B-1-25-2-01

PURDUE UNIVERSITY

Office of the Chief Financial Officer and Treasurer

August 15, 2024

The Honorable Eric J. Holcomb
Governor of the State of Indiana
Statehouse
Indianapolis, IN 46204

Dear Governor Holcomb:

At its meeting on August 2, 2024, the Purdue University Board of Trustees approved the planning, financing, construction and award of construction contracts for the Mathematical Sciences Building Data Center Renovation on the West Lafayette campus.

This project will renovate nearly 21,000 GSF on the ground and basement floors of the Mathematical Sciences Building. The renovations will maximize existing floor space by repurposing office spaces to expand the existing data center to house additional computer servers and supporting utilities, specifically electrical and chilled water.

This project allows for the continued growth of computing capacities for the research data center, which houses supercomputing resources supporting 64% of the sponsored research performed at Purdue in 2023. These supercomputers provide Purdue researchers with advanced computing capabilities to support a wide range of computational and data-intensive research, spanning from traditional high-performance computing to modern artificial intelligence applications

The estimated total project cost is $16,000,000 funded by Operating Funds – Reserves.

Subject to review by the Commission for Higher Education and recommendation by the State Budget Committee and the Budget Agency, we request your approval to proceed with this project. Attached are the completed forms that the Commission has prescribed for its review of such projects. We will be happy to answer any questions you or your staff may have or to provide any additional information that is needed.

Sincerely,

Christopher A. Ruhl
Chief Financial Officer and Treasurer

Attachments

c: Seth Hinshaw, Chief Financial Officer, Indiana Commission for Higher Education
Joe Habig, Deputy Director and Acting State Budget Director, Indiana State Budget Agency
Cody Wilson, Division Director, Indiana State Budget Agency
Kathleen Thomason, Comptroller, Purdue University
Anne Hazlett, Senior Director, Government Relations, Purdue University

Hovde Hall of Administration – 610 Purdue Mall – West Lafayette, IN 47907 – (765) 494-9705

PROJECT COST SUMMARY

Mathematical Sciences Building Data Center Renovation

Institution:	Purdue University	**Budget Agency Project No.:**	B-1-25-2-01
Campus:	West Lafayette	**Institutional Priority:**	N/A
Previously approved by General Assembly:	No	**Previously recommended by CHE:**	No
Part of the Institution's Long-term Capital Plan:	Yes		

Project Size:	20,767	GSF (1)	19,441	ASF (2)	0.936148697 ASF/GSF
Net change in overall campus space:	0	GSF	0	ASF	

Total cost of the project (3):	$ 16,000,000	**Cost per ASF/GSF:**	$ 770.45 GSF
Total cost of the demolition:	$ -		$ 823.00 ASF

Funding Source(s) for project (4):	Amount	Type
	$ 16,000,000	Operating Funds - Reserves

Estimated annual debt payment (6):	N/A
Are all funds for the project secured:	Yes

Project Funding:

This project is being fully funded by Operating Funds-Reserves, and all funds are secured.

Project Cost Justification

This project includes a heavy focus on the installation of mechanical and electrical equipment and their distribution systems. More information on the project scope and cost are defined in the capital project details section.

Estimated annual change in cost of building operations based on the project:	$ 1,200,000
Estimated annual repair and rehabilitation investment (5):	$ 240,000

PROJECT DETAILED DESCRIPTION - ADDITIONAL INFORMATION

Mathematical Sciences Building Data Center Renovation

Institution:	Purdue University	**Budget Agency Project No.:**	B-1-25-2-01
Campus:	West Lafayette	**Institutional Priority:**	N/A

Description of Project

This project will renovate nearly 21,000 GSF on the ground and basement floors of the Mathematical Sciences Building on the West Lafayette campus. The renovations will repurpose and maximize existing floor space by repurposing office spaces to expand the existing data center in the facility to house additional computer servers and an increase in supporting utilities, specifically electrical and chilled water. As part of the renovation, existing lighting will be replaced with more efficient LED fixtures.

Need and Purpose of the Program

High performance supercomputers provide Purdue researchers with advanced computing capabilities to support a wide range of computational and data-intensive research, spanning from traditional high-performance computing to modern artificial intelligence applications. These systems require specialized data center facilities.

In order to support additional growth of the data center, the electrical distribution capacity will be increased as well as chilled water distribution capacity. The new electrical and chilled water distribution will support future growth and provide a more flexible platform to support the server equipment. The renovation will also allow for additional physical space within the data center for new servers.

This project allows for the continued growth of computing capacities for the research data center, which houses supercomputing resources supporting 64% of the sponsored research performed at Purdue in 2023. The next computer lifecycle replacement and expansion is planned for mid-calendar year 2026.

In addition to faculty research enabled by these facilities, Purdue IT's Rosen Center for Advanced Computing anticipates renewal funding from the National Science Foundation for the 2nd generation of the Anvil system. To date for Anvil 1, the NSF has awarded $29M to Purdue, and we anticipate Anvil 2 to be at a similar scale, operating through approximately 2032.

Space Utilization

This project is a complete rethinking of the layouts of the MATH basement and ground floor to be the most efficient use of space possible for a data center. We moved a number of offices and workrooms out of the basement to make way for an efficient utility infrastructure layout. We coupled that layout by recreating the footprint on the ground floor above the infrastructure. By moving all the infrastructure to the basement and the servers on the floor above, it allows the server rooms to be laid out in the most efficient way possible. Lastly, the subterranean office space was not preferred by occupants.

Comparable Projects

Birck Nanotechnology Center Clean Room Modernization, Related Renovations and Equipment Purchases

- $49,000,000 / $19,000,000 in specialty equipment
- 20,500 GSF
- $1,463/GSF based on $30M construction budget
- Both spaces have a high demand for electrical power and cooling needs through chilled water. This translates into similar infrastructure being implemented in both projects. Both projects require a high degree of coordination and phasing to maintain critical infrastructure during the duration of the project.
- The uses of the spaces are different and although a clean environment is required in the data center it is not to the level required for the Birck project. Also, the Brick project is procuring and installing large air handlers as a part of the scope, and the MATH data center will be reworking HVAC distribution

Background Materials

CAPITAL PROJECT REQUEST FORM
INDIANA PUBLIC POSTSECONDARY EDUCATION
INSTITUTION CAMPUS SPACE DETAILS FOR Mathematical Sciences Building Data Center Renovation

	Current Campus Totals				Capital Request		
(INSERT PROJECT TITLE AND SBA No.)	Current Space in Use	Space Under Construction (1)	Space Planned and Funded (1)	Subtotal Current and Future Space	Space to be Terminated (1)	New Space in Capital Request (2)	Net Future Space
A. OVERALL SPACE IN ASF							
Classroom (110 & 115)	310,758	(2,547)	53,413	361,624	-	-	361,624
Class Lab (210,215,220,225,230,235)	737,430	(13,353)	27,267	751,343	-	-	751,343
Non-class Lab (250 & 255)	1,741,662	22,026	3,725	1,767,413	-	-	1,767,413
Office Facilities (300)	2,315,009	(31,940)	40,311	2,323,380	-	(3,195)	2,320,185
Study Facilities (400)	470,942	24,974	18,202	514,118	-	(1,027)	513,091
Special Use Facilities (500)	1,200,135	11,251	(10,437)	1,200,948	-	-	1,200,948
General Use Facilities (600)	969,612	13,384	11,290	994,286	-	-	994,286
Support Facilities (700)	2,918,659	(8,356)	(51,333)	2,858,970	-	6,959	2,865,928
Health Care Facilities (800)	218,188	(1,900)	-	216,288	-	-	216,288
Resident Facilities (900)	2,438,915	111,146	-	2,550,061	-	-	2,550,061
Unclassified (000)	170,958	-	-	170,958	-	-	170,958
B. OTHER FACILITIES (Please list major categories)				-			-
TOTAL SPACE	13,492,266	124,685	92,438	13,709,389	-	2,737	13,712,126

Notes:
- Space/Room codes based on Postsecondary Ed Facilities Inventory and Classification Manual (2006)

(1) Identify in a footnote the specific facilities that are included in the data in these columns. Do not include pending approval, non-submitted projects or non-funded projects

Space under construction includes:
- Shealy Hall Roof Replacement
- Zucrow High Speed Propulsion Lab
- Mechanical Engineering Building Renovation
- Life Sciences Phenotyping Greenhouse Building
- University Hall and Related Renovations
- University and Schleman Halls Strategic Transformer Replacement
- Birck Nanotechnology Center Clean Room Modernization and Related Renovations
- Purdue Airport Terminal
- Chilled Water Capacity Enhancement Projects
- Hillenbrand Residence Hall South

Space planned and funded includes:
- Wetherill Lab Drain and Supply Line Replacement Phase I
- Nursing and Pharmacy Education Building
- Mitchell E. Daniels, Jr. School of Business Building
- Graduate House Parking Garage Demolition and Site Restoration
- Wetherill Lab Drain and Supply Line Replacement Phase II - 2024
- Vawter Hall Electrical Enhancements and Replacement
- Shreve Hall Electrical Enhancements and Replacement
- Stewart Center and Purdue Memorial Union Courtyard Plaza Concrete and Waterproofing Replacement - 2025
- Burke Boilermaker Aquatic Center Mechanical Project
- Biochemistry Building Office of the State Chemist Lab Renovation
- Reed Animal Disease Diagnostic Laboratory Equipment Replacement
- Wesley Foundation Property Purchase & Sale
- Chi Omega Sorority Property Purchase & Ground Lease

CAPITAL PROJECT COST DETAILS

Mathematical Sciences Building Data Center Renovation

Institution:	Purdue University	**Budget Agency Project No.:**	B-1-25-2-01
Campus:	West Lafayette	**Institutional Priority:**	N/A

ANTICIPATED CONSTRUCTION SCHEDULE

	Month	Year
GMP Delivery	February	2025
Start Construction	May	2025
Occupancy (End Date)	February	2026

ESTIMATED CONSTRUCTION COST FOR PROJECT

	Cost Basis (1)	Estimated Escalation Factors (2)	Project Cost
Planning Costs			
a. Engineering			$ -
b. Architectural	$ 1,382,000		$ 1,382,000
c. Consulting			$ -
Construction			
a. Structure	$ 1,382,000		$ 1,382,000
b. Mechanical (HVAC, plumbing, etc.)	$ 4,020,000		$ 4,020,000
c. Electrical	$ 8,704,622		$ 8,704,622
Movable Equipment			$ -
Fixed Equipment			$ -
Site Development/Land Acquisition			$ -
Other (PM fee, contingencies, insurance, etc)	$ 511,378		$ 511,378
TOTAL ESTIMATED PROJECT COST	**$ 16,000,000**	**$ -**	**$ 16,000,000**

CAPITAL PROJECT OPERATING COST DETAILS

Mathematical Sciences Building Data Center Renovation

Institution:	Purdue University	**Budget Agency Project No.:**	B-1-25-2-01
Campus:	West Lafayette	**Institutional Priority:**	N/A

GSF OF AREA AFFECTED BY PROJECT 20,767

ANNUAL OPERATING COST/SAVINGS (1)

	Cost per GSF	Total Operating Cost	Personal Services	Supplies and Expenses
1. Operations	-	$ -		
2. Maintenance	-	$ -		
3. Fuel	-	$ -		
4. Utilities	$ 57.78	$ 1,200,000		$ 1,200,000.00
5. Other	-	$ -		
TOTAL ESTIMATED OPERATIONAL COST/SAVINGS	**57.7839842**	**$ 1,200,000**	**$ -**	**$ 1,200,000.00**

Description of any unusual factors affecting operating and maintenance costs/savings.

The updated data center will have nearly twice as much computing capacity as the existing data center while utility costs are expected to increase by only 63%. New, more efficient systems project to avoid utility cost increases of more than $650k per year. Total utility costs associated with the data center at MATH are projected to increase from $1.86M to $3.03M. A majority of the increase will be in electricity costs ($950k) while the remaining will be in chilled water costs ($220k).