

# **NDUS MASTER PLAN AND SPACE UTILIZATION STUDY**



# TIMELINE

- 2014: NDUS master planning completed by Paulien and Associates – key facility findings
  - Plenty of deferred maintenance
  - Institution master plan format should be revised
  - Space utilization information was incomplete based on lack of institution data.
- 2015: Implement programs to address the key findings.

# TIMELINE, continued

- 2016 – Key facility findings have been implemented.
  - Institution master plans are revised to more clearly reflect capital needs in three categories:
    - Program driven needs
    - Deferred maintenance needs
    - Life & Safety needs
  - Planning procedures are clarified and organized based on strategic planning and facility data.

# DATA-DRIVEN DECISIONS

- Facility master planning resolves strategic program needs through analysis of key criteria
  - Is there sufficient space available?
  - What is the condition of the space, and can it be utilized?
  - Can deferred maintenance needs and/or life safety needs be resolved with program needs?
  - What other options can be used in lieu of renovation or new construction?

# MASTER PLANNING OUTCOMES

- Strategic planning is not complete, and therefore program driven needs cannot be determined
- There is significant deferred maintenance, and we must find a way to reduce it
- Life safety needs are manageable with few exceptions
- There is excessive space

# SPACE UTILIZATION SUMMARY

- Criteria for determining space utilization based on current recognized methods:
  - Amount of time classrooms and class labs are being used (schedule component)
  - Occupancy based on number of student stations in each room (density component)
  - $\text{Schedule} \times \text{Density} = \text{Utilization}$

# SPACE UTILIZATION TARGETS

- Based on the integration of student schedules, faculty schedules, room availability, and class size / room size matching
  - Classroom Target: 30 hours of use per week, with classrooms filled to 80% of capacity
  - Teaching lab Target: 20 hours of use per week, with labs filled to 75% of capacity
- Actual utilization expressed as a percentage of this target.

# SPACE UTILIZATION

- On average, NDUS institutions are well below target.
- Causes
  - Excessive space
  - Space in poor condition
  - Non-centralized scheduling methods

# RECOMMENDATIONS ADOPTED BY SBHE 4/28/2016

- Institutions will utilize centralized classroom scheduling for no less than 95% of classroom and teaching lab space.
- Classrooms and teaching labs will be prioritized for deferred maintenance repairs.
- Facilities with deferred maintenance in excess of 65% of replacement value will be removed in lieu of repaired.

## **NDUS Institutional Master Plans Executive Summary and Suggested Motion**

**Suggested Motion:** Approve those components of the institutional master plans which illustrate the historical data, physical inventories, and Deferred Maintenance/Life-Safety-Security priority needs; and the three recommendations to improve space utilization rates and reduce deferred maintenance. Also reserve approval for the Program and Enrollment Driven needs until such time as the needs are reviewed and approved by the SBHE.

### **Executive Summary**

The eleven NDUS institutions are engaged in strategic plan preparation based on the goals and objectives approved by the Chancellor for each of the Presidents. The strategic plans provide guidance to the various divisions within each institution to reach those goals, and is reflected by their mission efforts. The facility needs required to implement their respective strategic plans are illustrated within the **Master Plan**, a document which sets the stage for physical growth and change.

One of the most important aspects of the Master Plan is to illustrate how an institution will accommodate any planned growth or changes in programs and enrollment. Educational programs, research programs, and economic development programs for each institution are mission critical in service to the state, and must be considered in the light of the system-wide responsibilities each institution carries and shares. As that system-wide consideration has not yet been completed, postponing the approval of the Program and Enrollment Driven needs for each institution is recommended.

In addition, there exists a critical need at all eleven institutions to develop and implement a funding mechanism which can address the burgeoning deferred maintenance and life safety liabilities we face. Without action, institutions will be compelled to close facilities within 6 to 10 years as critical building systems fail. In some cases, earlier estimates based on extrapolation of surveyed facilities are proving inaccurate, with actual deferred maintenance costs significantly in excess of those amounts. The institutions have identified their deferred maintenance and life safety priorities, and we recommend approval of that prioritization.

Finally, there exists a significant amount of excess space within the NDUS, which is reflected in the amount of square feet present per student, and the relatively low classroom and class lab utilization rates at a number of institutions. Acknowledging that condition, there are numerous contributing factors which we must address:

- The NDUS facility inventory is aging, and many classrooms receive less than optimal scheduling due to a lack of infrastructure, inadequate heating and ventilation, or general poor condition.
- Centralized scheduling is not uniformly in place at all institutions, making it difficult to utilize all classrooms and labs efficiently.
- There is an excess of classrooms and class laboratories.

### **Recommendations**

1. Require central scheduling of a minimum of 95% of classrooms and class labs at each institution to improve classroom and class lab utilization.
2. Prioritize deferred maintenance projects which improve classrooms and class labs which are currently underutilized due to existing conditions.
3. Remove facilities in lieu of repair where the estimated deferred maintenance cost is greater than 65% of the replacement value unless there is significant historical or other value present in the building.

## **Master Plan Facility Summary**

### **Bismarck State College**

BSC has an interesting and unique history whereby it has grown from a community college that served the needs of the Bismarck Public School system, to a two-year college that is part of the SBHE and serves the entire state. It has experienced steady growth, and anticipates continued growth of over 3% based on local demographics alone.

- Deferred Maintenance Priorities: Roofs, HVAC Condensers, and IT Infrastructure
- Life Safety Priorities: Card access systems, and Pedestrian Safe Zones

BSC owns or operates 16 buildings comprising 646,591 square feet.

### **Dakota College at Bottineau**

DCB has its origins as the School of Forestry established in 1894, and has grown in mission to become a two-year college offering a variety of academic programs. DCB has been affiliated with NDSU based on the horticulture and forest culture programs, but has since been affiliated with Minot State University in consideration of the community/regional college functions. The original Forest Service operation remains a part of the NDSU portfolio, and is co-located on the DCB campus. DCB anticipates a 10% growth in enrollment by 2021.

- Deferred Maintenance Priorities: Science Center repairs, oil fired boiler replacement, and resident hall repairs
- Life Safety Priorities: Resident Hall and Science Center code upgrades

DCB owns 21 buildings comprising 228,066 square feet.

### **Dickinson State University**

With consideration for the recent transitions in upper administration, DSU does not have an operational master plan in place at this time. Once completed, it will be forwarded to the SBHE for consideration.

DSU owns 29 buildings comprising 640,975 square feet

### **Lake Region State College**

LRSC was founded in 1941 as Devils Lake Junior College and Business School, and from 1987 through 1999, operated as a branch campus of UND. In 1999 it became a separate entity within the NDUS, and was subsequently renamed Lake Region State College. LRSC anticipates an overall modest reduction in headcount enrollment within the degree granting college, but anticipates steady growth in the TrainND programs.

- Deferred Maintenance Priorities: Window/wall repairs and replacement, flooring repairs, lighting upgrades.
- Life Safety Priorities: Card access systems, childcare facility security, interior door upgrades and replacements.

LRSC owns 13 buildings which comprise 256,818 square feet.

### **Mayville State College**

MaSU was established in 1889 as one of the original North Dakota teachers' schools (at the time known as "Normal Schools") and has since expanded its degree offerings significantly. The campus today has seen numerous improvements over the years, including a new steam plant funded by revenue bonds, as well as a renovation and addition to the Lewy Lee Fieldhouse funded by state appropriations. MaSU anticipates a steady, but modest, enrollment growth of 5% annually.

- Deferred Maintenance Priorities: Building automation control replacement, building envelope (walls and roof) repairs, and paving/parking lot repairs.
- Life Safety Priorities: Surveillance system, improved lighting, and fire suppression/detection.

MaSU owns 23 buildings comprising 371,355 square feet.

### **Minot State University**

MiSU was established in 1913 as a two-year normal school, with growth to baccalaureate programs in 1924. At the present time, MiSU anticipates enrollment to remain at its current level. More accurate projections are anticipated as strategic planning is completed.

- Deferred Maintenance Priorities: In general, building deferred maintenance needs across all building components, followed by infrastructure upgrades (parking lots, utilities, etc.)
- Life Safety Priorities: Building access control, video camera upgrades, and intercom system which will allow better communication of emergency events.

MiSU owns 38 buildings comprising 1,147,908 square feet.

### **North Dakota State College of Science**

Established in Wahpeton in 1903 as the North Dakota Academy of Science, NDSCS has grown to become one of the oldest two-year technical education institutions in the nation, further expanding trade programs to Fargo in 1997. It remains unique within the NDUS in regard to program offerings, with facility and infrastructure components geared specifically to its mission.

- Deferred Maintenance Priorities: Hektner Student Center M/E and fire protection, Central heating plant repairs, Robertson Hall Repairs, Pre-1970 building M/E repairs.
- Life Safety Priorities: Security Cameras, Hektner Student Center Kitchen needs, improved infrastructure for emergency response.

NDSCS owns 33 buildings comprising 1,311,190 square feet.

### **North Dakota State University**

Established in 1890 as North Dakota's land-grant university, NDSU represents all that encompasses a land-grant institution within this agrarian state. It is one of two doctoral research institutions within North Dakota, with approximately one-third of the total NDUS enrollment.

- Deferred Maintenance Priorities: Dunbar, Harris, and Churchill Hall deferred maintenance needs that include all building components.
- Life Safety Priorities: Dunbar Hall, College of Health Professionals, and College of Engineering space-use related life safety issues.

NDSU owns 96 buildings comprising 4,321,011 square feet.

### **North Dakota Agricultural Experiment Station**

The NDAES was established concurrently with NDSU as two important components of the land-grant university mission. NDAES has as its primary mission the responsibility of disseminating technology and information which stems from agricultural research that is conducted at the 7 experiment stations located throughout North Dakota, and comprising approximately 20,000 acres of land. NDAES does not have a specific, degree granting mission.

- Deferred Maintenance Priorities: *NDAES has a variety of deferred maintenance needs at all of the research stations. See master plan for details.*
- Life Safety Priorities: No specific life-safety needs

### **North Dakota Forest Service**

NDFS is affiliated with NDSU, and located on the Dakota College at Bottineau campus, with field offices located throughout North Dakota. NDFS has a mission specific to administering forestry services on a state-wide basis. It has field offices in Bottineau, Bismarck, Carrington, Fargo, Jamestown, Lisbon, Towner, and Walhalla. NDFS does not have a specific, degree granting mission.

- Deferred Maintenance Priorities: The Forest Service has identified numerous deferred maintenance projects which (in general) prioritize infrastructure repairs.
- Life Safety Priorities: No specific life-safety needs

### **University of North Dakota**

UND was founded in 1883 by the Dakota Territorial Assembly (a precursor to statehood) with a mission of liberal art education and professional programs aligned to serve the newly created State of North Dakota. It is one of two doctoral granting research institutions within the state, and encompasses approximately one-third of the total system-wide enrollment. UND anticipates enrollment to remain steady for the foreseeable future, with a more comprehensive strategic analysis of growth to take place once President Kennedy begins his term in office.

- Deferred Maintenance Priorities: Boiler upgrades, chiller replacement, building envelopes
- Life Safety Priority Needs: Fire protection and alarms, video surveillance, access control

UND owns 227 buildings comprising 6,695,644 square feet.

### **Valley City State University**

VCSU was founded in 1890 as the State Normal School, expanding in 1921 to offer 4 year degrees in a variety of programs. Renamed Valley City State University in 1987, it has since that time started a Master of Education program. VCSU anticipates approximately 3% annual enrollment growth.

- Deferred Maintenance Priorities: Misc. waterproofing, foundation repairs, and structural repairs.
- Life Safety Priorities: Structural repairs, upgrades to emergency services, fire alarms.

VCSU owns 29 buildings comprising 521,481 square feet

### **Williston State College**

WSC is one of the youngest NDUS institutions, founded in 1957 as the UND Williston Center. In 1984, the SBHE assumed direct responsibility for UND-Williston, and in 1999 the institution gained its current title as Williston State College and a fully autonomous NDUS entity. WSC serves the two year academic and TrainND needs of the region, and anticipates significant enrollment growth over the coming years as a result of new scholarship programs.

- Deferred Maintenance Priorities: HVAC upgrades, boiler repairs, roofing repairs
- Life Safety Priority Needs: Re-keying, video surveillance, and lighting

WSC owns 13 buildings comprising 334,811 square feet

## Master Plan Space Utilization Methodology

Nation-wide standards do not exist for space utilization rates for institutions of higher education for classrooms or teaching labs. There does exist a variety of standards which are very similar in utilization targets, and are based on both hours of use and seating capacity. Using the available standards, the NDUS has established utilization criteria which have been applied to all eleven institutions, acknowledging that utilization rates vary significantly based on (among other factors) the nature of the curricula at each institution. With that consideration, the following information on standards were used to develop the NDUS criteria:

1. The ratio recommended by Paulien and Associates for establishing classroom utilization, whereby 100% utilization is based on a combination of 30-35 hours of scheduled use per week, coupled with an average occupancy rate of 60-65% occupancy; and teaching lab utilization whereby 100% utilization is based on a combination of 15-20 hours of scheduled use per week, coupled with an average occupancy rate of 60-65%.<sup>i</sup>
2. The Colorado Department of Higher Education Space Utilization Guidelines (Statutory) whereby the Colorado DHE establishes classroom utilization targets of 30 scheduled hours per week and 67% occupancy, and teaching laboratories of 30 scheduled hours per week and 80% capacity.<sup>ii</sup>
3. The University of Minnesota Twin Cities Campus criteria established by the Office of Classroom Management placed target classroom utilization of 32 scheduled hours per week and 65% occupancy.<sup>iii</sup>

Based on the above benchmarking, the following criteria were established for NDUS institutions, with preliminary consideration for the diversity of mission at each institution. As an example, smaller institutions exhibit a greater number of standard class sizes driven by enrollment caps. As a result, a higher occupancy ratio pushes the capacity target up. In contrast, research institutions with a broad array of specialized teaching laboratories reduces the practical hours of use, and subsequently pushes that target down. For both classroom and teaching labs, hours of use criteria is similar to regional standards.

Classroom Utilization Target (100%) = 30 hours scheduled use at 80% capacity.

Teaching Laboratory Utilization Target (100%) = 20 hours scheduled use at 75% capacity.

The above standards therefore exist as a target, and where institutions report a significant deviation from the target, an analysis of conditions are provided which help explain the deviation.

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<sup>i</sup> See NDUS System Wide Master Plan (Paulien et.al.); The University of Vermont Classroom and Laboratory Utilization Study and Campus-Wide Space Analysis (Paulien) c. 2001.

<sup>ii</sup> Colorado Department of Higher Education Space Utilization Planning Guidelines, April 5, 2007

<sup>iii</sup> UM – TC Office of Classroom Management – Classroom Utilization Report Summary – 2001/2002

# 2016 Space Utilization Summary

## Introduction

For NDUS purposes, space utilization is defined by four basic metrics:

1. The efficiency of building space based on the comparison of assigned (used by a department) to unassigned (common spaces) areas within the building.
2. The amount of assigned space per FTE, both aggregate and on-campus only.
3. The amount of time and level of occupancy a classroom is used.
4. The amount of time and level of occupancy a teaching lab is used.

There are no common standards in use for any of the above categories. Classroom and teaching lab utilization has been defined (in general) as being fully utilized when classes are scheduled within the room for approximately 30 hours each week, and with occupancy targets of 75%. Due to the broad range of institutional missions and sizes within the NDUS inventory, the following targets have been established as a point of reference. Deviation from the target 100% indicates that there may be numerous conditions causing the deviation, which in turn are considered for each institution in the following summaries.

Overall, building efficiencies are very good, with an average of 75%. This target is also used for new construction, and is considered an acceptable standard throughout higher education. Space per FTE has a broad range throughout the NDUS, and reflects both the excessive inventory currently in place, as well as reduced on-campus enrollments as a result on online learning trends. Classroom and teaching lab utilization is only 50% of target at most institutions, and is caused by the same abovementioned trends, facility conditions, non-centralized scheduling, and excess space.

## Institutional Summaries

### Bismarck State College

BSC has a very high level of building space efficiency, and relatively low assignable space per FTE. Classroom FTE is approximately 50% of target, which may be the result of the specialized classrooms used at BSC which are not conducive to all types of learning. Teaching lab utilization is at target.

### Dakota College at Bottineau

DCB has a very high level of building space efficiency, but a relatively high level of assignable space per FTE. This can be attributed in part to online trends which are reducing on campus percentages of FTE. Overall classroom and teaching lab utilization is approximately 35% of target, which is attributed to the previously mentioned trends, but also the relatively small size of DCB which results in classrooms and teaching labs tailored for specific classes, and in turn represent a higher than average amount of total when considering the overall enrollment.

### **Dickinson State University**

While DSU does not have complete classroom and teaching lab utilization in place, the overall building efficiencies are similar to other NDUS institutions, while the space per FTE is on the upper end for 4 year institutions. The largest contributing factor to this ratio is the drop in FTE over the past 6 years for which DSU is recovering.

### **Lake Region State College**

LRSC has one of the highest building efficiency ratios, due in large part to the organization of the campus buildings. It also has one of the greatest spreads in space per FTE as a result of its significant online FTE. It has very few teaching labs, data for which is not included due to the minimal scheduling. Classroom utilization is 40% of target, and is again explained by the increase in online course availability.

### **Mayville State University**

MaSU has good building efficiencies, including the 200-300 square feet per student of assignable space. Both classroom and teaching lab utilizations are commendable, and reflects the reduction in space at MaSU occurring over the past 15 years.

### **Minot State University**

MISU, as with other NDUS institutions, very good overall space efficiencies. The assignable space per FTE is mid-range for the 4-year campuses, with classroom and teaching lab utilization efficiencies mid-range as well. Although there are mission specific requirements for all of the 11 institutions, 4 – year campuses are the most homogenous. Centralized classroom scheduling, space need evaluations, and overall class/lab conditions must be considered for raising the level of utilization.

### **North Dakota State College of Science**

The unique mission of NDSCS (this also applies in part to WSC) requires a classroom and teaching lab inventory that is limited in scheduling opportunities due to their specialization. As an example, shop space used for instruction on heavy equipment maintenance is classified as a teaching lab, and overall space per student is significant. In addition, the type of space is tailored for specific types of equipment, further reducing the scheduling flexibility. In general, space utilization at NDSCS is acceptable, although the larger spaces overwhelm the critical needs of smaller labs which are overcrowded. As a result, expansion and improvements at NDSCS should be weighed in the light of the institutional mission and overall condition of existing space.

### **North Dakota State University**

NDSU has the highest percentage of on-campus FTE when compared to the other research institution, UND. It also has the highest classroom and teaching lab utilization, along with the lowest amount of assignable space per FTE. This suggests overcrowding, which may pose life safety issues. NDSU is requesting replacement facilities which alleviate the overcrowding and life safety issues, which is supported by the space analysis.

### **University of North Dakota**

UND trends towards increased online course offerings has reduced the percentage of on-campus FTE, and subsequently reduces classroom and teaching lab utilization. In addition, UND reports that a lack of centralized scheduling, lab spaces which are too small per student station, and overall condition are affecting its ability to more efficiently use the space. In addition, UND has simply too much space, and is taking measures to reduce the inventory. This will result in improved efficiencies, learning experiences, and functionality.

### **Valley City State University**

VCSU is one of the oldest campuses, which is reflected in the overall building efficiencies. Many of the spaces were designed for obsolete uses, and subsequently increases the amount of unassignable spaces. The amount of space per FTE, as well as the overall classroom and teaching lab utilization are effected by the age of its facilities, while an increased online presence is further reducing that use. Removal of existing space in response to new, more efficient constructions are necessary for VCSU, and that process is underway with the current capital project requests.

### **Williston State College**

WSC building efficiency is good, with space per FTE is a reflection of its mission in western North Dakota. Classroom and teaching lab utilization is towards the top of the category, and approaching the target. WSC must plan for better utilization of existing space, as well as needs for additional space, as it realizes the target enrollments presented in the WSC master plan.

## **Conclusions**

On average, space utilization as to efficiency of buildings is acceptable, whereas with few exceptions, the NDUS institutions have space in excess of current needs. A program whereby older facilities with high levels of deferred maintenance are removed from service must be adopted. This will require relocation of programs and services to other facilities, but should be done so as a means to improve efficiencies.

Deferred maintenance funding resources should be concentrated on primary building infrastructure, as well as classroom and teaching labs. Where possible, removing life safety liabilities concurrently as a means to maximize the available funding must also be included within the project scope.

Centralized scheduling, which coordinates course schedules and classroom/teaching lab schedules, will provide better utilization and subsequently further reduce the overall necessary classroom/teaching lab inventory.

### NDUS Space Utilization

Institution	Net SF Total	Net SF Assigned	Efficiency % (Note 1)	Total FTE Fall 2015	On-Campus Fall 2015	SF Per FTE	SF Per On-Campus	Classroom Utilization (Note 2)	Class Lab Utilization (Note 3)
Bismarck State College	614,888	479,410	77.97%	2,912	2,245	165	214	52.0%	100.0%
Dakota College at Bottineau	154,659	135,602	87.68%	459	390	295	348	34.0%	32.0%
Dickinson State College	444,488	326,850	73.53%	1,070	1,045	305	313	N/A	N/A
Lake Region State College	151,096	136,264	90.18%	981	384	139	355	40.0%	N/A
Mayville State University	237,520	177,553	74.75%	796	596	223	298	80.0%	102.0%
Minot State University	1,030,051	773,689	75.11%	2,570	2,320	301	333	52.0%	38.0%
ND State College of Science	1,273,368	950,578	74.65%	2,305	1,562	412	609	22.6%	37.3%
North Dakota State University	4,712,948	3,569,258	75.73%	12,834	13,689	278	261	91.3%	176.7%
University of North Dakota	5,452,889	4,087,027	74.95%	12,455	11,667	328	350	61.0%	82.0%
Valley City State University	535,481	339,303	63.36%	1,031	830	329	409	32.3%	39.9%
Williston State University	309,071	239,085	77.36%	738	615	324	389	73.7%	78.7%
<b>Totals</b>	<b>14,916,459</b>	<b>11,214,619</b>	<b>75.18%</b>	<b>38,151</b>	<b>35,343</b>	<b>294</b>	<b>317</b>		

#### **Footnotes**

1. Efficiency refers to the relative amount of assignable space compared to total interior space (Net SF Total). Assignable space is functional space, or space assigned to a department for an intended use. It does not include hallways, stairwells, atriums, mechanical space, etc., or space considered used for access or operation of the building. 75% is a target for design, and reflects overall efficient use of the building.
2. Classroom utilization is a function of a) schedule and b) occupancy. A 100% utilization target would be for a scheduled use of 30 hours per week, with an occupancy of 100% if 80% of the maximum seating capacity of the room is used by the scheduled class.
3. Teaching Lab utilization is a function of a) schedule and b) occupancy. A 100% utilization target would be for a scheduled class lab use of 20 hours, with an occupancy