

SOUTH DAKOTA BOARD OF REGENTS

Budget and Finance

AGENDA ITEM: 7 – U

DATE: December 6-8, 2016

SUBJECT: Northern State University Regional Science Education Center – Facility Program Plan

Northern State University requests approval of its Facility Program Plan to construct a new science facility at a cost of \$25,175,000. This project’s Preliminary Facility Statement was approved by the Board at its June 2015 meeting.

At the December meeting, the Board discussed the possibility of using some Higher Education Facilities Funds to supplement the \$15M gift received for this new building. The proposal included an interest free loan for the balance of the project cost (up to \$20M), until such time that HEFF could pick up debt service of the project. If approved the Board would likely issue a private placement bond which the donor would buy and carry until HEFF would cash flow the debt service. At the time HEFF became available, the Board would issue bonds in an amount sufficient to buy the bonds back and then the principal and interest would be covered with HEFF. No decision was made pending a better cost estimate for the building.

The current cost estimate of the building is \$25,175,000. With the gift of \$15M, there is a funding gap of \$10,175,000. The Board will need to revisit the idea of committing HEFF in the future. This could mean replacing other projects on the current 2012 Ten-Year Plan, shifting the priorities, or committing funds after all other projects are completed. Without the commitment of HEFF, the project would have to be funded entirely with private funds. The legislation could include HEFF as a fund source, although unless there is a firm commitment, it could put the legislation in jeopardy.

Originally, the project was planned for both math and science programs, however, as a result of the architectural programming process, NSU determined that math will remain in the MeWaldt-Jensen building. The proposed new building will be approximately 50,000 gross square
(Continued)

DRAFT MOTION 20161206_7-U:

Option 1: I move to submit legislation to amend the 2012 Ten-Year Plan by adding the NSU Regional Science Education Center at a cost of \$25,175,000, with \$X.XXM to be funded with Higher Education Facilities funds and the balance to be funded with private funds.

Option 2: I move to submit legislation to approve NSU’s Facility Program Plan to construct a Regional Science Education Center at a cost of \$25,175,000. Funding for this project will come entirely from private donations.

feet. The selected site for this building will be on the corner of 12th Ave and State Street providing a gateway to campus. This site is currently fenced in and utilized as a practice football field. Since most visitors, staff and students arrive at NSU by traveling south on State Street, this facility will be the first glimpse of the campus. There will be easy access from this facility to both the Barnett Center and Johnson Fine Arts Center parking lots.

This facility will support the advancement of science education and research in the region. The Regional Science Education Center will be a significant addition both academically and architecturally, providing students and faculty with state of the art, flexible research and learning laboratories, innovative learning spaces, and collaborative interaction spaces. Laboratory designs within this building will have a unique set of physical parameters associated with pedagogical and scientific requirements. The following items will be implemented into the conceptual design: maximized adaptability/flexibility, multiple learning configurations, safety and security optimized, transparency of space with views and access to research, and shared lab prep with optimized work flow/adjacencies.

The facility would qualify for HEFF monies in the future for maintenance and repair. The utility costs would come from the general funds utility appropriation used to support academic facilities. Utility costs are estimated based on the size of the building and historical utility costs for academic buildings at NSU. Additional staff needed to routinely clean the building will come from the university's existing operating budget.

If approved, the Regional Science Education Center facility should be added to the 2017 legislative bill package. The facility could be an amendment to the 2012 Ten-Year Plan if HEFF dollars are being committed, otherwise it makes more sense for the bill to be a standalone bill.

Additional specifics of the project can be found in NSU's attached Facility Program Plan document and schematic drawings. This project is under the guidance of a building committee with Regent Morgan serving as the representative.

Northern State University Regional Science Education Center Facility Program Plan

Northern State University requests the approval of this Facility Program Plan for the construction of a new science facility. This Regional Science Education Center is an investment not only in Northern State University but in the entire region. Not only will our students majoring in the sciences benefit a great deal from this facility, in addition, given NSU's long standing tradition of excellence in teacher preparation, this regional initiative will benefit K-12 students and educators, strengthening our existing partnership and expanding opportunities for collaboration. The Preliminary Facility Plan was approved by the Board of Regents in June 2015.

A. Programmatic justification for discrete spaces

Northern State University's mission includes teaching, research and service, with student instruction and advising recognized as a primary area of emphasis. Faculty are recognized as exceptional teacher-scholars who engage in research for professional development and faculty include students in their research in order to prepare them for advanced studies, often placing students within the South Dakota Regental system.

Northern State University's recent grant in support of a science education center provides an exceptional opportunity to advance science education and research in the region, yielding increased enrollments in the sciences at Northern State University. This Regional Science Education Center will be a significant addition both academically and architecturally providing students and faculty with state of the art flexible research and learning laboratories, innovative learning spaces, and collaborative interaction spaces. Throughout the past 10 years, the number of students declaring a science major has fluctuated but we have experienced increases of 50-66% (159 majors in 2006 fall, 260 in the spring of 2012, 225 in the fall of 2016) and credit hour production in the sciences has increased nearly 68% (4,119 credit hours in FY07 compared to 6,911 credit hours in FY16).

The Preliminary Facility Plan proposed that both the math and science programs would be housed in the new facility. However, as a result of the architectural programming process, it has been determined that math will remain in MeWaldt-Jensen. Much of second floor will be reconfigured to meet the needs of the math program providing students and faculty with a robust teaching and learning environment. The development of enhanced learning facilities and services in mathematics emulates that of other successful institutions in the state, such as the School of Mines, with the objective of continuing to increase student success, retention, and graduation ratios.

This Regional Science Education Center will serve four distinct purposes:

1. Providing a facility that enhances learning and research opportunities for current and future Northern State University students. Northern State faculty will benefit from this new facility as an enhanced instructional environment, leading to enhanced learning outcomes.

2. Faculty will have dedicated research facilities which will enhance both their own research and increase opportunities for engaging students in research.
3. Providing opportunities for current and future science teachers to regularly increase their knowledge regarding science content and pedagogy, all for the objective of sustaining excellent elementary and secondary science education in the region and State of South Dakota.
4. Providing K-12 students the opportunity to learn and become excited about the sciences, with the goal of promoting STEM educational opportunities, a strategic initiative promoted by the Governor of South Dakota.

This facility will improve the educational experience in the following ways:

1. Efficiency will be impacted in two ways. First, this facility will allow for more efficient use of resources, including temperature control, appropriate ventilation in multiple spaces, and energy efficiency in terms of water, lighting and other parameters. Second, the facility will provide for much more efficient use of preparation and storage space. Currently, 1-3 labs utilize and share common prep spaces. This has led to duplication of certain supplies and pieces of equipment. This duplication will be avoided in the facility via use of a larger prep space shared by all labs within a discipline (e.g. single biology prep space and a single chemistry prep space).
2. Growth/expansion: Our programs have grown to the point where there is no appropriate space available for further expansion. Moving the sciences to a new facility while maintaining some lab spaces in MJ will allow for expansion of course specialized offerings, such as histology and geology, and additional programs, such as a MS in Environmental Studies and/or more specialized programs similar to Accelerated Nursing.
3. Collaboration: The new facility will improve collaboration between science faculty due to the common prep and research space. It will also allow for more collaboration with other entities such as the School of Education and EPSCOR, as well as enhance our capabilities to collaborate with researchers at other higher education institutions. We will also have the potential to expand existing activities such as the Northern South Dakota Regional Science Fair and the NSU Undergraduate Scholarship, Research, and Creativity Forum, and allow us to effectively host other events such as the Annual Meeting of the South Dakota Academy of Sciences. A new facility will be attractive to outside entities looking for interns and graduates to fill their positions, thus enhancing students' opportunities for internships and other hands-on educational experiences leading to employment and advanced studies.
4. Competitiveness: This facility will make NSU more competitive with other institutions in the region with newer facilities. We expect the facility itself to be a recruitment tool for our programs. Additionally, considering the new building will allow for expanded and more advanced education and research opportunities, we anticipate that our students will

ultimately be more marketable when pursuing careers or graduate/professional school programs.

Governor Dugaard recently stated “For more than a century, Northern has served our state and the region, and it is an increasingly important part of our education system.” This new facility will truly serve as a Regional Science Education Center, allowing Northern to continue to expand its role as a STEM outreach education partner with regional school districts in the State of South Dakota. In so doing, we will have an increased ability to encourage K-12 students to get excited about science and also equip teachers with the toolkits needed to better prepare their students. Importantly, the new building, when paired with our efforts of continually enhancing our science education agenda as well as advanced research opportunities for our students, will serve to augment economic development initiatives in the region and state as a whole. This will be achieved by our ability to better attract and retain high quality students and better prepare these students to enter into the work force of local and regional industries.

B. Gross Square Footage

The proposed building will include approximately 50,000 square feet with an efficiency of 60% resulting in 30,000 square feet of total programmed space.

C. Site Analysis

It has been determined that the building should reside on the corner of 12th Ave and State Street providing a gateway to campus. This corner of campus, currently fenced in and occupied by the practice football field, is the first glimpse of NSU seen by most people since the majority of people coming to campus arrive by traveling south on State Street. This location will provide easy access to the facility since it is adjacent to both the Barnett Center and Johnson Fine Arts Center parking lots.

D. Description of Key Building Features

Laboratory Design

Teaching, research, and related support lab spaces, have a unique set of physical parameters associated with pedagogical and scientific requirements. Based on the goals and detailed criteria discussed during the programming phase of the process the following items have been implemented into the concept design:

- Maximized adaptability/flexibility
- Multiple learning configurations
- Safety and security optimized
- Transparency of space with views and access to research
- Shared Lab Prep with optimized work flow/adjacencies

Teaching/Class Labs – the space requirements for each scientific area of study have been allocated with common elements of infrastructure and prep support sufficient to sub-divide and meet the specific needs of each discipline. Each laboratory has additional elements such as sinks and services that are specific to the course requirements. Class lab occupancies range from 16-24 students working in groups of 2 or 3 with benches. In each lab there is also provided book storage at the bench or wall cubby, an eyewash unit, safety shower (where fume hoods are located), and casework/countertop space at the perimeter.

Student/Faculty Research Labs - wet and dry research, laboratory support and core lab spaces for a variety of spaces such as analytical instruments, and specialized labs such as NMR/SEM are provided to enhance student research and collaboration among chemists, biologists and physical scientists. The research labs are envisioned to encourage scientific dialogue, recognizing the need for flexibility of research space to accommodate new directions in student work, discovery and strategic collaborations.

Prep/Support Labs – this area includes multiple consolidated rooms and functional areas to support all science discipline instruction and research. An Autoclave/Glass Wash area and Cell Culture room are provided which require close proximity to Microbiology, Biotechnology, and Plant Physiology labs while remaining secure inside the Biology Prep/Support zone. The Chemistry Prep/Support zone contains areas for dirty and clean operations, chemical storage, and access to instrumentation labs, with adequate space for wet bench preparation. Physics support consists of dry lab space for teaching and research lab environments.

Biology Labs

General Biology and the majority of the Class labs (Micro/Cellular, Biotechnology, and Ecology) are designed in a modular fashion, capable of adapting to meet specific laboratory needs and pedagogies. Rooms have been organized in a suite concept for general separation and specialized support functions. Students majoring in Biology currently must share lab space with students taking non-majors biology and chemistry. This creates scheduling conflicts but more importantly increases exposure to potential hazards since labs for science majors use considerably more chemicals and hazardous materials than do non-majors labs. Thus, having separate space will provide a safer environment for all students involved.

The medical lab will house a variety of courses, including anatomy, physiology, hematology, and others. Currently, many of these courses share space with the anatomy lab, which needs to be kept at a colder temperature than what is conducive to learning. Having a separate anatomy lab will serve as both a learning tool and a recruitment tool. This lab requires dedicated space for dissection with proper ventilation and changing areas for students.

The size of the lab that is currently available for microbiology and cell and molecular biology is inadequate making it difficult to accommodate the number of students enrolled in the lab sections. The new lab would provide adequate teaching space and provide better and more efficient storage and use of equipment. For example, the autoclave, currently housed in the

prep area, would be housed in its own suite which is safer and more efficient than having it in its current location. An imaging suite would house the confocal microscope along with other specialized microscopes and equipment used for both teaching and research purposes. This design would also better serve graduate students as new programs are developed by allowing them more access to equipment.

The strength of many of the organismal and field biology courses (*e.g.* Invertebrate and Vertebrate Zoology, Animal Behavior, Entomology, Aquatic Ecology, etc.) rely strongly on the use of preserved and live animals for either anatomical/behavioral observation or for longer term research projects. Current facilities are suboptimal for housing these organisms for several reasons; among the most prominent are lack of space, lack of proper dissection facilities/ventilation systems, and inconsistent temperature control. To support the study of biological sciences, the space will be designed for the purpose of supporting amphibians and meeting unique research needs.

The addition of a Biotechnology lab within a new science building will tremendously assist in teaching critical lab skills, providing outreach opportunities for future post-secondary students, enabling more collaborative projects and internships with local/regional institutions and companies (a requirement for the AS degree in Biotechnology), and delivering peer-reviewed research results surrounding this growing field of science.

The GIS lab will provide adequate and appropriate place to teach course offerings. GIS courses are currently taught in a science lab where the computers are placed along the room's periphery – facing away from the front of the class. Students cannot see the instructor at the front of the room and their computer simultaneously. In addition, there is insufficient space to provide the ability for a dual-monitor system (GIS industry standard) without cutting the size of the class. The proposed GIS lab will provide students with the learning environment they need.

The undergraduate research program in the sciences has seen significant growth in the past ten years, resulting not only in a substantial increase in the number of students participating in significant semester or yearlong independent research projects, but also tremendous growth in the number of students presenting their work not only at local events such as the NSU Scholarship and Creativity Forum, but also at regional and national conferences. For example, in the past three years, a total of fourteen students have participated and presented original research at regional events such as the annual meeting of the South Dakota Academy of Science and EPSCoR Undergraduate Research Symposium and ten students have presented research at national and international conferences (*e.g.*, annual meetings of the Society for Freshwater Science, Entomological Society of America, and Society for the Psychological Study of Social Issues). Additionally, two of the NSU students who attended/presented work at the annual meeting of the Society for Freshwater Science received a prominent fellowship to attend the meeting, thus encouraging them to stay involved and learn of opportunities for graduate research in the realm of ecology. A major outcome of these endeavors is the high percentage (near 90%) of our students accepted into graduate and professional schools as well

as those that obtain gainful employment upon graduation. A new building will not only provide better and more modern facilities for these research activities, but also serve to attract and recruit a broader base of high-quality students who may participate in these activities which ultimately will help them achieve their future career goals.

Chemistry and Physics Labs

The Organic Chemistry Lab will be specialized to conduct Organic laboratory experiments safely. It is the second largest set of labs for us and the number of students taking it will grow as the number of students majoring in biology increases. The Advanced Chemistry lab will house all of our other chemistry lab offerings which includes Criminalistics, Analytical, Physical, Instrumental Analysis, and Environmental Chemistry. An instrument room will house all of our larger instruments. This room will have specialized spaces to accommodate the specific needs of each instrument such as electrical requirements, special venting, and specialty gases. A proper Chemical Storage room is essential to any active science department. It will comply with all safety requirements as well as be big enough for healthy expansion of the department.

Physics lab space will provide the necessary dry bench teaching environment. The “workshop” or studio concept of Physics instruction permits students to work in collaborative teams of four at docked perimeter benches to allow for experimentation in the center of the room. The lab will be equipped with required power and mechanical systems to support specialized analytical equipment and apparatus. This teaching-friendly lab design provides a learning environment that enables students to learn the fundamentals of physics.

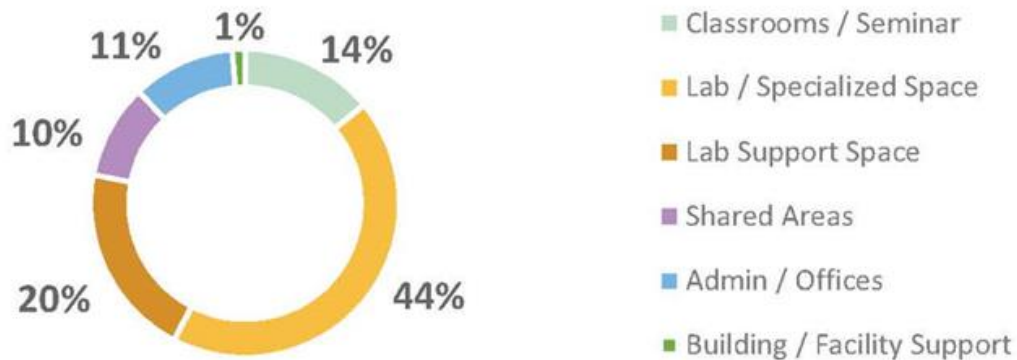
Classrooms and Offices

In addition to the laboratory classrooms, the new facility will also house three general classrooms and offices for faculty and support staff. Two of the three general classrooms will support 35 students each, and the other will seat 100 students with retractable lecture style seating to be flexible and adaptable to enable multiple uses.

Proposed space allocations can be summarized as follows:

Program		
Classrooms / Seminar		4,200
Lab / Specialized Space		13,120
Lab Support Space		6,120
Shared Areas		2,980
Admin / Offices		3,250
Building / Facility Support		400
Total Net Square Feet		30,070
Grossing Factor (60% Efficiency)		1.66
Total Projected Gross Square Feet		49,916

PROGRAM ALLOCATION BY SPACE TYPE



E. Illustrative Floor Plans

See attached.

F. Initial Cost Estimates and Funding Sources

The estimated project cost is \$25,175,000 which includes:

Construction Costs	\$18,200,000
Furniture, Fixtures & Equipment	2,500,000
Architect and Engineering Services	2,100,000
OSE	63,000
Construction Testing	15,000
Commissioning	150,000
Soil Tests and Survey	20,000
Contingency	2,127,000
Estimated Total Project Cost	<u><u>\$25,175,000</u></u>

G. Identification of Fund Sources

The funding would come from a combination of HEFF and private funds, or 100% private funds totaling \$25,175,000.

H. Operating Expenses and Impact to Campus Maintenance and Repair

Operating costs for the new facility will be funded through the university's utility allocation and existing operating budget. The budget includes additional staff to maintain the facility. Utility costs are estimated based on the size of the building and historical utility costs for academic buildings at NSU.

Estimated Annual Operating Costs

Salaries & Labor-Facility Workers	\$74,000
Contractual - Maintenance Contracts	10,800
Supplies	4,000
Utilities	42,000
	<u>\$130,800</u>

Maintenance and repair costs for the facility will be funded through the university's annual M&R allocation.