

Dennis L. Richards, P.E., BC.WRE, F.EWRI, F.ASCE

Stormwater / Hydraulic / Sedimentation Engineer



Registration/Certification

Professional Civil Engineer
Arizona No. 21560
Virginia No. 007808
Colorado No. 0064636
Nevada No. 026198
New Mexico No. 16429
Texas No. 124141

Board-Certified Water Resources
Engineer, American Academy
of Water Resources Engineers,
No. 00077

Education

M.S. (Civil Engineering,
Hydraulics) South Dakota
State University, 1970

B.S. (Civil Engineering)
South Dakota State University,
1969

Professional Societies

American Society of Civil
Engineers, Fellow

Environmental and Water
Resources Institute, Fellow

International Erosion Control
Association, Member

Arizona Floodplain Management
Association, Member

Mr. Richards is a Board-Certified Water Resources Engineer specializing in stormwater, hydraulic, and sedimentation engineering. His experience encompasses planning, analysis, design, and construction of storm water and flood control projects. Mr. Richards has served as Project Principal and/or Project Manager for numerous projects involving hydraulic and sediment transport analyses, floodplain delineation, channel and bridge scour analyses, stream stability, levee and/or bank protection design, and grade-control structure design. He has conducted investigations to evaluate channel stability and impacts to structures due to in-stream sand and gravel mining.

Mr. Richards has provided technical support on litigation cases related to drainage and flooding issues, channel and bank erosion, sedimentation, and floodplain/floodway issues. He has been deposed on various cases, participated in arbitration, and provided expert testimony during trial.

Mr. Richards has extensive experience with the National Flood Insurance Program and Federal Emergency Management Agency (FEMA) process, having conducted and/or managed over 30 flood insurance or letter of map revision projects as well as numerous floodplain analyses for transportation, drainage improvement, and flood control design projects. He has performed hydraulic, sediment transport, and scour analyses, and prepared contract documents for more the 15 levee/bank protection projects; and conducted hydraulic and bridge scour analyses for over 50 new or replacement roadway bridges.

Mr. Richards has prepared design guidelines, procedures, and manuals; developed and presented numerous training courses on hydraulic design, scour analysis, stormwater management, and floodplain issues; and authored technical papers. These include development of three State Standards on, "Floodplain Hydraulic Modeling," "System Sediment Balance." and "Watercourse Bank Stabilization" for the Arizona Department of Water Resources; principal author of the manual, "Soil-Cement Guide for Water Resources Applications," and co-author of the Federal Highway Administration Hydraulic Engineering Circular No. 9, "Debris Control Structures, Evaluation and Countermeasures."

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NATIONAL AND LOCAL COMMITTEE INVOLVEMENT

American Society of Civil Engineers (ASCE)

- ASCE Arizona Section Centennial Planning Committee, 2023-present
- ASCE Task Committee on Credentialing, 2018-2020
- ASCE/CEC Task Committee on Board Certification and Credentialing, 2018-2020
- ASCE Committee on Ethical Practice, 2017-present
- ASCE Arizona State Advocacy Captain, 2015-present
- ASCE Region 8 Board of Governors, 2008-2010
- ASCE Members Communities Committee, 2013
- ASCE Membership Committee, 2010-2011
- ASCE Publications Committee, 2008-2010 – Chair, 2009-2010
- ASCE Committee on Continuing Education, 2009-2012 – Chair, 2012
- ASCE *Civil Engineering Magazine* Oversight Board, 2010-2012
- Arizona Society of Civil Engineers Section Board, 2004-2007 – President, 2006
- ASCE Task Committee on the Evaluation and Design of Grade-Control, 1995-1999
- ASCE Task Committee on Bridge Management for Scour Safety, 1992-2000
- ASCE Arizona Section Board, 2004-2007 – President, 2006
- ASCE Task Committee on Institute Affiliation with Local Groups, 2003
- ASCE Phoenix Branch Board, 1994-1998 – President, 1997

Environmental and Water Resources Institute (EWRI)

- EWRI Task Committee on Scour at Various In-Stream Structures, 2018-2020
- EWRI Management Practices for Erosion and Sediment Control Standards Committee, 2004-2016 – Chair, 2017-present
- EWRI Standards Development Council, 2004-2010, 2017-present
- EWRI Local Activities Council, 2001-present – Chair, 2001-2007, 2020-2023
- EWRI New Professionals Council, 2015-2020
- EWRI Technical Products Innovation and Modernization Committee, 2016-2018
- EWRI Governing Board, 2011-2014
- EWRI Institute Operations Executive Committee, 2004-2014 – Chair, 2011-2014
- EWRI Awards Committee, 2011-2014
- EWRI Member Services Executive Committee, 2001-2003, 2015-2016
- EWRI Bridge Scour Task Force, 2005-2009

American Academy of Water Resources Engineers, (AAWRE)

- AAWRE Board of Trustees, President, 2024
- AAWRE Admissions Committee, 2017-present – Chair, 2020-2023
- AAWRE Board of Trustees, 2018-present
- AAWRE Awards Committee, 2023
- AAWRE Steering Committee, Q/C Low-Head Dam Inventory, Chair, 2022-2023
- AAWRE Eminence Committee, 2020-present
- AAWRE Body of Knowledge Task Committee, 2021-2023
- AAWRE By-Laws Committee, 2019-present

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International Erosion Control Association (IECA)

- IECA Education Committee, 2017 – Chair, 2017-present
- IECA Professional Development Committee, 2017-present
- IECA, Wetlands, Stream Bank, and Shorelines Restoration Sub-Committee, Chair, 2013-2016
- Member, IECA On Location Training Task Force, 2016
- IECA, Erosion & Sediment Control Technology Sub-Committee, 2000-2008 – Chair, 2003-2008
- Member, IECA Economic Research Committee, 2006
- Member, IECA Stream Restoration Technology Sub-Committee, 2000-2012
- Chair, International Erosion Control Association (IECA) Wetlands, Streambank, and Shorelines Restoration Educational Track, 2012-Present

AWARDS

- EWRI Service to the Institute Award, 2017
- Arizona ASCE John C. Park Outstanding Civil Engineer Award, 2009
- Arizona ASCE Civil Engineer Distinguished Service Award, 1999

EMPLOYMENT HISTORY

- January 2018 – Present: Engineering Consultant, Chandler, AZ
- December 2011 – December 2017: Senior Project Manager, Premier Engineering, Chandler, AZ
- February 2011 – December 2011: Engineering Consultant, Chandler, AZ
- January 2010 – February 2011: Senior Project Manager, Ayres Associates, Inc., Tempe, AZ
- March 2007 – January 2010: Vice President, Stormwater Management Division, Pacific Advanced Civil Engineering, Inc., Phoenix, AZ
- March 2006 – March 2007: Water Resources Group Program Manager, CMX, Chandler, AZ
- January 1999 – March 2006: Vice President, WEST Consultants, Inc., Tempe, AZ
- August 1987 – January 1999: Vice President, Simons, Li & Associates, Inc., Tempe, AZ
- October 1970 – August 1987: Hydraulic Engineer, U.S. Department of Transportation, Federal Highway Administration, Washington, D.C.

PROJECT EXPERIENCE

Forensic Assessment/Expert Witness

- Evaluation of Flooding of Ascend Church Property, 7377 W. Hunt Hwy, Queen Creek, AZ
- Evaluation of Flooding and Storm Drain Failure, 7600 W. Roosevelt St., Phoenix, AZ
- Property Flooding, 7012 E. McDonald Dive, Paradise Valley, AZ
- Evaluation of Lot 12 Drainage Conditions, Chaparral Vista Subdivision, Payson, AZ
- Residence and Property Flooding, 14236 N. 14th Pl., Phoenix, AZ
- Private Property Flooding, I-19 West Frontage Bridge at Sopori Wash, Amado, AZ
- Neighborhood Flooding, Emerald Park and US 60, Mesa, AZ
- Retail Store Flooding / Roof Drainage Assessment, Marana, AZ
- Evaluation of Onsite Drainage Design, 5728 N. Wilkinson Road, Paradise Valley, AZ

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- Private Property Drainage Assessment, 5434 E. Camel Hill Dr., Phoenix, AZ
- Private Property Flooding, 2335 S. Pine Tree Ln., Centennial Park, Mohave County, AZ
- Drainage Assessment of Public Improvements, 18493 N. Silverleaf Dr., Scottsdale, AZ
- Grading & Drainage Assessment of 3 Residences, Vision Hills Estates, Phoenix, AZ
- Drainage Assessment of Roof Runoff, 1341 N. Clyde Morris Blvd, Daytona Beach, FL
- Drainage Assessment, 501 Lakeshore Boulevard, Units 57 & 58, Incline Village, NV
- Drainage Assessment, Sage Valley Estates Subdivision – Units 1 through 4 and Sage Ranch Estates Subdivision – Unit 1, Fernley, NV
- Private Property Flood Assessment, 1530 E. Paradise Ln., Phoenix, AZ
- Private Residence Flood Assessment of 5230 E. Arroyo Rd., Paradise Valley, AZ
- Drainage Evaluation, Mehra Residence, Chandler, AZ
- Flood Assessment of 5101 E. Verde Ln., Phoenix, AZ
- Flood Assessment at Yee Property, Yee v. Rueter, Paradise Valley, AZ
- Flood Assessment at Aguirre Property, Aguirre v. HCZ Custom Homes, Phoenix, AZ
- Offsite Drainage Assessment, Central Yavapai Fire District v. Bluescope Contractors, Prescott Valley, AZ
- Section 404/Water Quality Certification Evaluation, California Regional Water Quality Control Board, Los Angeles Region v. United States Army Corps of Engineers, Los Angeles, CA
- Preliminary Drainage Assessment, Southern Hills HOA v. Woodside Homes, Coe Van Loo, et. al., Phoenix, AZ
- Galloway Wash Bank Erosion Preliminary Assessment, Hulsing/Thorstenson v. Town of Cave Creek, Cave Creek, AZ
- Sediment Transport Evaluation, Zang v. Fox, Paradise Valley, AZ
- Flooding of Bohmfalk Property, Bohmfalk v. Cochise County, Douglas, AZ
- Floodplain Evaluation, Fisher v. FNF, Phoenix, AZ
- Ward Real Estate & Development Company v. KPFF Consulting Engineers, Queen Creek, AZ
- Bank Erosion along Southern Tributary of Galloway Wash, Tinkelenberg v. Town of Carefree, Carefree, AZ
- Flood Assessment, Private Homeowner v. Mohave County, Lake Havasu, AZ
- SunRidge Canyon Litigation, Flooding due to Sediment and Debris Build-up, Fountain Hills, AZ
- Drainage Evaluation of Lots 33 and 34 of Sunset Canyon, Desert Mountain Development, Private Homeowner v. Rick Engineering, Scottsdale, AZ
- Flooding of McKenzie Residence, Scottsdale, AZ
- Evaluation of Moon Valley Wash, Holmes adv. Redd, Phoenix, AZ
- Drainage Evaluation, Borkenstein v. Cashen, Phoenix, AZ
- Kohl's Tonto Creek Ranch Drainage Easement Between Lots 56 & 57, Payson, AZ
- Drainage Analysis for Lot 29, Biltmore Estates, Phoenix, AZ
- Flooding of Oracle Innkeepers Property due to Debris Accumulation, Oracle Innkeepers v. City of Tucson, Tucson, AZ
- August 29, 2000, Flooding of Kern Residence, Tucson, AZ
- Investigation of Solitude Trails Subdivision Drainage, Pine, AZ
- Effluent Discharge Impacts on the Bed and Bank Stability of Santa Cruz River, U.S. Bureau of Reclamation & City of Marana v. Pima County, Tucson, AZ

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- Pecos Road Pipeline Scour, El Paso Natural Gas and Gila River Indian Community, Phoenix, AZ
- Landfill Encroachment on the Salt River Floodplain, The General's Partners, Tempe, AZ
- Flooding of Homeowners Association Property, Country Club Homeowners Association, Wickenburg, AZ
- Tri-City Landfill Encroachment on the Salt River, Salt River Pima-Maricopa Indian Community, Scottsdale, AZ

Hydraulic, Sediment Transport and Scour Analyses/Flood Control Design

- Scour and Lateral Migration Analysis of Potrero Creek, Love's Truck Stop, Nogales, AZ
- Scour and Lateral Migration Analyses for Petite Acres Bank Protection along Galloway Wash, Cave Creek, AZ, Private Client
- Hydraulic and Scour Analysis for Bank Protection along Galloway Wash Southern Branch, Carefree, AZ, Private Client
- Eagle Eye Road Improvements at Tiger Wash Project Drainage, Maricopa County Department of Transportation
- Phoenix Sky Harbor Runway Safety Area Improvements – Salt Riverbank Alignment Alternative Analysis/Concept Design, City of Phoenix, AZ
- Hydraulic and Scour Analysis for Berm Relocation Along Pinal Creek Adjacent to H & E Ranch, Gila County, AZ, Private Client
- Phoenix Rio Salado Low Flow Channel Design, I-10 to 19th Avenue, U.S. Army Corps of Engineers
- Final Design of Grade-Control Structure and Bridge Scour Countermeasures at Central Avenue, Phoenix Rio Salado Project, U.S. Army Corps of Engineers
- Final Design of Three Grade-Control Structures and 24th Street Bridge Scour Countermeasures, Phoenix Rio Salado Project, U.S. Army Corps of Engineers
- Hydraulic and Sediment Transport Analyses for the Tres Rios North Levee Design, Salt and Gila Rivers Confluence, U.S. Army Corps of Engineers
- FLO-2D Analysis of the Confluence of Sols Wash and Hassayampa River, Arizona Department of Transportation
- Old Road Bridge and Santa Clara River Bank Protection Concept Design Report, Los Angeles County, CA
- Queen Creek Wash Channel Design – Sediment Transport & Scour Analysis, Town of Queen Creek, AZ
- Sonoqui Wash Improvements – Sediment Transport & Scour Analysis, Flood Control District of Maricopa County, AZ
- Hydraulic, Geomorphic and Sedimentation Analyses in Support of the Va Shly' Ay Akimel (Salt River – 14 miles) Restoration Project, U.S. Army Corps of Engineers
- Hydraulic, Geomorphic and Sedimentation Analyses in Support of the Phoenix Rio Salado Oeste (Salt River – 8 miles) Restoration Project, U.S. Army Corps of Engineers
- Sediment Transport Study for the Agua Fria River, Flood Control District of Maricopa County
- Hydraulic, Geomorphic and Sedimentation Analyses in Support of the Tres Rios Del Norte (Santa Cruz River – 17 miles) Restoration Project, U.S. Army Corps of Engineers
- Santa Cruz River Sediment Transport Study – Los Reales to Prince Road, Pima County Flood Control District, AZ

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- Scour Analysis for a Transmission Line Crossing of the Canada del Oro Wash, Oro Valley, AZ
- Scour Analysis at Franco Wash (Tucson) for Old Nogales Highway Colonia Sewer Line Crossing, U.S. Army Corps of Engineers
- Sediment Transport Study and Monitoring Well Design for Cave Creek Water Reclamation Plant Effluent Discharge, City of Phoenix, AZ
- Salt River Pipeline Crossings Upstream of the Pima Freeway Crossing for the Northwest Water Reclamation Plant Recharge Basins and Sewer Force Main, City of Mesa, AZ
- Scour Analysis for APS Underground Transmission Ducts near Tempe Beach Park for Salt River 100-year and Maximum Channel Capacity Flows, City of Tempe, AZ
- Salt River Bank Protection at the Tri-City and Old Center Street Landfills, Salt River Pima-Maricopa Indian Community, Scottsdale, AZ
- Salt River Bank Protection for the Red Mountain Freeway - Pima Freeway to Dobson Road, Arizona Department of Transportation
- Salt River Bank Protection for the East Papago/Red Mountain Freeway - McClintock Drive to Pima Freeway, Arizona Department of Transportation
- Salt River Channelization and Bank Protection for East Papago Freeway - 40th Street to Mill Avenue, Arizona Department of Transportation
- Salt River Bank Protection Reconstruction of North Bank at Sky Harbor International Airport, City of Phoenix, AZ
- Salt River Bank Protection for 3rd Runway at Sky Harbor International Airport, City of Phoenix, AZ
- Salt River Bank Protection at the 19th Avenue Landfill, City of Phoenix, AZ
- Permanent Restoration Repair of the North Bank at the 19th Avenue Bridge and the Salt River, City of Phoenix, AZ
- Salt River Bank Protection at the 91st Avenue Wastewater Treatment Plant, City of Phoenix, AZ
- Gila River Bank Protection at the 116th Avenue Bridge, Maricopa County DOT, AZ
- Agua Fria River and New River Bank Protection at Camelback Ranch, Flood Control District of Maricopa County, AZ
- Scottsdale Desert Greenbelt - Reata Pass/Beardsley Wash Design, City of Scottsdale, AZ
- Skunk Creek Bank Protection and Channel Design - ACDC to 51st Avenue, Flood Control District of Maricopa County, AZ

Floodplain Delineations/Letters of Map Revision

- CLOMR-F for South Central Light Rail Extension Park & Ride Facilities, Baseline Road & Central Avenue, Phoenix, AZ
- Indian Bend Wash Floodplain Analysis for Proposed Pedestrian Underpass at Chaparral Road and Hayden Road, Scottsdale, AZ
- CLOMR-F for Park-N-Ride Facilities at Western Canal, Baseline Road and Central Avenue, Phoenix, AZ
- CLOMR and LOMR for Multi-Use Pathway along Salt River: 32nd Street Alignment to SR143/Hohokam Freeway, Phoenix, AZ
- LOMR for Twin Buttes Wash at Vistancia Marketplace, Peoria, AZ

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- CLOMR for Sky Harbor Runway Safety Area (RSA) Improvements at Salt River, Phoenix, AZ
- CLOMR for US 93 Bridge and Interim Bypass at Hassayampa River, Wickenburg, AZ, Arizona Department of Transportation
- Jackrabbit Wash Floodplain Delineation Study, Flood Control District of Maricopa County, AZ
- Cave Creek from CAP to Hwy 101 Floodplain Delineation Study, Flood Control District of Maricopa County, AZ
- Western/Highline Canal Floodplain Delineation, Flood Control District of Maricopa County, AZ
- Update of Laveen Area Floodplain Delineation, Flood Control District of Maricopa County, AZ
- Indian Bend Wash Floodplain Delineation, Flood Control District of Maricopa County, AZ
- Rainbow Wash Floodplain Delineation, Flood Control District of Maricopa County, AZ
- Christown Mall Area Floodplain Delineation, Flood Control District of Maricopa County, AZ
- 10th Street Wash Floodway Analysis, Flood Control District of Maricopa County, AZ
- Dreamy Draw Wash West Floodplain Delineation, Flood Control District of Maricopa County, AZ
- CLOMR and LOMR Bank Protection at 19th Avenue Landfill and Salt River, City of Phoenix, AZ
- CLOMR for Indian Bend Wash Improvements at the Squaw Peak Parkway, City of Phoenix, AZ
- LOMR for Clifton Flood Control Project on the San Francisco River, Arizona Department of Military and Emergency Affairs
- CLOMR and LOMR for Camelback Ranch Levee at Confluence of Agua Fria River and New River, Flood Control District of Maricopa County, AZ
- CLOMR for Scottsdale Road Bridge at Indian Bend Wash, City of Scottsdale, AZ
- LOMR for Ponding Conditions at State Farm Property, Papago Park Center, Phoenix, AZ
- CLOMR for Verde River Bridge at Dead Horse Ranch State Park, Cottonwood, Arizona Department of Transportation
- LOMR for Mint Canyon Wash near Confluence with Santa Clara River, Canyon Oaks Homeowners Association, CA
- LOMR for McCormick Lakes, City of Scottsdale, AZ
- LOMR for Skunk Creek Bank Protection at Skunk Creek Landfill, Phoenix, AZ
- CLOMR for Scottsdale Desert Greenbelt, Reata Pass Wash, Scottsdale, AZ
- CLOMR for Skunk Creek Channel Improvements - ACDC to 51st Avenue, Flood Control District of Maricopa County, AZ

Bridge Hydraulics and Scour Analyses

- Greasewood Springs Bridge Crossing of Pueblo Colorado Wash Bridge Scour Analysis, Navajo Division of Transportation, Navajo County, AZ
- SR 189 Bridge Crossing of Mariposa Canyon Wash, Arizona Department of Transportation, Nogales, AZ
- Captain Tom Wash Crossing Scour Analysis, Navajo Division of Transportation, Newcomb, NM
- Dennehotso Bridge crossing of Laguna Creek Scour Analysis, Navajo Division of Transportation, Navajo County, AZ
- Obed Road Bridge at the Colorado River Abutment Protection Design, Navajo County, AZ
- Mint Wash Bridge at Mint Wash, Prescott, AZ, Private Client
- Fain Road Bridge at Lynx Creek, Yavapai County, Arizona Department of Transportation
- Cotton Lane Bridge at the Gila River, Maricopa County Department of Transportation, AZ

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- US 60 / US 93 at the Hassayampa River, Arizona Department of Transportation
- US 93 at Sols Wash, Arizona Department of Transportation
- Woolford Road Bridge at Show Low Creek, Show Low, AZ
- Obed Road Bridge Rehabilitation at the Little Colorado River, Navajo County, AZ
- Oxbow Bridge Rehabilitation, Hydraulic and Scour Analyses, LaPaz County, AZ
- Mohave County Highway 91 and Beaver Dam Wash Bridge Concept Design, Mohave County, AZ
- Sand Wash Bridge at SR75, Arizona Department of Transportation
- Red Mountain Freeway (SR 202L) at the Salt River, Arizona Department of Transportation
- Sossaman Road Bridge at Queen Creek, Town of Queen Creek, AZ
- Pima Freeway (SR 101L) Bridge at the Salt River, Arizona Department of Transportation
- 116th Avenue Bridge (PIR) at the Gila River, Maricopa County Department of Transportation
- Priest Drive Bridge at the Salt River, Maricopa County Department of Transportation, AZ
- Red Mountain Freeway (SR 202L) at Indian Bend Wash and Salt River, Arizona Department of Transportation
- Hohokam Freeway (SR 143) Bridge at the Salt River, Arizona Department of Transportation
- Sky Harbor Expressway (SR 153) Bridge at the Salt River, Arizona Department of Transportation & City of Phoenix
- Local Government Agency Bridge Scour Evaluations, 184 bridges throughout Arizona, Arizona Department of Transportation
- Inventory and Scour Evaluation of All Transportation (10 bridges) and Utility Crossings of the Lower Gila River in Maricopa and Yuma Counties, U.S. Army Corps of Engineers
- U.S. 93 Bridge at the Big Sandy River, Arizona Department of Transportation
- Extension of Soil-Cement Bank Protection Toe-Down at SR 153 Bridge, Arizona Department of Transportation
- Hydraulic Analysis for East Papago/Hohokam/Red Mountain Freeways, Arizona Department of Transportation
- Dead Horse Ranch State Park Bridge at the Verde River, Arizona Department of Transportation
- Northern Avenue Bridge at the New River, Flood Control District of Maricopa County, AZ
- Riggs Road Bridge at East Maricopa Floodway, Maricopa County Department of Transportation, AZ
- Oracle State Park Bridge at Cherry Valley Wash, Arizona Department of Transportation
- Houston Mesa Road Bridge at the East Verde River, Gila County, AZ

Drainage Design

- Drainage Design for Alma School Road, Queen Creek Rd to Germann Rd, Chandler, AZ
- Indian Bend Wash Path at Chaparral Road, City of Scottsdale, Scottsdale, AZ
- Miller Road – Pinnacle Peak Road to Happy Valley Road, City of Scottsdale, Scottsdale, AZ
- Ellsworth Road and Williams Field Road, City of Mesa, Mesa, AZ
- Drainage Design for Lake Pleasant Parkway Storage, Phoenix, AZ
- Drainage Design for Cave Creek Storage Site, Phoenix, AZ
- Drainage Design for 19th Avenue Storage Stie, Phoenix, AZ
- Ellsworth Channel Relocation, Phoenix-Mesa Gateway Airport, Mesa, AZ
- AAA Industrial Park Drainage Improvements, City of Sedona, Sedona, AZ
- 1919 West Glendale Avenue Drainage Improvements Concept Design, Phoenix. AZ

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- Legends Master Concept Drainage Design, 7,200-acre planned community, D.R. Horton, Casa Grande, AZ
- Lee Wash Channel Improvements Final Design, Yavapai County Flood Control District, AZ
- Flood Mitigation Design at 91st Avenue Wastewater Treatment Plant, City of Phoenix, AZ
- 19th Avenue Landfill Environmental Cleanup Remedial Design, Phoenix, AZ
- University Drive Drainage Improvements Final Design, Higley Road to Power Road in Mesa, Flood Control District of Maricopa County, AZ
- Drainage Design for the Skunk Creek Landfill Update and Modifications, City of Phoenix, AZ
- Hydrology and Concept Drainage Design for Pima Freeway, Camelback Walk to Salt River, Arizona Department of Transportation
- Hydrology and Hydraulic Design for SR 86, Arva Valley to Robles Junction, Arizona Department of Transportation

Sand and Gravel Mining Investigations

- Plan of Development for Sand and Gravel Mining Operation along Gila River – Blackwater Site, Gila River Sand and Gravel Corporation, AZ
- Evaluation of Channel Stability and Impacts to Country Club Road Bridge and Alma School Road Bridges at the Salt River due to Proposed In-Stream Sand & Gravel Mining, Salt River Pima-Maricopa Indian Community, Scottsdale, AZ
- Sand and Gravel Mining Analysis of the Salt River for the Design of the Pima Freeway (L101) and Red Mountain Freeway Bridge (L202), Arizona Department of Transportation
- Hydraulic and Sediment Transport Analysis to Identify Impacts Associated with In-Stream Mining of the Salt River Near Sky Harbor International Airport, Phoenix, AZ
- Evaluation of Channel Stability and Impacts to Indian School Road and Camelback Road Bridges at Agua Fria River due to Sand & Gravel Mining, Flood Control District of Maricopa County, AZ

Master Drainage Studies/Plans

- Open Channel Maintenance Master Plan, Mesa, AZ
- Action Plan, Sage Valley Estates Subdivision – Units 1 through 4 and Sage Valley Estates Subdivision – Unit 1, Fernley, NV
- Yuma Valley Master Drainage Plan Update, Yuma County Flood Control District, Yuma, AZ
- Wittmann Area Master Drainage Plan Update, Geomorphic and Sediment Yield Analyses, Flood Control District of Maricopa County, AZ
- Queen Creek/Sonoqui Wash Hydraulic Master Plan, Sediment Transport Analysis, Flood Control District of Maricopa County, AZ
- North Scottsdale Reconnaissance Study, U.S. Army Corps of Engineers
- 10th Street Wash Feasibility Study, Flood Control District of Maricopa County, AZ
- Rio de Flag Wash Reconnaissance Study, Flagstaff, U.S. Army Corps of Engineers
- Hydrologic Analysis for Granite Reef Wash, Maricopa County Department of Transportation

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Technology Transfer

- Development of Two-Day Training Course, “*Scour Analysis for Small to Mid-Size Desert Washes.*” Arizona Floodplain Management Association.
- *Development of State Standard for Floodplain Management: “Floodplain Hydraulic Modeling,”* SS9-02, Arizona Department of Water Resources, 2002.
- *Development of State Standard for Floodplain Management: “System Sediment Balance,”* SS5-96, Arizona Department of Water Resources, 1996.
- *Development of State Standard for Floodplain Management: “Watercourse Bank Stabilization,”* SS7-98, Arizona Department of Water Resources, 1998.
- *Development of Procedures Manual for Local Government Bridge Scour Evaluation Study,* Arizona Department of Transportation, 1996.
- Development of Floodplain Issues Course, California Department of Transportation. National Flood Insurance Program requirements and map revision process. 1999.
- Co-author of Hydraulic Engineering Circular No.14 (HEC #14), “*Hydraulic Design of Energy Dissipators for Culverts and Channels,*” Federal Highway Administration, 1975.
- *Development of Storm Water Management Course Material,* California Department of Transportation, 1993. Course material on detention/retention system design and BMPs for erosion/sediment control.
- *Development of Urban Drainage Design Programs, (HY-22),* Federal Highway Administration, 1998. Developed computer programs for Hydraulic Engineering Circular No. 22 (HEC #22), “*Urban Drainage Design Manual.*”
- Development of Hydraulic Design Manual for Highway Projects on Federal Lands, Federal Highway Administration.
- Co-Author of “*Best Management Practices for Erosion and Sediment Control,*” Federal Highway Administration, 1978.
- Technical Advisor, *Hydraulic Design Series No. 5 (HDS #5), “Hydraulic Design of Highway Culverts,”* Federal Highway Administration.
- Technical Advisor, *Hydraulic Engineering Circular No. 15 (HEC #15), “Design of Roadside Channels with Flexible Linings,”* Federal Highway Administration.

Instructional Experience

- *Evaluation of Procedures for Calculation Scour Depth,* Arizona Floodplain Management Association, Chandler, AZ, May 2024
- *Scour Analysis,* Arizona Floodplain Management Association, one-half day workshop, Flagstaff, AZ, November 2017
- *Hydraulic Design of Culverts,* American Society of Civil Engineers, Phoenix Branch, one-half day workshop, Phoenix, AZ, August 2017
- *Scour Analysis for Streambank Stabilization,* International Erosion Control Association. Development and presentation of 1-day workshop on scour analysis for design of streambank stabilization, San Antonio, TX, February 2016.

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- *Streambank Stabilization for Restoration and Flood Control Projects*, ASCE Continuing Education Course. Development and presentation of 3-day workshops on design considerations for the stabilization of streambanks, 2005-2006.
- *Scour Analysis for Small to Mid-Size Desert Washes*, Arizona Floodplain Management Association (AFMA). Development and presentation of 2-day workshops on estimating scour for Arizona washes, 2004.
- *Predicting Bed Scour for Toe Protection Design on Bank Stabilization Projects*. ASCE Continuing Education Course. Development and presentation of 1-1/2 day workshops for predicting bed scour for the design of toe protection for bank stabilization projects, 2003-2005.
- *Floodplain Issues Workshop*, California Department of Transportation. Development and presentation of one-day workshop on National Flood Insurance Program, location hydraulic studies, and map revision process, 1999-2000.
- *Arid Lands Drainage Analysis Course*, Arizona State Land Department. Development and presentation of workshop on hydrologic modeling (HEC-1).
- *Storm Water Management Course, Pilot Presentation*, California Department of Transportation. Presentation of workshop on detention/retention system design and BMPs for erosion/sediment control.
- *Co-Instructor for Highway Drainage Design Training Course*, California Department of Transportation. Three-day course covering highway hydrology, open channel hydraulics, channel design, culvert design, and drainage policy.
- *FHWA Demonstration Project No. 20, "Improved Inlets for Highway Culverts."* A one-day workshop on basic culvert hydraulics and improved inlet design, 1972-1975.
- *FHWA Demonstration Project No. 31, "Hydraulic Design of Energy Dissipators for Highway Culverts."* A two- and one-half-day workshop on hydraulic design of culverts, energy dissipators, and stable channels, 1976-1982.
- *FHWA Demonstration Project No.73, "Highway Drainage Design."* A three & one-half day workshop covering highway hydrology, basic hydraulics, culvert design, energy dissipator design, roadway inlet design, and stable channel design, 1982-1987.

Professional Papers/Publications

Assessment of the Regime Equations for General Scour, D.L. Richards, 2018 Environmental and Water Resources (EWRI) Congress, Minneapolis, MN, June 2018.

Drainage Challenges for AAA Industrial Park Drainage Improvements, Sedona, Arizona, D.L. Richards, 2016 Environmental and Water Resources Congress, West Palm Beach, FL, May 2016.

Scour Analysis for Streambank Stabilization, D.L. Richards, 2015 International Erosion Control Association (IECA) Environmental Connection Conference, Portland, OR, February 2015.

Mandatory Continuing Education Requirements for Licensed Civil Engineers, G. Banik, L. Daugherty, K. Kleweno, N. C Bazan-Aria, D. Berry, D.L. Richards and J.A. Casazza, ASCE Journal of Professional Issues in Engineering Education and Practice, Reston, VA, June 17, 2014.

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Considerations When Designing Streambank Stabilization Measures, D.L. Richards, Storm Water Solutions Magazine, Arlington Heights, IL, March/April 2014.

Performance of Flood-Tested Soil-Cement Levees, K.D. Hansen, D.L. Richards and M. E. Krebs, United States Society on Dams Annual Conference, San Diego, CA, April 2011.

Soil-Cement Guide for Water Resources Applications, D.L. Richards and H.R. Hadley, Portland Cement Association, Skokie, IL, 2006.

Design of a Low Flow Channel for Salt River Restoration, D.L. Richards and G. Mashburn, 8th Federal Interagency Sedimentation Conference, Reno, NV, April 2006.

Debris-Control Structures – Evaluation and Countermeasures, J.B. Bradley, D.L. Richards, & C.D. Bahner, Hydraulic Engineering Circular No. 9, Federal Highway Administration, October 2005.

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