B-1-22-1-09

PURDUE UNIVERSITY

Office of the Chief Financial Officer and Treasurer

April 14, 2022

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

Dear Governor Holcomb:

At its meeting on April 8, 2022, the Purdue University Board of Trustees approved the planning, financing, construction and award of construction contracts for the Zucrow High Speed Propulsion Lab on the West Lafayette campus.

This project includes the construction of an approximately 54,500 square foot research facility with propulsion test cells, a high pressure air plant, control rooms, laser labs, office space and high-pressure equipment support.

This project directly supports two of Purdue's *Next Moves* initiatives: National Security and Technology and the Purdue Applied Research Institute. The project will enable significant new research and testing work that supports federal agencies and other organizations and contribute to the creation of new jobs.

The estimated total project cost is $73,000,000, 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
Zachary Jackson, Director, Indiana State Budget Agency
Jasmine Williams, Assistant Director, Indiana State Budget
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

Zucrow High Speed Propulsion Lab

Institution:	Purdue University	**Budget Agency Project No.:**	B-1-22-1-09
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:	54,500 GSF (1)	38,164	ASF (2)	0.70	ASF/GSF
Net change in overall campus space:		54,500		38,164	ASF

Total cost of the project (3):	$ 73,000,000	**Cost per ASF/GSF:**	1,339 GSF
Total cost of the demolition:	$ -		1,913 ASF

Funding Source(s) for project (4):	Amount	Type
	$ 73,000,000	Operating Funds - Reserves

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

Project Funding:

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

Project Cost Justification

The project cost/GSF is similar to the effective cost/GSF of the project listed in the Comparable Project section. Justification is included in the Comparable Project section.

Estimated annual change in cost of building operations based on the project:	$ 399,999
Estimated annual repair and rehabilitation investment (5):	$ 1,095,000

(1) Gross Square Feet (GSF)- Sum of all area within the exterior envelope of the structure.

(2) Assignable Square Feet (ASF)- Amount of space that can be used by people or programs within the interior walls of a structure. Assignable square feet is the sum of the 10 major assignable space use categories: classrooms, laboratories, offices, study facilities, special use facilities, general use facilities, support facilities, health care facilities, residential facilities and unclassified facilities. For information on assignable space use categories, see Space-Room Codes tab.

(3) Projects should include all costs associated with the project (structure, A&E, infrastructure, consulting, FF&E, etc.)

(4) Be consistent in the naming of funds to be used for projects. If bonding, note Bonding Authority Year (1965, 1929, 1927, etc.)

(5) Estimate the amount of funding the institution would need to set aside annually to address R&R needs for the project. CHE suggests 1.5% of total construction cost

(6) If issuing debt, determine annual payment based on 20 years at 4.75% interest rate

- If project is a lease-purchase or lease, adjust accordingly. Note the total cost of the lease in the project cost, and annual payments in project description

PROJECT DETAILED DESCRIPTION - ADDITIONAL INFORMATION

Zucrow High Speed Propulsion Lab

Institution:	Purdue University	**Budget Agency Project No.:**	B-1-22-1-09
Campus:	West Lafayette	**Institutional Priority:**	N/A

Description of Project

This project will construct a new 54,500 GSF facility that will include propulsion test cells and a high pressure air plant within the Maurice J. Zucrow Laboratories on the West Lafayette campus.

The facility will include up to five reinforced concrete test cells and associated laser labs, control rooms, support office space and work shop assembly areas. Layout and support for high-pressure piping, valves, pressure and storage vessels, liquid jet fuel tanks, pumps and instrumentation will be included in the project. The test cells in the High Speed Propulsion Lab will have the ability to mimic conditions. Researchers from academia, government and industry can design an experiment and run it in the test cell – bringing in the equipment that needs to be tested.

The new high pressure air plant will serve surrounding Zucrow Laboratories facilities, in addition to the new facility being built.

The new facility will displace some parking at the adjacent Zucrow test cell facility, and a new parking lot will be constructed as part of this project.

The required hot air piping will deliver 1,500°F air at 800 psi. The new air plant will be capable of producing 2,200 psi air at 5lbm/second.

Need and Purpose of the Program

This project will provide the necessary space to conduct additional jet propulsion engine testing and research work in support of two of Purdue's *Next Moves* initiatives: National Security and Technology and the Purdue Applied Research Institute — strategic initiatives designed to advance the University's competitive advantage.

The University intends to lead national centers of excellence with cross-sector participation; deliver new, one-of-a-kind research and test facilities that are national assets; and provide the advanced facilities and infrastructure to support mission critical efforts of federal agencies such as the Department of Defense, the intelligence community, USAID, as well as industry and non-governmental organizations.

The new high pressure air plant will replace the existing plant that is near the end of its useful life.

The completion of the Hypersonics Applied Research Facility and this project will enable an additional $25M in research and testing work, which will create more than 140 new jobs.

Space Utilization

The proposed Zucrow High Speed Propulsion Lab will provide testing, research and support space that totals 38,763 ASF. No interior space will be demolished as part of this project.

Comparable Projects

Zucrow High Pressure Research Lab Test Cells Construction and Control Center Renovation (ZL8) (2015)
- o 14,600 GSF
- o $8,200,000
- o $561/GSF

The ZL8 project included the construction of a new facility with test cells, laser lab, research preparation space, renovation and expansion of a nearby Zucrow facility with an added control center, research offices and a new parking lot.

The 2015 project cost was not inclusive of all work. An additional $2.4M was supplemented to include all required specialty piping, which made the 2015 construction costs effectively $724/GSF. ZL8 also did not include a high pressure air plant that this proposed project has, which accounts for approximately $8M of the $73M total project cost. The new facility is significantly larger than ZL8 at almost four-times the GSF.

Additionally, construction cost escalation in typical years is estimated by the market to be 4%. With supply chain issues and other global market conditions, 2020 showed escalation to be 15% and 2021 to be 20%.

Considering all factors listed above, the adjusted cost/GSF for ZL8 would be $1,362 in 2022 dollars, slightly higher but in line with the proposed project cost.

Background Materials

CAPITAL PROJECT REQUEST FORM
INDIANA PUBLIC POSTSECONDARY EDUCATION
INSTITUTION CAMPUS SPACE DETAILS FOR Zucrow High Speed Propulsion Lab

	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)	338,423	-	-	**338,423**			**338,423**
Class Lab (210,215,220,225,230,235)	745,937	86,679	-	**832,616**			**832,616**
Non-class Lab (250 & 255)	1,661,670	20,156	(497)	**1,681,329**		29,714	**1,711,043**
Office Facilities (300)	2,378,501	18,284	(443)	**2,396,342**		8,450	**2,404,792**
Study Facilities (400)	390,846	15,169	-	**406,015**			**406,015**
Special Use Facilities (500)	1,217,709	-	12,709	**1,230,418**			**1,230,418**
General Use Facilities (600)	987,864	15,462	2,921	**1,006,247**			**1,006,247**
Support Facilities (700)	2,871,393	(662)	-	**2,870,731**			**2,870,731**
Health Care Facilities (800)	208,803	-	-	**208,803**			**208,803**
Resident Facilities (900)	2,697,807	-	-	**2,697,807**			**2,697,807**
Unclassified (000)	20,868	-	-	**20,868**			**20,868**
B. OTHER FACILITIES (Please list major categories)							
TOTAL SPACE	**13,519,820**	**155,088**	**14,690**	**13,689,598**	**-**	**38,164**	**13,727,762**

Notes:

(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/Room codes based on Postsecondary Ed Facilities Inventory and Classification Manual (2006)

Space under construction includes:
- Gateway Complex
- Purdue Bands & Orchestra Building
- Hypersonics Building
- Secure Data Research Project
- Child Care Center Building
- Schleman/Stewart Renovation

Space planned and funded includes:
- Whistler Mechanical Project
- Life Sciences Phenotyping Greenhouse Building
- Mackey Locker Rooms Renovation
- Ross-Ade Stadium Renovation

(2) Space added as part of this project includes non-class lab (research) and office spaces.

CAPITAL PROJECT COST DETAILS

Zucrow High Speed Propulsion Lab

Institution:	Purdue University	**Budget Agency Project No.:**	B-1-22-1-09
Campus:	West Lafayette	**Institutional Priority:**	N/A

ANTICIPATED CONSTRUCTION SCHEDULE

	Month	Year
Bid Date (GMP delivery)	October	2022
Start Construction	January	2023
Occupancy (End Date)	March	2025

ESTIMATED CONSTRUCTION COST FOR PROJECT

	Cost Basis (1)	Estimated Escalation Factors (2)	Project Cost
Planning Costs			
a. Engineering	$ 3,550,000		$ 3,550,000
b. Architectural	$ -		$ -
c. Consulting	$ -		$ -
Construction			
a. Structure	$ 14,000,000		$ 14,000,000
b. Mechanical (HVAC, plumbing, etc.)	$ 38,885,000		$ 38,885,000
c. Electrical	$ 7,000,000		$ 7,000,000
Movable Equipment	$ -		$ -
Fixed Equipment	$ 520,000		$ 520,000
Site Development/Land Acquisition	$ 5,000,000		$ 5,000,000
Other (PM fees, contingencies)	$ 4,045,000		$ 4,045,000
TOTAL ESTIMATED PROJECT COST	**$ 73,000,000**	**$ -**	**$ 73,000,000**

(1) Cost Basis is based on current cost prevailing as of: (INSERT MONTH AND YEAR)

(2) Explain in the Description of Project Section of the "Cap Proj Details" schedule the reasoning for estimated escalation factors

CAPITAL PROJECT OPERATING COST DETAILS

Zucrow High Speed Propulsion Lab

Institution:	Purdue University	**Budget Agency Project No.:**	B-1-22-1-09
Campus:	West Lafayette	**Institutional Priority:**	N/A

GSF OF AREA AFFECTED BY PROJECT 54,500

ANNUAL OPERATING COST/SAVINGS (1)

	Cost per GSF	Total Operating Cost	Personal Services	Supplies and Expenses
1. Operations	1.37	$ **74,829**	70,317	4,512
2. Maintenance	2.52	$ **137,287**	108,498	28,789
3. Fuel		$ -		
4. Utilities	3.45	$ **187,883**	20,102	167,781
5. Other		$ -		
TOTAL ESTIMATED OPERATIONAL COST/SAVINGS	**7.34**	$ **399,999**	$ **198,917**	$ **201,082**

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

The total annual operating cost for the new facility is $399,999, and there is no demolition as part of this project to offset that amount.

(1) Based on figures from "Individual Cap Proj Desc" schedule