

National Park Service
U.S. Department of the Interior



Gateway National Recreation Area

Rehabilitating Building 7

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EXPERIENCE YOUR AMERICA

Project Goals

- Develop a proactive approach to climate change
- Rehabilitate using green technologies and improved storm preparedness designs
- Education and outreach showing how green technologies can be integrated into the rehabilitation of historic structures

Project Background

- Fort Hancock Lieutenants' Quarters #7
- Constructed in 1899
- 1940 garage addition
- 1942 fire - modifications to first, second and third floors

Project Background

- Young Leaders in Climate Change (YLCC)
 - Rehabilitation of an Historic Structure as a Model for Resilient Design
- Sandy Hook Climate Adaptation Workshop
 - Identified options for use of Building 7: a lease for a residence by season or week and/or a not for profit or a for profit bed and breakfast.
 - Identified resilient design ideas
 - “Build for tomorrow, think toward the future”
- Window Condition Assessment
- Short-term roof repairs

Project Background

- Rehabilitate Building #7 for short-term residential leases
- Provide guidance about how the Officer's Row Quarters can be rehabilitated
- Identify acceptable treatments
- Explore opportunities for sustainable applications, controls and systems

A/E Team

- DHM Design, Inc. Team
 - Anderson Hallas Architects, PC - Architects
 - Three Sixty, Inc. – Mechanical Engineering
 - JVA, Inc. – Structural and Civil Engineering
 - AEDG, Inc. – Electrical Engineering
 - DHM Design, Inc. – Landscape Architecture
 - MBP, Inc. – Cost Estimating

A/E Team Direction

- Scope project goals include:
 - Rehabilitation for use as a model of resiliency and sustainability;
 - Rehabilitate exterior features;
 - Provide accessible entrance and access within the interior;
 - Evaluate structural conditions;
 - Relocate and replace critical MEP systems above established flood level;
 - Provide fire detection and protection system as required by use;
 - Rehabilitate interior features;
 - Evaluate site and provide plan in compliance with Fort Hancock Cultural Landscape Plan.
 - Provide sustainability options such as solar shingles, solar hot water heater, solar shades.
 - Conduct a Value Analysis.

Functional Analysis of Bldg. Program

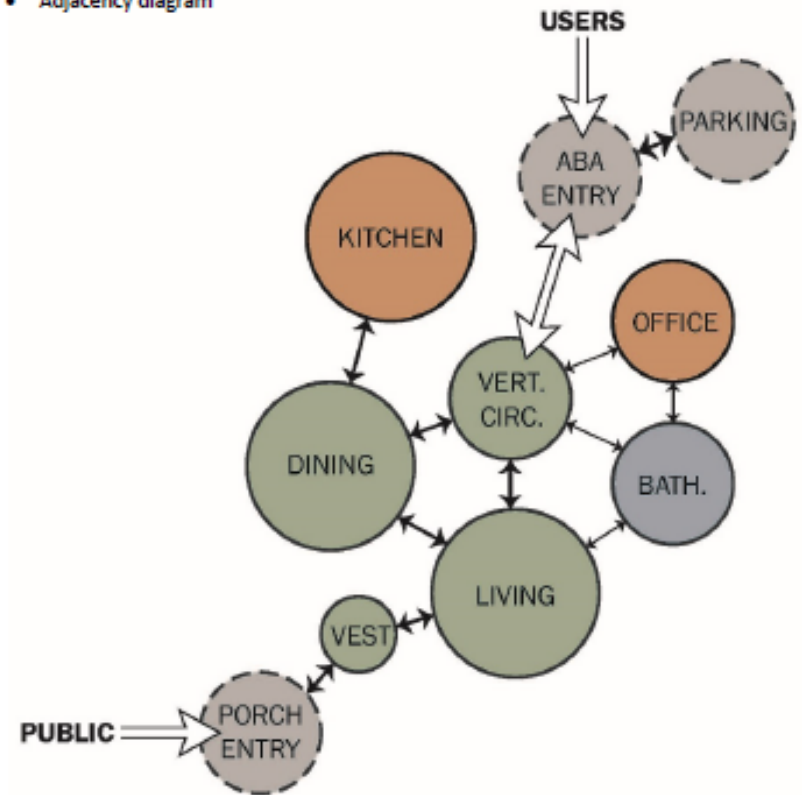
- Rehabilitate and restore historic spaces
- Provide safe egress
- Maintain building's historical integrity
- Provide accessibility
- Meet life safety and building codes
- Create comfortable environment
- Provide adequate HVAC
- Protect cultural resources
- Provide interpretation
- Provide climate and lighting control
- Provide fire suppression
- Upgrade electric and plumbing
- Provide adequate restrooms
- Restore integrity
- Mitigate hazardous materials
- Create a resilient building
- Create leasable space
- Provide viable use options for the structure that can be applied to other structures on the Fort Hancock site.

Programming

- **Functions & Spaces**
- Define needed functions.
- Determine which functions should be near each other.
- Define level of privacy required for each function.
- Determine which spaces will accommodate specific functions.
- Develop alternatives with distinct differences for evaluation.

Common to All Alternatives:

- Site entry
- Minimal site work
- Abandon basement
- ABA compliance
- MEP systems
- Exterior & Interior Rehabilitation
- Adjacency diagram



Adjacency Diagram

Pre-Value Analysis

■ **Masonry Wall Repair**

- Masonry repair necessary for all design alternatives.
- Two repair methods evaluated:
 - Remove exterior wythe of brick and rebuild with mechanical ties.
 - Leave exterior wythe in place and install mechanical ties in existing joints.
- Park wishes to evaluate further to develop a unit-wide approach.

■ **Windows**

- Rehabilitation and replacement options evaluated – not as a Value Analysis.
- Operational aspects and storm protection evaluated.
- Key factors considered: Reduce air and water infiltration; Thermal comfort; Energy reduction; Retention of existing historic fabric; and Ease of maintenance.

Pre-Value Analysis

- **Enhanced Resiliency & Energy Performance**
- Exterior Envelope Rehabilitation.
- Continuous Roof Insulation.
- Window Rehabilitation and Sustainability Options.
- On-Site Renewable Energy.
- Sustainable Lighting Controls.

Pre-Value Analysis

■ HVAC System Objectives

- Minimize view shed, soundscape, and archeological site impacts.
- Maximize the park's familiarity with the selected system while simultaneously minimizing the complexity of system components.
- Provide built-in system redundancy in terms of reducing the impact of a component failure.
- Provide high-efficiency equipment.

■ HVAC Systems Evaluated

- Variable Refrigerant Flow (VRF) with simultaneous heating and cooling.
- Geothermal and water source heat pumps – electric (pumps/fans).
- Gas furnace / DX cooling – conventional ducted mechanical system.

■ Preferred Alternative

- Geothermal.

Value Analysis - Alternate A

- Single Family Residence
- Accessible ramped entrance from Parade Ground.
- No accessible means to second or third floors.



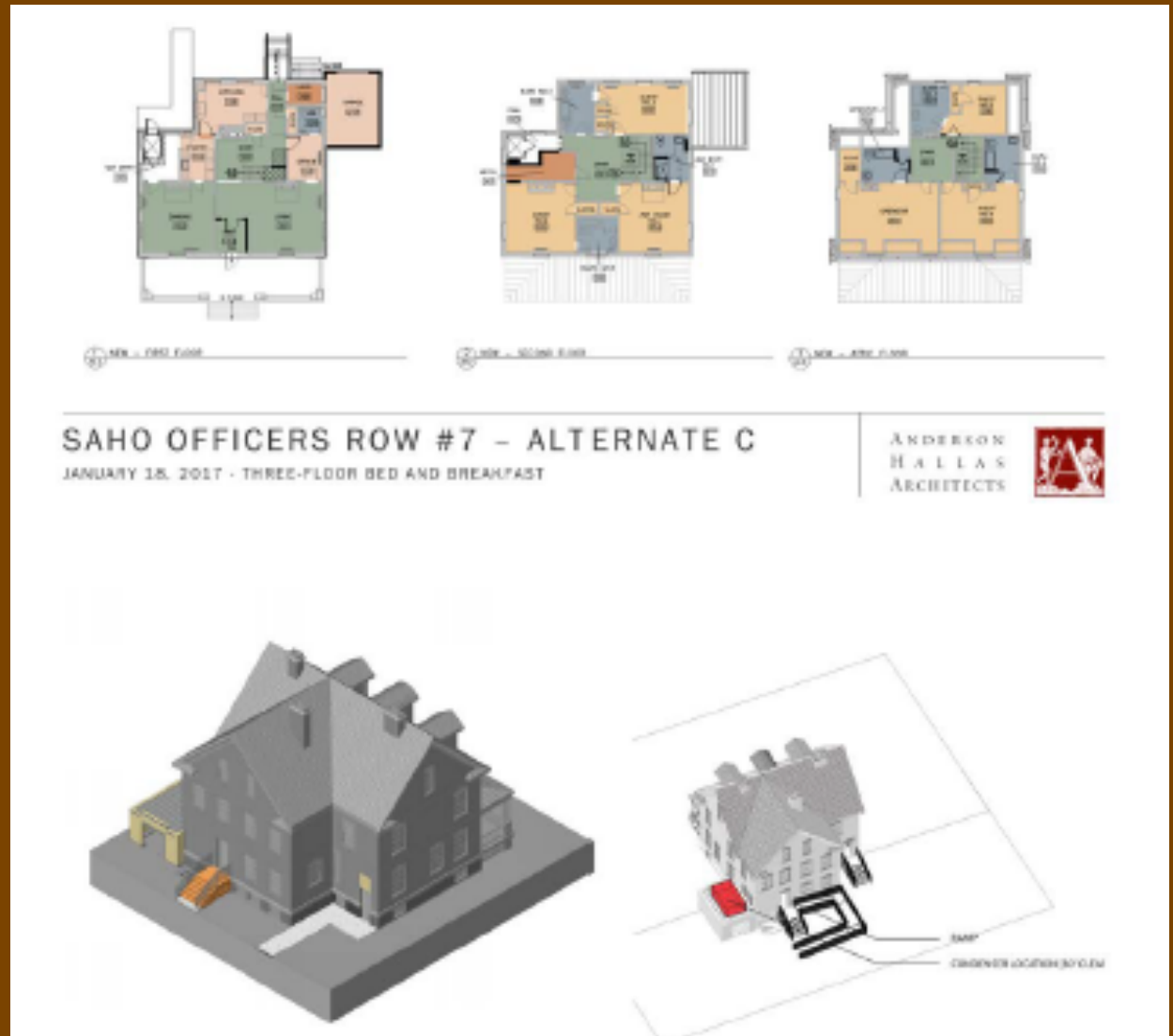
Value Analysis - Alternate B

- Two Floor Bed and Breakfast
 - Accessible entrance through garage.
 - Accessible Guest Room on First Floor.



Value Analysis - Alternate C

- Three Floor Bed and Breakfast
 - Accessible Entrance with lift in location of Lieutenants Office serving Second and Third Floors.
 - Three Guest Rooms at Second and Third Floors.



Value Analysis - Preferred Alternate

- Preferred Alternate
 - Accessible entrance through Garage.
 - Lift access from Entrance to First and Second Floors.
 - Three Guest Rooms each at Second and Third Floors.



Value Analysis Refinement

- The Preferred Alternative is still a conceptual layout.
- Certain functions could be moved without reducing the effectiveness of the layout.
- Two variants were developed.

Preferred Alternative – Variant 1

- First Floor
- Large storage space in garage.
- Bathroom on First Floor.



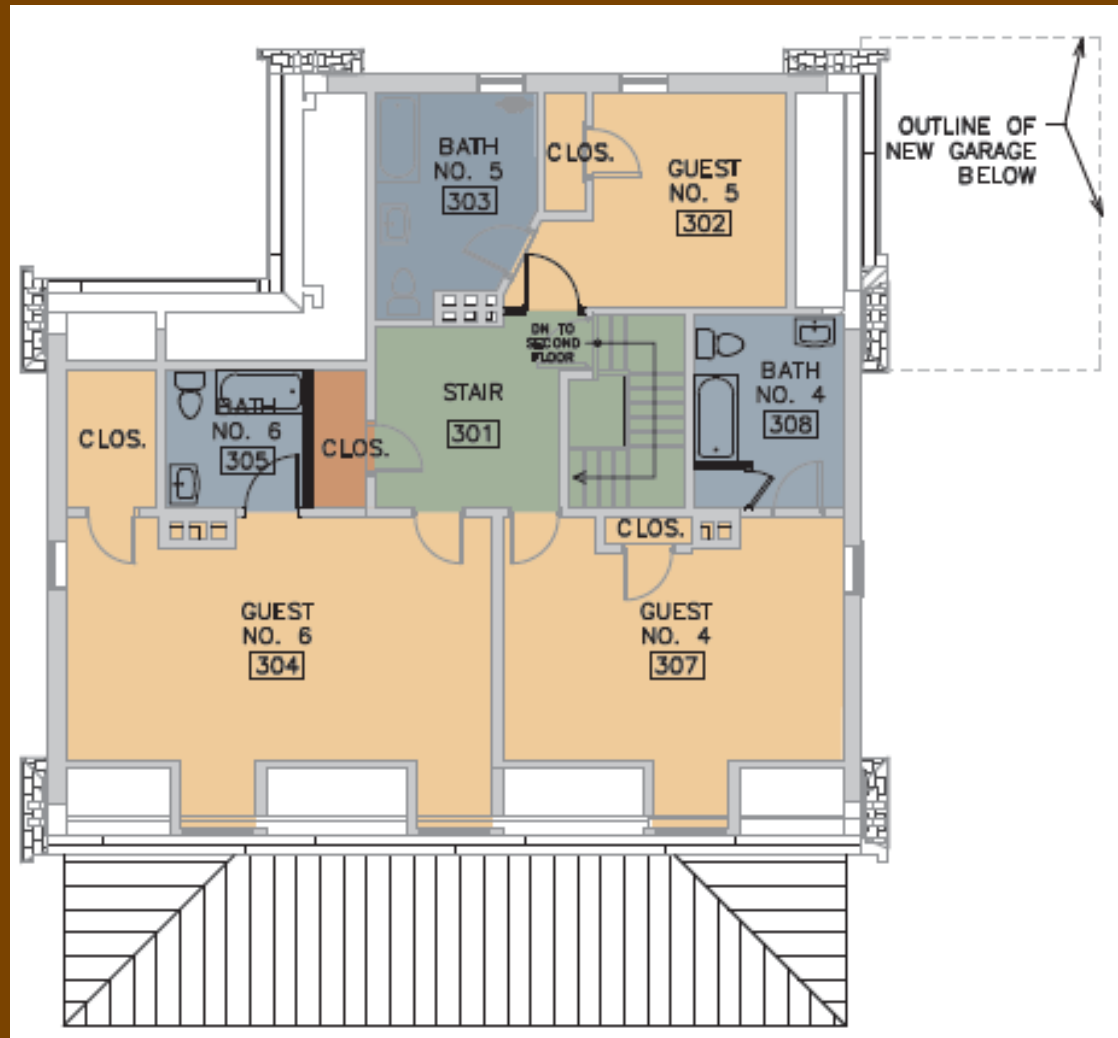
Preferred Alternative – Variant 1

- Second Floor
- Three Guest Rooms with full Bathrooms.
- Lift access from First Floor.



Preferred Alternative – Variant 1

- Third Floor
 - Three Guest Rooms with full Bathrooms.
 - One Guest Room could be Manager's Room.



Preferred Alternative – Variant 2

- First Floor
 - Lift location shifted leaving larger entrance area and smaller storage area in garage.
 - Game Room could be created in lieu of Bathroom behind stairs.



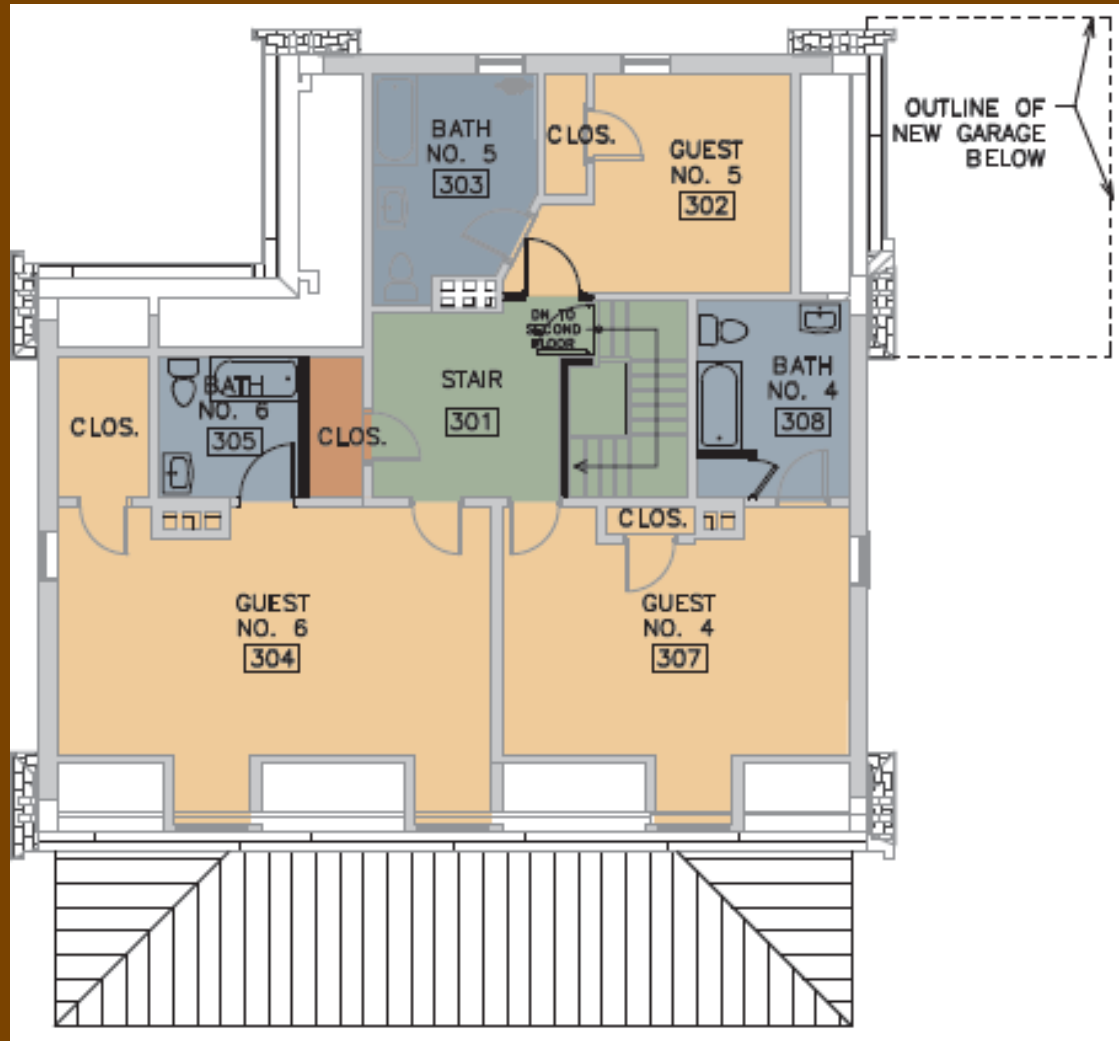
Preferred Alternative – Variant 2

- Second Floor
 - Lift access from First Floor – shifted to allow for better visibility from stair hall.
 - Three Guest Rooms with full Bathrooms.

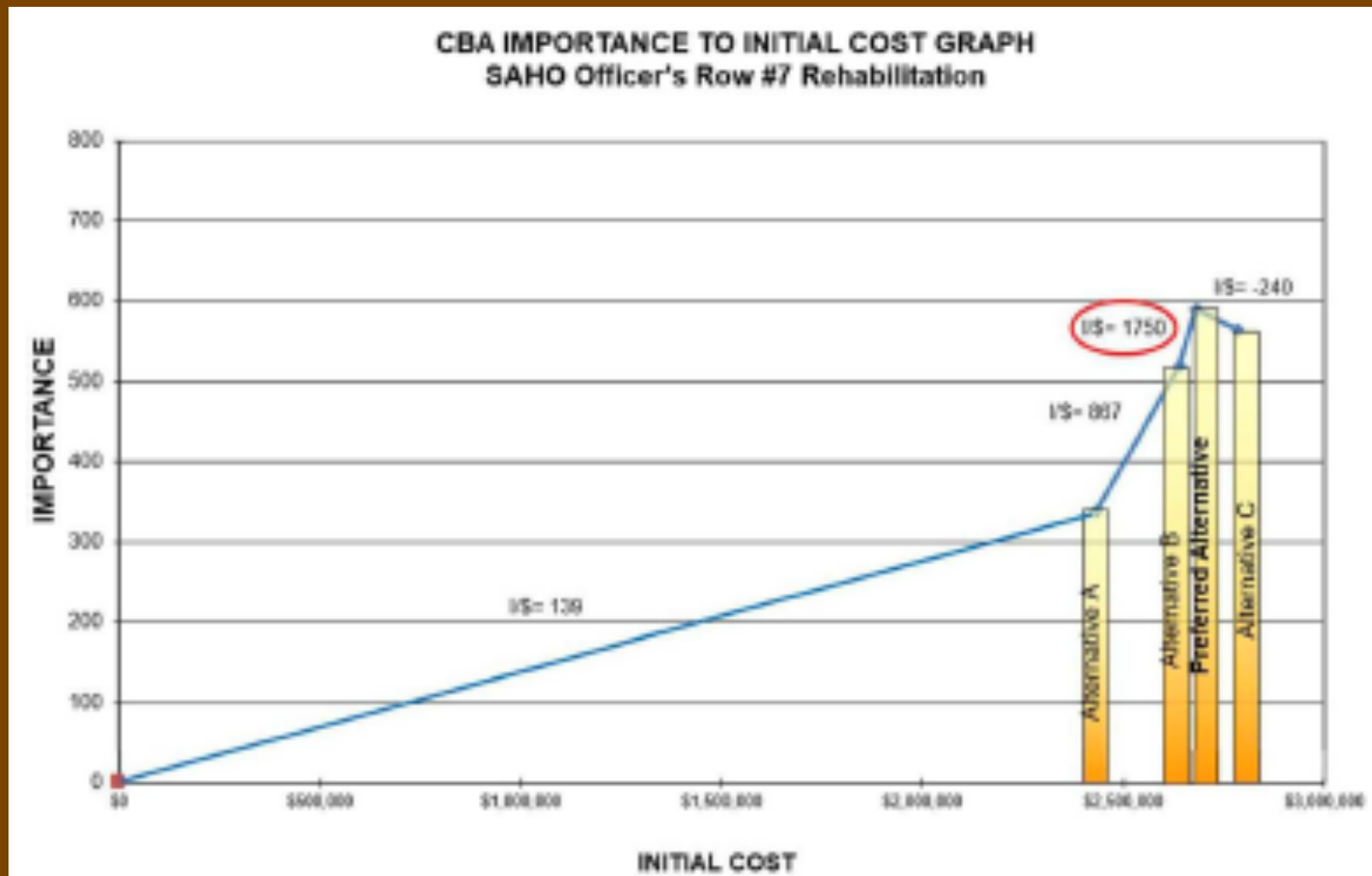


Preferred Alternative – Variant 2

- Third Floor
 - Three Guest Rooms with full Bathrooms.
 - One Guest Room could be Manager's Room.



VA - Choosing By Advantages



Cost Estimate – Class C

Item No.	Description	Quantity	Unit	Cost/Unit	Total
1	Alternative 1 - Base Rehabilitation	6,000	GSF	\$172	\$1,033,402
	Subtotal Direct Construction Costs				\$1,033,402
	Value of Government Furnished Property (GFP) Included in Direct Cost (see footnote)				\$0
	Direct Cost Subtotal without GFP				\$1,033,402
	Published Location Factor	0.00%			\$0
	Remoteness Factor	5.00%			\$51,670
	Federal Wage Rate Factor	0.00%			\$0
	State & Local Taxes	9.795%			\$101,222
	Design Contingency	30.00%			\$310,021
	Total Direct Construction Costs				\$1,496,315
	Standard General Conditions	15.00%			\$224,447
	Government General Conditions	7.50%			\$112,224
	Historic Preservation Factor	5.00%			\$74,816
	Subtotal NET Construction Cost				\$1,907,801
	Overhead	10.00%			\$190,780
	Profit	5.00%			\$95,390
	Estimated NET Construction Cost				\$2,193,971
	Bonds & Permits	1.20%			\$26,328
	Contracting Method Adjustment	5.00%			\$109,699
	Inflation Escalation	21	Months	2.50%	\$102,891
	Total Estimated NET Cost of Construction				\$2,432,888

Next Steps

- Complete Schematic Design Phase.
- Prepare to move into Design Development Phase.
- Identify construction phases that can be accomplished without impacting future work.
- Secure necessary funding for each construction phase.

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Questions?



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