# Accepted Manuscript

### Article

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 PII:
 S2095-8099(18)30191-7

 DOI:
 https://doi.org/10.1016/j.eng.2018.03.002

 Reference:
 ENG 49

To appear in: Engineering

Received Date:2 November 2017Revised Date:1 December 2017Accepted Date:3 January 2018



Please cite this article as: Q. Li, F. Guo, Y. Guan, A GIS-Based Evaluation of Environmental Sensitivity for an Urban Expressway in Shenzhen, China, *Engineering* (2018), doi: https://doi.org/10.1016/j.eng.2018.03.002

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# CEPTED

Engineering 4 (2018) xxx-xxx

## Research Sustainable Infrastructure—Article

## A GIS-Based Evaluation of Environmental Sensitivity for an Urban Expressway in Shenzhen, China

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#### **ARTICLE INFO**

Article history: Received 2 November 2017 Revised 1 December 2017 Accepted 3 January 2018 Available online

Keywords: Environmentally sensitive areas Urban expressway Geographic information system Low-impact development

### ABSTRACT

Urban eco-environmental degradation is becoming inevitable due to the extensive urbanization, population growth, and socioeconomic development in China. One of the traffic arteries in Shenzhen is an urban expressway that is under construction and that runs across environmentally sensitive areas (ESAs). The environmental pollution from urban expressways is critical, due to its characteristics of a high runoff coefficient, considerable contaminant accumulation, and complex pollutant ingredients. ESAs are vulnerable to anthropogenic disturbances and hence should be given special attention. In order to evaluate the environmental sensitivity along this urban expressway and minimize the influences of the ongoing road construction and future operation on the surrounding ecosystem, the environmental sensitivity of the relevant area was evaluated based on the application of a geographic information system (GIS). A final ESA map was classified into four environmental sensitivity levels; this classification indicates that a large proportion of the expressway passes through areas of high sensitivity, representing 11.93 km or 52.3% of the total expressway, and more than 90% of the total expressway passes through ESAs. This study provides beneficial information for optimal layout schemes of initial rainfall runoff treatment facilities developed from low-impact development (LID) techniques in order to minimize the impact of polluted road runoff on the surrounding ecological environment.

#### 1. Introduction

The urban ecological environment provides people with clean water resources and a comfortable living environment, both of which are the foundation of urban economic, social, and cultural development. However, with the development

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