Agenda

Stormwater Management System Objectives *D. Fisher*
- Complying with stormwater regulations
- Site assessment
- Mile High Flood District (formerly Urban Drainage & Flood Control District)
- Preparing stormwater pollution prevention plans
  - Federal, state, and municipal goals
- Design goals

Traditional Storage Design Considerations *D. Fisher*
- Detention basins
  - Sizing, water quality capture volume (WQCV) and excess urban runoff volume (EURV), full-spectrum detention, stormwater routing, sediment handling, outlet design
- Infiltration
  - Runoff attenuation, stormwater routing, sediment, soils and vegetation
- Interactive design example

Traditional versus Underground System Design *E. Wong*
- Selection criteria
  - Site constraints
  - Watershed and terrain considerations
  - Stormwater quantity and quality
  - Community and environmental factors
- What is acceptable in Front Range Colorado?
  - Mile High Flood District
  - Local jurisdictions

Underground Storage Design Considerations *E. Wong*
- Available products and materials
- Applications of different products/materials
- Sizing
- Full spectrum capability
- Maintenance considerations
- Stone as storage
- Manufacturer versus design engineer responsibility
- Structural considerations (loading, cover, adjacent infrastructure)
- Sound engineering judgement

Sustainable Best Practices in Stormwater Detention *D. Fisher*
- Naturalizing detention basins
- Small detention areas vs. large detention area
- Rain gardens
- Retrofitting existing systems and basins

Traditional and Underground Stormwater Storage
Denver, CO - Tuesday, January 14, 2020

HalfMoon Education Inc.
PO Box 278
Altoona, WI 54720-0278

Learning Objectives

You'll be able to:

Describe the components of traditional stormwater management design, including detention basins, routing, inflows and outlet design.

Compare the benefits of underground stormwater storage to traditional stormwater design.

Consider the terrain, site constraints, and community and environmental factors that impact system design in Front Range Colorado.

Explore design criteria for underground stormwater storage.

Describe sustainable best practices in stormwater detention, including rain gardens and naturalized detention basins.

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Review stormwater management system objectives

Discuss traditional stormwater storage design considerations

Compare traditional and underground system design

Examine underground stormwater storage design

Explore sustainable best practices in stormwater detention

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Professional Engineers
6.5 PDHs

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Faculty

Deborah A. Fisher, P.E., CFM, CPESC
Water Resources Engineer at Water Engineering Solutions LLC

Ms. Fisher has over 30 years of experience in hydrology and hydraulics, having designed hundreds of drainage and water quality treatment facilities all along the front range of Colorado. She has also authored hundreds of drainage studies and is well versed in low impact development, groundwater investigation, and emergency flood mitigation. She was the continuing education director for Martin/Martin for over ten years, and she conducted several hundred classes for the civil department. Ms. Fisher's current passion is helping people and solving problems, particularly for homeowners, to understand water migration and control, both on the surface and underground. She has performed dozens of site visits and water issue evaluations for conditions such as standing water, wet basements, excessive sump pump discharges, or other drainage issues.

Eliot Wong
Owner and Principal of Advanced Water Resources Engineering, LLC (AWARE)

Mr. Wong is the owner and principal engineer of Advanced Water Resources Engineering, LLC (AWARE), a water resources engineering firm that provides consultation relative to stormwater design and management, drainage, flood control, floodplain management, H&H, and permitting, as well as expert testimony on drainage and flooding litigation matters. Mr. Wong is a licensed professional engineer in Colorado with 15 years of consulting experience, and he has worked on stormwater projects in Colorado, Kansas, Missouri, South Dakota, Texas, Illinois, and New York, as well as in Peru. He has worked on nearly 40 litigation matters, of which many had a major component relative to stormwater runoff. Mr. Wong was a lead instructor for CDOT's Transportation and Erosion Control Supervisor Certification program and frequently presents the topic of underground storage and treatment, including as the annual guest lecturer at UWRI's 2-day detention design class. Mr. Wong enjoys spending time with his 12-month old son, the newest addition to his family.

Additional Learning

Webinar Series

National Electrical Code:
Onsite Power Generation and Distribution

- **Part I**
  Wed., Dec. 4, 2019, 11:00 AM - 2:15 PM CST
- **Part II**
  Thurs., Dec. 5, 2019, 11:00 AM - 2:15 PM CST

Floodplain Mapping and Regulation

- **Floods, Floodplains and Introduction to Floodplain Management**
  Wed., Dec. 4, 2019, 11:00 AM - 12:30 PM CST
- **Flood Maps and Flood Zones**
  Wed., Dec. 4, 2019, 1:00 - 2:30 PM CST
- **Elevations in the National Flood Insurance Program (NFIP) and Floodplain Regulation**
  Thurs., Dec. 5, 2019, 11:00 AM - 12:30 PM CST
- **Practical Floodplain Management**
  Thurs., Dec. 5, 2019, 1:00 - 2:30 PM CST

For more information
and other online learning opportunities visit:
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Seminar Information

Renaissance Denver
Stapleton Hotel
3801 Quebec Street
Denver, CO 80207
(303) 399-7500

Registration
8:00 - 8:30 am
Morning Session
8:30 am - 12:15 pm
Lunch (On your own)
12:15 - 1:15 pm
Afternoon Session
1:15 - 4:30 pm

Tuition

$289 for individual registration
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Included with your registration: *Complimentary continental breakfast and printed seminar manual.*

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- Mail-in or fax the attached form to 715-835-6066
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Continuing Education Credit Information

This seminar is open to the public and offers 6.5 PDHs to professional engineers and 6.5 HSW continuing education hours to architects and landscape architects in most states, including Colorado architects. Educators and courses are not subject to preapproval in Colorado.

This seminar is approved by the American Institute of Architects Continuing Education System for 6.5 LU|HSW (Sponsor No. J885) and the Landscape Architecture Continuing Education System for 6.5 HSW PDHs. Only full attendance is reportable to the AIA/CES and LA/CES. Visit *www.halfmoonseminars.org* for complete AIA/CES information under this course listing.

HalfMoon Education is an approved continuing education sponsor for engineers in Florida, Indiana, Maryland, New Jersey (Approval No. 24GP00000700), North Carolina, and North Dakota. HalfMoon Education is deemed an approved continuing education sponsor for New York engineers, architects and landscape architects.

The Association of State Floodplain Managers has approved this activity for 6.5 CECs.

This event also offers a continuing education opportunity to construction contractors, but it has not been submitted to any state contractor licensing entity for continuing education approval.

Attendance will be monitored, and attendance certificates will be available after the seminar for most individuals who complete the entire event. Attendance certificates not available at the seminar will be mailed to participants within fifteen business days.

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Registration

Traditional and Underground Stormwater Storage

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