

U.S. CAPITOL - EAST HOUSE UNDERGROUND GARAGE REHABILITATION

Washington, D.C.



Presentation Outline

- Basic LEED information/process
- LEED Design Score Sheet for this project
- Project information/concrete related scope
- LEED action plan
- Scope of trade work
- LEED Final Score Sheet
- LEED Certification Costs
- Project Challenges



Leadership in Energy and Environmental Design

A leading-edge system
for certifying the
greenest performing
buildings in the world

LEED® Facts	
Building size 12,500 square ft	
Type of building	
LEED for Core & Shell Development	
Certification awarded July 27, 2006	
Platinum	
Sustainable Sites	13/15
Water Efficiency	5/5
Energy & Atmosphere	12/15
Materials & Resources	6/9
Indoor Environmental Quality	10/13
Innovation & Design	10/13
*Out of a possible 62 points	

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Platinum	49*
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MISSION

To transform the way buildings and communities are designed, built and operated, enabling an environmentally and socially responsible, healthy and prosperous environment that improves the quality of life.

VISION

Buildings and communities will regenerate and sustain the health and vitality of all life within a generation

What is Green Building?



What Is Green Building?



Steps to LEED Certification

REGISTER YOUR PROJECT



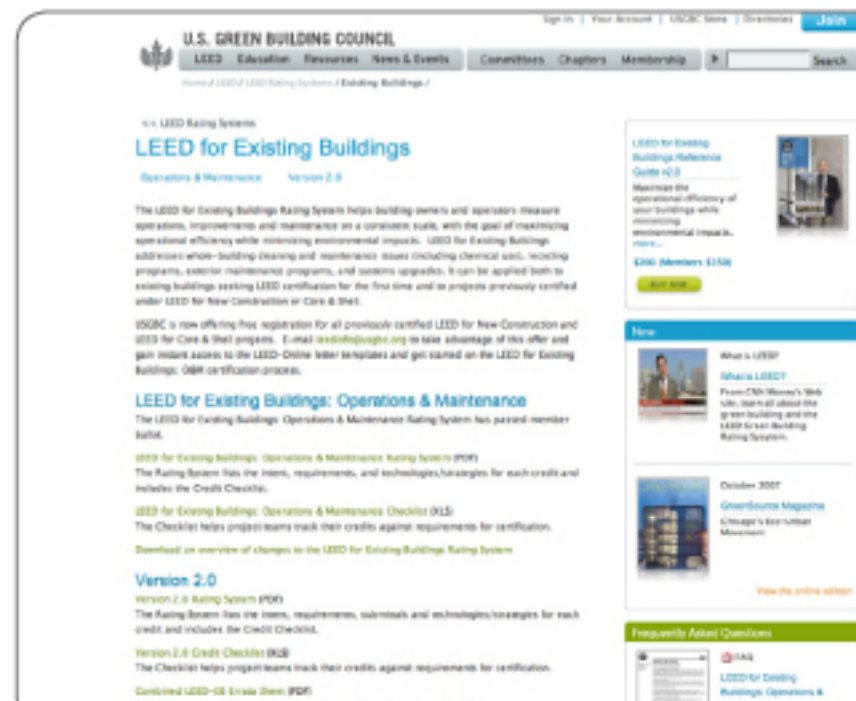
**TRACK PROGRESS &
DOCUMENT ACHIEVEMENT**



APPLY FOR CERTIFICATION

Getting Started: Tools

- Rating systems
- Reference guide
- Project checklist
- Credit Interpretation Requests (CIRs)
- LEED Online
- Educational workshops
- Project case studies
- www.usgbc.org



AOC HOUSE UNDERGROUND GARAGE (WEST GARAGE) - Washington, DC LEED 2009 V3 PROJECT CHECKLIST

52 5 5 48 Total Project Score (pre-certification estimates)

Possible Points 110

Certified 40 to 49 points Silver 50 to 59 points Gold 60 to 79 points Platinum 80 or more points

15 3 0 8 Sustainable Sites				Possible Points	26	
Y	M+	M-	N			
Y				Prereq 1	C Construction Activity Pollution Prevention	0
1				Credit 1	D Site Selection	1
5				Credit 2	D Development Density & Community Connectivity	5
			1	Credit 3	D Brownfield Redevelopment	1
6				Credit 4.1	D Alternative Transportation: Public Transportation Access	6
1				Credit 4.2	D Alternative Transportation: Bicycle Storage & Changing Rooms	1
	3			Credit 4.3	D Alternative Transportation: Low Emitting & Fuel Efficient Vehicles	3
		2		Credit 4.4	D Alternative Transportation: Parking Capacity	2
		1		Credit 5.1*	C Site Development: Protect or Restore Habitat	1
1				Credit 5.2	D Site Development: Maximize Open Space	1
		1		Credit 6.1*	D Stormwater Design: Quantity Control	1
		1		Credit 6.2	D Stormwater Design: Quality Control	1
		1		Credit 7.1	C Heat Island Effect: Non-Roof	1
1				Credit 7.2	D Heat Island: Roof	1
		1		Credit 8	D Light Pollution Reduction	1

4 0 0 6 Water Efficiency				Possible Points	10	
Y	M+	M-	N			
Y				Prereq 1	D Water Use Reduction	0
		4		Credit 1	D Water Efficient Landscaping: (50% Reduction or No Potable Use/No Irrigation)	4
		2		Credit 2*	D Innovative Wastewater Technologies	2
4				Credit 3	D Water Use Reduction: 30% 35% 40% Reduction	4

7 0 4 24 Energy & Atmosphere				Possible Points	35	
Y	M+	M-	N			
Y				Prereq 1	C Fundamental Building Systems Commissioning	0
Y				Prereq 2	D Minimum Energy Performance (10%/ 5%)	0
Y				Prereq 3	D Fundamental Refrigerant Management	0
		4	15	Credit 1*	D Optimize Energy Performance (Reno: 8%, 10%, 12%, etc.)	19
		7		Credit 2*	D On-Site Renewable Energy (1%, 3%, 5%, 7%, 9%, 11%, 13%)	7
		2		Credit 3	C Enhanced Commissioning	2
2				Credit 4	D Enhanced Refrigerant Management	2
3				Credit 5	C Measurement & Verification	3
2				Credit 6	C Green Power (Purchase 35% Electricity from Green Sources)	2

Legend:	Y	Achievable
	M+	Achievable with relative Low Cost / Effort and/or Uncertain
	M-	Achievable with relative High Cost / Effort and/or Uncertain
	N	Not Achievable
	D	Design Phase USGBC Submission
	C	Construction Phase USGBC Submission

10 0 1 3 Materials & Resources				Possible Points	14	
Y	M+	M-	N			
Y				Prereq 1	D Storage & Collection of Recyclables	0
2		1		Credit 1.1*	C Building Reuse: Maintain Existing Walls, Floors, & Roof (55%, 75%, 95%)	3
1				Credit 1.2	C Building Reuse: Maintain Existing Interior Nonstructural Elements (50%)	1
2				Credit 2	C Construction Waste Management: Divert 50% 75% from disposal	2
			2	Credit 3	C Materials Reuse: 5% 10%	2
2				Credit 4	C Recycled Content: 10% 20% (post-consumer + 1/2 pre-consumer)	2
2				Credit 5	C Regional Materials: 10% 20% Extracted, Processed, Manufactured Regionally	2
			1	Credit 6	C Rapidly Renewable Materials: 2.5%	1
1				Credit 7	C Certified Wood (50% FSC certified wood-based materials)	1

11 0 0 4 Indoor Environmental Quality				Possible Points	15	
Y	M+	M-	N			
Y				Prereq 1	D Minimum IAQ Performance	0
Y				Prereq 2	D Environmental Tobacco Smoke (ETS) Control	0
			1	Credit 1	D Outdoor Air Delivery Monitoring	1
1				Credit 2	D Increased Ventilation	1
1				Credit 3.1	C Construction IAQ Management Plan: During Construction	1
1				Credit 3.2	C Construction IAQ Management Plan: Before Occupancy	1
1				Credit 4.1	C Low-Emitting Materials: Adhesives & Sealants	1
1				Credit 4.2	C Low-Emitting Materials: Paints & Coatings	1
1				Credit 4.3	C Low-Emitting Materials: Flooring Systems	1
1				Credit 4.4	C Low-Emitting Materials: Composite Wood & Agrifiber Products	1
		1		Credit 5	D Indoor Chemical & Pollutant Source Control	1
1				Credit 6.1	D Controllability of Systems: Lighting	1
1				Credit 6.2	D Controllability of Systems: Thermal Comfort	1
1				Credit 7.1	D Thermal Comfort: Design	1
1				Credit 7.2	D Thermal Comfort: Verification - New owner commitment	1
			1	Credit 8.1	D Daylight & Views: Daylight 75% of Spaces	1
			1	Credit 8.2	D Daylight & Views: Views for 90% of Spaces	1

4 2 0 0 Innovation & Design Process				Possible Points	6	
Y	M+	M-	N			
1				Credit 1.1	D Innovation in Design: Exemplary Performance WE 3	1
1				Credit 1.2	C Innovation in Design: Exemplary Performance MRc4	1
1				Credit 1.3	D Innovation in Design: Exemplary Performance EAc6	1
		1		Credit 1.4	C Innovation in Design: TBD	1
		1		Credit 1.5	C Innovation in Design: TBD	1
1				Credit 2	C LEED™ Accredited Professional	1

1 0 0 3 Regional Priority				Possible Points	4	
Y	M+	M-	N			
1				Credit 1.1	C Regional Priority: MRc1.1 (75%)	1
			1	Credit 1.2	D Regional Priority: EA1 (40%/36%)	1
			1	Credit 1.3	D Regional Priority: WEc2	1
			1	Credit 1.4	D Regional Priority: EA2 (1%)	1

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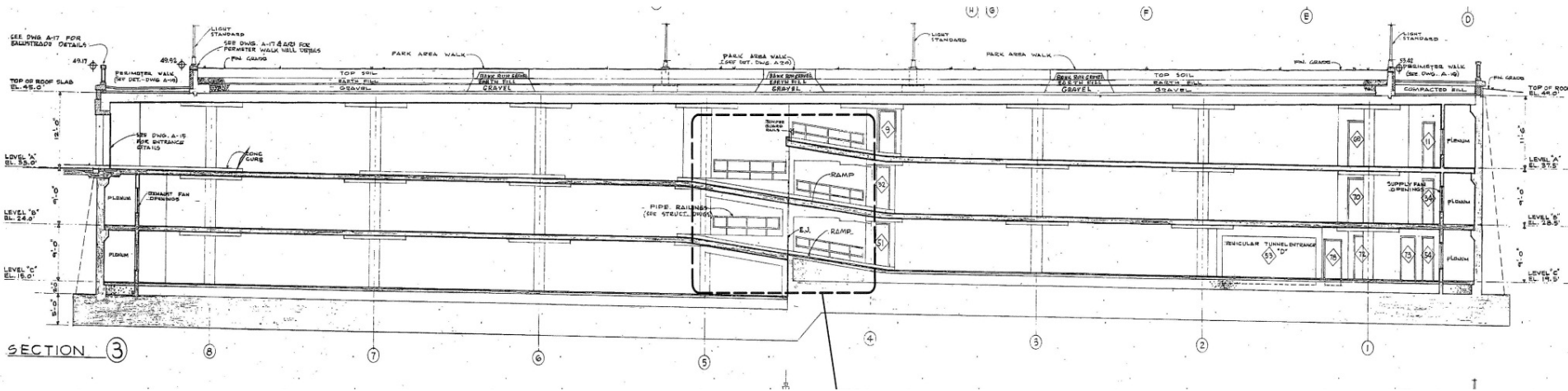
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Garage Section



Scope of Project – Concrete Related

- 172,000 SF of wall to wall hydrodemolition and 5" overlay



Scope of Project – Concrete Related

- 41,000 SF of 10" full depth slab repair



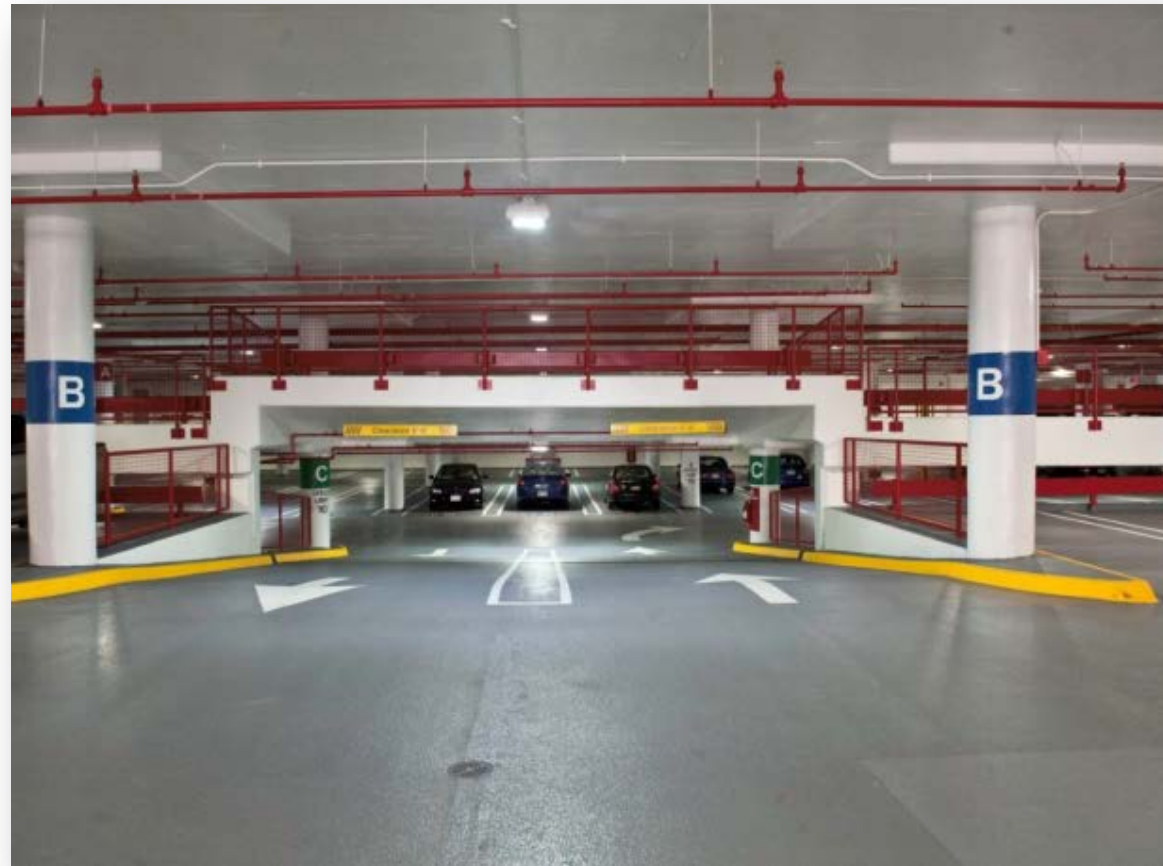
Scope of Project – Concrete Related

- Installation of 47 tons of new reinforcing steel



Scope of Project – Concrete Related

- Installation of 180,000 of urethane traffic membrane
- Installation of 1,450 LF of fire rated expansion joint flashing
- Installation of 44,000 SF of cementitious coating on foundation and vent shaft walls
- Painting of walls, ceilings and columns



Scope of Project – Trade Work

- Installation of new high efficiency steam heat system
- Installation of new start-of-the art LED lighting system
- Asbestos and lead paint abatement
- Installation of high efficiency automatic faucets and waterless urinals
- Installation of new deck drains and drain pipe system
- Modification of vehicular guardrails
- Replacement of garage pedestrian and stairway railings
- Refinishing of historic overhead garage entrance doors
- Replacement of metal doors and frames

LEED Action Plan

Strategy for Achieving Construction Phase Credits

- Site Pollution Prevention
- Fundamental Commissioning of Building Energy Systems
- Material Resource
 - Building re-use – 79% structural/66% non-structural
 - Construction Waste Management – recycled rate 99.6%
 - Recycling Content
 - Regional Materials
 - Certified Wood
- Indoor Environmental Quality
 - Construction Indoor Air Quality Management Plan – during construction/before occupancy
 - Low Emitting Materials – adhesives, sealants, paints, coatings
- Innovative Design – Added LEED Accredited Professional to staff
- Regional Priority – Building Re-use

Site Pollution Prevent Controls

Hydrodemolition used as primary demolition method



Site Pollution Prevention Controls

Install/maintain filter media at exhaust points



Site Pollution Prevention Controls

Divert and control waster water and concrete debris



Site Pollution Prevention Controls

Waste water treatment center (5.4 million gallons)



Recycling Waste

Separation of recyclable waste



Recycling Waste

7,716 tons of concrete debris



Recycling Waste

96 tons of steel debris



Source Materials

- New materials contained an average of over 23% recycled material and over 30% acquired locally
- New concrete was sourced within 40 miles of project and contained 14% slag (post-industrial recycled material)
- 47 tons of new reinforcing steel mostly recycled, domestically produced, and sourced within 500 miles
- Eliminated chemical bonding agent, used SSD condition to achieve superior adhesion – confirmed by bond tests

Indoor Air Quality

- Air Quality Management Plan, fresh air to workers, hydrodemolition minimized dust
- Sealants used contained only ½ of VOC limits established by The South Coast Air Quality Management District
- Logged paint and coating VOC content and quantities – able to stay 72% below the baseline criteria

LEED Project Score Sheet

<i>Category</i>	<i>Original Design</i>	<i>Final</i>
	SILVER	GOLD
Sustainable Sites	15	18
Water Efficiency	6	7
Energy and Atmosphere	7	11
Materials and Resource	10	11
Indoor Environmental Quality	11	12
Innovation in Design	4	6
TOTAL	53	65

Project Challenges

- Schedule - complete all work in 1 year/delayed NTP/\$15,000 per day LDs
- Security Checkpoints/Capitol Hill Police
- Neighborhood noise
- Coating of existing reinforcing steel
- Concrete cure/strength schedule
- Concrete repairs at terrace expansion joint
- Drainage system - redesign
- Stairway repair challenges
- Vehicular railing modification - leave posts in place
- Historical relevance of masonry in vertical shafts

Project Information

- Cost: \$18,070,702.00
- Duration: January 2011 – December 2011
- Engineer: URS Corporation
- Testing: Eastern Testing & Inspection (ETI)

LEED Certification Cost

- Registration: \$900.00
- Design Phase Review: \$10,619.40
- Construction Phase Review: \$2,654.85
- Expedite Review: \$5,000.00
- LEED Plaque: \$435.00
- Construction related LEED costs: estimated at \$90,000

Certification Cost TOTAL: \$109,609.25

