyer
- RIDE liaison
- State administrator #1 - Department of Administration
- State administrator #2 - Department of Administration
- State administrator #3 - Department of Administration
- The Metropolitan Regional Career and Technical Center co-principal

**Case Study: University Preparatory Academy, Detroit, MI (middle school)**

**Renovating an existing building**

The founder of UPA was an Assistant Secretary at the United States Department of Labor, and ran for Governor of Michigan and Mayor of Detroit. The founder's long-time standing in and knowledge of how to get things done paid off in many ways. One of the biggest pay-offs was that he managed to secure funds from K-Mart and purchase an ignored, rundown, abandoned Community Medical Center that was constructed in 1960 and built by the famous architect Albert Kahn. The founder envisioned this building that was stained with graffiti being the new site for University Preparatory Academy.

This building is in a neighborhood of the many museums of and in close proximity to the downtown. Middle grade students have access to the museums for their project work and are able to walk to these museums as well as to nearby internship sites in near-by businesses and non-profits.

**Case Study: MetWest, Oakland, California**

**Special regulations for schools**

One of the major issues for starting up a school in is finding land and finding a school facilities design that meets earthquake code. One factor that has helped speed up the start -up process has been the easing of the earthquake regulation code for schools in temporary office space.

The issue of space for small schools in is a major hurdle to overcome if these small schools are to get started. Without sufficient funds for capital costs for small schools, the whole project is in jeopardy due solely to time and cost factors for small schools facilities.

## Architect selection

### **Background:**

- **Architect's role:** The architect should listen to the school's needs and desires in order to translate the educational program of a Big Picture School into buildings that support that program.
- **Your role:** To work with the architect as a partner, guiding the design of the facilities based on your knowledge as an educator. Provide as much information as possible so the architect can create informed designs. Explore with the architect how design decisions will affect daily life in the school.

### **Strategies:**

- **Select an insightful architect.** The architect needs to comprehend the programmatic design and treat the project in the best ways s/he would treat both a public and a private project.
  - Does the architect believe in Big Picture School principles?
  - Look at her/his portfolio – ask which project the firm is most proud of and why.
  - Can s/he show evidence of values through other projects?
  - Does the architect understand how Big Picture Schools are unlike traditional high school?
  - Is the architect willing to participate in a design process that is as untraditional as the program itself?

## Design

**Programming Design** – *Communicating the school's needs and givens to the architect and decision makers*

### **Planning:**

- What type of facilities will you need to address the needs expressed by the school and neighborhood community?

### **Strategies:**

- Read and give packet of Big Picture School information to the architect:
  - **Introduction to BPS facilities** (same as Introduction to this document)
  - **Numbers of students**
    - A Big Picture School provides a personalized learning environment for 110 students. Each school is organized into eight Advisories of 14-17 students.
  - **Spatial organization**
    - The facilities are designed around relationships, not subject matter as in traditional schools. The design creates spaces for working and interaction among the neighborhood community, the Met community, each school, each Advisory, a Learning Plan Team, and the individual student.
  - **BPS building types**

- Small School(s)
  - Autonomous schools of 110 students each
- A school based health clinic
  - Free and open clinic for students and community, medical services – physical, immunizations, STD testing, counseling services, women’s health care and dental care.
- A fitness center
  - Available from early in the morning to late in the evening for students, staff and the community, houses gymnasium, cardiovascular and weight training area, rock climbing wall, locker room facilities and juice bar.
- A kitchen
  - Outfitted with commercial-grade equipment and will serve as the hub of all culinary services for the schools – food served in each school individually, providing catering for evening programs and meetings.
- A community field
  - Park-like space for school community and neighborhood, walking track, tree, welcoming environment for outdoor learning, athletic activities, community gatherings, gardens and graduation ceremonies.
- A performance center
  - Black Box theater, flexible, accommodates 300, mirrors and floor for dance, café
- Media center
  - Video studio, recording studio, Internet radio station, student-run technology help desk
- Maintenance Building
  - storage of large equipment and vehicles
- **BPS room types**
  - Different types of work spaces for individual learning styles and different types of work. Work spaces for different size groups: individual, Learning Team, 2-4 person meetings, advisory (14-17 people), staff meetings (3-20 people), whole school, whole campus (if more than one school)
  - Big Picture Schools essentials:
    - Advisories – place where whole advisory can sit around a table for a discussion. There are also spaces for students to work at computers and worktables for individual and small-group work. Advisors can meet with students one-on-one here to tutor and review work.
    - Commons – welcomes everyone to the school. It is the place for the whole school to gather for Pick Me Up and lunch. It is also available for all other types of meetings, advisory projects and group project work. Students can display their work on the walls and on the Mobile Student Display gallery. The furniture includes tall tables, stools and funky benches for a café feel. Trapezoid

tables allow people to sit together for lunch and can also be configured into rows when needed during presentations. The flooring is easily washable and natural light comes in through large windows and the clerestory windows of the surrounding rooms. Without the long corridors found in more traditional schools, students and staff can stand in the commons and feel connected with the whole first floor. This also maximizes the overall use of space in the building.

- Principal's office
- Administrative Area
- LTI coordinator office

Examples of room types that provide students a choice of workspace depending on their learning style and project work:

- **Workplace** – quiet area where students will find individual computer stations and worktables to research, write and work on their projects. Two room-divider/projection screens carve out a corner of the room that could be used for small-group meetings. Learning plan meeting and exhibitions.
- **Studio** – great place for hands-on work: exhibition preparation, art projects or any other work where students need to spread out or be messy. The room is like a workshop with plenty of counter space, sinks, a large butcher-block table, workhorses and computers with special design software. The Studio is equipped with ample storage including flat files and large, horizontal and vertical storage slots for exhibition boards and other large-scale work.
- **Study** – is a space that can be used as a get-away. Lots of windows, comfortable chairs, a round table and a computer provide students with a place for reading, a quiet workspace a place for small-group work as well as meetings. The study is available for staff to use as a place for confidential conversations and mediations with students and learning plan meetings.
- **Student workrooms**

- **Square footage needs**

Room	Square footage (per room)	Year 1		Year 2		Year 3		Year 4 (full capacity)	
		Number of rooms	Square footage						
<b>Advisory</b>	<b>500</b>	<b>2</b>	<b>1,000</b>	<b>4</b>	<b>2,000</b>	<b>6</b>	<b>3,000</b>	<b>8</b>	<b>4,000</b>
<b>Commons</b>	<b>Varies</b>	<b>1</b>	<b>1,000</b>	<b>1</b>	<b>2,100</b>	<b>1</b>	<b>2,100</b>	<b>1</b>	<b>2,100</b>
<b>Principal's office</b>	<b>150</b>	<b>1</b>	<b>150</b>	<b>1</b>	<b>150</b>	<b>1</b>	<b>150</b>	<b>1</b>	<b>150</b>
<b>Administrative area</b>	<b>250</b>	<b>1</b>	<b>250</b>	<b>1</b>	<b>250</b>	<b>1</b>	<b>250</b>	<b>1</b>	<b>250</b>
<b>Food service area (serving pre-made food only)</b>	<b>200</b>	<b>1</b>	<b>200</b>	<b>1</b>	<b>200</b>	<b>1</b>	<b>200</b>	<b>1</b>	<b>200</b>
<b>LTI Coordinator</b>	<b>150</b>	<b>1</b>	<b>150</b>	<b>1</b>	<b>150</b>	<b>1</b>	<b>150</b>	<b>1</b>	<b>150</b>
Workplace (individual work stations)	Varies	1	500	1	1,000	1	1,500	1	2,000
Meeting room (and quiet study)	Varies	1	150	1	150	1	300	1	300
Studio	350	1	350	1	350	1	350	1	350
Support staff offices (Nurse, Special Education, Social Worker, etc.)	150	Depends on staffing* <i>(link)</i>							
Staff workspace	200	1	200	1	200	1	200	1	200
Student workrooms	100	0	0	0	0	2	200	2	200
Storage	Varies		300		300		600		600

Notes:

- Rooms in **bold type** are essential to Big Picture School program.
- The Big Picture Schools constructed in Providence, RI totaled 15,400sqft each.
- Square footages listed above do not include bathrooms, mechanical rooms, electrical rooms, telephone closet, and walkways
- Support staff offices
  - Fill in number of offices needed for your school(s). When deciding how many offices you need, consider the following:
    - Can some people share an office?
    - Include home-base spaces for floating staff, volunteers, family center, and assistants where applicable.
    - Think of your needs in the coming years, not just your current situation.

- **Integrated Design Process goals**

- Integrated design is the consideration and design of all building systems and components together. It recognizes that each discipline's recommendations have an impact on other aspects of the building project. This approach allows for optimization of both building performance and cost.
- Too often, heating, ventilation, and cooling (HVAC) systems are designed independently of lighting systems, for example, and lighting systems are designed without consideration of day lighting opportunities. The architect, mechanical engineer, electrical engineer, contractors, and other team members each have their scope of work and often pursue it without adequate communication and interaction with other team members. This can result in oversized systems or systems that are optimized for non-typical conditions.

- **High Performance Building goals**

- ***Site sensitive planning***

How you place and shape buildings on a site will affect your daily life when you move in. Work with the understanding that the building exists within the context of an existing community and natural ecosystem, even when the setting is urban.

- Orientation of buildings – East/West lengthwise orientation maximizes consistent daylight
- Create mini-climates with clusters and positioning of buildings
- Integrate buildings into context of neighborhood.

- ***Indoor Air Quality (IAQ)***

The quality of the air inside a school is critical to the health and performance of students and staff. The school should provide superior quality indoor air by eliminating and controlling the sources of contamination; providing adequate ventilation; preventing unwanted moisture accumulation; and implementing effective operation and maintenance procedures.

#### Indoor Air Quality Checklist

- Source control: Reduce and/or eliminate the source of contaminants in buildings.
- Ventilation control: Provide adequate ventilation to dissipate the contaminants in buildings. Contaminants emanate from the building contents, equipment, occupants, and outside air.
  - Install a displaced ventilation system - bring ventilation in near the floor at low velocities
  - Bring fresh air into buildings instead of recycling it to ensure adequate oxygen levels
    - Normally, carbon dioxide levels peak in afternoon
    - High ceilings are beneficial for pollutants to gather above nose level

- **Building maintenance:** Buildings require regularly scheduled maintenance and cleaning to ensure that they perform throughout their life as they did when first constructed. Using environmentally friendly cleaning agents will reduce the opportunity for air contamination during the building's life.

- ***Thermal Comfort***

Thermal comfort is an important variable in student and teacher performance. Hot, stuffy rooms — and cold, drafty ones — reduce attention spans and limit productivity. They also waste energy, adding unnecessary cost to a school's bottom line.

#### Thermal Comfort Checklist

- Design in accordance with ASHRAE standards
- Install controls in each classroom to give teachers (limited) direct control over thermal comfort.
- Consider including temperature and humidity monitoring as part of the building's overall energy management system.
- Analyze placement of windows and skylights and provide adequate, controllable shading to avoid "hot spots" caused by direct sunlight.

- ***Visual Comfort***

A school should provide a rich visual environment — one that enhances, rather than hinders, learning and teaching — by carefully integrating natural and electric lighting strategies, by balancing the quantity and quality of light in each room, and by controlling or eliminating glare.

#### Visual Comfort Checklist

- Use the revised 9th edition of the Illuminating Engineering Society of North America (IESNA)'s *Lighting Handbook: Design and Application* as a guide.
- Illuminate spaces as uniformly as possible, avoiding shadows or sharp distinctions between dark and light.
- Provide task or accent lighting to meet specific needs (e.g., display areas, whiteboards, team areas).
- Develop individual lighting strategies for individual rooms or room types (e.g., classrooms, hallways, cafeteria, library, etc.). Avoid "one size fits all" approaches.

- ***Acoustic Comfort***

Attention to classroom acoustics is a must for proper learning. Noises such as vehicles outside the schools, foot traffic in hallways and mechanical equipment can hamper students' concentration. This is especially an issue for those for whom English is a second language, and those with hearing impairments.

#### Acoustic Comfort Checklist

- Reduce sound reverberation time inside the classroom.
- Limit transmission of noise from outside the classroom.
- Minimize background noise from the building 's HVAC system.

- ***Security and Safety***

Big Picture Schools are safe environments mainly because their small size allows everyone to know and care about each other. When choosing security measures, always think in the context of what type of community you would like to create. The disadvantages of using extreme measures, like security cameras, out-weigh the advantages. These measures are expensive, not reliable for catching criminal acts, and make students and staff uncomfortable.

#### Security and Safety Checklist

- Design landscaping to minimize places that are hidden from view. Ensure that key areas — parking, bicycle storage, drop-off points, and entries — are easily observable from inside the building.
- Design exterior lighting to facilitate nighttime surveillance.
- Consider designing common areas, particularly corridors, so that they are less institutional and more “room-like.” This creates visual connection of the rooms in the building.

- ***Ecosystem Protection***

A Big Picture School protects the natural ecosystem. As much as possible, the school incorporates products and techniques that do not introduce pollutants or degradation at the project site or at the site of extraction, harvest, or production.

#### Ecosystem Protection Checklist

- Avoid materials that harm the ecosystem
- Eliminate the use of ozone-depleting chlorofluorocarbons (CFCs) and hydro chlorofluorocarbons (HCFCs) as refrigerants in all HVAC systems.
- Give preference to locally manufactured materials and products to eliminate air pollution due to transportation.
- Develop the site to prevent storm water runoff and erosion.

- ***Energy Efficiency and Day-lighting***

Day lighting is the controlled admission of natural light into a space through windows or skylights. Use as much daylight as possible, especially in classrooms, while avoiding excessive heat loss, heat gain, and glare. Daylight is the highest quality light source for visual tasks, and studies clearly indicate that day lighting can enhance student performance. Properly designed systems can substantially reduce utility bills.

## Energy Efficiency and Day-lighting Checklist

- Design for diffuse, uniform daylight that penetrates deep into the room.
- Consider interior (shades, louvers, or blinds) and exterior (overhangs, trees) strategies to control glare and filter daylight.
- Consider skylights (horizontal glass), roof monitors (vertical glass), light from two sides, and/or clerestory windows.
- Consider higher and/or sloped ceilings to increase reflective lighting.
- Request drawings and models of day-lighting scheme, and graphs of energy use
- Divide light switch locations into two places – people usually will not take a few steps to turn on the other lights and 1/2 the light is usually adequate

- ***Water Efficiency***

Fresh water is an increasingly scarce resource throughout the United States. Control and reduce water runoff from its site, consume fresh water as efficiently as possible, and recover and reuse gray water to the extent feasible. These reductions help the local and regional environment while decreasing operating expenses.

### Water Efficiency Checklist

- Design landscaping to use water efficiently by specifying hardy, native vegetation
- Use recycled water for non-potable purposes
- Set water use goals for the school

- ***Materials Efficiency***

The U.S. EPA documents that Americans spend more than 90% of their lives indoors, and that pollutant concentrations inside buildings are two to five times greater than those outdoors. Health effects include headaches, fatigue, memory problems, eye irritation, and coughs.

You can reduce or eliminate potential sources of indoor air pollution by selecting the lowest odor, least toxic, lowest emitting, most moisture resistant, and most durable materials that can be safely installed and maintained.

Ask for materials that meet one or more of the following criteria:

- Durable.
- Movable, refinish-able, and reusable, recyclable.
- Made from or use resources that are renewable.
- Purchased from a manufacturing source that embraces environmentally friendly corporate policy, which is reflected in the operation of the production plant.
- When using carpet, choose carpet with minimal VOC, 100% closed loop, recycled material.

**Schematic design** – A fundamental stage of design, represented in symbolic form or a simplified floor plan.

**Planning**

- **Community Charrettes** – Host a public design meeting for staff, students, parents, and community members to brainstorm broad visions for design

**Strategies**

- **Design for redesign.** Educators must establish a new mental model and build with the intent of re-building that mental model. This changes the mindset of architects and builders to lower costs and save time.
- **Design for flexibility** Both the programmatic and physical designs should be designed to be able to change with the times. This includes flexible building materials as well.

**Design tips and discussions to have with architect**

DESIGN TOPIC	THINK ABOUT...
<b>Design intention</b>	<ul style="list-style-type: none"> <li>• What design features make an environment healthy and inviting environment?</li> <li>• How can you express a balance between warm and comfortable, and professional?</li> <li>• What is the scale and style of the buildings of the surrounding neighborhood?</li> <li>• What is the overall look you want to express? How will the exterior of the buildings influence how people understand the building? Certain shapes, roofs, and materials define a building as an “institution”.</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>• Include floor-to-ceiling moveable walls that allow the building to support changes in the pedagogical design of the school. Example, KI Moveable Wall Panels (see furniture and equipment list for details)</li> </ul>
<b>Materials for wall construction</b>	<ul style="list-style-type: none"> <li>• What are the life-cycle costs of construction materials? Using high quality materials is a must.</li> <li>• How do construction materials affect what the space feels like? What does it feel like to be in a room made out of concrete block versus drywall?</li> </ul>
<b>Organization of spaces</b>	<ul style="list-style-type: none"> <li>• What is the balance between visual connection and distraction? Organizing rooms around a central Commons opens the building and removes the connotation of long hallways found in traditional schools.</li> <li>• What is the affect of designing schools on two floors versus of one?</li> <li>• One, main entrance into the school helps you be aware of who comes in and out of the building.</li> <li>• The principal’s office needs to be easily accessible to students, parents and staff. Include interior windows and place in a central location keep principal visually connected. Locate office close to Administrative Area and entrance.</li> <li>• How many physical barriers are there to the Principal?</li> </ul>

<b>Room heights</b>	<ul style="list-style-type: none"> <li>Higher ceilings create reflective lighting opportunities, and help keep air toxins above nose level. Heights less than 10’ restrict choice of light fixtures. Ceilings that are too high create acoustic problems.</li> </ul>
<b>Shape of buildings</b>	<ul style="list-style-type: none"> <li>What exterior spaces would you like created by the shape of the building? Examples – outdoor learning areas and gardens.</li> </ul>
<b>Technology</b>	<ul style="list-style-type: none"> <li>Aim for a 2:1 student-to-computer ratio</li> <li>Using a Wide Area Network (WAN) allows students to access their work from multiple buildings and computers. Connecting computers to one server allows students and staff to move around and still be able to access their work.</li> <li>Research options for a combination wireless/wired network for staff with laptops.</li> <li>Avoid a computer “lab” that is hidden from view and causes distractions by grouping many students together.</li> <li>Set up individual workstations that provide privacy when the students are seated, but allow visual connections when standing (see Workstations in Furniture and Equipment selection).</li> <li>Lay out workstations to allow students to find a workspace that is compatible to their work style and project. Some students need a quiet environment, others need to be in a room with background noise.</li> <li>Using Big Picture Online (a web-based system), students can also access their work at their internship site and at home.</li> </ul>
<b>Utilities</b>	<ul style="list-style-type: none"> <li>What effect will choice of heating and cooling (HVAC) system have on daily school life? Considerations include acoustics, energy efficiency, cost, and temperature control.</li> <li>Which rooms need sinks? Examples – Studios and Staff Work Room.</li> </ul>
<b>Vehicle parking</b>	<ul style="list-style-type: none"> <li>How many staff members and students drive to school?</li> <li>How many visitors do you need to accommodate on a daily basis and during special events?</li> <li>Can you be a good neighbor to local organizations that are short on parking? You could barter parking spaces for time spent with the students.</li> </ul>
<b>Vehicle traffic</b>	<ul style="list-style-type: none"> <li>How do buses and cars drop off and pick up students?</li> <li>What is the traffic pattern that will result from the design?</li> <li>Will local drivers find a short cut through the school?</li> </ul>

## Case Study: University Preparatory Academy (UPA), Detroit, Michigan

### No backsliding!

The constraints of time, money, and pressure from builders led to some design changes at UPA. The schools kept their own identities on each floor but it was decided that two of the three schools would share space on the fourth floor, thus mixing the school populations. Although the first floor had many of the features discussed at the design meetings, the other floors started to look more like a regular school. The founder pointed out that to some degree the building's shape played a role in this design decision, because the building has a "wedding cake" appearance whereby each successive floor moves inward. Upon probing it was found that special rooms such as rooms for language and library were added to the upper floors and these "specials" constrained the design to set up autonomous schools on each floor. Students from all of the schools would be sharing space on the top floors. Once again, the mental model of what a school should have, not by law, but by looking at the traditional school paradigm influenced the design of the school and the model backslid into some learning environments that reflected what has always been.

The accomplishments of getting a school built in 14 weeks for \$70 a square foot can't be ignored. Without the time and the cost of the project coming into line the children would not have been in school on time for the fall of 2001. Would it cost more money to keep the schools autonomous? The answers are an emphatic, No!. The cost differences would be negligible to follow the Met's learning signatures. In this instance, the mental model of what schools should be is holding the architect, designer and educator hostage.

**Design Development and Construction Documents** – *Elaborating blueprints to work out the details including all systems and materials. The resulting documents act as an instruction manual for the construction contractors of how to build the facilities.*

### Design tips and discussions to have with architect

#### Design tips - Schools

DESIGN TOPIC	THINK ABOUT...
Ceiling finishes	<ul style="list-style-type: none"><li>• What is the effect of ceiling tile versus exposed ductwork?</li></ul>
Doors	<ul style="list-style-type: none"><li>• What material works with you design intention?</li><li>• In which doors would you like vision panels?</li><li>• It is important to install high quality, durable hardware.</li></ul>
Electrical outlets	<ul style="list-style-type: none"><li>• To build in flexibility, you will need power/data outlets on the walls at least every nine feet.</li><li>• Also include floor outlets with data, power and quality covers for</li></ul>

	<p>optimum flexibility.</p> <ul style="list-style-type: none"> <li>• Where will furniture be located? If flexible, lay out three realistic options to ensure adequate outlets.</li> <li>• Where will computers go?</li> <li>• Are you going to have vending machines?</li> <li>• Where will you want to plug in microphones, microwaves, printers, fax machines, and other equipment?</li> </ul>
<b>Entrances</b>	<ul style="list-style-type: none"> <li>• First impressions – focus on the entrance looking “not-school-like”</li> <li>• Include entrance vestibules for energy efficiency.</li> <li>• Double exterior doors divided by separate doorframes makes entrance more secure. (Just make sure there is a wide entrance somewhere in the building for moving large items in and out.)</li> <li>• Use vestibule with built-in floor mats. Additional entrance mats inside to door will help maintain floors.</li> </ul>
<b>Fenestration (windows)</b>	<ul style="list-style-type: none"> <li>• Include clerestory windows connecting rooms with a lot of natural light to those that do not get a lot of natural light.</li> <li>• Large vision panels between Study and Commons/Workplace – irregularly supervised areas</li> </ul>
<b>Flooring</b>	<ul style="list-style-type: none"> <li>• Which spaces require washable surfaces? Vinyl composite tile (VCT) feels institutional. Are there creative ways to use it? Other material options include sealed concrete and wood-looking tiles.</li> <li>• How does a room feel with a hard surface versus carpet? Advisories, Workplace and the Study are rooms that especially benefit from carpet.</li> <li>• Buying the cheapest product can often end up costing more in a few short years. (The average life expectancy of carpet is 7-10 years.)</li> <li>• Carpet color—lighter shades and colors more readily show the dirt. Multi-color patterned or marbled type of carpet can mask stains from food, liquids or other substances.</li> </ul>
<b>Keys</b>	<ul style="list-style-type: none"> <li>• An alternative to traditional keys is an electronic key system. It allows for easy reprogramming as you learn how to live in your building, when keys are lost and when employees leave.</li> </ul>
<b>Landscape</b>	<ul style="list-style-type: none"> <li>• Design landscaping to use water efficiently by specifying hardy, native vegetation</li> </ul>

	<ul style="list-style-type: none"> <li>• Request low-maintenance plants</li> <li>• Newly planted trees should have a diameter no less than 2.5”</li> <li>• Lay minimal sidewalks at time of completion. Watch traffic patterns for six months and then lay sidewalks where needed.</li> </ul>
<b>Personal storage</b>	<ul style="list-style-type: none"> <li>• No lockers, movable storage – see furniture and equipment</li> <li>• Where is built-in furniture appropriate? Where does it make more sense to have moveable storage?</li> </ul>
<b>Phone system</b>	<ul style="list-style-type: none"> <li>• PBX system or Centrex system? <ul style="list-style-type: none"> <li>• PBX – Internal system that accesses shared outside lines. <ul style="list-style-type: none"> <li>• In-house control – access to voicemail boxes, define placement of phones. Need technological administrator to manage the system.</li> <li>• Can increase number of phones more easily than with Centrex.</li> <li>• Reduces number of outside lines. Saves money because there is a monthly charge for each outside line.</li> </ul> </li> <li>• Centrex – Local phone provider administers phone system. Less knowledge needed, less control. <ul style="list-style-type: none"> <li>• Every phone has an outside line – monthly charge on every line.</li> </ul> </li> </ul> </li> <li>• Phones – long distance phone codes instead of access by-phone. If a code is abused, it is easier to track and change. Phones in all rooms, act as intercom. Some phones only in-house (rooms with less supervision).</li> </ul>
<b>Security</b>	<ul style="list-style-type: none"> <li>• An alarm system with motion sensors and door/window contacts is effective.</li> <li>• Create zones based on how the space will be used. It may make sense to divide building into multiple zones.</li> <li>• If you are building a multi-building campus, create system that can be centrally monitored.</li> <li>• What message are you sending to the community? Fences and bars on windows send a message of distrust.</li> <li>• The disadvantages of using security cameras out-weigh the advantages. Cameras are expensive, not reliable for catching criminal acts, and make students and staff uncomfortable.</li> </ul>

<b>Signage</b>	<ul style="list-style-type: none"> <li>• How do you want various users to access and utilize the building?</li> <li>• Are all entrances handicapped accessible or only specific ones?</li> <li>• Are entrances locked or unlocked? What occasional users should also be considered?</li> <li>• Choose a system that is as vandal-proof as possible, yet still allows changes of the various elements of individual signs while leaving the sign intact.</li> </ul>
<b>Technology</b>	<ul style="list-style-type: none"> <li>• Consult an independent technology expert (not a computer salesperson) for updated information when designing your school.</li> <li>• Set up workstations for specific purposes: scanning, word processing, video editing, etc.</li> <li>• When purchasing hardware look for a minimum three-year warranty and superb service. Look for computers with a minimum five-year, typical lifespan.</li> <li>• PC or Mac? Choose computers that reflect the computers used in the workplace. This will result in an estimate of 95% PC and 5% Mac. Macintosh computers tend to be beneficial for graphics, video and design work.</li> </ul>
<b>Restrooms</b>	<ul style="list-style-type: none"> <li>• Bathrooms – Include more stalls for the women’s room than the men’s. Use durable, solid-core, plastic dividers. A dark color makes it harder to vandalize. Attention to detail in tile pattern can improve the feeling of the space – less institutional</li> </ul>

**Design tips – Fitness Center**

<b>DESIGN TOPIC</b>	<b>THINK ABOUT...</b>
<b>Gymnasium</b>	<ul style="list-style-type: none"> <li>• Include adequate seating for spectators (bleachers).</li> <li>• Place scoreboard so it is centered on the court.</li> <li>• Do you want a high school or college regulation-sized court?</li> </ul>
<b>Gymnasium flooring</b>	<ul style="list-style-type: none"> <li>• Wood floor vs. multi-purpose, synthetic flooring:</li> <li>•</li> </ul>
<b>Locker rooms</b>	<ul style="list-style-type: none"> <li>• Provide enough lockers for daily-use or for each user to lock their own?</li> <li>• Include showers that provide privacy</li> </ul>
<b>Fenestration (windows)</b>	<ul style="list-style-type: none"> <li>• Include high windows for natural light into space. Include apparatus for easy operating if they will also be for ventilation.</li> </ul>
<b>Fitness area – cardiovascular and weight-lifting machines</b>	<ul style="list-style-type: none"> <li>• Fitness – areas for aerobics, weight training and cardiovascular machines should have privacy</li> </ul>

## Design tips – Performance Center

DESIGN TOPIC	THINK ABOUT...
<b>Theater</b>	<ul style="list-style-type: none"> <li>• Black Box...</li> <li>• have an idea of what types of productions/groups/events you would like to hold in the space and size space accordingly. Include dressing rooms and prop construction/storage space with double doors and outside access if possible.</li> <li>• Look at local theater groups – ask for advice</li> <li>• Flexibility is key. Space will be used for a variety of functions including: Performances, movie showings, meetings, exhibitions, event meal service, dances</li> <li>• Is this a facility that fills a need in your community? Great opportunity to partner with outside organizations.</li> </ul>

**Reviewing blueprints** – Become very familiar the floor plans of your facilities. Scrutinize each revision and bring up concerns with your architect. It is easier and cheaper to make changes on paper than once you move in.

### What to look for in the blueprints:

- Floor material – look at finish schedule
- Ceiling materials, height and shape (flat, pitched, sloped?)
- Sight lines – wall heights, interior windows, potential supervision issues
- Enough offices to accommodate future staff?
- Light – building orientation, effects of N, S, E and W sides
- Light – adequate light to all rooms?
- Noise – where are the HVAC systems?
- Different types and sizes of student workspaces?
- Electrical outlets – more than you think you will need, for flexibility – at least 9 in Advisories
- Data jacks in all rooms, even storage – adaptability of building
- Projection screen – presentation area in Commons for Pick Me Up
- TV/music hook-ups in Fitness area
- Adequate storage? (At least 600SF in each school)
- Telephones – jacks in possible phone locations?
- Studio storage – large-format storage for exhibition boards and cabinets

## Furniture, Equipment and Color Selection

### Furniture

- Durable, high quality and comfortable
- What types of furniture specifically support a Big Picture School? Likely to be different than traditional school furniture. May not be from a school catalog.
- Research – Erase assumptions of what school furniture is. Start by thinking about the daily activities and needs of the students and staff.
- Lightweight and flexible – modular

### Examples:

#### Design tips – by room type

LOCATION	THINK ABOUT...
<b>Advisory</b>	•
<b>Commons</b>	• Commons - variety of seating types, helps to make it feel like a café and less institutional
<b>Food Service Area</b>	• Know menu before choosing equipment. A student use microwave is useful (outside of food prep/service area).
<b>Offices</b>	•
<b>Studio</b>	• Install grommets into counters where computers or other appliances will be placed and the outlet is under the counter
<b>Study</b>	•
<b>Workplace</b>	•

#### Design tips – by furniture type

FURNITURE	THINK ABOUT...
<b>Support furniture</b>	• Files and bookshelves - Choose black for support furniture (files and bookcases). Later additions will blend in easier than if you try to work with beiges and putties.
<b>Storage</b>	• Student work storage – all sizes. Large, flat slots for exhibition boards, roll storage for drawings, shelves, files, etc.
<b>Work stations</b>	<ul style="list-style-type: none"> <li>• The best way to reduce visual distraction is to enclose the student’s peripheral vision with workstation back and side panels that rise above the work surface. Panels should be 50’ high (when standing, you can still see over them).</li> <li>• Sound-absorbing fabric or carpeting on both faces of workstations is recommended and discourages graffiti. Thicker fibers are more effective and durable.</li> <li>• Width of work surfaces/stations—Provide room for the student,</li> </ul>

	<p>electronic equipment, reference materials, textbooks and personal materials such as a 3-ring binder, notepads and a book bag. 48” is optimal.</p> <ul style="list-style-type: none"> <li>• Eye-to-monitor sight lines—Place the monitor on the work surface, not on the CPU as shown in most photos. The low position of the monitor reduces eye movement and focusing adjustment.</li> <li>• Height of work surface—For an “average” adult-size learner who will be keyboarding, the height is typically 28”. Consider providing several tabletop heights so students can choose.</li> <li>• Make sure the manufacture is committed to maintaining forward and backward compatibility of system components and replacement elements that you can add to, divide up and reconfigure arrangements as your program changes.</li> <li>• Work stations should include a system for 1) uncluttering work surface wires, 2) keeping wiring away from idle fingers, 3) holding wiring above the floor, and 4) routing wiring from station to station.</li> <li>• When deciding between workstations designed for offices or educational environments, consider that office workstations are optimized for the use of one particular person, day in and day out.</li> <li>• Make sure workstations can be assembled and re-assembled with everyday tools.</li> <li>• The low-cost RTA (ready to assemble) workstations from office supply outlets and catalogs are not sturdy enough.</li> <li>• Avoid pullout keyboard drawers and swing arm keyboard trays. They are vulnerable to breakage and force students to sit back from the work surface, leaving arms unsupported.</li> </ul>
<b>Chairs</b>	<ul style="list-style-type: none"> <li>• Chairs on casters can invite ride-around-the-room antics, especially if the floor isn’t carpeted.</li> <li>• Upholstered seats and backrests significantly reduce fatigue and physical distraction.</li> <li>• Armrests are undesirable because they typically prevent the user from sitting close to the edge of the work surface.</li> <li>• A “bargain” swivel chair is likely to fail in a few months.</li> </ul>
<b>General</b>	<ul style="list-style-type: none"> <li>• Check the gauge of the metal, the thickness of materials, the finishing</li> </ul>

processes and how the welding is done. You also should determine if replacement parts are readily available.

- Select products that are designed for one person to handle—portability and flexibility.

### **Case Study: Truman High School**

#### **Spatial organization**

When designing the architectural plans, they explored how to use a large space designed with system furniture and computers set up for students to do individual and group work. The problem was how to keep noise levels down and engagement in learning high. Truman was dealing with space and environmental issues reminiscent of offices rather than schools. Teachers were talking like project managers and CEOs. This is a shift in how educators are thinking about and living in learning environments (Stamps, 1998). These shifts do not conform to the mental model of schools. It signals, a similar pattern of innovation across school districts in translating innovative designs into facilities.

- **Color selection**
  - Coordinate walls, floors, base boards, window frames (they will be the same color inside and outside), door frames, furniture, built-in counters...
  - The building should be a backdrop for the life the students' work and art will bring to it. Do not make the building visually distracting.
  - Stay away from typically institutional colors.
  - When selecting furniture, choose simple colors and stay away from trendy colors. You will need to replace pieces later, so choose styles and colors that will be available later.

### **Case Study: University Preparatory Academy (UPA), Detroit, MI**

It was also expressed to the UPA design team that colors and furniture should be reflective of a home and office look. Cinder block construction would give way to sheet rock and other materials that were less durable but were more akin to what students would find in their homes. Paint colors would be selected for their warmth.

The same was true for the color scheme of the walls. The school has bright orange and army pea green walls and ceilings. The kind you commonly find in most schools. The founder stated that the walls were this color because the designer felt that was such a cloudy place most of the year that the students would be well served by bright colors. One has to wonder why they so closely resemble what people think of as wall colors in a school but not a home.

## **Construction Management Company Selection**

### **Background**

- Construction manager's role: The construction manager (CM) will administer the construction process of your building. This includes: cost estimation, hiring and managing sub-contractors, and keeping the project on schedule. The CM should let you know of any issues as they come up, so you can be included in the problem solving.
- Your role: Work with the construction manager as a partner, look after the details of construction step-by-step, and act as a translator for the CM of how the construction will affect the educational program of the building.
- A positive relationship with the construction managers is key to the success of the project. There will be many opportunities for the CM to put in extra effort to address the needs of the school beyond the original design. Your relationship will heavily influence their decision.

### **Planning**

- Do your research. Learn about construction management companies' past projects and employers.
- With the design committee, set an ambitious goal for W/MBE (Women and Minority-owned Business Enterprise) participation. Publicly announcing the goal will encourage the design committee to find ways to meet this goal.
- Now is the time to insist on including a commissioning agent in the budget for the end of construction. A commissioner is a 3<sup>rd</sup> party with technical expertise who ensures all building systems perform in accordance with design intent and are working. (See Commissioning and Move-in Section.)

### **Strategies**

#### **What to look for in a construction management company:**

- Willing to work for W/MBE participation goal
- Record of timeliness
- Willing to work with clients in public domain
- Willing to take the risk of working with innovation. Big Picture Schools change the process and form of the traditional school.

## **Case Study: The Metropolitan Regional Career and Technical Center, Providence, RI**

### **W/MBE participation**

The President of Minority Business Enterprises (MBE) had met with the design committee. He participated in design charrettes and kept updated about the Met school project. He also had meetings with the Department of Administration and RIDE. The MBE always felt that since this project was going to be built in , an neighborhood with a high percentage of African-American residents, that the Black Contractors Association should participate in high percentages, not only in contracting to do the work and purchasing the materials, but also in getting on the job training.

It was agreed that State Equity Officer would monitor the project and that an RFP approval team would review and approve all contracts for and include the percentage of MBE participation upfront. A sub-committee was set up to monitor W/MBE participation.

Committee members:

- Administration
- RIDE liaison, equity issues
- State administrator #1 - Department of Administration
- State administrator #2 State Properties
- The Center Director (Minority Business Enterprises /Women Business )
- The Met co-principal

1.5% of the overall work force was minority. These are the largest percentages ever for a public project in the State of Rhode Island. The social innovation of an innovative public school with a commitment to minorities as well as a Design Team and a Department of Administration willing to move in a direction the State never moved in before set a precedent in the State.

## **Bidding and Negotiation**

### **Background**

For each facet of construction, the CM will administer a public bid process to hire sub-contractors. The CM will analyze the bids and recommend sub-contractors to the design committee. The design committee ultimately awards the contract to the companies of their choice.

### **Planning**

- Host a meeting for local W/MBE sub-contractors. Let them know about the project and encourage them to bid.

- Does your state have a Department of Minority Business Affairs to help guide the bidding process?
- A separate sub-committee for W/MBE involvement may need to be set up.

### Strategies

- W/MBE –Uphold W/MBE participation as a high priority. If you do not, it will be easy to justify the reasons for not meeting the W/MBE goal.

## Site Work

### Background

Site work can be very politically involved. Different jurisdictions control the utilities, sidewalks, and environmental management of your site. The departments and companies have long and complex histories with each other.

### Strategies

- **Keep focus.** Continually ask, “How do we expedite this process for the sake of the students?”
- **Quality ingredients.** The composition of your soil will have a direct impact on the over-all look of your school. Use at least 18” of high-quality loam that does not have additives (like sea shells and large rocks).

## Construction

### Planning

- Keep organized records. When discrepancies arise, bring written proof to the table.

### Strategies

- **Sustain community involvement.** Throughout construction, host school and community meetings to update students, staff, parents and the community on construction progress, and to listen and respond to concerns.
- **Translate.** Act as a program-to-construction translator for the CM.
- **Monitor progress.** Walk around the construction site regularly. It is useful to get to know the sub-contractors and you will catch issues before they become larger problems. By keeping informed, your ideas will be more significant.
- **Be there.** Be available to the CM as an open resource at all times.
  - Create a working partnership with the CM and problem-solve issues as they arise. Many issues can be resolved on-site, leaving fewer – more involved – issues to bring to the design committee.
  - When unexpected issues arise, find a balance between compromising and defending the needs of the school.

## Commissioning and Move-In

### Commissioning

#### Background

- Toward completion of construction, the architect will create a punch list. This is a list of remaining items the CM needs to address before the building is ready to be turned over to the school.
- Building commissioning is a separate process of ensuring that systems in schools are designed, installed, tested, and verified as being capable of operating according to the school's needs and the designer's intent. A 3<sup>rd</sup> party with technical expertise ensures all building systems perform in accordance with design intent and are working.
- Because it anticipates problems, commissioning can avoid costly change orders, delays, and litigation. In addition to commissioning building systems, design professionals can commission high performance materials by making sure they are installed as specified and that proper documentation exists so the design intent is not compromised in the event of cleaning, repair, or replacement. (DOE – high performance schools)

#### Strategies

Maintain your own punch list and documentation of items that need to be addressed before you will accept the school. Be very detailed in your documentation and steadfast in ensuring their completion.

### Move-in

#### Planning

Organize orientations for the students and staff before move-in.

#### Strategies

- **Celebrate!** Host a public celebration that includes students, staff, parent, future mentors and community.

## References

- Bingler, S., Littky, D., & Washor, E. (1996).
- Bingler, S. (1999). *What if*. San Francisco: Metropolitan Project, Los Angeles, CA.
- Conant, J. B. (1967). *The comprehensive high school*. New York: McGraw-Hill.
- Copa, G., & Pease, V. (1992, December). A new vision for the comprehensive high school: Preparing students for a changing world. *New Designs for the Comprehensive High School {Journal?}*. 1-16.
- Copa, G. H. (2000). Impact of new designs for the comprehensive high school. Berkeley, CA: National Center for Research in Vocational Education. (ED 438419).
- Copa (2000). Learning at the Margins: Implications for Designing Learning Environments. Retrieved from [http://www.designshare.com/Research/AIA/AIA\\_AMS\\_Proceedings/Copa.htm p.3](http://www.designshare.com/Research/AIA/AIA_AMS_Proceedings/Copa.htm p.3) on March 12, 2003.
- Hiss, Tony *The Experience of Place: A New Way of Looking at and Dealing With Our Radically Changing Cities and Countryside* **Paperback:** 233 pages ; **Publisher:** Vintage Books; Reprint edition (October 1991)
- Littky, D. & Allen, F. (1999). Whole-school personalization: One student at a time. *Educational Leadership*. 57(8), 24-27.
- Moore, G., & Lackney, J. (1993). School design: Crisis, educational performance and design applications. *Children's' Environments*, 10 (2), 99-112.
- Nathan, J. & Febey, K. (2000). *Smaller, Safer, Saner, Successful Schools*. Washington, D.C.: National Clearinghouse For Educational Facilities.
- Senge, P., Kleiner, A., Roberts, C., Ross, R., & Smith, B. (1994). *The fifth discipline field book: Strategies and tools for building a learning organization*. New York: Doubleday
- Notes from “Designing High Performance Schools” Compact Disc, National Best Practices Manual and Energy Design guidelines for High Performance Schools, U.S. Department of Energy, DOE/GO – 102002-1603, October 2002