

---

**AWRA 2011 ANNUAL WATER RESOURCES CONFERENCE**  
**Albuquerque, New Mexico**

November 7-10, 2011

Copyright © 2011 AWRA

---

**HYDRAULIC MODELING STUDY FOR URBAN STORM WATER DRAIN STRUCTURE BMPs**

Jungseok Ho\*, Kevin Daggett\*\*, Julie Coonrod\*\*\*

**ABSTRACT:** Hydraulic modeling study to evaluate design alternatives of the proposed storm water quality structure for storm water Best Management Practices is presented in this presentation. A 1:30 scaled laboratory model and a three-dimensional Computational Fluid Dynamics (CFD) model examine the flow patterns and storm water debris filtering performance of the South Diversion Channel (SDC), City of Albuquerque, New Mexico. This study uses a CFD model solving the Reynolds-averaged Navier-Stokes equations. The SDC is a trapezoidal storm drain channel which has a longitudinal slope of 0.14 % with an earthen bottom width of 30.0 ft and side slopes of riprap. The Manning roughness coefficient of the channel is estimated to be 0.035. Although the channel has been designed for a discharge of 3,450 cfs, the more frequent discharges in the channel vary between 100 cfs to 600 cfs. The goal of the proposed design is to divert flow at the upstream end of the existing concrete structure and to remove storm water debris from that flow before allowing it to re-enter the SDC. The proposed design should not generate 20% of longitudinal velocity profile compared to the existing structure. The model tests three different prototype flow discharges: 1,200 cfs, 2,200 cfs and 4,700 cfs. Three-dimensional Acoustic Doppler velocity meter take measurements at five locations in and around the models. The laboratory model also tests orifice and spillway to evaluate the best performing of sediment retention. Five different orifice shapes and openings and corresponding discharges through orifice and spillway are tested to achieve the best performing sediment retention design. The numerical model predictions show good agreement with the laboratory model measurements.

---

\* Assistant Professor, University of Texas Pan American, Civil Engineering ASB 1.204, Edinburg, TX 78539 USA, Phone: 956-665-3104, Email: [hoj@utpa.edu](mailto:hoj@utpa.edu)

\*\* Stormwater Quality Program Engineer, Albuquerque Metropolitan Arroyo Flood Control Authority, Albuquerque, NM, United States

\*\*\* Professor, University of New Mexico, Civil Engineering Department, Albuquerque, NM, United States