

Water Sensitive Urban Design (Advanced Low Impact Development Design)

Purpose and Background

Water Sensitive Urban Design (WSUD) techniques are being used extensively for storm water controls. Most WSUD techniques are designed to attempt to replicate the original hydrology of a site. They are also sometimes promoted as a way to significantly reduce the storm sewer system required for a development. But do they actually meet these requirements? If so, as engineers, how can we verify that we can meet these goals?

In order to verify how WSUD features function, it is necessary to examine in more detail the hydrologic calculations associated with these techniques. In many WSUD designs, the intent is to capture and store or infiltrate 80% or 90% of the annual rainfall. This course will cover the methods of analysis to determine the design rainfall, including a brief example of the statistical analysis required. The course will also cover the use of basic software to determine if the proposed WSUD features will actually capture the required amount of annual rainfall, including longer-term simulations that are often required.

The hydraulic design of WSUD features is often neglected. The assumption is often made that all of the water goes into the WSUD feature simply because that's the design intent. A good hydraulic design is necessary based on the configuration of the LED feature. This course will cover hydraulic analysis of numerous WSUD features, including structures intended to divert water into WSUD features. It will also examine how the use of WSUD features impacts the required sizing of storm sewer systems.

Water Sensitive Urban Design techniques have the potential to significantly change how we approach storm water design. However, if the hydrology and hydraulics of these features are not carefully considered by the designers, these features also have the potential to be very ineffective and promote inappropriate design of future storm sewer systems.

Seminar Instructor

MARK PETERSON, P.E. is currently a special-projects engineer with Advanced Engineering and Environmental Services in Helena, Montana. He has been practicing engineering for 38 years and is registered in Montana, Wyoming, North Dakota, South Dakota and Minnesota. He has worked in state government in highway design and subdivision review. He has also worked as a consultant for over 20 years. He has taught courses in storm drainage for municipalities and regulatory agencies and currently teaches courses for ASCE in detention pond design, pipe material selection, storm sewer design, practical hydrology and storm water treatment. He has also been published in the ASCE Journal of Hydraulic Engineering. Mark earned his BS and MS degrees from Montana State University.

- For group training, contact John Wyrick (JWyrick@asce.org) or Stephanie Tomlinson (STomlinson@asce.org)

Summary Outline

- Overview of WSUD features
- Establishing appropriate rainfall parameters
- Hydrologic and hydraulic analysis of WSUD techniques
 - * bioretention cells
 - * vegetative swales
 - * infiltration trenches
 - * pervious pavements
- Analysis of long-term WSUD performance
- Analysis of WSUD impacts on peak flows
- Improving performance of WSUD features

Learning Outcomes

- Use data available to estimate appropriate rainfall factors for WSUD features
- Determine the hydrologic and hydraulic performance of bioretention cells
- Determine how to model infiltration and permeable pavement features using common software
- Determine how improvements to specific hydraulic features can improve performance

Seminar Benefits

- Understand how rainfall data is used to develop the 90% event
- Understand what field measurements are necessary to estimate the performance of a bioretention cell.
- Learn how to model infiltration and runoff from bioretention cells using common software
- Learn how to estimate the potential capacity of infiltration trenches.
- Learn how to model permeable pavement options using common software
- Understand how WSUD features can impact peak flow calculations
- Learn how to improve the performance of WSUD features including bioretention cells and infiltration trenches

Who Should Attend?

This course is for anyone involved with the design or review of Water Sensitive Urban Design (WSUD) features. This includes design engineers, regulatory officials and landscape architects. The course is technical in nature but the equations used are not complicated.

CEUs/PDHs: ASCE has been approved as an Authorized Provider by the International Association for Continuing Education and Training (IACET), 1760 Old Meadow Road, Suite 500, McLean, VA 22102. In addition, ASCE follows NCEES guidelines on continuing professional competency. Since continuing education requirements for P.E. license renewal vary from state to state, ASCE strongly recommends that individuals regularly check with their state registration board(s) on their specific continuing education requirements that affect P.E. licensure and the ability to renew licensure. For details on your state's requirements, please go to: http://www.ncees.org/licensure/licensing_boards/.

ASCE seminars are available for On-Site Training. For details regarding On-Site Training and/or needs-based training opportunities, please contact:

John Wyrick, Director
On-Site Training Worldwide
ASCE Continuing Education
Tel.: 703-295-6184
Email: jwyrick@asce.org

