LSC Webinar
Anticipating Renovating and Renewing Learning Spaces

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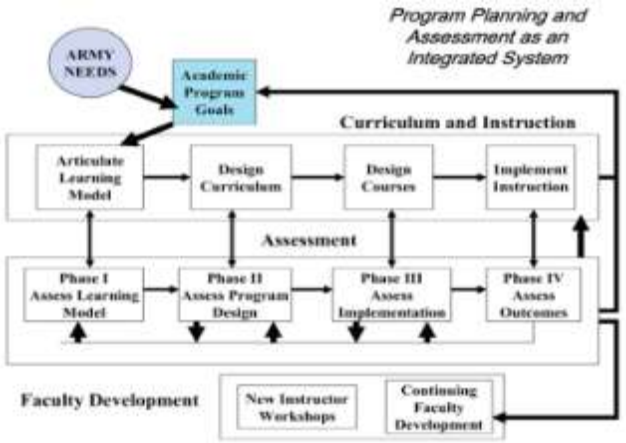
Webinar Agenda

- Project Overview
  - Establishing objectives
  - Addressing challenges
- Process
  - Building a team
  - Asking questions
  - Determining design principles
- Educational Initiatives
  - Making science visible
  - Blurring the learning experience

The United States Military Academy at West Point

- Four-year, undergraduate only, federally-funded institution.
- Every graduate receives a BS degree and is commissioned a 2LT in the US Army with a 5-8 year service commitment
- The academic program consists of a strong 30 course core program and a study in-depth component in one of 47 majors
- Every cadet is required to take 2 semesters of general chemistry in the freshman year and 2 semesters of a calculus based introductory physics in the sophomore year.



Project Overview

The building complex that included the Old Cadet Library and the Bartlett Hall Science Building is undergoing a two-phase renovation into the Bartlett Hall Science Center.

Building houses the Department of Chemistry & Life Science, Department of Physics & Nuclear Engineering, Photonics Research Center, Nuclear Science & Engineering Research Center, Center for Molecular Science, Space and Missile Defense Research and Analysis Center, and Archives & Special Collections.

The project renovates 317, 912 sq. ft. of nationally registered historic space into 329,747 sq. ft. of classroom, teaching labs, research labs, office and archive space: total estimated cost—$164 million.

Phase 1

- Bartlett Hall Science Center: a two-phase renovation of Bartlett Hall North (formerly known as Cadet Library) and the Bartlett Hall Science Building
- Phase 1 – Bartlett Hall North
  - Cost – $46 million; 112,450 sq. ft. of renovated space
  - Anti-terrorism, force protection (AT/FP) upgrades (blast resistant windows); Seismic upgrades (collector cords and thicker walls)
  - LEED Silver
  - Construction began Nov 2009; substantially complete Dec 2011
  - Architect and Engineer—URS
  - Lab design—RFD
  - General Contractor—Consigli Construction

The Planning Team

- A representative from each department occupying the building
  - Physics – LTC John Hartke
  - Chemistry – COL Russ Lachance
  - Archives & Special Collections – Ms Suzanne Christoff
- Architect & Engineer Team (URS)
  - Head architect
  - Reps from the MEPs
  - Interior designer
  - Lab designer (RFD)
- The contracting officer from Army Corps of Engineers

Challenges

- Making the case
  - Army regulations dictate the sizes of rooms
  - Had to convince the Army and US Congress of our needs
- Calibrating needed space against available funds
  - Not enough space for the entire desired program
  - Costs driven at AT/FP requirements and seismic upgrades
- Transforming an historic building
  - Portion of building is nearly 100 years old and has historic features
  - Linking sections of the building constructed in 1910's, 1930's, and 1960's
- Teaching during construction

Planning Process

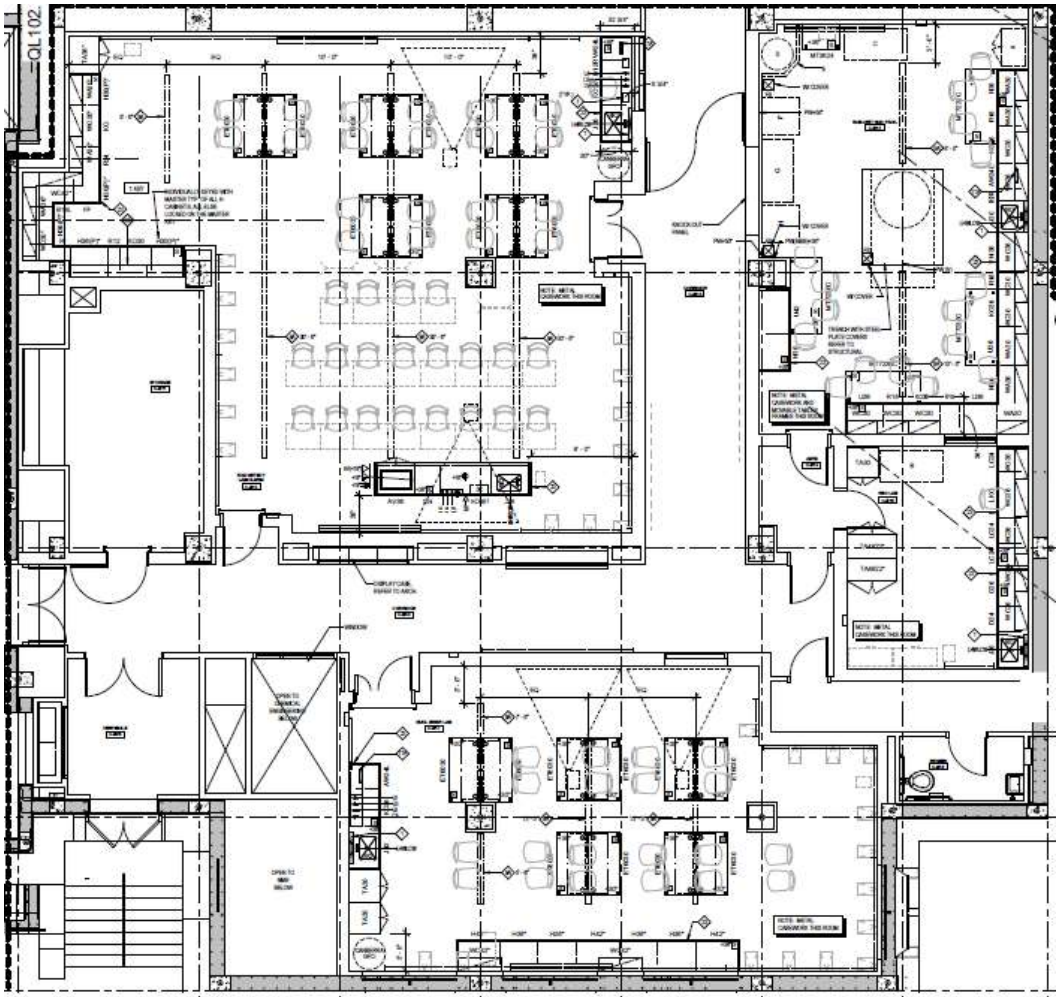
- Started with a 2001 planning charrette
- Defined project objects and principles of design
- Defined desired functionality and requirements
- Looked around at others
- Great team work between architects and users
- Followed the US Army Corps of Engineers design process.

Principles of Design

- Flexible to adapt to emerging STEM educational initiatives and technologies (50 years before next renovation)
- Maintain small class size (16 cadets per section)
- Make the building “Comfortable” and “Welcoming”
- Maximize the use of the space
- Immerse the cadets in the science and technology of the US Army.

Principles of Design
Beginning with the End in Mind

- Grouping like type labs in a single area
- Gives the majors a sense of ownership
- Gains synergy between courses



Project Objectives

- Environmental Objectives
  - Create and environment that encourages study in science and reinforced the process of scientific investigation
  - Promote communication between cadets and faculty to further learning and foster mentoring relationships through a positive physical environment
  - LEED Silver Certification
- Operational Objectives
  - Create space that is flexible and can accommodate future equipment and technology
  - Provide a state-of-the-art utility and infrastructure system
  - Develop an environment that is durable and easily maintained
  - Meet federal seismic and anti-terrorism force protection requirements
- Aesthetic Objectives
  - Create an environment that is visually attractive
  - Design a facility that reflects the quality, character, and tradition of USMA
  - Ensure that all new design elements preserve and contribute to the USMA National Historical Landmark District

Project Functionality and Requirements

- Started with the courses to be taught in Bartlett Hall North
  - Defined functional requirements for IT, power, air handling, gasses, water and shielding
  - Analyzed student population and scheduling paradigm – defined room size and number of rooms
  - Explored how courses could be taught
  - Created desired adjacencies
- Found we needed more space than was available
  - Had to defend requirements to the Army.

Look Around

- Attended PKAL (LSC) workshop
- Visited other institutions, including:
  - Naval Academy
  - Duke University
  - Notre Dame
  - University of Virginia
  - Virginia Institute of Technology
  - Rochester Institute of Tech
  - Patriot League schools
- Sought input from our faculty.

Visited every science building of every college my son considered in his college search

Questions about the Planning Process?

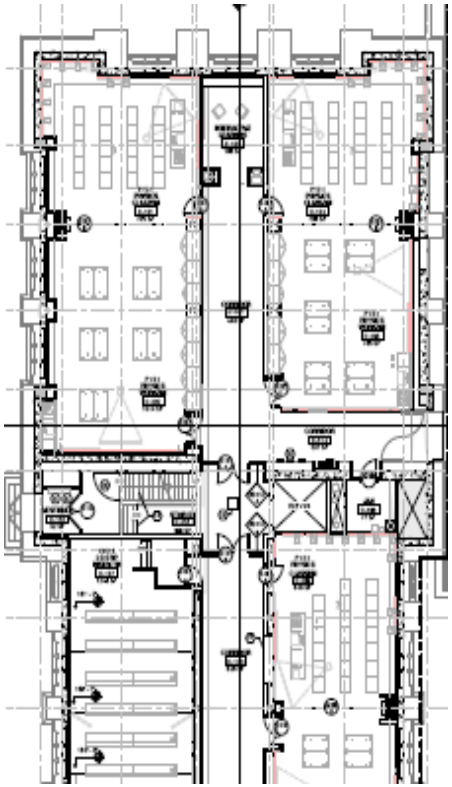
- How did you address the challenge of renovating an historic building? What did you need to find out? Were there any surprises?

- **QUESTIONS FROM WEBINAR PARTICIPANTS**
  - Raise your ‘virtual’ hand
  - Send a ‘chat’ message

- What other challenges emerged as the planning progressed?

More Challenges…& Opportunities

- Fitting the requirements inside the shell of the building and around support columns
- Making compromises and trade-offs
- Managing the budget estimate
- Utilizing the Corps of Engineers Design Process



Corps of Engineer Design Process

- 15% design
  - Architects laid things out in a sketch
  - Identified requirements not meet
  - Users traded spaces, combined functionality, made sacrifices

- 30% design
  - Set the wall locations
  - Sized the MEP requirements
  - First real budget estimate
  - Start casework design

Corps of Engineer Design Process (cont)

- 60% design
  - Deconflict and look for efficiencies
  - Integrate into campus infrastructure
  - Refine casework design
  - Interiors details
  - Good big idea cut-off
  - Budget estimate
  - First construction schedule
  - Formal external review
- 90% design
  - Final good idea cut-off
  - Deconlict and details

Planning during Construction

- Weekly user meetings
  - Address construction issues that were having an impact on teaching/learning
  - Manage changes that affect functionality
  - Watch for schedule impacts on the transition between phases
  - Ensure quality control
  - Identify opportunities for improvements along the way.

Lessons Learned So Far

- Don’t trap yourself in the, “This is how we do it”
- Think about, “what we could do if…”
- Ask, “how are we going to be teaching in 50 years and how can the building enable that process?”
- Include the students
- Immerse the architect team in the culture of the institution
- When making compromises during design, remind yourself of first principles
- Stay connected to construction process
- Teaching during construction is hard
- Transition between construction phases requires very detailed planning.

QUESTIONS?

Educational Initiatives Again: Principles of Design

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Educational Initiatives Again: Project Objectives

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Educational Initiatives

- Make science visible
- Blur the laboratory and classroom experience
  - Area clusters
  - Classatories
- Make the learning environment comfortable

Why Make Science Visible?

- Cadets have a natural aversion to the sciences until they start to experience it
- Classes from other disciplines are taught in our building
- Demonstrate that physics (chemistry) is not proprietary to the “priestly” smart people but that it is all around, part of all we do, and accessible to all.

Hallway Windows into Labs

Hallway Display Case

Making Science Visible

- Based on research and practice in the field, sciences become more accessible and interesting when the doing of science and the world of science is visible to the students.
  - Putting windows into labs
  - Putting display cases in the halls.

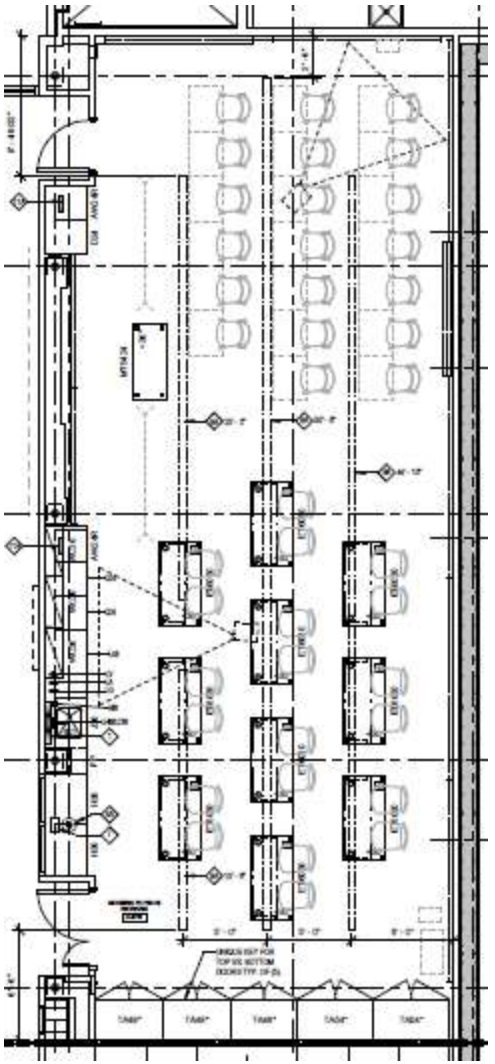
Questions

- Any reaction from faculty?
- Any reaction from students?

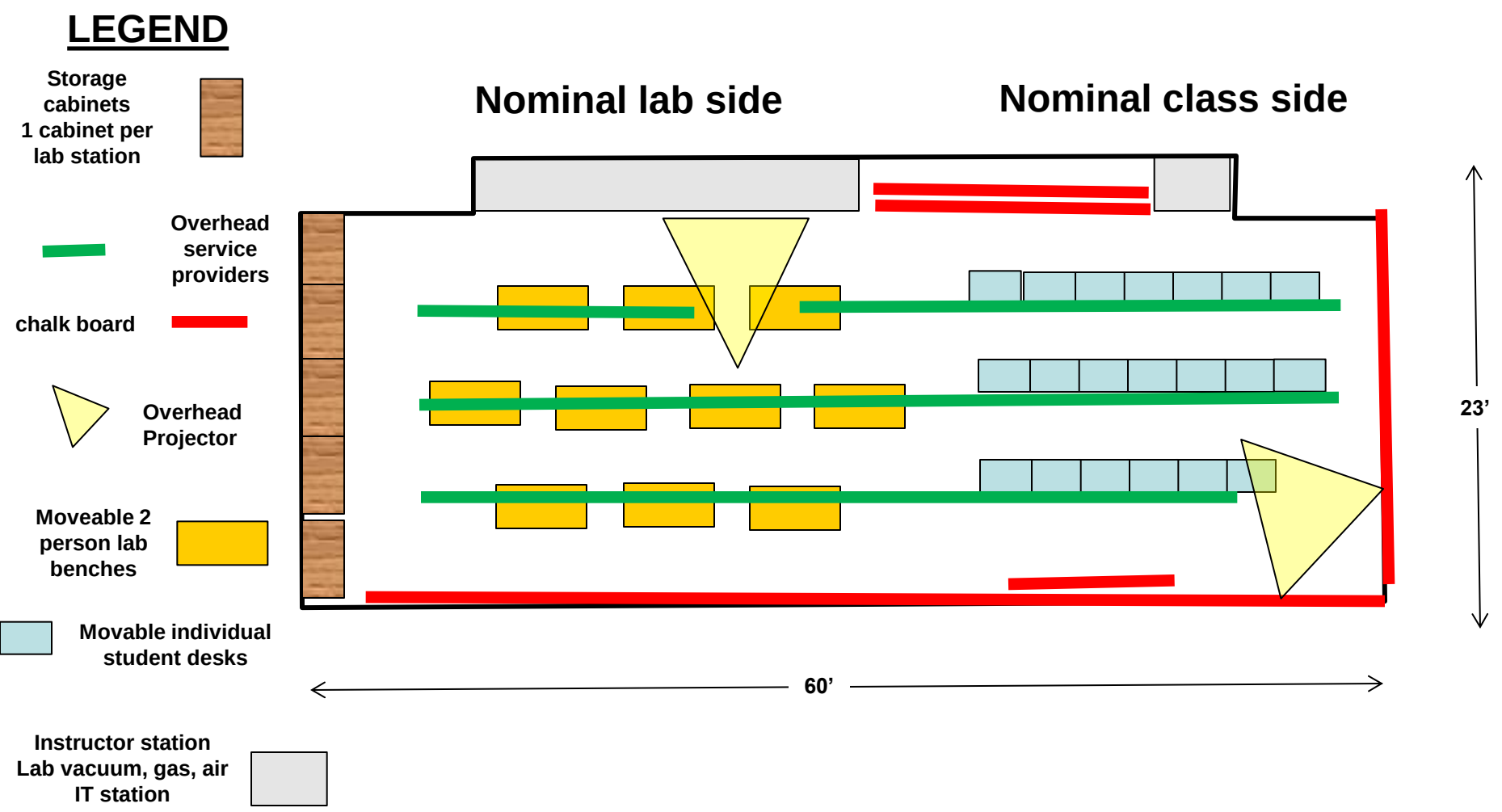
QUESTIONS FROM WEBINAR PARTICIPANTS?

Blurring the Learning Experience Classatories

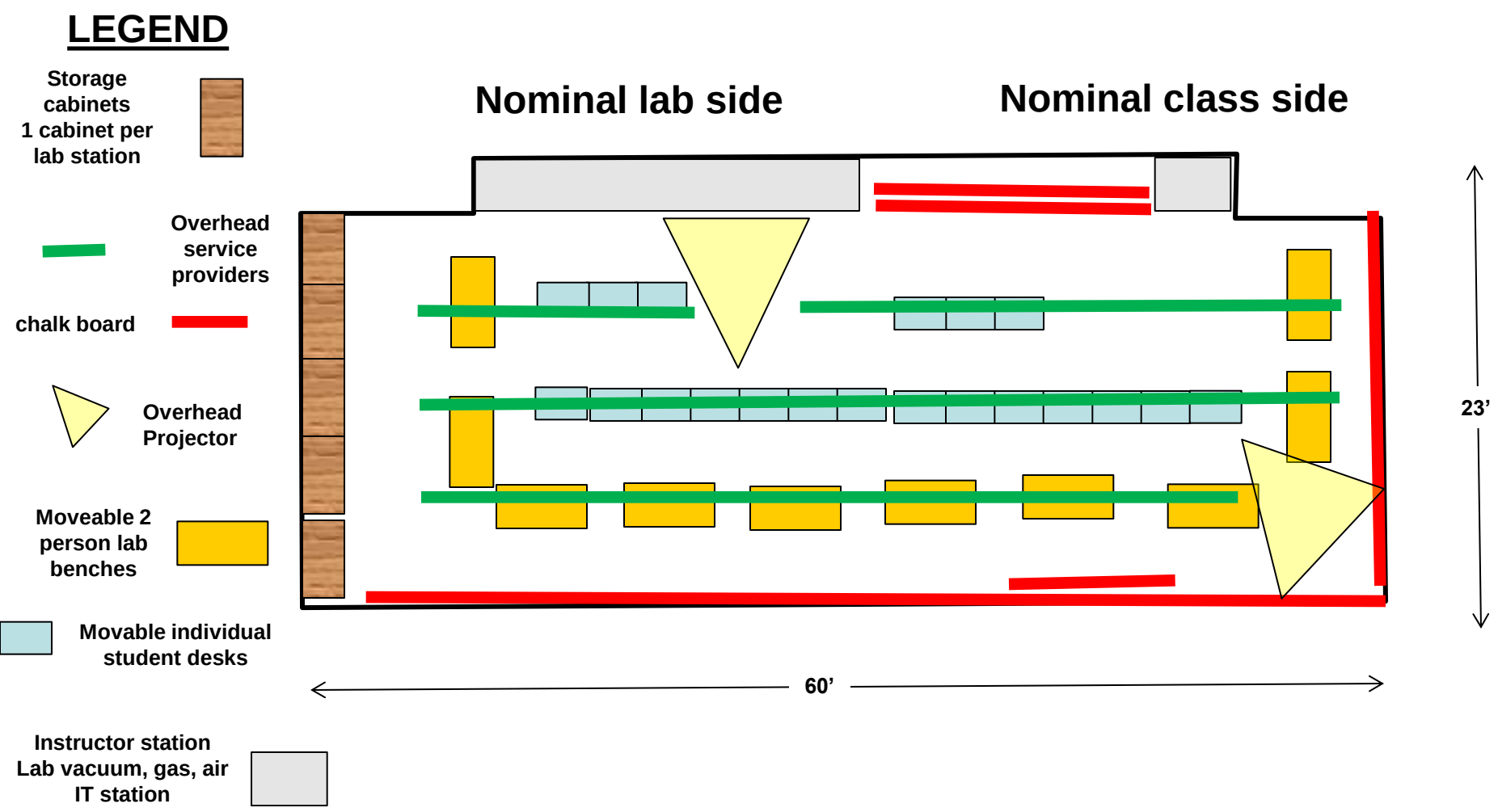
- Combine the classroom and laboratory functions into a single space
- Rearrangement of the desks provides either small group work space or individual work
- Supports a wide range of contemporary research-based pedagogies and/or more traditional approaches.



Physics Classatory Example 1



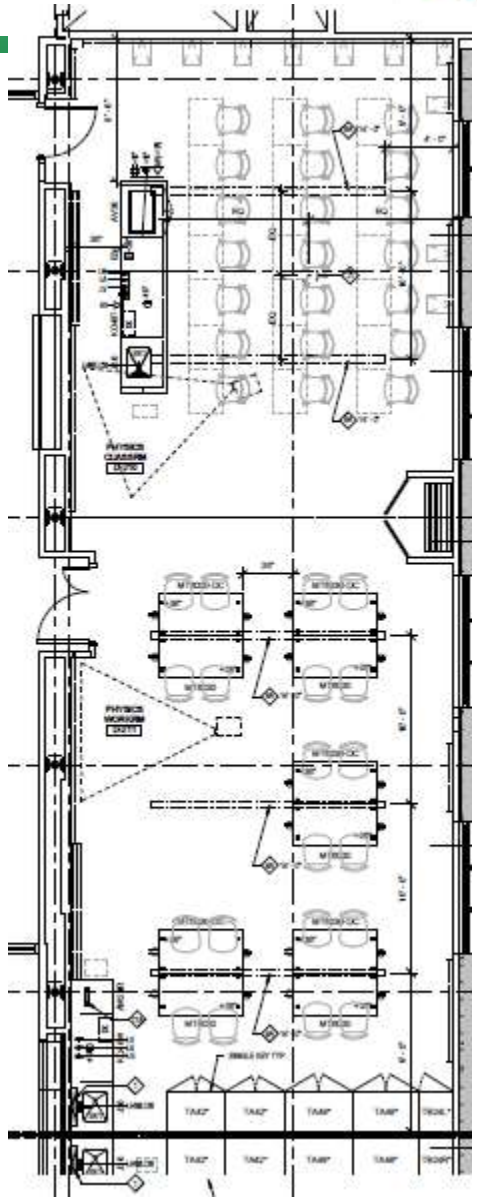
Physics Classatory Example 2



Classatory

Blurring the Learning Experience Lab/Class Combos

- Combination rooms that have movable walls to open lab into classroom
- Maintains the flexibility of allowing other courses to be taught in the same room
- Instead of “take boards” now we can “take experiments”



Questions

- Has faculty development been linked to the development of these new kinds of learning spaces?
- Are there challenges to adaptability/flexibility?
- What is the relationship between the spaces for teaching and for research in Bartlett?

QUESTIONS FROM THE WEBINAR PARTICIPANTS?

Creating Adjacencies: Area Clusters

- Grouping like type labs in a single area
- Gives the majors a sense of ownership
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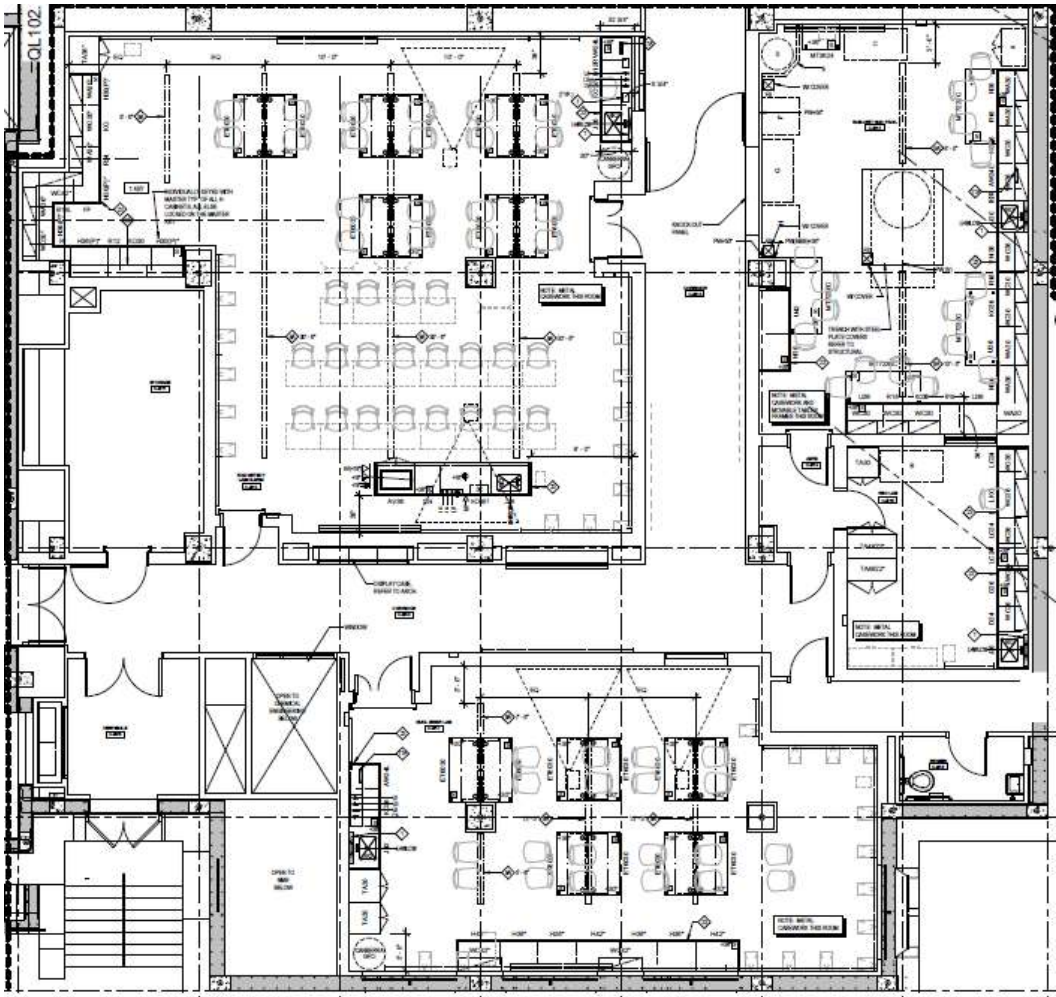
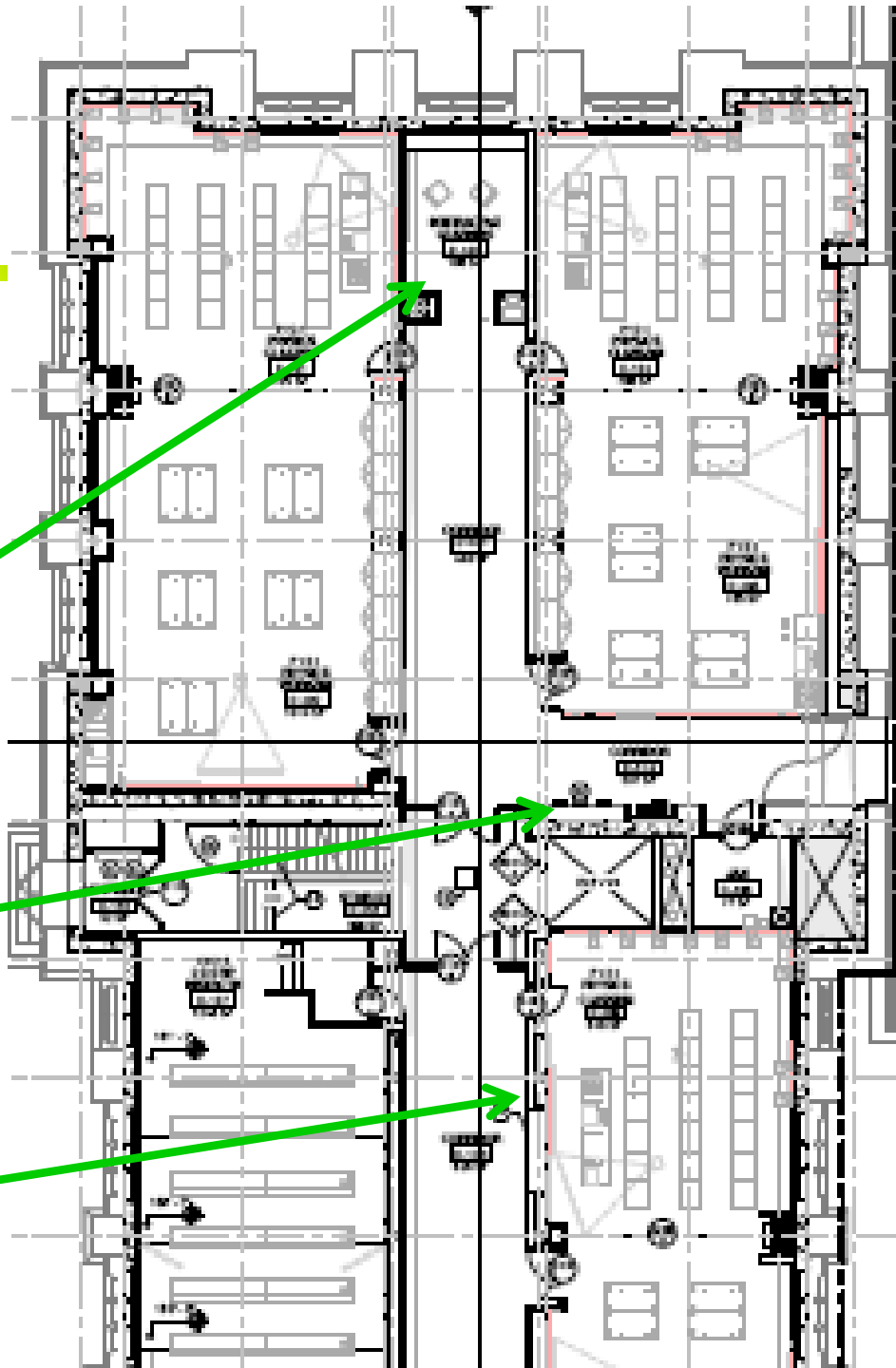


Comfortable Building

- Why should the building look like a prison?
- Soft seating at the end of halls
- Make science visible items in “dead space”
- Adding “bumper spaces”



Standard Classroom

Chalkboards all around
Movable student desks

Instructor Bench with:
AC/DC power
Water
Air
Vacuum
Gas
Computer and IT controls

Smartboards,
wireless,
Document projectors

Questions

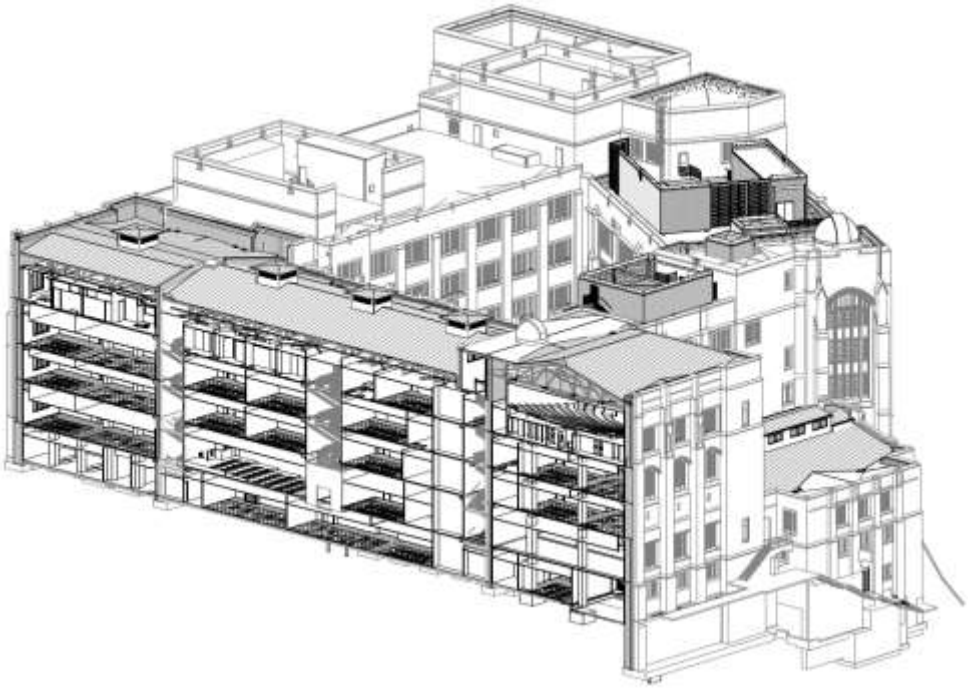
- Any regrets?
- Any lessons learned that are informing the evolution of Phase II of Bartlett Science Center?

QUESTIONS FROM THE WEBINAR PARTICIPANTS?

- What's next?

Phase 2

- Remainder of Bartlett Hall
  - Cost – $118 million
  - 212,718 sq ft of renovated space and 11,906 sq ft new construction
  - Same AT/FP, seismic and environmental controls as phase 1
  - LEED Silver
  - Broken into two parts:
    - Part 1 began Feb 2012 expected completion summer 2014
    - Part 2 from summer 2014 to Christmas 2015
  - Architect and Engineer – URS and STV – Lab design - RFD
  - General Contractor – Walsh Const.



Final Reflections