

## Centre for Sustainable Infrastructure – Capability Statement

### Overview

The Centre for Sustainable Infrastructure (CSI) provides a focus for multi-disciplinary research in the field of sustainable civil infrastructure. Expert staff undertake research and specialist consulting to industry in three main program areas:

- Advanced structural and geotechnical systems
- Transportation systems
- Water resources modelling

In addition to its research activities, the Centre provides education and training through the undergraduate Civil Engineering degree and the Master of Construction Management and Civil Engineering postgraduate coursework program.

Facilities include a modern Geotechnical laboratory, structural testing and data acquisition equipment - including a number of universal test and impact machines, and a fluids laboratory that has been used for the development of a number of innovative storm water systems to improve water quality.

### Research

CSI has three major research programs consisting of a series of projects involving industry partners, centre staff, research fellows and graduate students. The research is carried out using analytical and experimental techniques which suit the project requirements, and emerging technologies are always considered. The three research program areas are as follows:

#### **Program 1: Advanced Structural and Geotechnical Systems**

The projects within this theme focus on physical testing of structural systems and the re-use of materials reclaimed from construction and demolition waste. Many of the projects have a sustainability theme through the use of new materials, the re-use of old materials and the extension of life of existing facilities. Some of the current and emerging projects include:

- Proof testing and performance rating of building products
- Strength and drift capacity investigation of structural systems
- Dynamic response of structures to blast and earthquake
- Development of long span integrated floor systems
- Applications of reclaimed and new materials in civil infrastructure
- Integrated pavement design using reclaimed materials
- Geotechnical laboratory testing, field instrumentation and in-situ testing
- Ground improvement, soil stabilisation and geosynthetic applications

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### **Program 2: Transportation Systems**

CSI currently has Transportation Systems research strengths in asset management of low volume roads and the complex contact interface between wheel and rail. The Centre has also started work on the emerging theme of transport access for the elderly. Some of the current and emerging projects include:

- Knowledge management systems for transport asset management
- Modelling low volume road performance
- Development of new rail and wheel materials to improve performance
- Modelling wear and rolling contact fatigue at the wheel rail interface
- New thick rail coatings for reducing noise and extending asset life
- Improving railway access issues for an ageing population

### **Program 3: Water resources modelling**

CSI conducts urban water research which focuses on improving water supply capacity through the harvesting of storm water and the re-use of wastewater. This research is particularly relevant to Australia in the context of climate change, drought and a growing population. CSI also conducts internationally recognised coastal and oceanography research with a focus on wave and ocean modelling. Some of the current and emerging projects include:

- Deterioration modelling of water supply, stormwater and sewer systems
- Litter separation in urban water stormwater systems
- Sustainable water resource management
- Spectral modelling of wind-generated waves
- Dynamics of surface ocean waves
- Wave breaking and dissipation
- Impact of climate change on coastal and port facilities

### **Industry Involvement**

Staff within CSI have a number of existing alliances and linkages with government, industry, and research centres and universities around the world. A number of CSI staff are involved with the Standards Australia and Engineer Australia technical and management committees. One of the Centre's core objectives is to further establish and broaden these collaborative links with industry to facilitate research opportunities and to ensure research outcomes are focused on improvements to infrastructure and the needs of society.

The Centre has undertaken many collaborative research projects and currently provides specialist consulting advice to a number of leading consulting firms and industries including, construction, infrastructure service providers, energy, mining, petrochemical, manufacturing and government organisations. CSIs diverse range of industry partners include:

- Local Councils and the City of Melbourne,
- Building Commission, ABCB, Victorian Office of Housing
- CSIRO, Bureau of Meteorology
- Melbourne Water, City West Water, South East Water
- Terrock Consulting, CICIND
- VicRoads, ARRB, Sustainability Victoria
- Alex Fraser Industries and Delta Demolition
- Woodside Energy and MetOcean Engineers, Coastal Engineering Solutions, Ocean Waves Pacific
- Network Rail, Rail Safety and Standards Board, UK

## **Education**

CSI provides a vibrant and supportive research environment for postgraduate research students. The Centre has around 30 students undertaking research within the three main program areas. In addition, a number of postgraduate coursework students undertake minor research projects within CSI which contribute to the research output of CSI and provide pathways for PhD studies.

## **Key Contact**

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## **Further Information**

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