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COST ESTIMATE

Investigation of Settlement
and Upheaval at the
Jefferson Memorial

WASHINGTON, D.C

January 30, 2008

PREPARED FOR

National Park Service
National Capital Region
1100 Ohio Drive, SW
Washington, D.C. 20242

PREPARED BY

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PURPOSE OF THE ESTIMATE

This estimate has been prepared pursuant to an agreement HNTB and Faithful+Gould, for the purpose of establishing the probable cost of alternative construction at the conceptual submission stage of design.

PROJECT DESCRIPTION

This project encompasses the rehabilitation of the Ashlar Seawall, North Plaza, and Northwest Stairs.

BASIS OF ESTIMATE

This estimate was prepared from documents received on April 30, 2007 as well as conversations with members of the design team. Any design and engineering changes and/or additions produced subsequent to these documents are not included in this estimate. This revised submittal is based on NPS comments received January 22, 2008.

BASIS FOR PRICING

Pricing shown reflects probable construction costs obtainable in the Washington, DC area, on the date of this statement of probable costs. The intention of this estimate is to reflect fair market value for the construction of this project. It is not a prediction of low bid. We understand the project may be procured on a negotiated basis with a set-aside contractor. We have attempted to allow for this lack of competition in the Summary.

CONSTRUCTION SCHEDULE AND ESCALATION

An escalation factor has been added to the summary sheet to cover expected inflation between the date of the estimate and midpoint of the construction, which is stated to be July 2011. This factor should be checked often, over this 3 year period, prices may vary.

CONTRACTOR MARKUPS

Subcontractors' markups have been included in each line item unit price. These markups cover the cost of field overhead, home office overhead, and profit and can range from 15% to 25% of the raw cost for that particular item of work.

General Contractor's Overhead (consisting of job site general conditions, home office overhead, and bond) and Profit used in this estimate is stated in each Project Summary, using factors recommended by NPS.

CONTINGENCIES

A 20% Design and Pricing Contingency has been added to the Project Summary, to cover unknown requirements or design elements not anticipated or detailed at this stage of development. As the design develops further, this contingency will be reduced on subsequent estimates. At the final Construction Document phase estimate, it will be eliminated.

ITEMS AFFECTING THE COST ESTIMATE

Items which may change the estimated construction cost include, but are not limited to:

- Non-competitive bid conditions
- Modifications to scope of work in estimate since the drawings were issued to HFG
- Special Phasing requirements
- Restrictive technical specifications or excessive contract conditions
- Sole source specifications of materials or products
- Bids delayed beyond the projected schedule

ITEMS EXCLUDED FROM THIS ESTIMATE

Items that are not in this estimate include, but are not limited to:

- Hazardous material abatement
- Impact Fees and Permits
- Professional design and consulting fees
- Owner's field inspection costs
- Off-site work
- Mechanical, electrical and or plumbing
- Items marked on plans as N.I.C.
- Cost of delays created by security requirements
- LEED contingency

STATEMENT OF PROBABLE COST

Faithful+Gould has no control over the cost of labor and material, the general contractor's or any subcontractor's method of determining prices, or competitive bidding and market conditions. This opinion of probable cost of construction is made on the basis of experience, qualifications, and best judgment of a professional construction consultant familiar with the construction industry. Faithful+Gould cannot and does not guarantee that proposals, bids or actual construction costs will not vary from this or subsequent cost estimates.

Faithful+Gould has no control over the quality, completeness, intricacy, constructability, or coordination of design documents, or over the amount of funds available for this project. Therefore, Faithful+Gould is not responsible for design revision costs in the event that the estimate is in excess of the established budget.

Faithful+Gould staff of professional cost consultants has prepared this estimate in accordance with generally accepted principles and practices. This staff is available to discuss its contents with any interested party.

SEC	DESCRIPTION	QTY	UoM	RATE	SUBTOTAL	TOTAL
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Alternate #1 - Scope Narrative

This alternative consists of installing micropiles through the existing concrete seawall, the underlying fill and alluvial soils, and into bedrock. For this alternative, segments of the North Plaza slab must be removed to excavate behind the seawall. We anticipate removing the Plaza slab at the expansion joint located approximately 10 ft behind the seawall. The existing grade beams would remain in place. Battered micropiles could be installed from inside the excavation, or from scaffolding at the Plaza elevation through the stem and the base of the seawall. Holes should be cored through the wall to allow micropile installation. Following micropile installation, the wall would be backfilled and the Plaza slab replaced.

This alternative allows work from land, without the need for cofferdams in the Tidal Basin. It also permits inspection of the back of the wall and possibly excavation of test pits under the wall to investigate the conditions of the wall footing and timber piles. It would also provide an opportunity to determine if there is washout of the backfill behind the wall through the joints or the wall footings and to remedy it.

One disadvantage of this alternative is that it requires removal of a portion of the North Plaza slab, excavation, and backfilling with select material, and the consequent disruption to Memorial operations and added cost. It also requires temporary support of the excavation and dewatering.

This alternative would consist of approximately 52 micropiles battered at 20 degrees through the wall stem, and 52 micropiles battered at 5 degrees through the wall base. The piles should have a minimum bond length of 10 ft into bedrock. At least one load test on a sacrificial, instrumented micropile should be performed to verify the design micropile capacity.

Seawall - Alternate #1
Main Estimate

January 25, 2008

SEC	DESCRIPTION	QTY	UoM	RATE	SUBTOTAL	TOTAL
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Main Estimate

	Remove & reset granite capstone to curve	378	LF	\$200.00	75,600	
	Remove & replace concrete plaza slab	4,900	SF	\$35.00	171,500	
	Cut concrete slab as required	510	LF	\$40.00	20,400	
	Excavate & deposit on site; backfill	1,360	CY	\$46.00	62,560	
	Sheeting & shoring to plaza	4,000	SF	\$35.00	140,000	
	Protect existing grade beams	1	LS	\$10,000.00	10,000	
	5 1/2" cased micropiles, grouted & drilled	9,880	LF	\$125.00	1,235,000	
	Premium for rock drill	1,040	LF	\$30.00	31,200	
	Premium for core drill RC wall	600	LF	\$50.00	30,000	
	Load test pile	1	EA	\$10,000.00	10,000	
	Mobilization for piling equipment	1	LS	\$10,000.00	10,000	
	Subtotal					1,796,260
	Published Location factor	3%				53,888
	Standard general conditions	20%				370,030
	Government general conditions	10%				222,018
	Overhead	10%				244,220
	Profit	10%				268,641
	Price & Design contingency	20%				591,011
	Historic preservation factor	10%				354,607
	Escalation to mid-point construction July 2011	29%				1,131,195
	Contracting method adjustment	25%				1,257,967
	Total for Seawall - Alt #1 Construction cost					6,289,837
	NPS Administration	8%				503,187
	Engineering Fees	NIC				
	Construction Contingency	10%				679,302
	TOTAL PROJECT COST					7,472,326

PREFERRED OPTION by SCHNABEL

SEC	DESCRIPTION	QTY	UoM	RATE	SUBTOTAL	TOTAL
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Alternate #2 - Scope Narrative

This alternative consists of installing micropiles through the existing concrete seawall and underlying soils, and into competent rock. Holes should be cored through the wall and the granite capstone would be removed to allow micropile installation. We anticipate that the capstone should be removed and reset along the west half of the seawall in all alternatives to match the existing North Plaza elevation.

The main advantage of this alternative is that it does not require removal of the North Plaza slab nor excavation behind the wall. It does not require dewatering or a cofferdam within the Tidal Basin. The work area would be significantly smaller than in other alternatives.

This alternative does not allow inspection of the back and of the foundation of the seawall. If this is deemed necessary, it would be part of a separate item. Also, this alternative requires a significant amount of core drilling through the wall. It also may have a larger impact on the timber piles.

This alternative would consist of 51 micropiles battered at 7 degrees and 51 micropiles battered at 13 degrees through the wall stem. Micropile length and load testing requirements would be similar to alternative #1.

Seawall - Alternate #2
Main Estimate - Final

January 25, 2008

PREFERRED OPTION by SCHNABEL

SEC	DESCRIPTION	QTY	UoM	RATE	SUBTOTAL	TOTAL
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Main Estimate

	Remove & reset granite capstone	490	LF	\$200.00	98,000	
	5 1/2" cased micropiles, grouted & drilled	9,690	LF	\$125.00	1,211,250	
	Premium for rock drill	1,020	LF	\$30.00	30,600	
	Premium for cored drill RC wall	1,020	LF	\$50.00	51,000	
	Load test pile	1	EA	\$10,000.00	10,000	
	Remove & reset granite wall 4' high	112	LF	\$200.00	22,400	
	Mobilization for piling equipment	1	LS	\$10,000.00	10,000	

Subtotal

1,433,250

	Published Location factor	3%			42,998	
	Standard general conditions	20%			295,250	
	Government general conditions	10%			177,150	
	Overhead	10%			194,865	
	Profit	10%			214,351	
	Price & Design contingency	20%			471,573	
	Historic preservation factor	10%			282,944	
	Escalation to mid-point construction	29%	July 2011		902,590	
	Contracting method adjustment	25%			1,003,742	

Total for Seawall - Alt #2 Construction cost

5,018,710

	NPS Administration	8%			401,497	
	Engineering Fees		NIC			
	Construction Contingency	10%			542,021	

TOTAL PROJECT COST

5,962,228

SEC	DESCRIPTION	QTY	UoM	RATE	SUBTOTAL	TOTAL
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Alternate #3 - Scope Narrative

This alternative consists of installing micropiles to the north and south of the footing of the existing concrete wall. For this alternative, segments of the North Plaza slab must be removed to excavate behind the seawall. We anticipate removing the Plaza slab at the expansion joint located approximately 10 ft behind the seawall. The existing grade beams would remain in place. Battered micropiles could be installed from inside the excavation to the south of the wall footing, and pile cap extensions would be constructed. The micropiles to the north of the footing could be installed from the North Plaza elevation; however a cofferdam would be needed in front of the wall to construct the pile cap extension. Following construction of the pile cap extensions, the wall would be backfilled and the Plaza slab replaced.

This alternative would reduce the impact on the timber piles, as the micropiles are installed outside the wall footprint. It also allows inspection of the back and foundation of the wall. Other types of deep foundation elements could be used with this alternative. However, we anticipate that micropiles will have less impact on the seawall than most other foundation types. Coring of the existing wall is not necessary.

This alternative requires a significant volume of excavation and backfilling, removal of the North Plaza slab, cofferdams, and dewatering in front and behind the wall.

This alternative would consist of 53 vertical micropiles in front of the wall, and 53 micropiles battered at 5 degrees behind the wall. Micropile length and load testing requirements would be similar to alternative #1.

Seawall - Alternate #3
Main Estimate - Final

January 25, 2008

SEC	DESCRIPTION	QTY	UoM	RATE	SUBTOTAL	TOTAL
Main Estimate						
	Remove & reset granite capstone to curve	378	LF	\$200.00	75,600	
	Remove & reset alternate concrete plaza slabs	2,500	LF	\$35.00	87,500	
	Cut concrete slab as required	750	LF	\$40.00	30,000	
	Excavate & deposit on site; backfill	850	CY	\$46.00	39,100	
	Sheeting & shoring to plaza	8,000	SF	\$35.00	280,000	
	Protect existing grade beams	1	LS	\$7,500.00	7,500	
	5 1/2" cased micropiles, grouted & drilled	10,070	LF	\$125.00	1,258,750	
	Premium for rock drill	1,060	LF	\$30.00	31,800	
	Load test pile	1	EA	\$10,000.00	10,000	
	RC cap extension to base 2'x2'	1,000	LF	\$100.00	100,000	
	Mobilization for piling equipment	1	LS	\$10,000.00	10,000	
	Coffer Dam - allowance	1	LS	\$250,000.00	250,000	
	Subtotal					2,180,250
	Published Location factor	3%				65,408
	Standard general conditions	20%				449,132
	Government general conditions	10%				269,479
	Overhead	10%				296,427
	Profit	10%				326,069
	Price & Design contingency	20%				717,353
	Historic preservation factor	10%				430,412
	Escalation to mid-point construction	July 2011	29%			1,373,013
	Contracting method adjustment		25%			1,526,886
	Total for Seawall - Alt #3 Construction cost					7,634,428
	NPS Administration		8%			610,754
	Engineering Fees	NIC				
	Construction Contingency		10%			824,518
	TOTAL PROJECT COST					9,069,700

SEC	DESCRIPTION	QTY	UoM	RATE	SUBTOTAL	TOTAL
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Remediation Method for the North Plaza

At the North Plaza, there is noticeable relative movement at the interface between the structural slab on piles and the adjacent circular roadway slab on grade. The elevation difference, resulting from settlement of the slab on grade, is a trip hazard and requires frequent asphalt patching (about 0.5 inch of patch every three months during 2006 and 2007). Our proposed remediation method consists of cutting at the edge of the structural slab, removing 10 ft of the circular roadway in the west direction and replacing with a 10 ft wide structural transition slab. Micropiles would be installed at five feet on center adjacent to the western-most grade beam on the North Plaza, and would be capped with a grade beam. This beam would support the east edge of a new structural slab. A new footing would support the west edge of the slab, and at either end a flexible joint would be used to allow the slab to undergo anticipated settlements without causing tripping hazards.

North Plaza
Main Estimate - Final

January 25, 2008

SEC	DESCRIPTION	QTY	UoM	RATE	SUBTOTAL	TOTAL
Main Estimate						
	Remove ring road	600	SF	\$10.00	6,000	
	Cut edge of slab	110	LF	\$40.00	4,400	
	RC slab 10"-12" thick	600	SF	\$25.00	15,000	
	Flexible joint	115	LF	\$20.00	2,300	
	Patch & repair existing surface as required	1	LS	\$2,500.00	2,500	
	5 1/2" cased micropiles, grouted & drilled	1,140	LF	\$125.00	142,500	
	Mobilization for piling equipment	1	LS	\$7,500.00	7,500	
	RC grade beam cap 3'x2'	60	LF	\$175.00	10,500	
	RC footing to slab edge 3'x2'	45	LF	\$100.00	4,500	
	Subtotal					195,200
	Published Location factor	3%				5,856
	Standard general conditions	20%				40,211
	Government general conditions	10%				24,127
	Overhead	10%				26,539
	Profit	10%				29,193
	Price & Design contingency	20%				64,225
	Historic preservation factor	10%				38,535
	Escalation to mid-point construction July 2011	29%				122,927
	Contracting method adjustment	25%				136,704
	Total for North Plaza Repairs-Construction Costs					683,518
	NPS Administration	8%				54,681
	Engineering Fees	NIC				
	Construction Contingency	10%				73,820
	TOTAL PROJECT COST					812,019

Northwest Stair Repair
Main Estimate - Final

January 25, 2008

SEC	DESCRIPTION	QTY	UoM	RATE	SUBTOTAL	TOTAL
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Remediation Method for the Northwest Stairs

The Northwest Stairs that approach the North Plaza along the Ashlar Seawall are supported on their north side by the seawall, and on their south side by H piles and a grade beam. To the south of the stairs, a slab on grade sidewalk intersects perpendicularly. At this interface between the sidewalks on piles and on grade, there are differential elevations resulting in a trip hazard and the need for an asphalt patch. Our proposed remediation method consists of removing 10 ft of the sidewalk slab, and creating a joint at the base of the existing grade beam. A new structural slab would be constructed and supported on the existing beam to the north, and a new footing at the south edge. Th interface would be sealed with a flexible joint to allow the sidewalk to undergo anticipated settlements.

Northwest Stair Repair
Main Estimate - Final

January 25, 2008

SEC	DESCRIPTION	QTY	UoM	RATE	SUBTOTAL	TOTAL
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Main Estimate

	Remove concrete sidewalk	80	SF	\$8.00	640	
	Cut edge of slab	16	LF	\$35.00	560	
	RC slab 10"-12" thick	80	SF	\$25.00	2,000	
	Flexible joint	16	LF	\$20.00	320	
	Patch & repair existing surface as required	1	LS	\$1,000.00	1,000	
	RC footing 3'x2'	8	LF	\$100.00	800	

Subtotal **5,320**

	Published Location factor	3%				160
	Standard general conditions	20%				1,096
	Government general conditions	10%				658

	Overhead	10%				723
	Profit	10%				796
	Price & Design contingency	20%				1,750

	Historic preservation factor	10%				1,050
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	Escalation to mid-point construction July 2011	29%				3,350
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	Contracting method adjustment	25%				3,726
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Total for Northwest Stair Repairs-Construction Costs						18,629
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	NPS Administration		8%			1,490
	Engineering Fees		NIC			
	Construction Contingency		10%			2,012

TOTAL PROJECT COST						22,131
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