vision

New Haven Schools:

Building for the 21st Century

Gilbane

Program Drivers (2000-present)

- Improve Learning Environment
- Enrollment growth—needed new capacity
- Building Age/Deferred Maintenance
- Technology Upgrades
- Code and ADA compliance
- Community/Jobs Program
- Economic Development (SBI)
- Neighborhood Revitalization
- Reduce Energy & Operating Costs
- Security /safety for schools in Urban setting

Educational Program Objectives

- Update and modernize all schools to allow for **maximum flexibility** for changes in educational programs as technology evolves
- Change to a Pre-Kindergarten to 8th Grade structure
- Provide for a 2 classroom/grade "model" program
- Improve facilities for core support and specialized services
- Smaller, "themed" program high schools
- Pre-school programs for all children in every neighborhood
- Diverse learning environments (hands on and lecture)

K-12 Hot Topics

- Quality of Design/Standards
- Community Centers
- LEED/Energy Efficiency
- Renovation vs. New
- New Educational “Flagships”
- Hands on education/Vo-Tech
- Academies within Schools
- Safety in Schools
- Technology ready (current and future)

Phases of a Large Rebuilding Program

- ★ 1-2 years **Early Studies & Innovative Funding**
- ★ 1-2 years **Early Master Plan & Political Structuring**
- ★ 4-5 years **Phase 1 Implementation**

  First Projects Completed, “Credibility Building,” Update Master Plan, Confirm Ph. 2 Commitments
- ★ 4-5 years **Phase 2 Implementation**

  Standardize Design, Large Volume Construction, Refine “end-game”
- ★ 3-5 years **Phase 3**

  End Game

1994: City effort Conditions Evaluation Study

- Site & Building Conditions
  - Building Exterior & Interior Condition
  - Code/ADA Compliance
  - Building Systems – Mechanical – Security –Technology Assessment
  - Historic Significance/Fabric – Renovation?

1995-96: Innovative Funding

- Early tax lien sale generated $23 million for early city share on Phase 1
- Concentrated legislative approach obtained commitments for magnet funding, “renovate like new,” swing space funding, etc.
- ERATE funding of technology
- Gradual buildup of local support for limited property tax increases (i.e. consistent with performance)
- Funding of energy saving changes

1996-97: Necessity of Master Plan

- Enrollment Projections- City wide
- Educational Program Requirements
- Building Capacity Assessments
- Facility Condition Assessments
- Phased Implementation Plan
- Financial Plan
- Community Goals
- Swing Space availability – fit out and planning

★ *Update Plan at Each Critical Program Phase* ★

1998: GILBANE is hired

- By late 1997, Phase 1 program had grown to 11 schools, $170 million
- Decision to hire outside Program Management (PM) assistance: Gilbane Building Company
- Gilbane provides 1998 -2000 Revision of Master Plan
- Initial projects starting construction
- Advantages of Program Manager
  - Visible evidence and responsible control of program dollars
  - Administers and interfaces with all program constituents
  - Maintains all communication and reports with State School Facilities

1998-00:
Gilbane Master Plan Update

- Updated Enrollment Projection
- Updated Educational Program Requirements
- Refined Capacity Assessment of Buildings
- Updated facility assessment / priority list
- Detailed and updated financial plan
- Updated Community Goals
- Swing Space Strategy implementation

★***Refinement of Implementation Plan***★

1998-00: Why Program Management?

- Program Managers are **owner advocates** and staff extensions (BOE, Facilities, City entities)
- Program Managers **mitigate project risk** by providing an owner comprehensive project leadership in all phases of design and construction.
- Program management allows the use of **experienced construction professional staff** to match program design, cost and schedule requirements

Capacity Adjustment

- **"Seat" Capacity** affected by:
  - Changing space standards
  - Enrollment policy
  - Mandatory code and statutory changes
  - Educational program requirements and essential core support spaces
- **"Preferred" Capacity** results from evaluation of facility's ability to satisfy all of above requirements

Implementation Challenges

- Realistic & Updated Master Plan
- Swing Space Plan
- Cost & Schedule Control
- Design Standards/High Performance
- Communication—Website Based
- Workforce & SBI Goals
- Field Quality Control of Unique
- Maintaining Local & State Support as Project Budgets Increase from Inflation & Economic Factors

Implementation Challenges: Need for Swing Space Strategy

- "Gut" renovation of "like-new" projects requires schools to be vacant during construction
- 35 of 44 projects require moving into temporary swing space optimizing construction schedule and minimizing costs
- 10 different facilities used for swing space including old schools replaced by new buildings, leased private school space and converted leased space

Swing Space Schedule

	SCHOOL CONSTRUCTION PROJECTS REQUIRING SWING SPACE (NO. PUPILS)	1/04-6/04	8/04-12/04	1/05-6/05	8/05-12/05	1/06-6/06	8/06-12/06	1/07-6/07	8/07-12/07	1/08-6/08	8/08-12/08	1/09-6/09	8/09-12/09	1/10-6/10	8/10-12/10	1/11-6/11
1A	EDGEWOOD (250)															
1B	EDGEWOOD (250)															
2A	LINCOLN BASSETT (250)															
2B	LINCOLN BASSETT (250)															
3	BRENNAN (289)															
4	WEXLER (283)															
5A	FAIR HAVEN MIDDLE [6-8] (644)	644														
5B	FAIR HAVEN MIDDLE [5] (220)	220														
6	HALE (533)															
7	TRUMAN (353)	353														
8	CELENTANO (287)	276	310	310												
9	BARNARD (232) - June 06		206	206	258	258										
10	TROUP [5-8] (415) - June 07				659	659	591	591								
11	BEECHER (293) - Apr 07		367	367	357	357	357	357								
12	CLINTON (556) - Jun 05		535	535												
13	HOOKER K-2 (213) Nov 06				249	249	249									
13A	HOOKER 3-4 (91) - Jun 09							91	91	91	91	91				
13B	HOOKER 5-8 (160) - Jun 09							160	160	160	160	160				
14	SHERIDAN (339) - Jun 08								395	395						
15	COLUMBUS K-4 (408) - Jun 08						315	315	315	315						
16	DAVIS (365) - Jun 10										376	376	376	376		
17	CLEMENTE (K-3) (221)								221	221						
17	CLEMENTE (4-8) (374)								374	374	374	374				
18	BISHOP WOODS (268)								373	373	373	373				
19A	MAURO SPLIT (200)												200	200		
19B	MAURO SPLIT (200)												200	200		
20	HILL CENTRAL (532)										450	450	450	450		
21	DWIGHT (384)														460	460
22	EAST ROCK (753)												820	820	820	820
23	CROSS ANNEX (167)														167	167
	SUBTOTAL- SWING SPACE NEEDS	1493	1418	1418	1523	1523	1512	1514	1929	1929	1824	1824	2046	2046	1447	1447

Program Management Approach

Board of Aldermen

Board of Education

Program Manager
- Project Development
- Pre-Design
- Project Construction
- Post-Construction

School Building Committee (CSBC)

Each Project

Architects & Consultants

School-Based Building Advisory Committee (SBBAC)

CT Office of School Facilities (OSF)

City of New Haven
- Fire Marshall
- City Plan / Zoning
- Traffic & Parking
- Engineering
- Building
- Public Works
- Parks
- CEO
- Economic Development
- Police

Construction

Construction Manager

General Contractor

Prime Contractor

Sub Contractors

The Value of Community Involvement (SBBAC)

- School Based Building Advisory Committees (SBBAC) Community becomes **invested** in process and new school
- Each community is unique with process that allows for input and involvement, more support for each school before, during and after construction and for overall program because of buy in.

School Construction typical Schedule in Connecticut

File for state approval	15 months
Develop educational building program	2 months
Develop conceptual design	1 month
Develop schematic design	2 months
Design development	3 months
Construction documents	5 months
State and local approval process *(bidding and award of contracts by Board of Education)*	2-4 months
Building construction (typical school)	14-16 months
Move-in to building *(furnishings /equipment / commissioning / turnover)*	1-2 months
Total Schedule	45-60 months

Community Impacts

- Workforce Initiative – Jobs
- Training in Various Construction Trades
- Small and Minority Business Opportunities

★ *37 Completed and Active Projects (2013 data)* ★

★ *Total Construction Trade Labor Hours 6,010,130 hrs.* ★

Unique Facilities

Aquaculture Vo-Ag High School

- Magnet Vocational School Located on Long Island Sound
- 40,000 new & 24,500 renovated Square Feet for 360 students
- Marine Focused Campus features:
  - Greenhouse
  - Aquariums & Fish Farm
  - Plant & Animal Science Labs
  - Boat Restoration Workshop

Dewberry Goodkind

Project Cost: *$27 m*

State Funding: *100%*

Completion: *Winter 2003*

Unique Facilities

Barnard Environmental Studies Magnet School

- Elementary students acquire their math and reading skills through course work with an environmental science focus.
- The building's facilities support a curriculum of sustainability through interactive learning:
  - Largest solar panel display in CT
  - WeatherBug Station
  - Two greenhouses & gardens
  - West River Nature Center, connected to the main school by a pedestrian bridge over Rt. 34
  - Educational kiosks

- **Connecticut's 1st GOLD LEED™ Certified SCHOOL Building.**

Project Cost:	***$43 m***
Students:	***600***
Square Feet:	***90,000***
Completed:	***Summer 2006***

Unique Facilities

Central Kitchen (2003)

- Master Plan included Central Kitchen to realize benefits on all levels:
  - Reallocation of Kitchen space at schools
  - Reduction of Kitchen Staff
  - Uniform quality and nutrition standards
  - Energy Savings

Unique Facilities

Hillhouse High School & District Wide Field House

- One of 2 large comprehensive high schools
- 1,200 students
- Multi-phase renovation/addition while occupied

- New 92,000 sf District Field House

S/L/A/M Collaborative
Project Cost: $86 m
Completed: 2002

New Educational Flagships:

Cooperative Arts & Humanities High School

- Pelli Clarke Pelli Architects
- 145,000 GSF on 1.5 acres in the heart of New Haven's Theater District.
  - Performance & Black Box Theaters
  - Full Support; including Scene Shop
  - Studio Spaces for:
    - Dance
    - Theater
    - Film
    - Music
    - Video Labs

Project Cost:	*$66 m*
Construction Cost:	*$47 m*
Completion:	*Fall 2008*

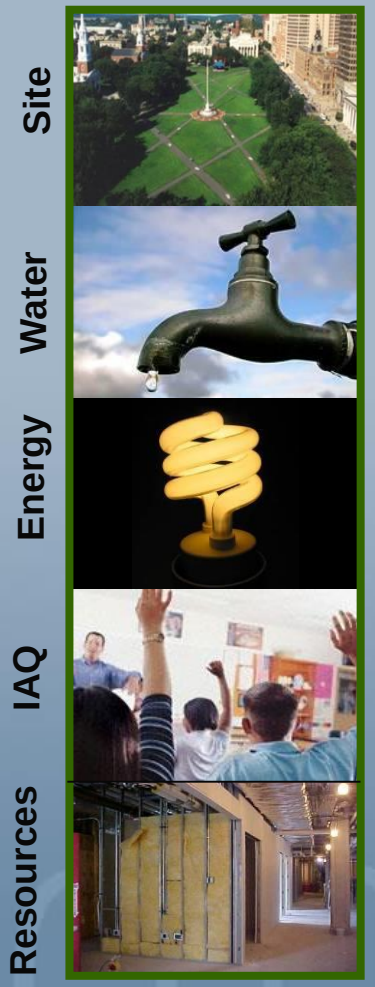
Unique Facilities

HILL CENTRAL / CLEMENTE Schools Central Utility Plant (2011)

- Central Utility Plant designed to service 2 schools in adjacent campuses
- Implementation of Fuel Cell technology for electricity, heating and cooling
- CUP allowed a more efficient system integration and minimize first cost for separate mechanical building systems at each school.

Defining Expectations Building Program Standards

- Programming Guidelines
  - Space programming
  - Best practices –lessons learned
- Material Standards
  - Level of quality – life cycle
  - Format consistency
- High Performance Guidelines
  - Sustainable design strategies
  - Student performance
  - Health of occupants
  - Cost effectiveness/operation/maintenance
  - Environmental stewardship
  - Energy Efficiency



School Construction Design Standards

Defining Expectations

- Design Guidelines
  - Space programming

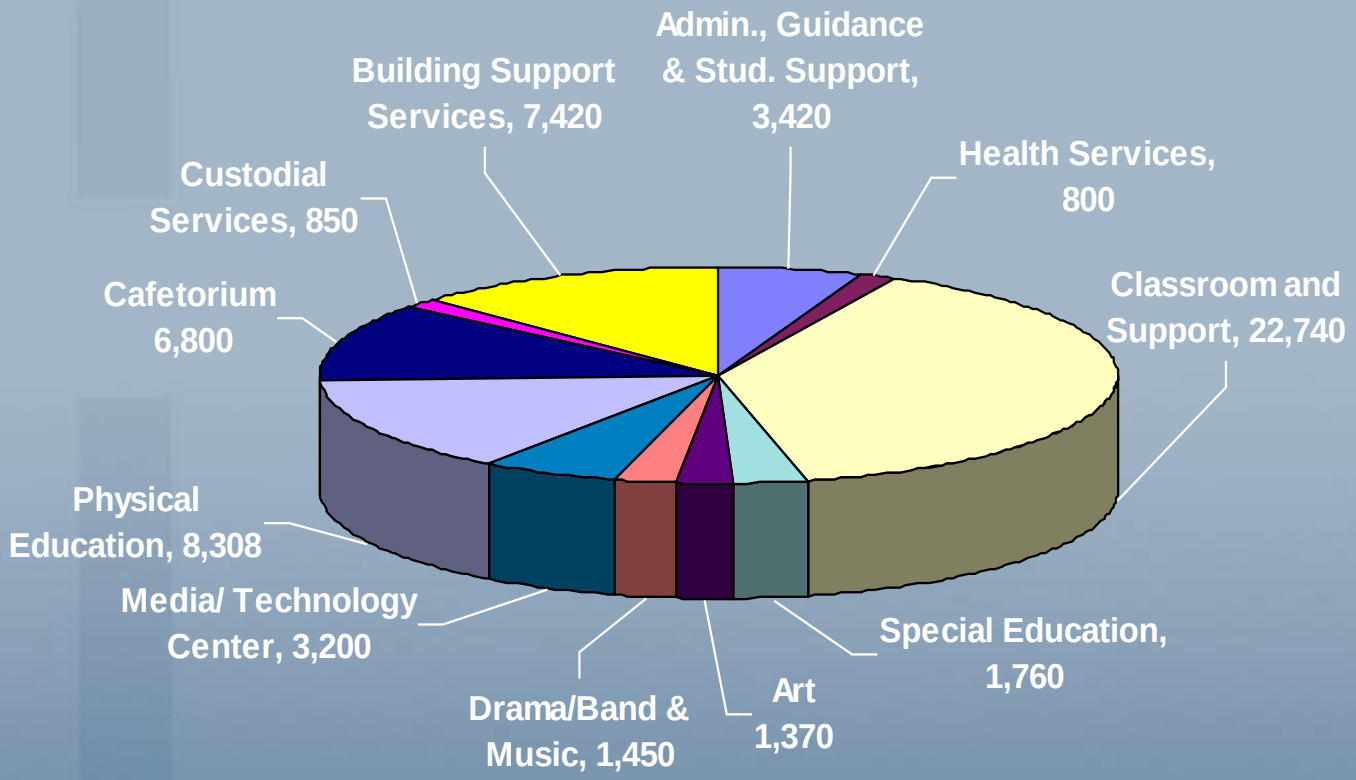
New Haven School Construction Program — *Model PreK-8 Space Program*

MODEL PreK-8 SPACE PROGRAM

Space	# staff/ stu	Area/ stu	NSF/ rm	# rms	Total NSF	stu capacity	NSF/ STU	Remarks
Administration, Guidance & Student Support (Incl. Faculty & Parents Areas)								
Administration:								
Reception/Waiting Area (Admin)	4		150	1	150			
General Office Area			300	1	300			
Principal's Office	1		180	1	180			
Assistant Administrator's Office			150	1	150			*Locate remotely from main administrative office area; typically in area of older students.*
Assistant Admin. ReceptWorkspace			120	1	120			*Locate adjacent to Assistant Admin. Office*
Mail/Workroom (Admin)			150	1	150			
Document Storage Area			100	1	100			
Conference Room (Admin)	8	25	200	1	200			
Security Office			100	1	100			
Parent Room			150	1	150			
Staff Toilet (Admin)			60	1	60			
Guidance & Student Support:								
Reception/Waiting Area (Guidance)			150	1	150			
Work/Storage Room (Guidance)			200	1	200			
Guidance Counselor Office			150	1	150			
Social Worker Office			120	1	120			
Speech Pathology			120	1	120			
Bilingual/ESL/Migratory			120	1	120			*Evaluate the need for this space with project committee*
Psychologist Office			120	1	120			
Testing Room			80	1	80			
Foreign Language Office			150	1	150			*May be located near or adjacent to Foreign Language Classroom*

School Construction Design Standards

Space Programming



Net Required Area:	*55,140 sf*
Maximum Enrollment:	*540*
Required Gross Area:	*76,138 sf*

School Construction Design Standards

Material Standards

Owner Expectations

- Design Guidelines
  - Space programming
  - Best practices – lessons learned
- Material Standards
  - Level of quality
  - Format consistency

School Construction Program

Growing from good to great

Kids First

New Haven Public Schools
REBUILDING OUR SCHOOLS

New Haven
School Construction Program

Technical Guidelines
For
Architects & Engineers

Program Manager
Gilbane Building Company
54 Meadow Street
New Haven, Connecticut 06519

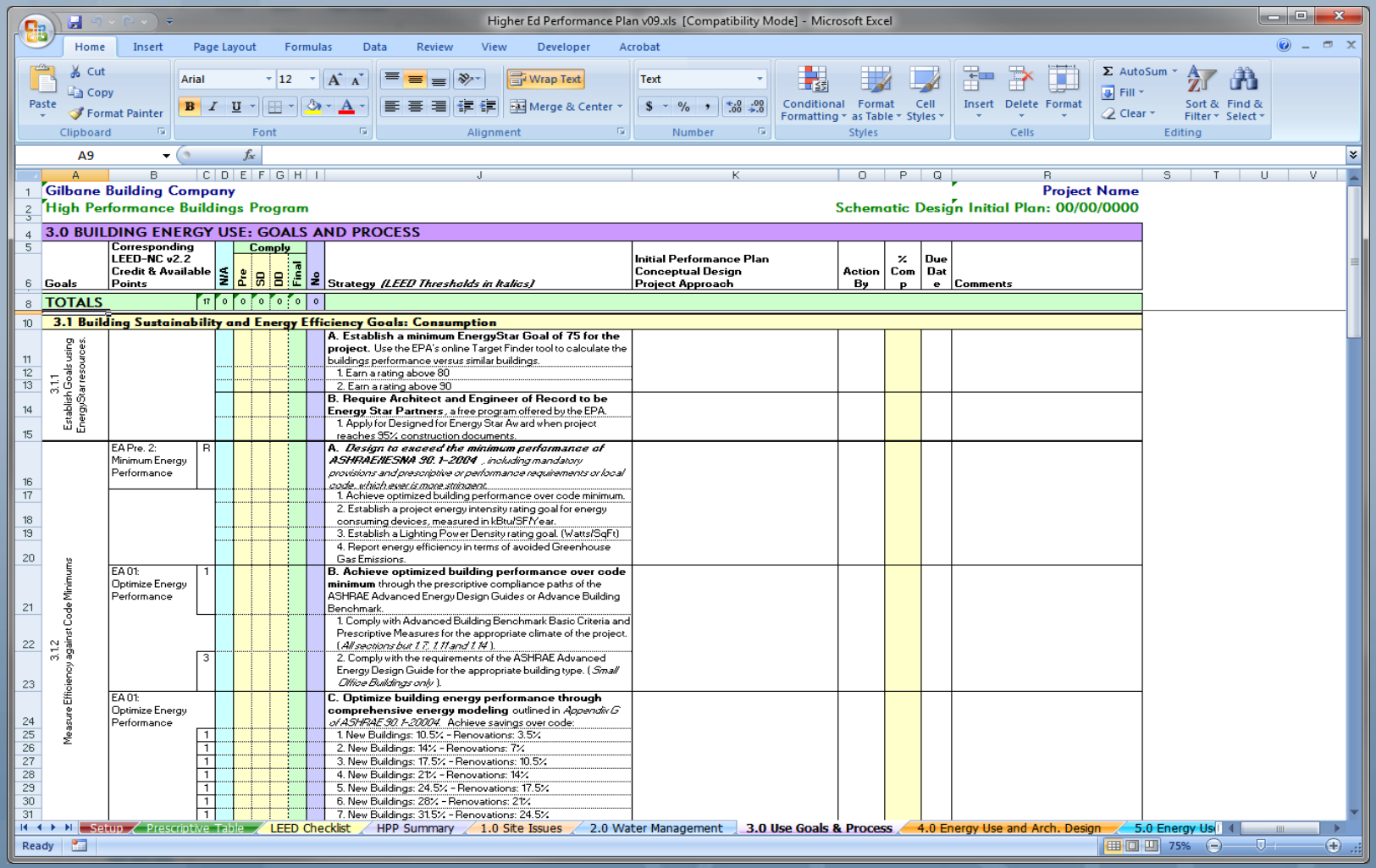
ISSUED: MARCH 1, 2004
REVISED: December 15, 2006

School Construction Design Standards

Material Standards

- Design Guidelines
  - Space programming
  - Best practices – lessons learned
- Material Standards
  - Level of quality

Gilbane High Performance Building Plan



Gilbane High Performance: When does it start?

CONCEPTUAL DESIGN

- All hands design charrette
- Performance plan developed
- Design continues using plan as guide

SCHEMATIC DESIGN

- Design continues
- Groups discuss ECM's as they are analyzed
- Plan updated at 100% SD charrette

DESIGN DEVELOPMENT

- Energy Modeler analyzes design
- Life Cycle Cost Analysis prepared
- Commissioning Agent reviews Project
- Design is optimized to findings
- Plan updated at 100% DD Charrette

CONSTRUCTION DOCUMENTS

- Design is optimized and finalized
- Final Energy Model Report prepared
- Life Cycle Cost Analysis is tool for VE
- CxA prepares Cx Plan
- Plan is updated at 50% CD Charrette

Sooner Better Than Later!

High Performance Participants

OWNER'S TEAM

Operations & Maintenance Personnel

LEED Consultant

End Users, if appropriate

DESIGN TEAM & CONSULTANTS

Architect

MEP, Structural & Civil Engineers

Lighting, Interiors & Other Consultants

ENERGY MODELER

Everyone!

CONSTRUCTION MANAGEMENT TEAM

Gilbane Team:
PM, PE, HPB COE Staff

(estimating, SME's)

Commissioning Agent

LOCAL UTILITIES

To discuss rebates & incentives

Gilbane High Performance Approach

Existing Building Energy Consumption Survey	Full Life Cycle Cost Analysis including Utility Costs
Single Project & Program-wide Performance Plans	Grant & Rebate Application Management
LEED Documentation of Energy Credits	Measurement & Verification and O & M Readiness
Energy Modeling Peer Review	Program-wide Energy Modeling
Energy Audits(Level I & II)	Energy Efficiency Measure Consulting
Whole Building Energy Modeling	Renewable Energy Analysis

Gilbane High Performance Building

EXISTING FACILITIES

- Model Existing Buildings to determine where savings exist
- Review current energy consumption through utility bill analysis
- Level I and Level II Energy Audits

PRE-CONSTRUCTION

- Create the energy model for review, analysis and design optimization
- Review an existing model (prepared by another party) to confirm savings and provide a fresh eyes approach
- Research and develop proper documentation to submit for rebates, grants and incentives from government and utilities.
- Run Life Cycle Cost Analysis on proposed equipment
- Develop Energy Modeling Documentation for 'like' LEED submission
- Full 'like' LEED Project Administration

CONSTRUCTION

- Confirm energy efficiency of submittal documentation
- Work with utility companies and others to verify grants & rebates

POST CONSTRUCTION

- Implement real time energy monitoring to report real time building efficiency and sustainability information
- Comprehensive video training on HPB systems/continuous commissioning

High Performance

1: Goals

Energy Efficiency

- Energy Star Targets & Savings over Code
- Lighting Power Density
- Renewable/On Site Power
- Energy Modeling
- Commissioning
- Passive Heat & Light Strategies
- Occupant Comfort

Environmental Sustainability

- Water Use
- Site Selection
- Landscaping & Building Placement
- Materials Selection Standards
- Occupant Productivity
- Architectural Considerations
- Policy Goals

2: Design

Energy Efficiency

- MEP and HVAC Selection
- Envelope Design
- Controls and Monitoring

Environmental Sustainability

- Materials and Fixture Selection
- Architectural and Landscaping Policies and Details to Support Sustainability Goals

3: Policy

Operations & Maintenance

- Construction Waste, IAQ, Site . other
- Building O&M Policies, Practices

Gilbane High Performance BENEFITS
Why Adopt Good Management Principles

PREVENTATIVE MAINTENANCE
can save an average
of 15% on O&M costs

Preventative Maintenance –
Manufacturer's Requirements

PREDICTIVE MAINTENANCE
can save an *additional* average
of 10% on O&M costs

Predictive Maintenance –
Facility Manager's Expertise

Gilbane High Performance – Post Construction

- Operations and Maintenance Readiness
- BENEFITS

20% Design & Construction Costs

80% Operation & Maintenance Costs

Gilbane High Performance Benefits

- Evaluation of actual building performance:
- Actual Energy consumption versus Energy Model
- Effect of occupants on the Energy Model – computers and miscellaneous equipment used.
- Light loads
- Effect of Preventive Maintenance Program

Gilbane High Performance Actual Benefits

(kBtu/SF/year)	Initial 7 Schools *(2005-2006)*	Current Schools *(2007-2009)*	Savings
Energy Used	74	60	20%
Energy Saved	29	43	47%
Energy Saved	28%	42%	47%

Benefits

- Post construction monitoring is in progress for all completed schools for additional validation of energy cost savings
- Before implementing High Performance Building Design , the City was experiencing at an average of 190 kBtus/sf/yr (no AC) currently the City is under 70 kBtus/sf/yr, and we are currently modeling under 40 kBtus/s.f with the recent implementation of LED lighting in the latest buildings with AC