

10.0 HYDRAULIC MODELING SOFTWARE SELECTION

In the Phase I Part I Wellington Avenue CSO Control Plan Report, Earth Tech recommended the City or Earth Tech, on behalf of the City, develop a hydraulic model of the City's entire collection system, including the sewers, pump stations, combined sewer overflows, and CSO facilities, to accurately establish the system's baseline flow conditions and response to wet weather with regard to CSO events at each of the CSO treatment facilities and provide a tool to assess the effectiveness of CSO control alternatives. Earth Tech conducted a comparison of various commercially available hydraulic modeling software packages and recommended the most appropriate hydraulic modeling software package based on meeting the City's technical needs in a cost effective manner.

Hydraulic Modeling Comparison and Results

- The general criteria considered to determine which hydraulic models were selected for evaluation included: hydrologic and hydraulic analysis, the ability to perform combined sewer overflow analysis, GIS integration, performance of a capacity analysis, and review of new development.
- Four models were selected for evaluation; each meeting the above referenced general criteria: INFOWORKS, XPSWMM, DHI MOUSE and EPA's Storm Water Management Model (SWMM).
- The key component of each of these models is the ability to simulate free-surface flow, pressure flow, and surcharged flow. Each of the models can simulate flows under free surface conditions (i.e., utilizing Manning's Equation where velocity and cross sectional flow area are constant over time).
- The following criteria were established to evaluate the four models with each category assigned a numeric rating from 1 to 10, with 10 indicating the best fit of the criteria:
 - Technical Requirements 60%
 - Cost to Purchase Software Package 20%
 - Ease of Use 10%
 - Technical Support 10%

Recommendations

Earth Tech performed an evaluation of the four hydraulic models currently being utilized for hydrologic and hydraulic analysis of combined and separated wastewater collection systems, similar to the City of Newport's system. Earth Tech has extensive experience with the application of each of the modeling software packages.

Based on the review of the features of each of these models, Earth Tech recommends that the MOUSE model be utilized to perform the analysis of the City's sanitary sewer system, storm drains and combined sewer overflows. Selection of this model is a close choice over INFOWORKS due primarily to its lower licensing cost.

Conclusions

Based on the results of the comparison of hydraulic modeling software packages, DHI MOUSE is the most cost effective choice for modeling the sanitary sewer system in the City of Newport.

A detailed description of the hydraulic modeling software selection process, including: procedures, criteria, results, and recommendations is presented in the following Technical Memorandum.