MEMORANDUM

To: Brenda McComb, Dean Graduate School, OSU

Date: October 27, 2014

From: Badege Bishaw, Program Director, Forest Ecosystems and Society, OSU

Jim Coakely, Associate Dean, College of Business, OSU

Claire Montgomery, Head, Forest Engineering Resource Management, OSU

Balasingam Muhunthan, Chair, CEE Department, Washington State University

John Willis, Vice President, CH2M Hill, Portland, OR.

Re: GRADUATE PROGRAM REVIEW, School of Civil and Construction Engineering, Oregon State University

The panel along with Brenda McComb, Dean of the Graduate School conducted a comprehensive review of the graduate program of the School of Civil and Construction Engineering. The review included the self-study report of the CCE program followed by onsite visit on October 6, 2014. The panel acknowledges the contributions by the CCE faculty, students, and staff in the preparation of the self-study report, and their assistance during our site visit. Special thanks are accorded to Dr. Chris Bell and the CCE staff for facilitating this process.

The report by the panel follows:

1. Overall Recommendation

Maintain and Restructure.

2. Summary of Findings and Recommendations

Program Strengths:

The CCE program currently awards degrees in Master of Engineering (M. Eng), MS in Civil Engineering, and PHD in Civil Engineering. The program has excellent reputation with industry and its graduates have been employed by many of the major firms especially in the Northwest. The course curriculum is strong, allows students to specialize in a number of specialized tracks within CCE such as structural, geotechnical, ocean engineering, and transportation.

The CCE program has added over twenty new tenure stream faculty since the last review in 2004. The program has also seen significant growth in graduate students, especially in the M. Eng degree program. CCE has also seen growth in the number of PhD students. Many of the faculty members associated with the CCE program are leaders in the respective disciplines. The admission process of the student into the program is well defined. The computing, laboratory, and library facilities are on par or better in some instances with peer institutions. Some of the laboratory facilities such as the Hinsdale Wave research and the Kiewit Material Performance lab are unique and position the faculty and researchers in the program to collaborate on multi-investigator, multi-institution large grants and contracts.

Students and recent graduates speak highly about the quality of the overall program, collegiality of faculty, and the student experience.

Program areas that need attention

The CCE programs lists success in three themes, Sustainability, The Human Interface, and Resilience, as key for it to meet the Strategic Goals of the College of Engineering and the University. The program has set research, educational, and outreach goals in each of these theme areas to meet the overall mission, and plans to continue to increase the core faculty to enable them to develop appropriate expertise within these three themed areas. However, the current mission for the school does not emphasize research, nor does it appear to be aligned with the three themes stated in the CCE goals. The mission of the School of CCE needs to be updated with these strategic goals.

We also have concerns about the adequacy of infrastructure, personnel, organizational, and administrative support to meet these ambitious goals.

Much of the criticism of the program found from the self-study report, interview with faculty, staff, and students, arise partly as a result of the significant growth experienced by the program over the last few years. They include, inadequate desk space for graduate students, sporadic graduate course offerings, and lack of adequate guidance and supervision prior to arriving on campus and during the first term.

We also note that personnel growth has been unbalanced. While there has been strong growth in faculty numbers and graduate student enrollment, moderate growth in undergraduate student enrollment, there has been little, if any, growth in administrative staff. Despite the significant growth in faculty lines, the program appears to have difficulty in attracting a diverse faculty pool. The pool of applicants for the graduate programs also appears to lack in candidates from underrepresented populations.

Faculty input suggests that their workload is stretched to the limit with increased graduate students and course loads. The annual research expenditure in the program has remained fairly flat over the last ten years.

Based on our findings, the following recommendations are made for the program to continue to excel with its current strengths and to plan for future success.

Recommendations:

1. Update the School mission to be consistent with the stated strategic goals of the unit.
2. Ensure the strategic goals can be met by increasing faculty lines even more to account for the growing work load. If faculty increases cannot be achieved, then adjust the goals by reducing MS enrollment to achieve the stated target for PhD enrollment or reducing the target for PhD enrollment.
3. Partner with the Graduate School to explore opportunities to increase the diversity in graduate student applicant pool.
4. Develop a formal and documented process to conduct Annual Reviews for graduate students.
5. Provide better communications between program and students, especially with admitted students prior to arrival on campus. Identify the major professor in admission letter. During orientation and within the graduate student handbook, include facilities and other supporting activities – students indicated they were not aware of support available to them. Better coordination between specialties – students indicated it was not always clear which policy applies (university, school or individual unit/discipline).
6. Increase support staff – suggest a graduate academic advisor – minor issue with major professors not familiar with required coursework.
7. Provide better tracking of placement – collect information from major professors and document.
8. Provide better support for Graduate Teaching Assistance.
    a. Provide overview of facilities such as access to copiers
    b. Reorganize Seminar course
    c. Provide yearly schedule of graduate classes and increase the reliability of course offerings. Specifically, avoid cancellation of courses at the last minute, change of offering time, etc.
9. Encourage faculty and researchers in the program to make effective use of the unique testing facilities to write major multi-investigator, multi-institution grants. This will contribute to increased research expenditures.
10. Given the breadth of the CCE program, consider Transcript visible specialties.

3. Detailed Findings

Introduction:

The overall objective of the review of the graduate program is to ensure that it meets its overall stated mission as well as its alignment with the college of engineering, the Graduate School, and the University. The review and the recommendations herein provides an opportunity for the CCE program to reflect on its strengths and opportunity for future success in continuing to grow the program.

The panel reviewed the self-study report submitted by the CCE program before the onsite visit on October 6, 2014. The site visit program of the panel consisted of the following:

8:00 - 8:30 AM	School Head & Graduate Coordinator	Kearney 111
8:30 - 9:15 AM	Graduate Coordinator & Staff	Kearney 111
9:15 - 10:15 AM	Graduate Committee & Coordinators	Kearney 311
10:15 - 10:30 AM	Break	
10:30 - 11:30 AM	Tour Facilities	
11:30 - 12:30 PM	Meet with students	Owen 101
12:30 - 1:30 PM	Working lunch for Review Panel	Kearney 111
1:30 - 2:30 PM	Program Faculty	Kearney 311
2:30 – 3:15 PM	Dean Ashford	Covel 101
3:15 – 3:30 PM	Break	
3:30 – 4:00 PM	Executive Session	Kearney 111
4:00 – 4:30 PM	School Head & Graduate Coordinator	Kearney 111
4:30 – 5:00 PM	Executive Session	Kearney 111

Clarifications relating to specific items found in the self-study report were obtained from CCE faculty, staff, and students. The organization of the report consists of our findings and recommendation as needed on some essential metrics for the continued success of the program. These include input, productivity, and outcomes and impacts.

Inputs:

i). Mission of the program, and its relationship and alignment with the mission of the academic college, Graduate School, and university mission

Section 1.3.2 of the self-study lists the goals of the CCE programs towards achieving the Strategic Goals of the College of Engineering (detailed in section 1.3.1). These goals are centered on three themes for the graduate programs: Sustainability, The Human Interface, and Resilience. The program has planned for an increase in their core faculty to enable them to

develop appropriate expertise within these three themed areas. These goals are well aligned with the goal of the College, and the University.

However, the stated mission of the School of CCE in section 1.2 needs updating to be consistent with these strategic goals. The current mission does not emphasize research, nor does it appear to be aligned with the three themes stated in the CCE goals.

Recommendation: Update the School mission to be consistent with the stated strategic goals of the unit.

ii). Recruitment and enrollment trends

As explained in the self-study, the enrollment in the CCE programs has increased over the past few years and there is a steady stream of applicants to the program. There has been a slight increase in the percentage of female candidates – from approximately 20 percent to 25 percent.

As reported in the self-study, there has not been much improvement in the diversity of the applicant pool with respect to underrepresented domestic populations.

Recommendation: The School should partner with the Graduate School to include promotional materials for CCE programs at the diversity recruiting events attended by OSU (SACNAS and the California Diversity Forum).

iii). Admissions selectivity and level of financial support

The program is appropriately selective with a well-defined admissions process with participation by faculty. The school provides adequate financial support to the majority of its PhD and MS students (the MEng program which, by design, is self-funded).

iv). Curriculum Strength

The program provides a suite of graduate courses in the various specialized disciplines with the major degree programs. The course contents are rigorous, up to date, and many have hands-on projects built within the curriculum. These prepare well the students for their careers upon graduation. The CCE program also invites speakers from various industry and academia to enrich student and faculty experience in the school.

The requirements of 12 graduate credits in CCE courses for PhD students puts the students who had completed a previous degree at CCE in OSU at a disadvantage. There are not many courses available in certain areas.

iv). Quality of personnel and adequacy to achieve mission and goals; Level and quality of infrastructure; Quality of organizational support

The quality of the tenured line faculty appears to be quite good. Half (16) earned PhDs from institutions that are currently ranked in the top 10 Engineering programs. Nearly two-thirds (21) earned PhDs from institutions ranked in the top 25. Almost all commentary from students about quality and collegiality of faculty, major professor experience, courses, and the overall program is positive – some emphatically so. From the survey of students 1 and 5 years after graduation,

60% felt “very prepared” for their career and 86% would recommend this program to others. On a scale of 1-to-5, the average score was 4.36 for overall quality of graduate instruction and 4.27 for overall satisfaction level; the average score was 4 or greater for all but one of the remaining categories. In a survey of current students, satisfaction with equipment and facilities, OSU library, graduate courses, graduate program exams, and overall guidance from CCE faculty and staff. Satisfaction with the major professor experience was particularly high (4.53). These positive scores were further supported by the written commentary that accompanied the survey and verbal commentary offered during our meeting with graduate students (which was well-attended and productive).

Three areas that need attention were noted by students in our meeting with them, in the quantitative portion of the survey, and in written commentary in the survey. These are inadequate desk space, sporadic graduate course offerings, and lack of adequate guidance/advising/orientation/direction prior to arriving on campus and during the first term.

Inadequate space is a growth phenomenon. Graduate student enrollment has doubled in the last 6 years and 40% of the graduate student population is without a desk. This problem is recognized in the Self Study Report and plans are underway to make more efficient use of existing space in the short run. In the long run, however, additional space will be needed. We noted, in particular, that many students with teaching assistantships do not have access to a private place to meet with students or grade exams and assignments.

CCE also recognizes that they need to offer more stand-alone graduate courses and to offer them consistently so that students can plan ahead and complete their degrees in a timely fashion. CCE has made significant progress to achieve that goal already and has stated this explicitly as a goal for 2015.

Inadequate initial advising is also noted in the Outcomes / Satisfaction section of the Self Study. I did not see any plans to address it in the self-study. However, the Review Committee feels that this problem is “fixable” and has some suggestions for how to do it. The single most important step is to make sure that all students are assigned an initial advisor (which may become the major professor for that student’s program) and that the name and contact information for that person be included on the admission letter. The student should be encouraged to make contact prior to arrival on campus for advice. Other suggestions include: making sure that students receive consistent guidance from CCE, COE, and the Graduate School; make sure that students know that the CCE Graduate Student Handbook exists and where to find it; implement a formal annual review of progress; conduct a facilities tour early in fall term; reinstate teaching assistant workshop.

As noted in the self-study, the biggest challenge for CCE will be to manage growth. The faculty has grown from 26 to 35 tenured line faculty and graduate enrollment has more than doubled (according to Table B) since the last CCE Graduate Program Review. Goals for the future include addition of 5 more faculty lines and growth in doctoral student enrollment to 100 students, graduating 20 per year. We have concerns about the adequacy of infrastructure, personnel, organizational, and administrative support to meet these ambitious goals:

- Space, which is already limited, will be a major issue that must be addressed by doing more than utilizing existing space more efficiently. CCE and COE are aware of this issue.

- We note that personnel growth has been unbalanced. There has been strong growth in faculty numbers and graduate student enrollment, moderate growth in undergraduate student enrollment, and little, if any, growth in administrative staff. As far as we can tell, the only new FTE allocated to administrative support for graduate education since the last review was 0.2 FTE for the Associate School Head to serve as a graduate program chair. We recommend the addition of a full-time graduate student advisor to the administrative staff.

- We also note that the faculty feel that they are at a competitive disadvantage for external research funds to support graduate students because the granting agencies do not want to pay tuition. Therefore, the agencies prefer to award grants to faculty in institutions that waive graduate student tuition. The faculty propose that tuition for PhD students be waived upon advancement to candidacy. This is a University-level decision.

- Finally, we question whether 5 additional faculty are sufficient to meet the goal of roughly doubling doctoral enrollment (50 additional graduate students) while maintaining the quality of the graduate student experience. The current graduate student advising load with 32 faculty and 159 graduate students is nearly 5 students per faculty line: 1.1 MEng, 2.2 MS, and 1.7 PhD. That is a very heavy load, even considering that MEng is largely a coursework degree. With 40 faculty, 100 PhD students, and flat MEng and MS enrollment, the total advising load will not increase substantially (to a little over 5 students/faculty), but PhD advising will increase relative to the other two components so that the effective work load will increase. We know that COE is in the process of strategic planning and that revisiting the current set of goals will be part of that process. We recommend that COE and CCE consider:
  - increasing faculty lines even more to account for the growing work load or
  - adjusting the goals by:
    - reducing MS enrollment to achieve the stated target for PhD enrollment or
    - reducing the target for PhD enrollment.

Productivity:

i). 4- and -8 year graduation rates for master's and doctoral students

- Graduation rate for Master's (4 years rate, cohort based) was 95% in 2009 (Table J). Since the last program review in 2003 there is an 8% increase on Mater's graduation rate.

- Graduation rate for doctoral degree (8 year rate, cohort based) was 71% in 2005. However, there was no additional data beyond 2005 to see the trend on graduation rate for doctoral graduates.

- CCE has a plan to growth its graduate students to 300 to meet the University 2025 strategic plan. The program will grow its graduate students to 100 Ph.Ds. and 200 M.S. and M. Eng. students.

- Attrition in Ph.D. students depends on admission of M.S. and M. ENG students

ii). Publications or evidence of other scholarly work by students and faculty

- Faculty is currently producing more than three papers on average per year, with students involved 50% of the time.

- Grant and contract received by graduate faculty was 80 (2003/04). There is a substantial increase in grant and contracts revived in 2012/13, which is 137 or 58% increase (Table I).

- CCE faculty also collaborates on multidisciplinary research with faculty in other colleges, e.g. College of Forestry, Wood Science and Engineering.

- Faculty should use the support from the research office on proposal and grant writing to increase their competitiveness to secure funds to support their research and graduate students.

iii). Student satisfaction with their education and mentoring experience

There is good interaction between graduate students and CCE faculty. Most students say the CCE program prepares them for job and carrier goals they aspire. However, some students express concern and they think, things can be done better by the program. Here are some suggestions by graduate students:

- Students want to see updated list of course to be offered for the year to help them plan their class schedule and prepare their program of study ahead of time.
- CCE qualifying exam should be clearly shown on the CCE website. The Department and Graduate School preliminary exam should be coordinated.
- Students want to know their major advisor when they are admitted to the program.
- International students want to get internship opportunities before they graduate.

Outcomes and Impacts:

i) Placement and Success of Graduates:

The CCE program has an excellent reputation with industry. Many of CCE program master's graduates are employed by consulting engineering companies in the Pacific Northwest. As such very few of masters and doctoral graduates have issues finding employment, and, that the majority do so immediately on graduation. Graduate placement and success information comes from anecdotal sources and student perceptions. CCE does not have good data to enable objective assessment of post-graduation employment. The Engineering College, including the school of CCE is funded in part by the Engineering Technology Industry Council (ETIC). ETIC is interested in data and stories on the placement and success of students in Oregon businesses and non-engineering programs in the state of Oregon are providing that data to ETIC.

Recommendation: While graduate program has had little issues with placement of graduates, it is necessary to track the placement and success of graduates. This is important to manage the proposed increase in both masters and PHD graduate students. It would also benefit the CCE in providing a measure of objectiveness that could drive refinement in the graduate program for placement and success of both industry facing and academic graduates. Given the expected increase in PHD students, it is also recommended to that efforts be made and to have a program to encourage these students to prepare for academia and national research labs.

ii) Satisfaction of students and graduates:

The available data confirmed by student interviews shows a high degree of satisfaction of the program. The students felt equally prepared for industry and academic careers.

iii). Professional or national rankings:

The most recent rankings published by the US News and World Report places the CCE program to be among the top 50 in the nation. With the recent addition of new faculty, their research productivity, and the quality of the program this ranking is expected to rise.