

SOUTH DAKOTA BOARD OF REGENTS

Budget and Finance

AGENDA ITEM: 7 – R

DATE: March 30-April 1, 2016

SUBJECT: South Dakota State University Plant Science Research Support Facility – Facility Design Plan

South Dakota State University requests approval of its Facility Design Plan to continue planning, design and construction of the Plant Science Research Support Facility at a projected cost of \$4,500,000. SDSU’s Preliminary Facility Statement for this project was approved in October 2014 with the Facility Program Plan approved by the Board at its December 2014 meeting. The Building Committee approved this Facility Design Plan at their March 21, 2016 meeting.

This new facility will consist of 17,142 gross square feet. The space will house laboratory, seed preparation, seed drying storage, office, support, multi-purpose and unloading areas. The building will be located north of the existing Foundation Seed Stock and Plant Science Storage buildings. There is gravel road access from the north and from the south, but a new driveway will be added to connect the building drives and parking lot to Stadium Road. A parking lot will be created south of the building to accommodate 20 to 25 parking spaces.

The building will include individual workrooms that will line each side of a main corridor. The workrooms contain laboratory bench top space for equipment and individual lab tech work. The rooms will also contain compressed air, vacuum system, and dust collection equipment.

An office suite with support spaces is located along the west end of the building. There will be six enclosed private offices in this area with open office area that will house six or seven workstations, a copy/print center and shared work space. In addition, program spaces will include multi-purpose space, restrooms, IT closet, and custodial space.

(Continued)

RECOMMENDED ACTION OF THE EXECUTIVE DIRECTOR

I move to approve SDSU’s Facility Design Plan to move forward with planning and design to construct a Plant Science Research Support Facility at an estimated cost of \$4,500,000. Funding for this construction project will consist of \$2,400,000 from SDSU’s Facilities & Administration Sponsored Programs indirect funds, \$1,100,000 from the SDSU Foundation Seed Stock Grant, \$500,000 from the SDSU College of Agriculture & Biological Sciences, and \$500,000 from Agriculture Industry Partners. The building committee overseeing this project is being headed by Regent Schartz.

Along the east side of the building there will be dedicated shared program space. A large walk-in cooler for long-term seed storage will be included plus space for seed preparation and grinding, mechanical, electrical, and drying space. An unloading alley is also part of this area. The seed preparation and grinding room areas will share a dedicated dust collection system. The prep area will contain laboratory safety equipment required for chemical seed treatment.

Changes from the Facility Program Plan include a reduction of the overall building size to meet the budget requirements of the project. The location of the building was formerly noted as being north of the North Headhouse and Greenhouses along the north edge of campus.

Funding for this project will consist of \$2,400,000 from SDSU Facilities & Administration Sponsored Programs indirect funds, \$1,100,000 from SDSU Foundation Seed Stock Grant funds, \$500,000 from SDSU College of Agriculture and Biological Sciences funds, and \$500,000 from Agriculture Industry Partners.

Additional details of the project can be found in SDSU's attached Facility Design Plan document, elevation and schematic drawings.

FACILITY DESIGN PLAN

PLANT SCIENCE RESEARCH SUPPORT FACILITY SOUTH DAKOTA STATE UNIVERSITY

South Dakota State University (SDSU) requests approval of this Facility Design Plan to continue planning, design and construction of the Plant Science Research Support Facility.

The Preliminary Facility Statement (PFS) was approved at the October, 2014 Board of Regents meeting. Schematic Design was completed in 2015. The Facility Program Plan (FPP) was approved at the December 2014 Board of Regents meeting. This submittal is a result of the schematic and design development phases completed by MSH Architects.

1.A. ARCHITECTURAL, MECHANICAL AND ELECTRICAL SCHEMATIC DESIGN

The spaces are consistent with the program requirements and facility described in the Facility Program Plan.

Architectural and Structural Schematic:

The site will be accessed from the north via gravel drives and from the south via existing gravel drives. A new driveway will be added to connect the building drives and parking lot to Stadium Road. A gravel parking lot will be located south of the building and sized to accommodate 20 to 25 parking spaces.

This project will provide modern seed processing and storage facilities for crop production and plant science research. The outcome of this research will be superior varieties of seed and propagating materials. The building will also aid field and crop testing verification and research conducted by the Plant Science Department. Additionally, storage of seed stock for future variety development and comparative research will be provided.

The building program consists of individual workrooms that line each side of a main corridor. The workrooms contain laboratory bench top space for equipment and individual lab tech work. The workrooms will also contain compressed air, vacuum system, and dust collection equipment. The main corridor has been sized to accommodate seed storage and handling via a small forklift or hand truck.

An office suite with support spaces is located on the west end of the building. The office suite contains six enclosed private offices. There is also an open office space that can accommodate six to seven workstations, copy/print center, and shared work space. Other program spaces within the office suite include a multi-purpose space, restrooms, IT closet, and custodial space. The office suite can be accessed from the main corridor or a dedicated entrance on the south side of the building.

The east side of the building is dedicated to shared program functions within the building. These spaces include a large walk-in cooler for long-term seed storage, seed preparation and grinding room, mechanical room, electrical room, unloading alley, and drying rooms. The seed preparation and grinding room is a shared space dedicated to seed treatment and grinding processes. It contains three grinding rooms each having a dedicated dust collection system. The preparation area will also contain laboratory safety equipment required for chemical seed treatment. The drying rooms will contain both low-temperature high velocity drying rooms and high temperature drying ovens. Both drying systems are required for specific types of seed and plant material as well as to provide more flexibility for research projects. The unloading or drive-through alley will be used for handling bulk quantities of seed.

The building structure will consist of poured-in-place concrete footings and foundation, slab on grade concrete floor, and light frame wood construction for the walls and roof structure. The building envelope will be constructed to meet or exceed the current energy code requirements for commercial buildings. The building will be clad with a combination of materials including split face masonry block, cement board paneling, and sheet metal. All cladding materials have an expected life of at least 50 years.

Plant Science Research Support Facility Space Program

Program Function	Net Square Footage (NSF)	Notes
Laboratory	5,396	Workroom For Laboratory Equipment And Bench Top Work Space Grinding And Preparation Area For Seed And Plant Material Grinding, Preparation And Processing
Seed Preparation	630	
Unloading Alley	2,066	Bulk Loading And Unloading Of Seed And Plant Material
Seed Drying	1,510	Low Temperature Drying Rooms And High Temperature Drying Ovens Walk-In Cooler For Long Term Seed And Plant Material Storage, Main
Storage	2,991	Corridor for Bulk Seed And Equipment Storage
Office Space	2,143	FTE Offices And Graduate Student Offices
Multi-Purpose Room	478	Conference Room, Reference Library, Workroom, Printing, and Break Room
Support Spaces	1,506	Restrooms, Custodial, Electrical, And Mechanical
TOTAL NSF	16,720	
	Total Estimated	
	Gross Square Footage (GSF)	17,142

Mechanical Schematic:

Heating & Cooling

The office suite, workrooms, and support spaces will be heated and cooled with a central gas-fired air distribution system. A connection to the new north campus chiller plant is also being considered. Each space will be served by variable air volume terminal (VAV) box(es) to control air temperature in each regularly occupied space. Each VAV box will be equipped with an electric reheat coil. The unloading alley, seed drying, and electrical rooms will be tempered with local gas-fired heaters. Additional local gas-fired air distribution equipment will be provided for the low

temperature drying rooms. The equipment will have the capability to increase ambient temperature in the drying rooms to 120 degrees Fahrenheit.

Ventilation

The heating and cooling system will be designed to provide code required air changes throughout the building. The ventilation system will also provide adequate makeup air for the dedicated dust collection systems. High performance building standards will be used as the basis of design for filtration media in the ventilation system to ensure a high standard of indoor air quality for the facility.

The drying rooms will be equipped with general ventilation supply air to positively pressurize the room. Surplus ventilation air will be exhausted via louvers to the exterior. Electric unit heater(s) will be provided to maintain minimum room temperatures when outdoor temperatures are 50 degrees F or less.

Temperature Control

The building automation systems shall be designed as a direct extension of the existing campus system. The system shall contain all points and programming as required to allow for automated control and monitoring of the heating, cooling and ventilation systems.

Dust Collection Systems

The grinding rooms will be equipped with dedicated dust collection equipment. The Workrooms will also contain recirculating dust collection equipment for small samples. The recirculating dust collection equipment will filter and recirculate air into the space.

Plumbing Schematic

Water Service

A new water main will be required to produce adequate fire sprinkler pressure and flow to the building. There will likely be an 8" PVC pipe installed under a separate project 300 feet south of the building site. New pipe connections to the 8" PVC branch main shall be provided with isolation valves to the building for maintenance. A backflow preventer and water meter will be provided inside the building.

Waste Piping

Site elevations and sewer line inverts are being investigated to determine if a gravity flow system is possible for the project. If the elevations do not allow for adequate gravity flow from the site, the domestic sewer will be pumped into an existing sanitary manhole located south of the project site. The sump basin and pump will be sized for anticipated flows from the restrooms and multi-purpose room sink.

Storm water will be collected and surface drained around the building. Erosion will be controlled with paved surfaces or landscape rock surrounding the building. Storm water leaving the site will flow north into a detention pond that is currently under construction.

Plumbing Fixtures

Plumbing fixtures will meet ADA requirements and be low-flow sensor operated. An eyewash station will be provided in the Grinding/Prep Area where chemical seed treatment will occur. The workrooms do not require plumbing fixtures.

Fire Protection System

A fire service and wet pipe sprinkler system will be added to serve the entire building. The sprinkler system will be designed and installed per NFPA-13. The existing fire hydrant located approximately 150 feet southwest of the building site will be replaced.

Electrical Schematic

Power Distribution

The new facility will be served by a high voltage line originating from an existing switch vault located to the southwest of the building site adjacent to the Foundation Seed Storage Lot. The power distribution system is 208Y/120 Volts, three-phase, four wire, plus ground. Larger loads will be fed at three-phase and general power, and lighter loads will be fed with single-phase power. The grinding and cleaning rooms are hazardous locations and will require special electrical accommodations.

Emergency Power

No emergency power is planned for the building. Emergency egress lighting will be provided by battery packs in the luminaires that are used for normal lighting.

Security System

Rough-ins for card readers at the main entrances to the building shall be provided. Camera systems shall be coordinated to monitor entrances to the building.

Lighting Systems

LED lighting fixtures will be utilized where possible. Lighting will be controlled by local manual switches and occupancy sensors. Daylighting will be used to supplement electrical lighting where appropriate. Exterior lighting will be controlled by a photocell. Interior light will have a battery backup installed in the fixture for emergency egress lighting. Exit signs will be LED with battery backup.

Data & Communications

The communications systems shall be designed in accordance with the SDSU and national standards. Data networking will consist of Cat 6 cabling to work stations and telephone outlets from the IT Room. The cables will be run in conduit in the walls and all exposed areas and in cable trays above accessible ceilings. Existing servers will be used for the project.

Fire Alarm System

An addressable fire alarm system will be designed into the project and consist of an upgraded main fire alarm control panel, smoke and heat detectors in accordance with the NFPA standards.

1.B. CHANGES FROM THE FACILITY PROGRAM PLAN

The overall size of the building has been reduced in order to meet the budget requirements of the project while maintaining functionality. Square footage has been reduced in the drying room, work rooms, and storage. Space reductions were accomplished with more spatially efficient equipment and by consolidating shared functions into shared space.

The location of the project site has also changed from the site described in the Facility Program Plan. The new project site is located directly north of the Foundation Seed Stock and plant science storage buildings. The reasons for the change in site are: proximity to the existing plant science storage buildings, existing access roads and driveways, and the former project site has been devoted to the Sustainable Local Food Education Center.

SDSU has prepared a high performance building design and construction standards for LEED waiver request that has been approved by the Office of the State Engineer for this project. The waiver request is based on the terms set forth in the South Dakota Administrative Rules 10:09:03:01 item one fewer than 20 permanent occupants in a 24-hour period. The design team has also performed a simple first cost-to-life cycle payback analysis of the LEED certified design as compared to the ASHRAE standard baseline. The analysis has estimated the first cost payback to be over 30 years; which is outside of the payback recommendation of 15 years listed in item two of the Administrative Rules.

1.C. IMPACT TO EXISTING BUILDING OR CAMPUS-WIDE HEATING/COOLING/ELECTRICAL SYSTEMS

The new building will not have an impact on the campus-wide utility systems. A new 8" PVC water line is planned under a separate project to address water pressure issues in the northwest quadrant of campus. A connection to the new north chiller plant is being investigated, but will not have an impact beyond the building project requirements.

1.D. TOTAL CONSTRUCTION COST ESTIMATES

Total Probable Project Cost (Phase I & II)

Probable Construction Cost	\$	3,362,000
Owner & Design Contingency		250,000
Equipment (walk-in cooler, drying oven, & misc.)		298,000
Design/Professional Services		352,500
Other Services		238,000
Probable Project Cost Total	\$	4,500,000

Construction & Design Funding Sources

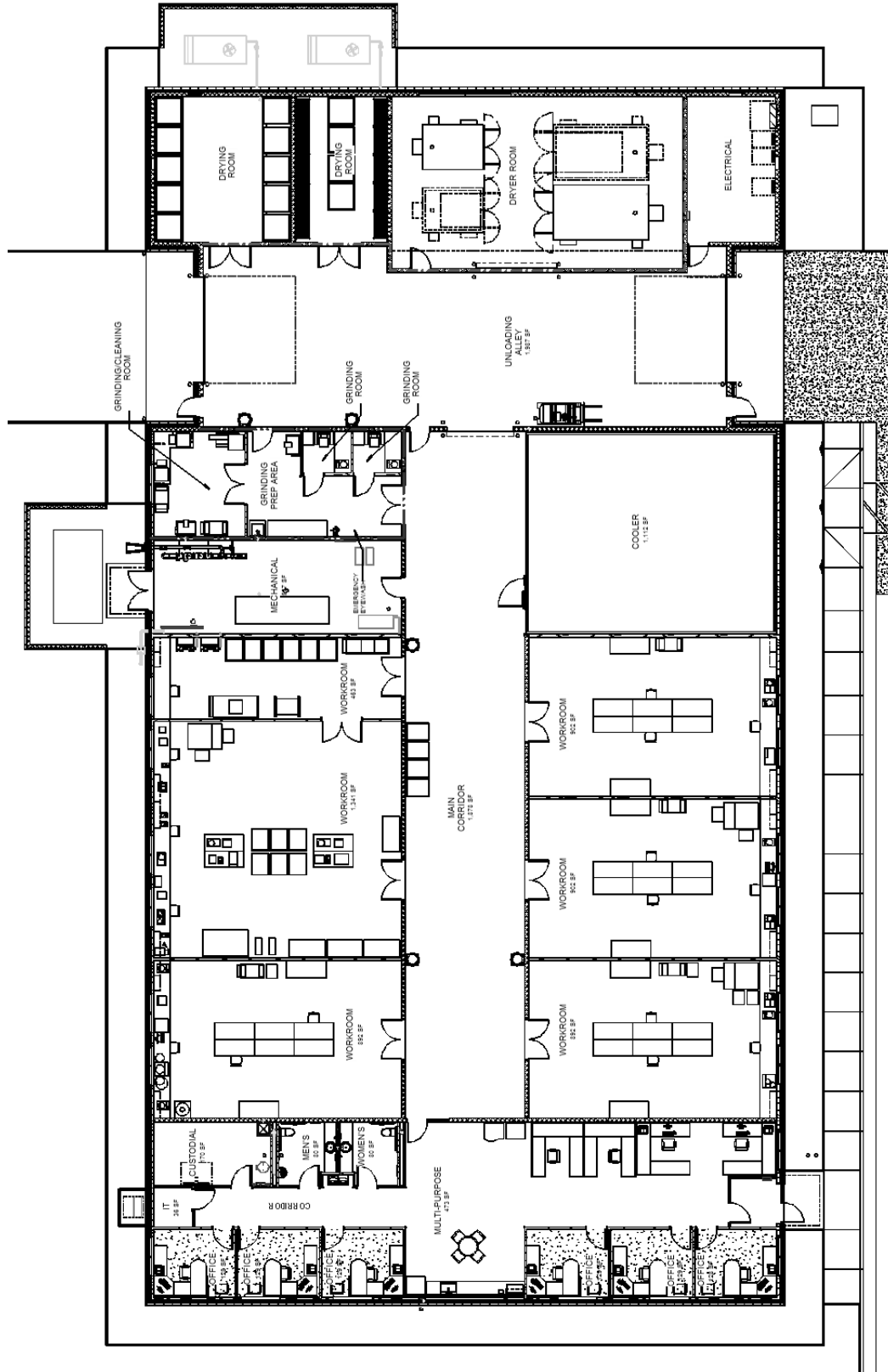
SDSU Facilities & Admin Sponsored Programs-Indirect	\$	2,400,000
SDSU Foundation Seed Stock Grant		1,100,000
SDSU College of Agriculture & Biological Sciences		500,000
Agriculture Industry Partners		500,000
Total	\$	4,500,000

1.E. CHANGES FROM COST ESTIMATES FOR OPERATIONAL OR M&R EXPENSES

The operational and M&R expenses for the Plant Science Research Support Facility will be funded from Agricultural Experiment Station funds, research indirect recovery costs, and production revenues. The estimated current replacement value (CRV) for the facility is \$4,100,000. Based on recognized industry standards, the annual funding for maintenance and repair/capital renewal funding should be equal to 1.5% to 3% of the building replacement value. This annual repair/capital renewal allocation should be between \$61,500 and \$82,000.

The annual routine operational expenses are estimated to be between 0.5% and 1.5% of the current replacement value, which should range between \$20,500 and \$61,500. The facility will have a large amount of specialized equipment and a significant amount of vehicular traffic in the unloading alley and main corridor, which has the potential to intensify maintenance and the accumulation of dirt and debris in the building. The facility will also require approximately 0.75 FTE for routine custodial services.

Electric, gas, sewer and water costs will likely average \$2,500 per month based on historic usage in the existing Seed House. The steam usage in the existing Seed House has been converted to natural gas usage to account for building heating and seed drying activities. The envelope and HVAC systems in the new facility will be more efficient than the existing Seed House. However, increased air changes due to dust collection systems and building-wide air conditioning will likely offset the envelope and equipment efficiencies of the new building.



16,720 SQFT

OVERALL FLOOR PLAN
1/8" = 1'-0"
0 5 10



NORTH ELEVATION
1/8" = 1' 0"



EAST ELEVATION
1/8" = 1' 0"



SOUTH ELEVATION
1/8" = 1' 0"



WEST ELEVATION
1/8" = 1' 0"



3D-IMAGE

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