National Museum of African American History and Culture

Brenda Sanchez, FAIA, LEED AP BD+C
Sr. Architect/Sr. Design Manager
Smithsonian Institution
“To help Americans remember, and by remembering stimulate a dialogue about race to help foster a spirit of reconciliation and healing.

To be a beacon for the nation that reminds us of what we were, what challenges we still face, and to point us toward what we can become”

Dr. Lonnie Bunch, Director
National Museum of African American History and Culture
1865 – End of the Civil War
1915 – Civil War veterans
1965 – Voting Rights
History: Enabling Legislation
December 16, 2003

- Accommodation/Flexibility
- Urban planning context
- Project Cost/Constructability
- Compatibility; Visitation Potential
- Design opportunity/constraints
- Economic opportunities
- Access, Transportation, proximity
- Cultural & Historic Resources
- Environmental/Ecological Factors
- Safety, Security & Risk Management Factors
- Utilities
History: Site Selection

January 2006

- 2004: Smithsonian Institution Board of Regents appoints a 19 member National Museum of African American History and Culture Council
- March 2005: Dr. Lonnie Bunch is named Director of the National Museum of African American History and Culture
- January 2006: The Board of Regents selects the Monument Site for the new Museum.
Early Planning Efforts:  Budget
2003 - 2015

• Enabling legislation stipulated 50% federal and 50% non-federal funds
• Council starts fundraising efforts
• Budget:  $540M
  • $270M Federal appropriations from FY2005 through FY2015
  • $270M Trust fund contribution
• Includes:
  • Planning and Design
  • Construction and Construction Management
  • Commissioning
  • Exhibit Design and Fabrications
Early Planning Efforts: Schedule
2006

• Goal: Opening 2015

• Concurrent Activities:
  • Public Consultation
  • Historic Preservation Reviews
  • Environmental Impact Statement
  • Building a Collection
  • Master Facilities Planning
  • Exhibit Programming
  • AE Competition and Selection
  • Building Design
  • Gas Line Relocation
  • Selection of Constructor-CM@Risk
  • Construction
  • Commissioning
  • Exhibit Design
  • Exhibit Fabrication and Installation
  • Off-Site Collection Facilities
Early Planning Efforts: Public Consultation Begins 2006
Early Planning Efforts: Historic Preservation and EIS 2006 - 2011

**NEPA**

**Scoping**
- Purpose and Need

**Draft Document**
- Preliminary Alternatives Development
- Understand the Existing Environment
- Refine Alternatives
- Identify Potential Environmental Consequences
- Compare Alternatives

**Public Workshop/Hearing**

**Final Document**
- Focus on Selected Alternative
- Specify Environmental Consequences and Mitigation Commitments

**FONSI/ROD**

**Section 106**

1. **Initiate the Process**
   - Establish Undertaking
   - Identify Appropriate SHPO/THPO
   - Plan to Involve the Public
   - Identify Other Consulting Parties

2. **Identify Historic Properties**
   - Determine Scope of Efforts
   - Identify Historic Properties
   - Evaluate Historic Significance

3. **Assess Adverse Effects**
   - Apply Criteria of Adverse Effects

4. **Resolve Adverse Effects**
   - Continue Consultation

**Memorandum of Agreement**

Smithsonian Institution
Public Engagement

with Stakeholders and General Public

- American Association of Museums
- Organization of American Historians
- National Association of Counties
Early Planning Efforts: Collections Building
2007 - 2008
PRE-DESIGN: Programming
2007-2008

Master Facilities Programming:
• People
• Collections
• Facilities

Responsible for:
• Visitation Estimates
• Audience Research
• Public Engagement and Outreach
• Exhibition Master Planning
• Collections and General Museum Requirements
• Site Analysis
• Facilities Program

Freelon Bond: The Freelon Group, Davis Brody Bond, Lord Cultural Resources and Amaze Design
### PRE-DESIGN: EIS Tier 1 - Design Alternatives

**2007 - 2008**

<table>
<thead>
<tr>
<th>Alternatives</th>
<th>ALT. 1</th>
<th>ALT. 2</th>
<th>ALT. 3</th>
<th>ALT. 4</th>
<th>ALT. 5</th>
<th>ALT. 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contextual Building Alignment</td>
<td>75°</td>
<td>90°</td>
<td>105°</td>
<td>90°</td>
<td>90°</td>
<td>60°</td>
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<tr>
<td>Washington Monument Orientation</td>
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<tr>
<td>Free Form</td>
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<tr>
<td>Terraced Roof</td>
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<tr>
<td>Enframing</td>
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<tr>
<td>Low Profile</td>
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<tr>
<td>Height</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>6</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Floors Above Grade</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Floors Below Grade</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>3</td>
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<tr>
<td>Total GSF</td>
<td>415,000 gsf</td>
<td>376,000 gsf</td>
<td>411,000 gsf</td>
<td>385,500 gsf</td>
<td>430,000 gsf</td>
<td>350,000 gsf</td>
</tr>
</tbody>
</table>

For planning purposes the alternatives use a generic 15 foot floor to floor height.
Over 5 years of Consulting Parties and Agency Meetings
Development of Design Principles to Guide design
Sensitivity to Urban Context
Mall Context
Washington Monument Context
Archeology and Photo Documentation completed

Results:
• Size of Building above ground; 216’x216’
• Height of Building < Commerce Building
• Setback increased to the South for Monument view while respecting McMillan setbacks
• Site/Landscape; fluid movement across site
• Pavilion on a glass base for at grade views
• Corona, porch, water feature designs and materials refined
“We are not building the Model”

- **60% Design**
  Demonstrated understanding of mission, design principles and physical design parameters, program, building technology, security and sustainability.

- **40% Teamwork**
  Design process, methodology collaborative process and contribution of all team members.
PRE-DESIGN: Design Competition
2009

Devreaux and Purnell

Freelon Adjaye Bond/SmithGroup

Diller Scofidio Renfro

Moody Nolan/Antoine Predock

Foster and Partners

Smithsonian Institution

Safdie Architects
Place of Inspiration reflecting African American Resiliency and Spirituality

Three Irreducible Elements:  Corona Porch Color/Materiality

Four Pillars:  Learning American History International Considerations Collaboration
DESIGN: Design Concepts

2010

Starts:
January 2010

Presentations to Agencies:
2010 - 2011

Approval of Concept
Design:
March 2011
DESIGN: Design Alternatives
2010 - 2011
Main Elements:
• Four Pillars (4 Cores)
• Deep steel trusses spanning between the four cores in the corona
• Corona floor framing and slabs supported by the deep steel trusses
• Façade structure supported at roof level
• Two below-grade floors
• Foundations
• Materials: Steel above grade and Concrete below
Main Goal:
1. Passive Design
2. Maximize potential of Corona -
3. Develop a comprehensive water management strategy
4. Understand energy drivers for the Museum
5. Specify simple systems that can be maintained efficiently (geothermal later explored but discarded).
6. Use daylight

Sustainability “is not a line item”

Obtain LEED GOLD at a Minimum!!
DESIGN: Landscape
2010 - 2011

Hardscape Gatherings
in the Landscape

Shrubs and Perennial
Plantings

Views approaching
Constitution Avenue
from 14th Street
DESIGN: Flood Control
2010 - 2011

Years Later:
Final Installation
DESIGN: Presentations to CFA and NCPC
2011
CHALLENGES: Schedule, Funding and Appropriations
2005 - 2015

Schedule:
Opening Date established: November 2015

Funding:
First Federal Capital appropriation 2005
Last Federal Capital appropriation 2015
Continuous Fundraising in unpredictable amounts

Challenge:
Find Construction Delivery Method that would allow us to meet the schedule and meet commitments to the Contractor

Solution:
Design team to provide Construction Documents in packages to accelerate schedule and correspond to the funds available.
## Project Delivery System Matrix

<table>
<thead>
<tr>
<th>Contract Delivery System</th>
<th>Positive Attributes</th>
<th>Negative Attributes</th>
<th>Mitigation Strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Design Build</strong></td>
<td>Eliminates most errors and omissions</td>
<td>Owner does not have 100% control of the design of the project</td>
<td>Provide a good set of design criteria and standards</td>
</tr>
<tr>
<td></td>
<td>Faster design (subcontractor input)</td>
<td>Owner does not have control of the fix</td>
<td>Require DB to submit a systems narrative with proposal</td>
</tr>
<tr>
<td></td>
<td>Facilitates fast-tracking (fastest del.)</td>
<td>to deal with errors and omissions</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Facilitates early procurement of long lead Items</td>
<td>DB has incentive to reduce quality to gain additional savings</td>
<td>Limit the amount of shared savings</td>
</tr>
<tr>
<td></td>
<td>Single source of responsibility (Adm)</td>
<td>Greatest flexibility for changes</td>
<td>Aggressive QA by owner reps</td>
</tr>
<tr>
<td></td>
<td>Greater flexibility for changes</td>
<td>Limited or no opportunity for fast tracking</td>
<td>Require partnering sessions</td>
</tr>
<tr>
<td></td>
<td>Better integration of proprietary systems</td>
<td>Limited flexibility</td>
<td>Require ADR</td>
</tr>
<tr>
<td></td>
<td>Under a GPM - greatest flexibility for cost and budget management</td>
<td>Some owner responsibility for errors and omissions</td>
<td>Require BMI</td>
</tr>
<tr>
<td></td>
<td>Incentives to deliver the project below cost (guarantee maximum price / share savings clauses)</td>
<td>Some incentive to deliver the project below cost (GMP - shared savings)</td>
<td>Adequate contingency funds</td>
</tr>
<tr>
<td></td>
<td>Partnering relationship</td>
<td>Owner has 100% control of design</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Faster project delivery (no sol for GC req.)</td>
<td>Owner has control of fix to deal with errors and omissions</td>
<td></td>
</tr>
<tr>
<td><strong>CM at Risk</strong></td>
<td>Reduces errors and omissions</td>
<td>Limited or no opportunity for fast tracking</td>
<td>Require partnering sessions</td>
</tr>
<tr>
<td></td>
<td>Predictable project costs</td>
<td>Limited flexibility</td>
<td>Require ADR</td>
</tr>
<tr>
<td></td>
<td>Flexibility to pursue a design - bid - build strategy</td>
<td>Some owner responsibility for errors and omissions</td>
<td>Require BMI</td>
</tr>
<tr>
<td></td>
<td>Some incentive to deliver the project below cost (GMP - shared savings)</td>
<td>Limited subcontractor input in design</td>
<td>Adequate contingency funds</td>
</tr>
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<td></td>
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<td>Owner has 100% control of design</td>
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</tr>
<tr>
<td></td>
<td>Faster project delivery (no sol for GC req.)</td>
<td>Owner has control of fix to deal with errors and omissions</td>
<td></td>
</tr>
<tr>
<td><strong>Design Bid Build</strong></td>
<td>Most prevalent (traditional delivery)</td>
<td>Owner responsible for errors and omissions</td>
<td>Require partnering sessions</td>
</tr>
<tr>
<td></td>
<td>100% control of design</td>
<td>Little flexibility</td>
<td>Require ADR</td>
</tr>
<tr>
<td></td>
<td>100% control of fix for design errors and omissions</td>
<td>Little opportunity for fast tracking</td>
<td>Provide for independent peer review of the design documents</td>
</tr>
<tr>
<td></td>
<td>Predictable initial project costs (fixed)</td>
<td>No integration of proprietary systems</td>
<td>Adversarial relations (greater adm)</td>
</tr>
<tr>
<td></td>
<td>Adversarial relations (greater adm)</td>
<td>No subcontractor input in design</td>
<td>Require BMI</td>
</tr>
<tr>
<td></td>
<td>Little opportunity for early purchase of long lead items</td>
<td>Little opportunity for early purchase of long lead items</td>
<td>Adequate contingency funds</td>
</tr>
<tr>
<td></td>
<td>Longest project delivery</td>
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</tbody>
</table>
We also looked at:

• Integrated Project Delivery (IPD) – Contracting Issues

Participated in Forum through Associated General Contractors

Conducted surveys with other owners and owners’ reps, and selected:

• Construction Management at Risk (CMc)
  • Construction Manager takes risk of building the project
  • A-E remains under separate contract to the Owner
  • Overlapping phases

Analyzed methods and risks based on Smithsonian past experience as well as that of other agencies/owners
CONSTRUCTION: CMc@Risk
2010 - 2011

• Schedule Advantage:
  • CMc Delivery:
    • Start late 2012
    • End late 2015/early 2016
  • Design/Bid/Build Delivery:
    • End-to-end design: complete late 2013
    • Construction complete 2017

• Cost Control:
  • Pre-Design Services and Reviews
  • GMP
  • Schedule/Cost Control
CONSTRUCTION: CMc @ Risk Selection
2010 - 2011

CMc @ Risk Delivery:
• Issue Concept Design with RFP
• CM selected through “best value” process
• Initial awarded for pre-construction services
• Cost verification for Concept Design
• Multiple package fast track delivery
• Shared savings provision
• Clark Smoot Russell contracted, 2011
• January 2010: Concept Design Start
• October 2010: Submission of Concept to SI
• November 2010: Schematic Design Starts
  Site Acoustic Reports, Groundwater Sampling Reports, etc.
• January 2011 – 65% SD Docs for CxAgent
• March 17, 2011 First Design Package and Concept Approval by CFA/NCPC
• April 1, 2011 – Schematic Design Submission to SI
DESIGN: Corona
2011

Smithsonian Institution
DESIGN: Corona
2011
CHALLENGE: Design Assist for Exterior Enclosure 2012

- Design assist evolution - panels:
  - Ultra high performance concrete (UHPC)
  - Stamped metal
  - Cast bronze

Cast aluminum with PVDF finish

Smithsonian Institution
CHALLENGE: Design Assist for Exterior Enclosure

2012

- Reflectance
- Material
- Weight
- Maintenance
CHALLENGE: Design Assist for Exterior Enclosure
2014

“Custom Artisan PVDF Panel Finish”

Commission of Fine Arts & National Capital Planning Commission final approval March 2014
EXHIBIT DESIGN: Selection of Exhibit Designer

2011

• Engagement of Exhibit Designer: Ralph Applebaum
• The Museum acquires a Jim Crow Railroad Car
• Collaboration between David Adjaye and Raph Applebaum begins, and
• In July 2011, a new Concept for the History Galleries is born...
CHALLENGE: History Galleries 2011

- April 2011 Schematic Design Complete
- July 2011 New Concept for History Gallery

- Excavation extends to 70' below grade
- Redesign of Foundation and Sub-grade Exterior Envelope
- Location and Protection of Railroad Car and Angola Prison Tower
CHALLENGE: Relocation of Gas Line

Site Preparation: Relocation of major gas line
CHALLENGE: Relocation of Cooling Towers
2011

- Studies to share NMAH capacity
DESIGN & CONSTRUCTION: Schedule Check-Up 2011

• April 1, 2011 Schematic Design Submission to SI
• Jan 2012 Site Utilities Package # 1
• Feb 2012 Groundbreaking Ceremonies
• April 2012 Support of Excavation Wall/Excavation Package #2
• April 2012 35% Design Submission
• May 2012 Exterior Enclosure Design-Assist Package #3
• June 2012 Deep Foundation Piles Package #4
• Sept 2012 Concrete and Vertical Transportation Package #5
• Sept 2012 65% Construction Documents
• Jan 2013 Structural Steel Package #6
• Mar 2013 MEP/FP Package #7
• Aug 2013 100% CDs Complete
• Jan 2014 Exhibit Specific CDs 100% Complete
• Jan 2014 Interior Build-out & Site Work Package (GMP) #8
• Feb 2014 Conformed Set
CONSTRUCTION: Site Utilities Work Begins
January 2012
• February 22, 2012: President Barack Obama speaks at the Groundbreaking Ceremony with former First Lady Laura Bush, Smithsonian Secretary G. Wayne Clough, First Lady Michelle Obama, and NMAAHC Director Lonnie Bunch
CONSTRUCTION: Design Assist for Exterior Enclosure
April 2012

- Exterior Enclosure was identified early as a long lead system for early procurement. It consists of:
  - Structural framing
  - Corona screen
  - Curtainwall system

- Design Assist for the exterior enclosure was incorporated in both the Design and Construction Contracts

- Design provided “intent” documents before 35%

- Issued to CMc for best value selection
CONSTRUCTION:  Design Assist for Exterior Enclosure
April 2012 - 2013

- Resulted in Changes in:
  - Corona
  - Structural Framing
  - Curtain Wall
CONSTRUCTION: Deep Foundation Piles & Concrete and Vertical Transportation
June – September 2012
CONSTRUCTION: Excavation and Foundation Walls
2012-2013
CONSTRUCTION: Structural Steel and MEP
January – March 2013
CHALLENGE: Arrival of Large Artifacts
November 2013
EXHIBITION DESIGN
2010 - 2014

Segregated Rail Car

Military History

Civil War

Middle Passage
CONSTRUCTION: Corona Production and Finishing 2014-2016
CONSTRUCTION: Completion Exterior Enclosure
October 2016
Installation of Cooling Towers

First Vertical Truss, Dec 2014
CONSTRUCTION: Porch Installation
2014 - 2016
CONSTRUCTION: Roof Installation
2014 - 2016
COMPLETION!
2016
COMPLETION!
2016
COMPLETION!
2016

Smithsonian Institution
COMPLETION!
2016
COMPLETION!
2016
Credits:

Design Team

Architect of Record: The Freelon Group
Architectural Team:
The Freelon Group, David Adjaye Associates, Davis Brody Bond with the SmithGroup
Structural Engineering: Robert Silman and Guy Nordenson Associates
MEP/FP Engineering: WSP Flack and Kurtz
Civil Engineering: Rummel Keppler & Kahl
Landscape Design: Gustafson Guthrie Nichol Ltd.
Cost Estimating: Faithful + Gould
Security: ARUP
Specifications: Construction Specifications
Blast/CBR/Perimeter Security: Weidlinger Associates
Sustainability: Rocky Mountain Institute
Acoustics/Audio-Visual/Telecommunications: Shen Milsem Wilke
Theatre/Multimedia: Fisher Dachs Associates
Vertical Transportation: Lerch Bates
Lighting: Fisher Marantz Stone
Food Service: Hopkins Food Service
Hardware: Erbschloe Consulting Services, Inc.
Façade: R. A. Heintges & Associates

Construction:

Clark/Smoot/Russell

Smithsonian Institution Project Team Leaders:
Design Management: Brenda Sanchez
Construction Management: Steven Christensen
Program Executive: Jud McIntire

This Presentation:
Professional Photography: Alan Karchmer
Contributors: Brenda Sanchez, Jud McIntire, Sharon Park