

# **White Paper on Transportation Environmental Quality Research**

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## **Summary**

Transportation environment includes the built and natural environments that support and surround the transportation infrastructure, namely streets and highways or airports. The quality of transportation environment encompasses air, water and the ecosystem aspects. This white paper specifically focuses on the current research strength in the College of Architecture (CARC) that is concentrated on highway corridor and stormwater. Faculty in the CARC has been leading this research area and collaborating with faculty from different colleges at Texas A&M (TAMU). The intent is to reiterate the existence and stature of this research area in the CARC and the University, with an attempt to strengthen the multidisciplinary nature of this area and further cover areas beyond land transportation and stormwater. Present active research of this area includes bioretention for stormwater quality, roadside vegetated filter strips and swales for improving stormwater quality, surface soil erosion and roadside vegetation management.

## **Merit and potential for societal and scholarly impact**

Transportation is an essential social and economic activity with inevitable, negative impacts. Over the past few decades, the world has been experiencing a global growth phenomenon fueled by expanding human and vehicle populations that led to intensification in demand for the movement of goods, and further stimulated by globalization and trade liberalization. Overlaying the general growth scenario is a further phenomenon of rapid urbanization, which tends to concentrate the negative impacts.

Transportation environmental quality is an applied research area that provides solutions or alternatives that mitigate or even eliminate adverse effects resulting from urbanization. Its merit and potential impacts on society start from local community and are transferrable in the global scale. Research results generated in the United States are of interest to highway construction-intensive countries such as China and India, which in turn creates international research/practice opportunities.

## **Multidisciplinary nature of topic—participation and leveraging potential**

The issues interfaced between transportation and environmental quality are multi-facets. Disciplines that are involved with this research area cover civil engineering, urban planning, geography, environmental science and landscape architecture. For example, stormwater management requires knowledge of hydrology and land use planning; surface soil erosion needs knowledge of hydraulics, soil and infrastructure design; and roadside vegetation management requires participation of agronomists and maintenance specialists.

## **Alignment with Vision 2020 and College plans**

Under former Texas A&M President Dr. Robert Gates' leadership, the College of Architecture (CARC) identified three signature areas of excellence: sustainability, health system and visualization. These three areas represent CARC's multidisciplinary nature that goes across departmental boundaries. They also fit well with Vision 2020. The transportation environmental

quality is well-aligned with one of the sub-areas of sustainability that embraces socially responsible, environmentally sensible, and financially feasible developments.

**Existence of critical mass and excellence at Texas A&M and availability of an external candidate pool**

Current transportation related research at the Texas A&M University System (TAMUS) is primarily through the renowned Texas Transportation Institute (TTI). In specific, stormwater is specialized in the Environmental Management Program and air quality by the Air Quality Studies Center.

Dr. Ming-Han Li, assistant professor of LAUP, who is also affiliated with TTI has led several studies in multidisciplinary teams that were composed of faculty members from different colleges or even different universities, including the Dwight Look College of Engineering at TAMU (civil engineering), The University of Texas at Austin and Texas Tech University. Specific TAMU faculty members Dr. Li have collaborated with are Dr. Francisco Olivera (water resources), Dr. Tony Cahill (water resources), Dr. Kuang-An Chang (coastal engineering), Dr. Kung-Hui Chu (environmental engineering) and Dr. Jean-Louis Briaud (geotechnical engineering).

**Space and infrastructure feasibility (including proposed plans)**

Major TAMUS facilities contributed to this research area include TTI Hydraulic, Sedimentation and Erosion Control Laboratory and various laboratories of civil engineering at TAMU.

**Corporate, federal, and foundation interest and award potential**

Current and potential funding agencies of the transportation environmental quality are National Cooperative Highway Research Program, Federal Highway Administration, state departments of transportation and Environmental Protection Agency.