Military / Federal Architecture: A Catalyst for Best Practices

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WebEx Presentation
January 27, 2016
Learning Objectives

Course Description:
• This session is geared to all architects in large and small firms to learn about best practices that were developed delivering military / federal projects that have influenced the broader practice of architecture.

Learning Objectives:
• Understand the mission of Military / Federal Architecture and its role in serving public interest in the built environment, both through case studies and built examples.

• Gain a comprehensive understanding of the size and scope of the current Military / Federal portfolio and the increasing need for advancing the practice of architecture through examples and outreach.

• Analyze the various practice initiatives utilized in the Military / Federal Practice arena and understand how these have influenced and improved the broader practice of architecture.

• Understand the functions of Integrated Project Delivery and Target Value Design and how to utilize these best practice tools to during the concept design phase of a project.
Brief Introduction

• Barbara Price has over 40 years of experience in directing, planning, design, and management for a wide variety of projects. Barbara was the division vice president for federal programs with JACOB'S Global Buildings, an Executive Vice President with AECOM and held senior executive/managing principal positions with CRSS, HOK, ODELL and LS3P.

• Barbara holds a BA in Cultural Anthropology and an MA in Architecture from the University of Colorado, and studied at the USACE Contracting Officer's Training Program and United States War College in Carlisle, PA.

• She received the SAME Max O. Urban Medal - Outstanding Architect and DOD Charles Trainer Medal - Outstanding Contributions to A/E Practice. Barbara has led national committees for AIA, CURT, DBIA, and SAME and recently chaired the AIA Integrated Project Delivery Strategy Group and AIA/AGC Joint Committee. She has delivered national and international workshops and conferences including the 2002 AIA National Convention.

• Barbara has been active with architecture students at University of Colorado, Princeton, University of Maryland, UNC Charlotte, and Clemson University. She serves on the Clemson School of Architecture Professional Advisory Board.
My Early Days

• Milan Architects – Family Practice
• CRSS – Joe and Eddie
• Intro to Federal Work
Family Practice:
Community Based Practice
Integrated Art & Innovation

American Tobacco Co. Mural
Denver, Colorado

High School Gymnasium
Trinidad, Colorado
Changing Times

Inflation for Example:

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<th>NAME</th>
<th>LOCATION</th>
<th>TOTAL COST</th>
<th>COST/SF/FT</th>
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MISSION DRIVEN
Cost Sensitive
Collaborative
Predictable Outcomes
ENGAGED LEADERSHIP
Advancing Practice: Tools

Thought Leadership, Charrettes, EBD, Sustainability, Technology Enabled Practice
CRSS – Process Driven Design

- Willie Pena and Problem Seeking
- Basis for Fort Drum Program of Requirements
- Setting the standard for Military Practice
Thought Leadership: Charrette Process

“Sprint Start” – Partnering Sessions

“Sprint Start” allows all the project stakeholders in the Mobilization/Program Definition phase to “get up to speed” quickly on the client’s program goals and objectives.

“Sprint Start” process is:

- **Objective** – Asking the right questions, listening and documenting
- **Participatory** – Building consensus through involvement of key stakeholders
- **Analytical** - A heuristic process that breaks the problem into parts
“Sprint Start” – Partnering Sessions

Building consensus through participation

The Science of Listening & Understanding – Analysis cards, brown sheets and other graphic tools helps Team achieve better understanding

Solutions by Team – Best solutions come only through dynamics of team action

On-the-Spot Analysis – Referred to as “squatters” approach. Team moves into the client’s location and works with the client to develop solutions
“Sprint Start” – Partnering Sessions

Analysis Cards used to resolve Architectural Issues

ARCHITECTURAL

OPTION 1
- Use sandstone tile over metal
- Can be plaster on third and fourth floors
- Use steel stud framing for the entire exterior (stud framed exterior system)
- Explore how the titanium panels are installed
- Store front glass wall instead of glass curtain wall
- Replace some glass with metal

OPTION 2
- Replace titanium panels with metal panels
- Straighten elevation

INTERIORS
- Eliminate raised flooring from telecom room
- Explore alternative flooring material for terrazzo

STORE FRONT
- Simplify skylight
- Eliminate sunshades on north side of the building
- Change children’s canopy to more fabric type canopy

REVIEW
- Clarify about no vinyl wall coverings
- Heliport requirements (need more specificity)

ELEVATION
- Eliminate water feature
- Fire place

CURRENT ALLOWANCE OF $300,000 IN THE BUDGET

TRAFFIC
- Clearly define traffic signalization

REDUCE
- Number of ballards
“Sprint Start” – Partnering Sessions

Analysis Cards used for a Value Engineering Session
Advancing Practice: Thought Leadership

Sustainability
Integrated Sustainable Processes:

Predictable Outcomes: Integrated Cost Model

GUAM Master Plan
AECOM Architect of Record
Integrated Sustainable Processes:

Computational Fluid Dynamics:

Air speed & movement

Tracking warm air re-circulation

Temperature plots

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NASA N232 Sustainability Base
NASA Ames Research Center, Moffett Field, California, USA
U.S. General Services Administration Real Property Award Winner, Green Innovation, 2010

AECOM Architect of Record
Advancing Practice: Thought Leadership
MEDCOM / Evidence Based Design / World Class Checklist
**Project Details**

- **Location**: Fort Benning, GA
- **Design-Build** hospital on greenfield site
- **$333 million** construction budget
- **Architect/Engineer of Record**: Ellerbe Becket
- **Client**: US Army Corps of Engineers

Approximately 700,000-SF, state-of-the-art full service replacement hospital.

Includes associated site work and utilities infrastructure.

Behavioral treatment unit, surgical units, ICUs, LDR and post-partum units.

The project’s nature-focused design includes expansive glass walls that provide natural lighting and views of the outside courtyard, creating a soothing physical and emotional healing space.

**AECOM Architect of Record**
Walter Reed National Military Medical Center

Project Details

• Location: Bethesda, MD
• Design-Build RFP documents for the renovation/construction of 1,100,000+ SF of clinical space/support facilities
• Upgrades to central plant and utilities
• $640 million construction budget

• Ongoing Construction Administration services since 2009
• Multiple follow-on tasks for additional renovation projects on the campus
  – Pharmacy Renovation
  – Integrated Cardiac Health Clinic
  – Main Operating Rooms Renovation
  – Relocation of the In Vitro Fertilization Department
  – Cancer Center of Excellence
  – Pathology Laboratory Renovation
  – Two Parking Decks

AECOM Architect of Record
Advancing Practice:
Turning Data into Information
BIM, IPD, TVD
Thought Leadership: BIM – USACE Roadmap
The Promise of Integrated Delivery:
Eliminate Conflict Related Change Orders, Improve Cost Models
The Promise of Integrated Delivery:
Reduce Cycle Time; Reduce Rework
The Promise of Integrated Delivery:
Reduce Cycle Time; Create Data Once Use it Forever
USACE Battle Command Training Centers
Using Data Sets for 3D, 4D, 5D and 6D
USACE Battle Command Training Centers
BIM Technology for the Life of the Project
JACOBS Architect of Record

USACE Battle Command Training Centers
Advance Planning, Programming, Space Types
CAVE: Virtual 3D Coordination and Mockup In addition to the replication of the project in BIM Jacobs will create virtual mockups to aid in detail coordination. Specific areas will include virtual laboratory mockups. Our experience has show that these virtual mockups are successful in identifying design and coordination issues prior to constructing in field mockups and aid in collective decision making. These digital mockups are easily modifiable and can be used for “what if” scenario evaluation. Jacobs will establish an on-site Viz Lab and portable CAVE capabilities to showcase these designs in a 3D stereo format.
USACE Battle Command Training Centers

Extracting Quantities:

**BIM-Based Quantification Approach**
- Coordinate Quantification methodology with the design and estimating team to ensure the Design Model Content and Organization is suitable for quantification
- Review quantification lessons learned at the beginning of the project
- Assign any additional intelligence the objects in the model in order to extract specific quantities that the estimators require.
- **Use Model to extract basic** Design Estimating Quantities
- Work with estimators to establish Quantities to Extract and Track
- Tracking of Design Quantities that are extracted from the model

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JACOBS  Architect of Record
USACE Battle Command Training Centers

BIM: Constructability, Scheduling & Safety

BIM Approach for Constructability:
• Set-Up and Assemble the Design in BIM with the eventual construction in mind – organized around a forecasted construction schedule work break-down structure
• Actively link BIM to construction schedule prior to 50% deliverable
• Review project phasing and logistics with constructability experts
• Update design based on recommendations
• Produce one safe constructible design solution to client prior to contractor award
Wedge 1 Renovation, The Pentagon

Project Details

- Location: Arlington, VA
- 1,100,000 SF, first of 5 wedges
- $152 million
- Awards:
  - Wedge 1 Renovation and South Terrace Addition Craftsmanship Award, Washington Building Congress
  - Certificate of Merit for Excellence in Construction, Associated Builders and Contractors

- Required extensive renovations as part of a phased modernization program.
- Wedge 1 was demolished to its concrete shell and completely reconfigured to accommodate 5,000 personnel.
- State-of-the-art office space.
- Renovation preserved the historic exterior appearance while upgrading AT/FP measures, including:
  - Blast-resistant improvements to the exterior walls
  - Structural reinforcement for new windows along the building perimeter

AECOM Architect of Record
National Guard Projects:

AECOM Architect of Record
Fort Stewart Modularity Project, Fort Stewart, GA. This ultra rapid project designed to support the Army’s transformation and mobilization. Barbara utilized the charrette process to organize the design team, contracting team and client groups to design and build this $73M project in 143 calendar days. To meet this demanding schedule, facility construction was accomplished in factories while the site was being prepared. Designers and contractors worked hand in glove 24/7, living on site to support this intense project delivery schedule.

Project awarded AGC’s Build America Award.
Noted: Fastest Project since WWII
Hawaii Command and Control Facility

Project Details

• Location: Fort Shafter, HI
• 330,000 SF
• Consolidates the US Army Pacific’s command and control operations and support functions
• Construction will occur in four phases, with completion targeted for 2018.
• Designed to LEED Gold standards

AECOM Architect of Record
EPA’s new main research center includes a 1,000,000 sf research and administration facility and the 150,000 sf EPA National Computer Center, which supports the computer work for all EPA facilities across the country. The lab programs include chemistry, biology and physics, as well as research facilities for blood toxins and infectious disease control. Also included are laboratories for analyzing the effects of the environment on human beings.

Specialty facilities include high-bay laboratories constructed for the incineration of materials and the testing of automotive fuels and automobile and truck dynamos. Additional facilities are provided for the testing of various fuels for firing in boilers and engine and emission testing.

Project Highlights
• “Green Design” $250 million, 1,150,000 sf laboratory
• Cutting edge design standards for EPA facilities
• Infectious disease, inhalation sterile areas, and blood toxin laboratories
• 70,000 sf vivarium
• More than 1 million cfm of once-through hood exhaust air
• Includes EPA’s National Computer Center
• 32 mVA electrical distribution, looped communications/data network
• 5 MW of on-site standby generation
• 10,500-ton chilled water plant
• Two 90 MBTUH high temperature hot water (HTHW) generators
• High temperature hot water distribution at 370 F

HOK Architect of Record
Since its establishment, the Centers for Disease Control and Prevention (CDC) has experienced a constant need for expansion. The CDC’s most recent expansion project provides a new laboratory building to accommodate portions of the National Center for Infectious Diseases currently located in other buildings on the CDC Atlanta campus. Expansion of the existing Central Energy Plant will satisfy the energy demands of the new facility. The building design provides flexible and technologically appropriate microbiological laboratory arrangements to enable the CDC to maintain its position as a world leader in infectious disease research. This two-phase project, totaling 220,000 sf will support the largest BL-3 and BL-3+ barrier/containment facility in the nation.

Project Highlights

- Phase 1, 140,000 sf, $47 Million
- BL-3 and BL-3+ barrier containment facility
- Central plant master plan and hydraulic analysis for 25 buildings and more than 300 acres
- Master plan for 16 megawatts of power generating capacity
- Interstitial maintenance and serviceway
- More than 700 low temperature freezers

Centers for Disease Control and Prevention, Building 17, Atlanta, GA
Naval Air Warfare Center, Patuxent River Naval Air Station, MD.

The project included 32 facilities; 2 new construction projects, and 30 renovation projects for a total of 1,400,000 SF of office, laboratory and high bay/shop space.

The project was recognized with multiple design excellence awards.
Old Executive Office Building, Washington, DC
AECOM Architect of Record.
THANK YOU, ITS BEEN FUN!
Thought Leadership: MEDCOM
Evidence Based Design/ World Class Checklist

AECOM Architect of Record
Integrated Building Information Modelling (BIM)
Sustainability

AECOM Architect of Record
Boiler Plantroom 3-D Schematic Design
TOOLS & TECHNIQUES
Design to Cost

• Integrated Project Delivery
• Target Value Design
Best Practices

- Charrettes
- Evidence Based Design
- BIM
- Sustainability
PRACTICE INITIATIVES
Intelligence Experience

• Building Types:
  – Command and Control Facilities
  – Data Centers
  – Secure Facilities
  – Office Facilities
  – Military/Federal Government Facilities
  – Training Facilities

• Services:
  – Facility Design
    • Full Service Architectural + Engineering
    • Security Systems / IT
    • Anti-Terrorism/Force Protection Design
    • LEED/Sustainable Design
  – Design-Build RFP Development
  – Planning and Programming Charrettes
  – Facility and Master Planning

D/B Add/Alter NASIC Intelligence Production Complex, Wright-Patterson AFB, OH

Defense Intelligence Analysis Center, Tighe Auditorium, Washington, DC

AECOM Architect of Record
Project Details

- Location: Wright-Patterson Air Force Base, OH
- 180,000 SF
- $75 million
- Architect and Engineer of Record on Design-Build team for this expansion and renovation project.
- Award: 2007 Construction Excellence Award, Headquarters Air Combat Command, United States Air Force

- NASIC provides real-time intelligence analysis for US military assets worldwide.
- Project increased the building by 135,000 SF and renovated 45,000 SF of the existing facility.
- The addition includes a 500-seat auditorium, a cafeteria and an additional one-story, SCIF designed to support future expansions.
- Houses multiple SCIF spaces and a large data center.

AECOM Architect of Record
US Department of Transportation Headquarters

Project Details

• Location: Washington, DC
• $300 million
• Architect of Record
• Awards:
  – 2006 Environmental Award Honorable Mention, GSA
  – 2007 Won Build America Award, Federal/Heavy New Construction, Associated General Contractors of America
  – 2007 Office Project of the Year, Mid-Atlantic Construction Magazine
  – 2007 Plaque of Honor, The Building of America presented by Construction Communications
  – 2007 Craftsmanship Award Winner, Washington Building Congress

First new cabinet-level headquarters to be designed and constructed in Washington in over three decades.

11-acre site

Design approach was to create two separate buildings that complement each other with respect to their size, shape and architectural character.

2,000,000 SF; 950-car parking garage

67,500 SF green roof, largest in DC.

AECOM Architect of Record
US Army Maneuver Center of Excellence Headquarters

Project Details

- Location: Fort Benning, GA
- 500,000 SF classroom and office building
- $135 million construction cost
- Complete system, interior and façade renovation
- Phased construction for continued occupancy
- Carbon Fiber structural reinforcement
- LEED Gold design
  - Rooftop solar array
  - Rainwater harvesting for cooling tower make-up water

AECOM Architect of Record
Dynamic Prototype BIM Manual for a 4-Airman Dormitory – V1.0
April 16, 2009

JACOBS Architect of Record