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UNIVERSITY OF WYOMING

## DEGREE PROGRAM PROPOSAL

### BACHELOR OF SCIENCE IN CONSTRUCTION MANAGEMENT

December 5, 2016

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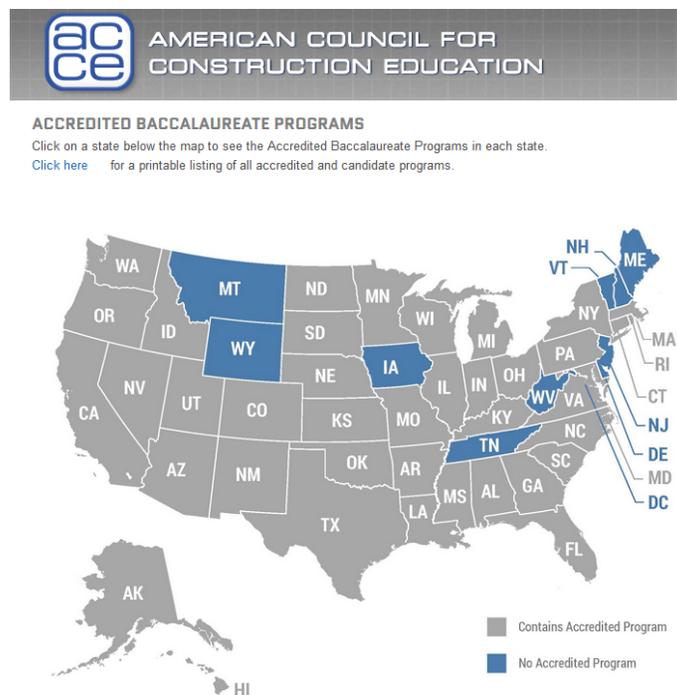
## EXECUTIVE SUMMARY

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The College of Engineering and Applied Science (CEAS) at the University of Wyoming (UW) proposes the creation of a Bachelor of Science degree in Construction Management. This program will build upon the strengths of existing degree programs offered by the Department of Civil and Architectural Engineering.

We believe that this program will increase CEAS enrollment by 100 students over 4 years. To accommodate these additional students, we have created a phased implementation plan for; 2 Professors of Practice, 2 tenure track faculty and 1 administrative assistant. Through a phased approach, we believe we could offer this program as early as Academic Year 2017-18 with minimal new resources required.

Currently, UW does not offer coursework in construction management. The image below generated by the American Council for Construction Education (ACCE) shows Wyoming as one of the few states not currently offering an accredited construction management degree.



We would like to create an educational program focusing on construction management to include subjects related to the vertical construction, mining and heavy/ highway industries. Locally and nationally, these skills can lead to rewarding careers for Wyoming citizenry and employment growth for communities around the State.

Students interested in the construction industry may begin as majors in civil or architectural engineering, but some may find the requirements of an engineering degree too rigorous or may not relate design engineering to the role they see themselves filling in the industry. In this event, the University of Wyoming (UW) has no alternative path into the construction industry. Students may drop out, transfer to another institution, or transfer to another major. Through implementation of a construction management degree, the CEAS can attract new students and retain those we have by offering this technical management-focused path into the construction industry.

As the industry continues to move towards integration of the design and construction fields through delivery methods such as design/ build, construction manager-at-risk, integrated project delivery and public-private-partnerships, graduates with cross-disciplinary educational backgrounds are becoming more valuable to employers in both the design and construction fields. Developing construction management education at UW not only provides a gateway for students looking to join the construction management field, but it also enhances our existing programs by providing exposure to construction related issues for those enrolled in our engineering programs.



*UW Architectural Engineering students currently get a 'small dose' of construction practices.*

This proposal includes required coursework in a series of courses identified as Vista (CE 1000, 2000, 3000). This is a three-semester program currently required of Civil, Architectural Engineering students and is proposed for Construction Management majors. Courses in this series focus on solving complex design and construction issues through cross-disciplinary collaboration and the use of building-integrated modeling (BIM).

## **OPPORTUNITY**

We believe the CAES can increase enrollment by 100 students over 4 years with a non-engineering bachelor's degree program in construction management. This is based on regional comparators (Page 6). After implementation of an undergraduate degree, a graduate degree could represent another major source of new students, especially if offered online to non-traditional students. We would also like to explore the opportunities represented by Continuing Education and various certification programs. Note that CAES also has a surveying program, offered online, and we have regular certification programs for transportation engineers through our LTAP Center. The infrastructure exists at UW for non-traditional methods of delivery.

The State of Wyoming is home to seven community colleges. Each of these institutions offer courses in either construction management or construction technology. Two of these institutions, Caper College and Laramie County Community College offer A.S. degrees in Construction Management and have established

transfer programs allowing students to transfer into ACCE accredited B.S. programs. These are students that we can keep in our state by offering a four-year degree program.

This coursework addresses a major objective in UW's new strategic plan: to *help diversify the state's economy*.

The need for such a program has been consistently identified by our industry partners, the Governor's plans for economic development, and our students. As we have been discussing the possibility of launching such a program at UW we have received an overwhelming response of support (Appendix 'A' – Letters of Support).

In June 2016, the Advisory Board for Civil and Architectural Engineering submitted a letter to Dean Michael Pishko expressing support for this vision. In consecutive meetings November, 2015, April, 2016 and October, 2016, the Board has expressed strong enthusiasm for the plan as described in this proposal.

The UW Foundation is also extremely supportive of this proposal and eager to start reaching out to industry partners interested in helping with this initiative.

## **INDUSTRY DEMAND**

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Career options for construction managers are excellent. Nationwide, employment of Construction Managers is expected to grow 16% from 2012-22, according to the Bureau of Labor Statistics. In 2014, there were approximately 373,200 construction managers in the workforce and that number is expected to increase to approximately 391,100 by 2024.

In addition to growth in the construction industry, there are a substantial number of construction managers who are expected to retire by 2024 creating an additional need for new graduates. The median annual salary in 2015 for construction managers ranged from \$90,410 for construction managers working for heavy and civil construction firms to \$78,010 for construction managers working in residential building construction.

**PEER INSTITUTION ANALYSIS**

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In addition to studying the requirements of the ACCE, the Curriculum Advisory Committee (CAC) has researched the degree requirements of a number of peer institutions to ensure that our proposed curriculum is comparable to other programs being offered regionally and nationally. The summary of this comparison is attached as Appendix 'B'. The table below identifies institutions used in this comparison. The table reflects the number of students currently enrolled in each of the B.S. programs. Many of these institutions also offer M.S. degrees. The faculty listed for each program that includes an M.S. degree also support those programs.

<p><b><u>Brigham Young University</u></b>          B.S. in Construction Management          Not Accredited          238 students currently enrolled          9 Faculty          Offers a Master's Program</p>	<p><b><u>Colorado State University</u></b>          B.S. in Construction Management          ACCE Accredited          770 students currently enrolled          16 Faculty, 6 Instructors          Offers a Master's Program</p>
<p><b><u>Kansas State University</u></b>          B.S. in Construction Science Management          ACCE Accredited          382 students currently enrolled          14 Faculty, 3 Instructors          Offers a Master's Program</p>	<p><b><u>Montana State University</u></b>          B.S. in Construction Engineering Technology          ACCE Accredited          200 students currently enrolled          10 Faculty, 3 Instructors          Offers a Master's Program</p>
<p><b><u>North Dakota State University</u></b>          B.S. in Construction Management          ACCE Accredited          144 students currently enrolled          9 Faculty, 4 Adjunct Instructors          Offers a Master's Program</p>	<p><b><u>South Dakota State University</u></b>          B.S. in Construction Management          ACCE Accredited          185 students currently enrolled          5 Faculty, 3 Instructors          Offers a Master's Program</p>
<p><b><u>University of Nebraska</u></b>          B.S. in Construction Management          ACCE Accredited          700 students currently enrolled          13 Faculty          Offers a Master's Program</p>	<p><b><u>University of Washington</u></b>          B.S. in Construction Management          ACCE Accredited          250 students currently enrolled          11 Faculty          Offers a Master's Program</p>

## **PROGRAM OVERVIEW**

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The CAC has established a proposed curriculum for the program (Page 9) based on regional and national comparators, ACCE accreditation standards and recommendations from the Civil and Architectural Engineering Advisory Board. The curriculum is composed of coursework both new and existing courses in the following areas:

- 13 new courses in Construction Management
- 5 existing courses from Civil & Architectural Engineering
- 5 existing courses from the College of Business

New courses proposed in Construction Management are as follows:

### **CM 2100– Introduction to Construction Management**

Introduction to the theories and principles of managing complex construction projects. Covers project delivery methods, design and construction process, project financing and organizational structures.

### **CM 2120 – Construction Materials and Methods**

Introduction to building materials including soils, concrete, masonry, metals, plastics and composite materials. Overview of construction strategies used for differing building types and sizes based on use and location.

### **CM 2200– Structures**

Introduction to structural systems including shear and moment distributions for wood, steel and concrete building systems.

### **CM 2400 – MEP Systems**

Overview of electrical distribution, information technology and controls systems. Mechanical systems overview including, plumbing, heating, ventilation and air conditioning.

### **CM 3100 – Scheduling**

Project planning, critical path scheduling and work flow. Understand project phasing, bid packages, schedule contingencies and resource availability. Introduction to scheduling software.

### **CM 3220 – Soils and Concrete**

Soil mechanics, foundation engineering, and foundation construction.

### **CM 3120 – Estimating**

Strategies for creating material take-offs and developing cost estimates at varying stages of projects based on delivery method and available resources.

### **CM 3140 – Heavy Construction Methods**

Construction equipment and construction techniques for earthwork, mining and horizontal construction.

### **CM 3160 – Construction Law**

Contracts, insurance/ bonds, roles and responsibility in various project delivery methods. Labor relations, dispute resolution arbitration

### **CM 4100 – Project Management**

Introduction to the organization, management, and administrative functions on construction projects.

### **CM 4120 – Construction Safety**

Understand local, state and federal laws for safety in the workplace. Occupational Safety Hazards Administration (OSHA) accident prevention policies and jobsite safety. Understand the role of a safety coordinator and job planning to prevent worksite injuries.

### **CM 4600 – Building Integrated Modeling**

Utilize 3D software such as Autodesk Revit and Navisworks to create design, construction, coordination and fabrication models.

### **CM 4900 – Capstone Project**

## **DISTINCTION OF THE UW CONSTRUCTION MANAGEMENT PROGRAM**

While one of the objectives of this proposal is to align the program with those of our peer institutions, there are distinctive characteristics of the proposed program we feel to be important in the education of future construction managers. These include an emphasis on coursework in BIM and cross-disciplinary collaboration.

The use of building integrated modeling (BIM) has become common practice among the architecture and engineering professions. The construction industry is following suit by integrating BIM to improve how construction projects are delivered. In today's construction industry, architects and engineers create design and construction documents for projects using BIM software. The resulting models are now being used by contractors who import the models into software programs to perform various tasks throughout the design and construction process. The models are used during preconstruction for cost estimating, scheduling and constructability studies and continue to be used when designers complete the model final coordination and fabrication drawings. BIM has been shown to improve the quality and coordination process improving efficiency and profitability across the industry.

The UW Department of Civil and Architectural Engineering has become recognized as a leader in the use of BIM software as a tool in educating our students. Adding a CM program to the department is an opportunity to build upon this reputation. We are proposing an additional course focused solely on BIM proficiency through the use of software such as the Revit and Navisworks programs, both widely utilized throughout the construction industry.

We would also like to respond to current trends in the industry related to project delivery methods. Many owners, especially in the development of large scale projects, are utilizing non-traditional delivery methods such as construction manager-at-risk, design/ build, integrated project delivery and public-private-partnerships. These delivery methods all involve the integration and collaboration of design professionals, engineers and contractors through the entire design and construction process.

We have recently added a series of courses (Vista 1000, 2000,3000) required of our current students in Civil and Architectural Engineering. These courses are project-based courses which focus on a holistic view of the construction industry and explore the benefits of alternate project delivery methods. A key component of these courses is the cross-contamination of disciplines through collaboration on projects from design through construction. The curriculum we are proposing for CM would require completion of these courses. Adding students pursuing construction management careers to this mix greatly enhances educational opportunities for students participating in these courses. By adding diversity to the program we believe that this series of courses could evolve into an opportunity for students to design and construct real projects as a part of their educational career.

## **IMPLEMENTATION SCHEDULE**

As outlined in the proposed curriculum flow chart below, the first year of study consists entirely of courses currently offered by UW. Therefore, we believe that we could start offering the program Academic Year 2017-18 and plan for full implementation by 2020.

# Construction Management, BS



## FRESHMAN YEAR

Fall Semester		Hrs	Spring Semester		Hrs
CE 1000	VISTA I	1	ARE 1600	Architectural Design Studio I	3
MATH 1450	Algebra and Trigonometry	5	MATH 2200	Calculus I	4
	USP C1 requirement	3	PHYS 1110	General Physics I	4
	USP FYS requirement	3		USP C2 requirement	3
	Science Elective	4		USP V requirement	3
<b>TOTAL</b>		<b><u>16</u></b>	<b>TOTAL</b>		<b><u>17</u></b>

## SOPHOMORE YEAR

Fall Semester		Hrs	Spring Semester		Hrs
ACCT 1010	Accounting I	3	ACCT 1020	Accounting II	3
CM 2100	Intro to Construction Management	3	ARE 2600	Architectural Design Studio II	3
CM 2200	Structures	4	CM 2120	Construction Materials and Methods	3
MGT 1040	Legal Environment of Business	3	CM 2400	MEP Systems	3
	USP H requirement	3	STAT 2050	Fundamentals of Statistics	4
<b>TOTAL</b>		<b><u>16</u></b>	<b>TOTAL</b>		<b><u>16</u></b>

## JUNIOR YEAR

Fall Semester		Hrs	Spring Semester		Hrs
CE 2000	VISTA II	3	CM 3120	Estimating	3
CE 2070	Engineering Surveying	3	CM 3140	Heavy Construction	3
CM 3100	Scheduling	3	CM 3160	Construction Law & Contracts	3
CM 3220	Soils and Concrete	3	MGT 3110	Business Ethics	3
	USP H requirement	3		USP C2 requirement	3
<b>TOTAL</b>		<b><u>15</u></b>	<b>TOTAL</b>		<b><u>15</u></b>

## SENIOR YEAR

Fall Semester		Hrs	Spring Semester		Hrs
CE 3000	VISTA III	3	CM 4120	Construction Safety	3
CM 4100	Project Management	3	CM 4900	Capstone Design Project	3
CM 4600	Building Information Modeling	3		CM Elective	3
MGT 3210	Management and Organization	3		CM Elective	3
	CM Elective	3			
<b>TOTAL</b>		<b><u>15</u></b>	<b>TOTAL</b>		<b><u>12</u></b>
<b>TOTAL CREDIT HOURS</b>					<b><u>122</u></b>

## RESOURCES

The program would be administered by the Department of Civil & Architectural Engineering. The new faculty in Construction Management would join faculty of Civil & Architectural Engineering (currently 20 members). There is excellent disciplinary synergy between Civil Engineering, Architectural Engineering, and Construction Management. We view the Department as having 'one faculty' to oversee three programs. Also, there is great potential for collaborative research, team teaching opportunities, etc. One of the new faculty positions in Construction Management will serve as the Program Coordinator. With program growth, we may need two faculty members with administrative responsibilities; a Program Coordinator and an Accreditation Coordinator.

We have developed a phased implementation plan for new faculty members based on the Course Flow Chart and our existing faculty resources. With 10 of the courses already being offered at UW, the initial faculty resources are minimal. Additional faculty members are introduced each semester/ year as additional courses beyond our current capacity appear in the course flow chart.

Program/ computing fees, in addition to the resources in our existing facilities, will support additional costs related to materials, software and equipment for the program.

The phased implementation plan as outlined in the table below, designates a faculty member for each new course. The table also provides associated cost per year based on the implementation of program courses. Calculations in the table assume an annual 3% cost-of-living increase.

FACULTY/ STAFF	2017-2018		2018-2019		2019-2020		2020-2021	
	FALL	SPRING	FALL	SPRING	FALL	SPRING	FALL	SPRING
<b>Professor of Practice - General</b>	\$60,000.00	\$60,000.00	\$61,800.00	\$61,800.00	\$63,654.00	\$63,654.00	\$65,563.62	\$65,563.62
Program Administrator								
Vista 2								
Vista 3								
Architectural Design								
Introduction to Construction Management								
MEP Systems								
<b>Tenure Track - Structural</b>			\$46,350.00	\$46,350.00	\$47,740.50	\$47,740.50	\$49,172.72	\$49,172.72
Materials and Methods								
Project Management								
Structures								
<b>Tenure Track - Geotech</b>					\$47,740.50	\$47,740.50	\$49,172.72	\$49,172.72
Introduction to Construction Management								
Soils and Concrete								
Heavy Construction Methods								
<b>Professor of Practice - Construction Management</b>					\$63,654.00	\$63,654.00	\$65,563.62	\$65,563.62
Accreditation Management								
Construction Safety/ Risk Management								
Construction Law								
Estimating								
Scheduling								
<b>Tenure Track - Building Integrated Modeling</b>							\$49,172.72	\$49,172.72
Building Integrated Modeling								
Capstone								
ARE 1600								
<b>Administrative Assistant (1/2 Time)</b>	\$25,000.00	\$25,000.00	\$25,750.00	\$25,750.00	\$26,522.50	\$26,522.50	\$27,318.18	\$27,318.18
<b>Faculty/ Staff Sub Total</b>	\$85,000.00	\$85,000.00	\$133,900.00	\$133,900.00	\$249,311.50	\$249,311.50	\$305,963.57	\$305,963.57
<b>FACULTY/ STAFF ANNUAL TOTAL</b>	<b>\$170,000.00</b>	<b>\$170,000.00</b>	<b>\$267,800.00</b>	<b>\$267,800.00</b>	<b>\$498,623.00</b>	<b>\$498,623.00</b>	<b>\$611,927.13</b>	<b>\$611,927.13</b>

## **CONTRIBUTORS**

This document has been prepared in consultation with the following contributors:

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*Dean of the UW College of Engineering and Applied Science*

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*UW Civil and Architectural Engineering*

Matthew D. Newman, AIA, LEED AP BD+C

*Professor of Practice*

*UW Civil and Architectural Engineering*

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## **APPENDICIES**

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APPENDIX 'A' – LETTERS OF SUPPORT

APPENDIX 'B' – PEER INSTITUTION CURRICULUM COMPARISON



## Sustainable Traffic Solutions

**Joseph L. Henderson PE, PTOE**  
Traffic Engineer / Principal

June 20, 2016

Mr. Michael Pishko, PhD  
Dean - College of Engineering & Applied Science  
University of Wyoming  
1000 East University Avenue  
Laramie, WY 82071

RE: Support of the Case Statement for a Construction Management Degree Program at UW  
Prepared by Dr. Denzer

Dear Dean Pishko,

At the April meeting of the Department of Civil and Architectural Engineering Advisory Board, the Board voted to support the case statement for a construction management degree program at UW that was prepared by Dr. Denzer. The Board believes that there is a need for this program because there is a market for people with this degree. It would also provide another option for people with an interest in engineering who are not able to complete the math and science requirements for an engineering degree. The Board appointed a task force to review other programs in the area and assess the requirements to launch a program at UW. The Board understands that UW is not considering new programs at this time and that this is a long-term effort.

There are several career options for construction managers including working with general contractors or as an owner's representative. According to [collegegrad.com](http://collegegrad.com), the median annual salary in 2015 for construction managers ranged from \$90,410 for construction managers working for heavy and civil construction firms to \$78,010 for construction managers working in residential building construction. In 2014, there were approximately 373,200 construction managers in the workforce and that number is expected to increase to approximately 391,100 by 2024. In addition to growth in the construction industry, there are a substantial number of construction managers who are expected to retire by 2024 creating an additional need for new graduates.

The American Council for Construction Education (ACCE) accredits construction management programs in the United States. Based on information found on the ACCE website, Wyoming is one of only 11 states that does not have an accredited baccalaureate program for construction management. Based on the direction in Dr. Denzer's case statement, the Board supports the three goal milestones to work towards an accredited program and will be providing informational support to move forward.

Wyoming is currently experiencing a severe downturn in the economy due to the closure of coal mines and reduced prices for oil and gas. The economic downturn has resulted in hundreds of construction workers being laid off. A construction management degree program would give these construction minded people an option for a professional degree in a field in which they have hands-on experience.

Mr. Michael Pishko, PhD

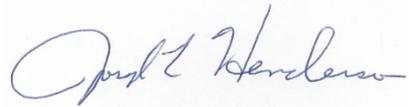
June 20, 2016

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Finally, there are many benefits to the Engineering College that would be realized by creating a construction management program. Two of the benefits would include increased department size and the potential for increased development funds. A construction management degree program would attract new students to the Civil and Architectural Engineering Department as well as retain students who are now forced to leave the college if they are unable to complete the math and science requirements for an engineering degree. Another benefit is the potential for increased donations to the Department due to the significant industry interest in this type of program.

The Department of Civil and Architectural Engineering Advisory Board urges you to consider this recommendation.

Sincerely,

A handwritten signature in blue ink that reads "Joseph L. Henderson". The signature is fluid and cursive, with the first name "Joseph" being the most prominent.

Joseph L. Henderson, PE, PTOE

Past Chair, Civil and Architectural Engineering Advisory Board

cc: Ben Blalock – University of Wyoming Foundation

Craig Russow – University of Wyoming Foundation

Anthony Denver, PhD – Chair of the Department of Civil and Architectural Engineering

Jessica M. Killian, PE, LEED GA – Chair of the Construction Management Task Force

UW Department of Civil and Architectural Engineering Advisory Board

Wyoming Constructors  
2020 Grand Avenue, Suite 305  
Laramie, Wyoming 82070  
307.234.9771 TEL  
307.234.9490 FAX  
www.haselden.com



October 19, 2016

Matt Newman, Office of Facilities Architecture  
University of Wyoming  
1000 E. University Avenue  
Laramie, WY 82071

Dear Matt,

As a member of our local construction industry, supporter of the University of Wyoming, and partner on many past and current projects at the university, please accept this letter of support for the proposed Construction Management program at the University of Wyoming.

As Wyoming's only provider of a four-year bachelor's degree, the University of Wyoming has a unique opportunity to provide education to many people. The addition of a Construction Management program will fulfill the needs and desires of many students interested in the construction industry as a career.

Presently construction firms tend to hire qualified candidates from outside of Wyoming since a Construction Management program doesn't exist within the state. Local construction companies need to fill open positions from inside the state and this program would make that possible. I highly encourage and support the development of a Construction Management program at the University of Wyoming.

Thank you for your time and consideration.

Sincerely,

HASELDEN WYOMING CONSTRUCTORS

A handwritten signature in blue ink, appearing to read 'D. Oliver', is written over the typed name.

Derek Oliver  
Vice President

441 Landmark Drive, Suite 250  
Casper, WY 82609  
307.472.0065 V  
307.472.0086 F  
www.gejohnson.com



October 19, 2016

To Whom It May Concern:

GE Johnson Construction Wyoming has had the privilege of partnering with the University of Wyoming on multiple occasions for the completion of large projects on their campus in Laramie. Throughout our history with the University, we have engaged not just UW leadership and faculty, but the students and community which make up the school's identity. Our work has been extremely collaborative, giving us a first-hand understanding of the caliber of individuals who come to UW and the potential for exponential growth moving forward. It is with extreme confidence we write this letter of reference in full support of the addition of a two-year Construction Management program at the University of Wyoming.

Construction is no longer a transactional industry; in the past, builders interacted only with a set of plans and jurisdictional authorities. But as the times have changed, we have become more active, communicative, and engaging with all stakeholders of a given project. This approach is at the heart of GE Johnson's work program and allowed us to truly connect with the UW community. We created opportunities for students and staff to participate in the construction process, generating feedback and demonstrating the processes and tools we use in the creation of complex structures. This experience was extremely enlightening, and leads us to believe there is overwhelming interest at UW in the construction industry. The creation of an Associate's Degree program in Construction Management offers a very unique opportunity to capitalize upon this momentum.

Whereas in many industries, the rise in technology is eliminating jobs, the construction industry has realized the need for more qualified, capable professionals as the tools of our trade reach new sophistication. This has resulted in an increasingly short supply of qualified young professionals to fill a growing number of jobs. The void is currently being met by Construction Management programs across the nation, but there is still a need for these types of young professionals across the nation and in Wyoming. UW now has the ability to empower young men and women with the education they need to succeed in construction and keep them in the state as it continues to grow.

GE Johnson has been highly impressed with UW's ability to develop well-rounded, forward-thinking men and women with the type of critical thinking skills our industry requires. For this reason alone, we believe a Construction Management program would have great success on this campus. It is our privilege to fully endorse this initiative, and to lend our unconditional referral of the University of Wyoming.

Sincerely,  
GE Johnson Construction Wyoming

A handwritten signature in blue ink, appearing to read "C. Holt".

Chris A. Holt  
Construction Executive



October 20, 2016

Matthew D. Newman, AIA  
University of Wyoming  
1000 East University Avenue  
Laramie, Wyoming 82071

Re: Proposed University of Wyoming Construction Management Degree

Dear Mr. Newman,

On behalf of Martin/Martin Wyoming Inc. and Martin/Martin Inc. We are writing to you in support of the proposed Construction Management Degree at the University of Wyoming.

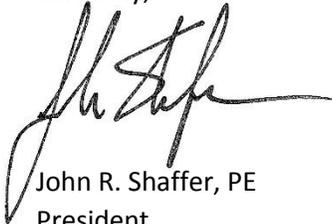
As the largest Structural Engineering firm within the State of Wyoming we have been involved in a significant number of construction projects over the years. These projects range from simple residential foundations to complex multi-million dollar educational facilities at the University. In addition, our Lakewood, CO office is a premier regional and national engineering firm that has completed numerous high profile construction projects. This wealth of experience has allowed us to analyze the construction process and come to the conclusion that one of the keys to a successful project is effective construction management personnel.

As construction projects become more and more complex, both within the State and regionally, it is critical for the construction process to include a construction manager with a formal education. Although tradesmen have successfully completed this management function in the past, we believe there is a compelling need for this type of education within the State of Wyoming. In consideration of the large quantity of construction per-capita in the State, higher education training in construction management affords a terrific opportunity to retain some of our young people in well-paying careers that benefit Wyoming.

Having familiarity with other construction management programs within the mountain region, we have observed the collaboration between engineering and construction management curricula has generally been lacking. The strength of the engineering program at the University of Wyoming provides tremendous opportunity through strong collaboration between engineering and construction management programs. First, such collaboration could assist accelerated recognition and growth of the new construction management program. Second, true collaboration and cross pollination of students would result in graduates with unmatched skillsets.

For the many reasons stated above, we strongly support the proposed Construction Management Degree at the University of Wyoming. Should you or others have any questions regarding this recommendation, please feel free to contact us.

Sincerely,



John R. Shaffer, PE  
President



Patrick S. McManus, PE, SE, PhD  
Principal

APPENDIX 'B' - PEER INSTITUTION CURRICULUM COMPARISON

	MONTANA STATE	KANSAS STATE	SOUTH DAKOTA STATE	COLORADO STATE	BRIGHAM YOUNG	NORTH DAKOTA STATE	WASHINGTON STATE	UNO	UNIVERSITY OF WYOMING
<b>CONSTRUCTION MANAGEMENT COURSES</b>									
Design Process/ Collaboration	EGEN 310R								CE 1000, 2000, 3000
Computer Applications in Construction	ETCC 204, DDSN 101	CNS 200, 510, ARE 310, 312			CFM 155		ME 123, CM 422	CNST 2250	ARE 1600, CM 4600
Architectural Drafting/ Construction Documents	EGEN 115	CNS 210, 321, 325	CM 124	CON 131	CFM 105	CM&E 200, CM&E 212	CM 311	CNST 1120	ARE 2600
Materials and Methods	EMAT 251, ARCH 241	CNS 220, 523, 524	CM 216	CON 151		CM&E 203	CM 313, 323	CNST 2510	CM 2120 - MATERIALS
Concrete and Masonry Construction	ETCC 310	CNS 330, 528			CFM 217	CM&E 453			
Structures 1	EGEN 203	CNS 231	CM 353	CON 359	CFM 210	CM&E 250	ARCH 320	CNST 3350	CM 2200 - STRUCT 1
Structures 2	EGEN 208	CE 331		CON 459	CFM 302	CM&E 450	ARCH 321	CNST 3360	CM 2220 - STRUCT 2
Structures 3	ETCC 412	CNS 522							
Electrical Systems	EELE 354, ETME 425	CNS 535	CM 333	CON 360	CFM 241, CFM 330	CM&E 421	CM 322	CNST 3060	CM 2400 - MEP SYSTEMS
Estimating 1	ECIV 307	CNS 641	CM 232	CON 265	CFM 311	CM&E 305	CM 331	CNST 3780	CM 3120 - ESTIMATING
Estimating 2		CNS 643		CON 365	CFM 411	CM&E 380	CM 410	CNST 3790	
Surveying	SRVY 230, SRVY 273	CE 212	CM 210	CON 261		CM&E 204	CM 334	CONE 2210	CE 2070
Materials Testing		CE 331		CON 251				CNST 2520	
Mechanical Systems	EGEN 331, ETME 425	CNS 534, CNS 536	CM 333	CON 371	CFM 320, CFM 330	CM&E 421	CM 321	CNST 3050	CM 2400 - MEP SYSTEMS
Construction Equipment and Soil Mechanics	ETCC 302, ECIV 404	CNS 440	CM 320, CM 374	CON 366, CON 469	CFM 335	CM&E 260, 301	CM 332, 432	CNST 2410	CM 3220 - SOILS/ CONCR.
Construction Safety		CNS 550	CM 400	CON 317	CFM 345	CM&E405	CM 333	CNST 3440	CM 4120 - SAFETY
Construction Practices/ Field Management	ECIV 308	CNS 110, CNS 330		CON 101, 351	CFM 350	CM&E 405	CM 420, CM 412	CNST 2420	CM 4100 - PROJ. MGMT.
Scheduling and Cost Control	ECIV 405	CNS 645	CM 443	CON 461	CFM 412	CM&E 240, 403	CM 411, 434	CNST 4850, 4760	CM 3100 - SCHEDULING
Construction Operations/ Management		CNS 660	CM 410	CON 465	CFM 415, CFM 445	CM&E 111, 315	CM 310, CM 421	CNST 1310, CNST 4200	CM 2100 - INTRO CM
Capstone/ Seminar	ETCC 499R		CM 471	CON 267, 487	CFM 416, 417, 418, 291r, 491r	CM&E 488	CM 431	CNST 4890	CM 4900
Real Estate Development					CFM 420, 426	CM&E 430			
Sustainability and Regulatory Building Solutions					CFM 460		CM 335		
Acoustic Systems		ARE 537							
Building Management					CFM 400				
<b>ENGLISH COURSES</b>									
English 1	WRIT 101W	ENGL 100	ENGL 101	CO 150	WRTG 150	ENGL 110	ENG 131	ENGL 1160	ENGL 1010
English 2	WRIT 201	ENGL 200	ENGL 277	Advanced Writing	ENGL 316	ENGL 120	W COURSE	ENGL 3980	COJO 3010 - USP C3
English 3		ENGL 417				ENGL 320	CM 301		
Speech	COMX 11US	COMM 105	SPCM 101	SPCM 200	MCOM 320	COMM 110	COM 220	CMST 2010	COJO 2010 - USP C2
<b>BUSINESS</b>									
Economics	ECNS 101S & ECNS 202	ECON 110	ECON 202	ECON 202		ECON 105	ECON 200	ECON 2200, ECON 2220	ECON 1010
Business Accounting 1	ACTG 220	ACCTG 231	ACCT 210	ACT 205	ACC 200	ACCT 102	ACCTG 215	ACCT 2010	ACCT 1010
Business Accounting 2			ACCT 211				ACCTG 225		ACCT 1020
Construction Accounting		CNS 646		CON 462	CFM 425		CM 312	CONE 2060	
Contracts/ Construction Law	BGEN 361	CNS 642	CM 473	CON 367	CFM 385	BUSN 431	MGMT 200, CM 423	LAWS 3930	CM 3160 - CONST. LAW
Business Management Course	EGEN 330	MANGT 420, CNS 542	MGMT 360	MGT 305		MGMT 320	MGMT 300	MGMT 3490	MGT 1040, MGT 3210
Human Resources			MGMT 460	MGT 473			CM 433	CNST 4800	MGT 3110
Management Information Systems			MGMT 325						
Business Finance			MGMT 310						
Legal and Ethical Issues in Business				BUS 205					
Global Leadership					ENG T 231				
<b>MATH</b>									
Algebra 1		MATH 205	MATH 102	MATH 117					MATH 1450
Algebra 2				MATH 118					
Precalculus	M 151Q	MATH 205	MATH 121			MATH 107			
Calculus	M 165Q, M166Q 1&2			MATH 141		MATH 146	MATH 124	MATH 1950	MATH 2200
Statistics	STAT 216Q	STAT 350	STAT 281	STAT 204	STAT 121	STAT 330	STAT 311	MATH 1530	STAT 2050
Trigonometry				MATH 125	MATH 111	MATH 105			
Applied Mechanics			GE 241						
<b>SCIENCES</b>									
Physics 1	PHSX 205	PHYS 113		PH 121	PHSCS 105	PHYS 211	PHYS 121	PHYS 1050	PHYS 1110
Physics 2	PHSX 207	PHYS 114					PHYS 122		
Chemistry	CHMY 121IN		CHEM 106			CHEM 121			
Geology	ERTH 101IN			GEOL 120		GEOL 105	ESS 101	GEOL 1170	

■ COURSES OFFERED BY 88-100%    
 ■ COURSES OFFERED BY 63%    
 ■ COURSES OFFERED BY 50%    
 ■ COURSES OFFERED BY < 50%