UNIVERSITY SYSTEM of MARYLAND

Rita Rossi Colwell Center*
Deferred Maintenance Project

Part I & II Facility Program

Prepared Jointly by
Facilities Management, University of Maryland Baltimore County
and Capital Planning, University System of Maryland

January 2023

*formerly the Christopher Columbus Center

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PART I PROGRAM

A. Agency Information

Rita Rossi Colwell Center, Baltimore MD

701 East Pratt Street
Baltimore, MD 21202

The Colwell Center (formerly known as the Christopher Columbus Center) is the headquarters of the University System of Maryland (USM) and home to its Institute of Marine and Environmental Technology (IMET). The Center serves as a collaborative hub for economic development among USM, IMET, and private industry. The Center community is comprised of USM faculty and staff, private entities in science related fields, and start-up companies in the IMET Harbor Launch Incubator.

The Columbus Center for Marine Research and Exploration was built in 1995 to be a multi-use facility, to provide a world center for excellence in marine research, and to allow the public to interface with the scientific research world--to provide a port hole to the Marine World. In 1998, the center's largest tenant, the University System of Maryland, purchased the facility and assumed management responsibility.

In 2010, there was a reorganization which resulted in the creation of the Institute of Marine and Environmental Technology (IMET). IMET is a joint University System of Maryland research institute capitalizing on the strengths of the University of Maryland Center for Environmental Science, the University of Maryland Baltimore County and the University of Maryland Baltimore. The Columbus Center facility is managed and operated by UMBC.

Today, the missions of exploration and collaboration continue. By drawing faculty and students from the University System of Maryland and scientists from around the world, IMET faculty conduct research into marine and coastal environments. Towson University's Center for STEM Excellence also furthers this mission at the Columbus Center, by serving Maryland's K-12 schools through outreach programs supporting science education.

In December 2022 the building was officially renamed to the Rita Rossi Colwell Center. Dr. Colwell was instrumental in the founding of the Columbus Center for the purpose of expanding environmental science education and research in Baltimore City and it is most appropriate that the building is now being named for her as the Rita Rossi Colwell Center. Dr. Rita Rossi Colwell is an internationally renowned microbiologist and marine scientist of Italian American descent with strong connections to the USM and IMET. Dr. Colwell is a prominent national and international scholar with a distinguished record of service and accomplishments.

B. Project Purpose

The University System of Maryland, with its administrative partner for the Center (UMBC), seeks to construct deferred maintenance improvements at the Colwell Center in Baltimore, including replacement of the aging tent roof and HVAC upgrades. This work will be completed in two separate, overlapping phases. Phase I will replace the distinctive tension fabric roof while Phase II will upgrade the mechanical system. The FY 2024 budget includes funds for design of both phases and to begin construction of Phase I.

C. Project Justification

1. Factors That Influence the Facilities Problems

UMD enrolls approximately 10,000 graduate students, which is about one-quarter of the student body. As of fall 2020 about one-third were in-state, one-third out-of-state and one-third international students. Graduate students are especially price sensitive to rental rates and often commute to campus to avoid the high cost of living in Greater College Park.

2. Facilities Problems and Desired Solutions

Phase 1 Replace Columbus Center Tension Fabric Roof

Complete replacement of the Tension Fabric Roof. Current roof is at end of life and at risk of failing. This roof encloses a portion of the interior of the Columbus Center and failure would cause unacceptable damage and would be much more costly than replacement.

Phase 2 Columbus Center Central Plant Refurbishment

Central Plant refurbishment replaces obsolete chillers, controls, motors, pumps, demolition of ice storage units—all of which have reached the end of their useful life and have shown tendency for failure. The estimate is shown for the project as a whole. If cash flows are such that a phased approach to the Central Plant Refurbishment work is desired, an implementation plan could be developed spanning multiple years.

3. Alternatives

The tent roof not only covers the “atrium” portion of the Colwell Center building, but it serves a unique purpose as part of the west wall of the facility. The labs and offices on the west side of the building have no exterior walls. Thus, if the tent were removed, it would leave some spaces within the building exposed. Care will have to be taken to plan the replacement carefully and in succession.

An option for roof replacement was discussed previously, in several detailed architectural studies over the last 10-15 years—the latest in 2016. In these studies, the distinctive fabric tent was removed and replaced with a permanent roof, over new/enclosed space—adding significant square footage to the building. The cost of these changes proved prohibitive, however, and were not pursued.

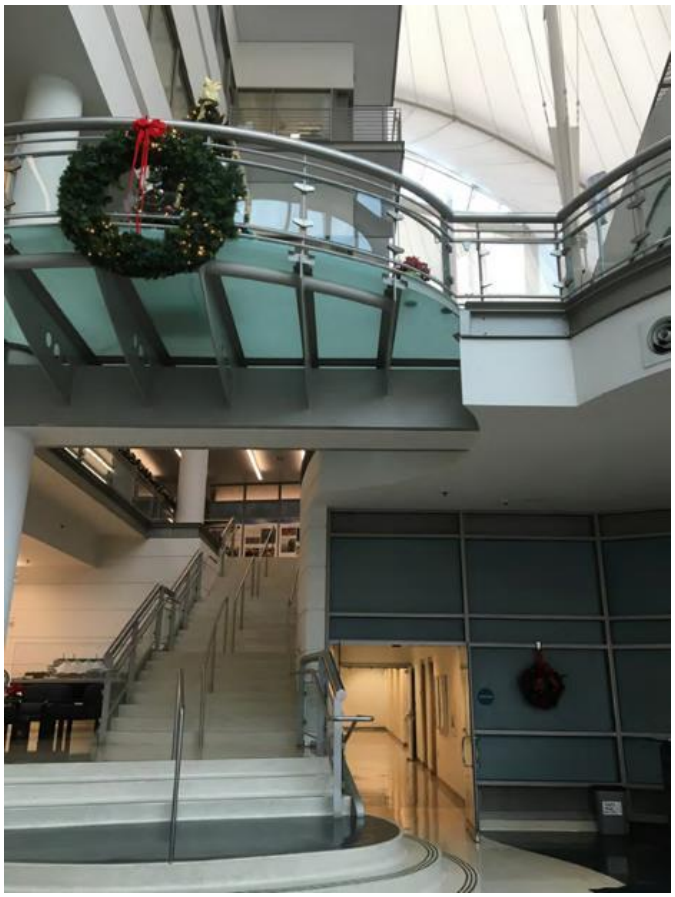
There is no alternative to repairing/replacing mechanical components.

PART II PROGRAM

A. Project Scope

Phase 1 Replace Columbus Center Tension Fabric Roof

This involves complete replacement of the Tension Fabric Roof. Replacement would include the main membrane, liner, awning canopy and additional work to repaint the structural steel components. This project element has to be completed in one phase. (See photos in Appendix A)



What is the age of the membrane roof?

The 29-year-old membrane roof was installed during the initial construction in 1994.

This roof encloses a portion of the interior of the Colwell Center and failure would cause unacceptable damage and would be much more costly than replacement. Please provide quantitative data to support this.

As the picture shows at the main entrance lobby, the building's interior finishes are directly below the membrane roof. Any failure of this membrane would directly expose a portion of the Aquaculture Research Center and three levels of exhibit hall, offices, conference rooms, and research labs to rain, wind, snow, and other inclement

weather. A failure of this nature would require an immediate cease of operations, would result in lost research, and potentially casualties to aquatic life. Given the lengthy time to manufacture and install a new roof, a failed roof would be catastrophic to building operations and result in costly replacement and repair of dozens of interior spaces.

Phase 2 Columbus Center Central Plant Refurbishment

Central Plant refurbishment replaces obsolete chillers, controls, motors, pumps, demolition of ice storage units. This phase would consist of initial design, order of long lead items such as the chiller equipment. It is important to order all chillers at the same time in order to avoid model changes by the manufacturer. Phases for this work could be accommodated as follows:

- Replace chilled water pumps, install three chillers and associated piping.
- Install one chiller, replace central plant and chiller controls and balance the chillers.
- Refurbish all air handling units, optimize the energy management control system and replace exhaust fans. Demolish thermal storage system and complete final system inspections and comprehensive system testing.

What is the general age of the mechanical equipment to be replaced?

Most of the mechanical equipment to be replaced was part of the initial construction in 1994 and therefore 29-years-old.

Some of the proposed mechanical system improvements will improve the energy efficiency of the building. Is quantitative data available on the potential savings?

While the potential savings for the proposed mechanical system replacement cannot be quantitatively determined without benefit of system design, there are numerous on-line references (e.g. energy.gov) documenting average energy performance metrics for mechanical equipment has improved significantly over the past three decades. Besides direct energy savings, there are operating and environmental benefits to the proposed project as upgraded systems will eliminate costly on-going maintenance and use of obsolete refrigerants that contribute to the depletion of the ozone layer.

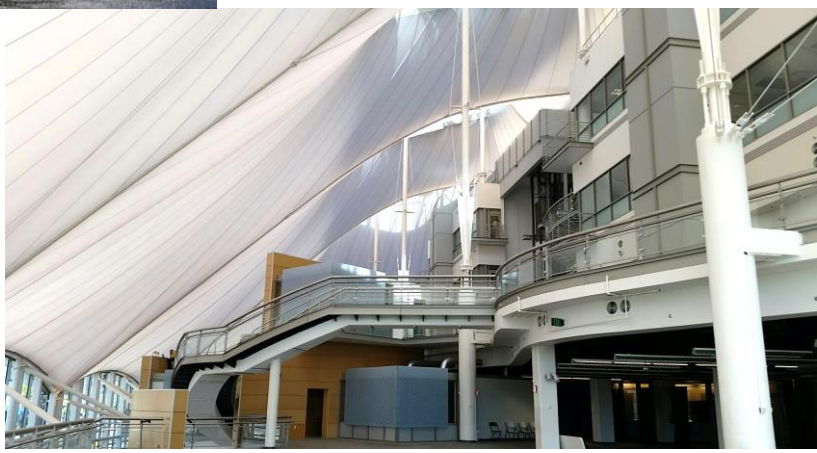
APPENDICES

APPENDIX A

Colwell Center

Exterior

Interior Atrium view showing underside of tent fabric



Detail showing some of the wear/ damage to tent fabric

Mechanical Equipment in Colwell Center Penthouse Space

APPENDIX B

DEPARTMENT OF BUDGET & MANAGEMENT

Capital Budget Information System (C.B.I.S.)

AGENCY WORKSHEET FOR REQUESTED CAPITAL PROJECTS

1/3/2023
11:02:26AM
Data as of
12/31/2022
10:01:15 am

Agency: University System of Maryland
Sub-Agency: University System of Maryland Office
Institution:
Project Title: USM Columbus Center Deferred Maintenance

Project Description:

Construct deferred maintenance improvements at the University System of Maryland Columbus Center in Baltimore, including replacement of the aging tent roof and HVAC upgrades. This work will be completed in two separate phases. Phase I will replace the tension fabric roof while Phase II will upgrade the mechanical system. The FY 2024 budget includes funds for design of both phases and to begin construction of Phase I.

Estimated Project Cost and Requested Funding:

Uses	Prior Appropriations	Current Request	Future Estimate	Estimated Totals
Planning	0	1,340,000	0	1,340,000
Construction	0	3,593,667	16,539,333	20,133,000
TOTAL	0	4,933,667	16,539,333	21,473,000
Sources				
GO Bonds	0	4,933,667	16,539,333	21,473,000
TOTAL:	0	4,933,667	16,539,333	21,473,000

Source of Estimate: Min Engineering

Project Detail:

Net Sq. Foot: 0 **Gross Sq. Foot:** 0 **Percent Efficiency:**

Capacity: 0 **Unit Cost:** 0

Schedule:

Status: Under Review

Program Approval Part 1: **Program Approval Part 2:**

Design Start Date: 07/2023 **Design Time:** 12

Construction Start Date: 03/2024 **Construction Time:** 19

Completion Date: 10/2025

Cost & Funds - Request CIP Difference:

This is a new project

Details:

Proposed NSF

Area	Net Square Footage
TOTAL:	

Agency: University System of Maryland
Sub-Agency: University System of Maryland Office
Institution:
Project Title: USM Columbus Center Deferred Maintenance

Cost Per Square Foot:

Structural Cost: /GSF (excludes sitework/utilities)

Total Contract Cost: /GSF (includes sitework/utilities)

Details and Justification - Request

Project Element Description.

This work will be completed in two separate pieces.

Phase 1 Replace Columbus Center Tension Fabric Roof

·Complete replacement of the Tension Fabric Roof. Current roof is at end of life and at risk of failing. This roof encloses a portion of the interior of the Columbus Center and failure would cause unacceptable damage and would be much more costly than replacement. Replacement would include the main membrane, liner, awning canopy and additional work to repaint the structural steel components. **Note** this project element has to be completed in one phase.

Phases 2 Columbus Center Central Plant Refurbishment*

·Central Plant refurbishment replaces obsolete chillers, controls, motors, pumps, demolition of ice storage units. This phase would consist of initial design, order of long lead items such as the chiller equipment. It is important to order all chillers at the same time in order to avoid model changes by the manufacturer.
·This phase would replace chilled water pumps, install three chillers and associated piping.
·This phase would install one chiller, replace central plant and chiller controls and balance the chillers.
·This phase would refurbish all air handling units, optimize the energy management control system and replace exhaust fans. Demo thermal storage system and complete final system inspections and comprehensive system testing.

*Note regarding Phase 2: The estimate is shown for the project as a whole. If cash flows are such that a phased approach to the Central Plant Refurbishment work is desired, an implementation plan could be developed spanning multiple years.

DRAFT CASH FLOW ATTACHED

Attachment(s): 6

Related Project Information

Budget ID:	RB36	**Agency Priority:**	0.00 of 1.00
Subdivision:	Baltimore City	**Analyst:**	Kwame Kwakye
Legislative District:	46	**DLR:**	12/31/2022

APPENDIX C1

1/3/2023
11:03:57AM

DEPARTMENT OF BUDGET & MANAGEMENT

Capital Budget Information System (C.B.I.S.)

DEPARTMENT OF GENERAL SERVICES
COST ESTIMATE WORKSHEET (CEW)

Project Number		Escalation set at 9.00% for 2022, 5.00% for 2023, 5.00% for 2024, 5.00% for 2025, 5.00% for succeeding calendar years	
CEW Title	Phase I Tensile Roof Replacement		
Project Title	USM Columbus Center Deferred Maintenance		
Agency	University System of Maryland	**Date Estimate Completed**	14-Sep-22
SubAgency	University System of Maryland Office	**Estimate Reference Point**	Jul-22
Location	Baltimore City	**Source of Estimate**	OEM Tensile Roof Company
Prepared By	Mark Beck	**Recommended By**	

1. Design Phase	Budget			**2. Project Type**	Renovation	
3. Design Period	Jul-23	Nov-23	4months	**4. Est. Bid Date**	Jan-24	
5. Construction Period	Mar-24	Mar-25	12months	**6. Est. Mid-Point Date**	Sep-24	26 months from reference point

7. Area

		GSF	NSF/NASF	Eff. Factor	% Efficiency
a1. New	None	0	0	N/A	N/A
	TOTAL NEW	0	0	N/A	N/A
b1. Renovation		32,300	0	N/A	0.0%
	TOTAL REN	32,300	0	N/A	0.0%

Total GSF	32,300
Total NSF	0

8. Structure

		GSF		$/SF		Amount
b1.	Basic: Ren.	32,300	x	268		8,656,400
c.	Structural Steel Intumescent					60,000
d.	Built-in Equipment					0
e.	Interior Demolition					0
f.	Information Technology				+	0
g.	Subtotal					8,716,400
h.	Subtotal with RCF	g. x 1.00				8,716,400
i.	Escalation to Mid-Pt	h. x 15.38%			+	1,340,582
j.	Structure Subtotal					10,056,982

9. Site

a.	General Site Work	0% of Structure Subtotal		0
b.	None		+	0
c.	Subtotal			0
d.	Subtotal with RCF	c. x 1.00		0
e.	Escalation to Mid-Pt	d. x 15.38%	+	0
f.	Site Subtotal			0

10. Utilities

				Amount
a.	General Utility Work	0.0% of Structure Subtotal		0
b.	None		+	0
c.	Subtotal			0
d.	Subtotal with RCF	c. x 1.00		0
e.	Escalation to Mid-Pt	d. x 15.38%	+	0
f.	Utility Subtotal			0

11. Subtotal from Sections 8, 9, and 10 — 10,056,982

			Amount
12a.	Total Construction Contingency	5.0%	502,849
b.	Green Building Premium	0.0%	0
c.	CM Cost Construction Share	0.0%	0
d.	Public Art Premium	0.0%	0
13.	Inspection and Testing	2.2%	221,254
14.	CPM Schedule		0
15a.	None		0
16.	A/E Basic Services	2.5%	263,996
17.	A/E Special Services	0.0%	0
18a.	Bldg. Equip. Commissioning	0.0%	0
b.	CM Pre-Construction Fees	0.0%	0
c.	None		0
19a.	Movable Equipment		0
b.	Information Technology Equipment		0
20.	Acquisitions		0

21. TOTAL PROJECT COSTS

a.	Acquisitions		0
b.	Total Design Funds and Related Costs		264,000
b1.	Prior Design Funds	-	0
b2.	New Design Funds Required		264,000
c.	Total Construction and Related Costs		10,781,000
c1.	Prior Construction Funds	-	0
c2.	New Construction Funds Required		10,781,000
d.	Total Equipment 19a + 19b		0
Total Project Cost			**11,045,000**

Structural Cost at Mid-Pt	$311/GSF
Building, Structure, and Utilities Cost at Mid-Pt	$311/GSF
Total Cost	$334/GSF

CEW Notes Item 7, B1 gross square footage of total fabric area. Item 7, B2 - Intumescent paint on structural steel for tent frame is need of repairs in some areas. Existing coating is blistering and flaking due to original construction application issues. Item 12A - 10% per UMBC Guidelines for Capital Projects. Item 16 - Lowered to 2.5%, not sure at this time if there will be a need for an A/E to involved with the project but should have some funding available in case one is needed.

APPENDIX C2

1/3/2023
11:05:29AM

DEPARTMENT OF BUDGET & MANAGEMENT

Capital Budget Information System (C.B.I.S.)

DEPARTMENT OF GENERAL SERVICES
COST ESTIMATE WORKSHEET (CEW)

Project Number		Escalation set at 9.00% for 2022, 5.00% for 2023, 5.00% for 2024, 5.00% for 2025, 5.00% for succeeding calendar years	
CEW Title	Columbus Center Central Plant Refurbishment		
Project Title	USM Columbus Center Deferred Maintenance		
Agency	University System of Maryland	**Date Estimate Completed**	15-Sep-22
SubAgency	University System of Maryland Office	**Estimate Reference Point**	Jan-22
Location	Baltimore City	**Source of Estimate**	Min Engineering
Prepared By	Mark Beck	**Recommended By**	

1. Design Phase	Budget			**2. Project Type**	Renovation	
3. Design Period	Nov-23	Jul-24	8months	**4. Est. Bid Date**	Sep-24	
5. Construction Period	Nov-24	Oct-25	11months	**6. Est. Mid-Point Date**	Apr-25	39 months from reference point

7. Area		GSF	NSF/NASF	Eff. Factor	% Efficiency
a1. New	None	0	0	N/A	N/A
	TOTAL NEW	0	0	N/A	N/A
b1. Renovation	None	0	0	N/A	N/A
	TOTAL REN	0	0	N/A	N/A

Total GSF
Total NSF

8. Structure		GSF	$/SF		Amount
a1.	Basic: New None	0 x	0		0
c.	Mechanical				5,630,000
d.	Electrical				230,000
e.	Building Automation Systems				1,245,000
f.	Information Technology			+	0
g.	Subtotal				7,105,000
h.	Subtotal with RCF	g. x 1.00			7,105,000
i.	Escalation to Mid-Pt	h. x 21.65%		+	1,538,233
j.	Structure Subtotal				8,643,233

9. Site				
a.	General Site Work	0% of Structure Subtotal		0
b.	None		+	0
c.	Subtotal			0
d.	Subtotal with RCF	c. x 1.00		0
e.	Escalation to Mid-Pt	d. x 21.65%	+	0
f.	Site Subtotal			0

10. Utilities				**Amount**
a.	General Utility Work	0.0% of Structure Subtotal		0
b.	None		+	0
c.	Subtotal			0
d.	Subtotal with RCF	c. x 1.00		0
e.	Escalation to Mid-Pt	d. x 21.65%	+	0
f.	Utility Subtotal			0

11. Subtotal from Sections 8, 9, and 10 — 8,643,233

			Amount
12a.	Total Construction Contingency	5.0%	432,162
b.	Green Building Premium	0.0%	0
c.	CM Cost Construction Share	0.0%	0
d.	Public Art Premium	0.0%	0
13.	Inspection and Testing	3.2%	276,583
14.	CPM Schedule		0
15a.	None		0
16.	A/E Basic Services	7.0%	635,278
17.	A/E Special Services	2.0%	181,508
18a.	Bldg. Equip. Commissioning	1.5%	130,000
b.	CM Pre-Construction Fees	1.5%	129,648
c.	None		0
19a.	Movable Equipment		0
b.	Information Technology Equipment		0
20.	Acquisitions		0

21. TOTAL PROJECT COSTS			
a.	Acquisitions		0
b.	Total Design Funds and Related Costs		1,076,000
b1.	Prior Design Funds	-	0
b2.	New Design Funds Required		1,076,000
c.	Total Construction and Related Costs		9,352,000
c1.	Prior Construction Funds	-	0
c2.	New Construction Funds Required		9,352,000
d.	Total Equipment 19a + 19b		0
Total Project Cost			**10,428,000**

Structural Cost at Mid-Pt /GSF
Building, Structure, and Utilities Cost at Mid-Pt /GSF
Total Cost /GSF

CEW Notes Item 8C - Chillers, primary chilled water pumps, secondary chilled water pumps, condenser water pumps. Study estimate of 4,256,560 + 10.0% CIP Project Contingency + 4.5% CM Fee + 2% CM Contingency + 10% CM General Conditions + 4.5% Service Center Fee, rounded up to 5,530,000. Item 8D - EMCC replacement & smoke relief fan 1 VFD. Study estimate of 172,275 + 10.0% CIP Construction Contingency + 4.5% CM Fee + 2% CM Contingency + 10% CM General Conditions + 4.5% Service Center Fee, rounded up to 230,000. Item 8E -

Project Number		Escalation set at 9.00% for 2022, 5.00% for 2023, 5.00% for 2024, 5.00% for 2025, 5.00% for succeeding calendar years	
CEW Title	Columbus Center Central Plant Refurbishment		
Project Title	USM Columbus Center Deferred Maintenance		
Agency	University System of Maryland	**Date Estimate Completed**	15-Sep-22
SubAgency	University System of Maryland Office	**Estimate Reference Point**	Jan-22
Location	Baltimore City	**Source of Estimate**	Min Engineering
Prepared By	Mark Beck	**Recommended By**	

Replace building automation system. Study estimate of 937,500 + 10.0% CIP Construction Contingency + 4.5% CM Fee + 2% CM Contingency + 10% CM General Conditions + 4.5% Service Center Fee , rounded up to 1,245,000. Item 9 - Work is within an existing building, there is no site work associated with the project. Item 10 - Work is within an existing building, there is no utility work associated with the project. Item 12A - 10% per CEW Guidelines for UMBC Capital Projects. Item 13 - 3.2% per CEW Guidelines for UMBC Capital Projects.Item 16 - 7% per CEW default value.Item 17 - Added 2.0% for work phasing effort due to project complexity as building systems cannot be offline but for short periods of time. Item 18A - 1.5% per CEW Guidelines for UMBC Capital Projects. Item 18B - 1.5% per CEW Guidelines for UMBC Capital Projects.