

Mr. Paulsen is a civil engineer with more than 20 years of experience in municipal infrastructure, flood risk management, and forensic investigation. At ESi he investigates failures of water, wastewater, and stormwater systems and provides litigation support and expert testimony on geotechnical issues, buried pipe failures, pavement design and performance, and construction disputes.

Before joining ESi, Mr. Paulsen served as Executive Director of the Metro Flood Diversion Authority, where he procured the first public-private partnership delivered under the U.S. Army Corps of Engineers' public-private partnership pilot authority. He secured full funding and financing for the \$3.2 billion program — federal appropriations, state and local revenue, WIFIA financing, tax-exempt green bonds, and private capital — and led the project into substantial construction.

Mr. Paulsen has served as city engineer for more than a dozen municipalities and has directed resident project representatives across large capital programs. He has testified before the United States Senate Committee on Environment and Public Works and before the North Dakota and Massachusetts legislatures on flood protection governance and alternative project delivery.

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## Education

BS, Civil Engineering. North Dakota State University. 2005

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## Licenses & Certifications

- State of Minnesota P.E. License 47964
- State of North Dakota P.E. License 6633
- Certified Floodplain Manager, Federal Emergency Management Agency
- Certified Storm Water Pollution Prevention Plan Designer, University of Minnesota
- Certified Traffic Control Supervisor, American Traffic Safety Services Association

## Contact Information

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## ESi Minneapolis

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## Areas of Specialization

- Floodplain Management
- Hydraulic and Hydrologic Modeling
- Municipal Water and Wastewater Systems
- Water and Wastewater Treatment
- Storm Water Design
- Buried Pipe and Drainage Systems
- Pavement Design
- Construction Claims and Project Delivery
- Expert Witness and Litigation Support

- Certified Technician, Minnesota Department of Transportation — Aggregate Production; Bituminous Street; Concrete Field Inspection 1 & 2; Grading & Base
  - Certified Technician, American Concrete Institute — Aggregate Testing; Cement Testing; Field Concrete Testing; Laboratory Concrete Testing; Concrete Construction Inspection
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## **Positions Held**

### **Engineering Systems Inc., Plymouth, Minnesota**

- Senior Managing Consultant, 2024 – Present

### **Moorhead Public Service, Moorhead, Minnesota**

- Board Member, 2019 – 2026

### **Metro Flood Diversion Authority, Fargo, North Dakota**

- Executive Director, 2019 – 2024

### **Paulsen Engineering, Moorhead, Minnesota**

- President, 2019 – 2024

### **Stantec, Fargo, North Dakota**

- Regional Manager, 2018 – 2019

### **City of Moorhead, Moorhead, Minnesota**

- City Council Member, 2016 – 2019

### **Bolton & Menk, Fargo, North Dakota**

- Senior Project Manager, 2015 – 2018

### **Kadrmass Lee & Jackson, Moorhead, Minnesota**

- Engineer IV, Office Manager, 2012 – 2015
- Engineer II, Project Manager, 2009 – 2012
- Engineer I, Project Engineer, 2005 – 2009

### **United Rentals Inc., West Fargo, North Dakota**

- Traffic Control Supervisor, 2001 – 2005
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## **Continuing Education**

- **AI in Action: Enhancing Work with Intelligent Solutions** – American Water Works Association, 2025
- **Blue-Green Strategies for Climate-adaptive Cities** – American Water Works Association, 2025

- **Financing Options for Resilient Watershed and Water Infrastructure** – American Water Works Association, 2025
  - **Strategy and Action Items to Bring a Municipal Bond Transaction to Market** – American Water Works Association, 2025
  - **Advancements in Pipeline Inspection and Assessment Techniques** – American Water Works Association, 2025
  - **Federal Water Policy 2025: Meeting Requirements in the Midst of Change** – American Water Works Association, 2025
  - **A Fireside Chat with EPA Leadership** – American Water Works Association, 2025
  - **geoSTORM Stormwater Modeling Software Training** – CivilGEO, 2025
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## **Professional Affiliations/Honors**

### **American Society of Civil Engineers**

- Associate Member

### **City Engineers Association of Minnesota**

- Associate Member

### **National Society of Professional Engineers**

- Member, Minnesota and North Dakota

### **Association of State Floodplain Managers**

- Member, Minnesota

### **Engineers Without Borders**

- President and Founder, Red River Valley Professional Chapter, 2014 – Present
- Professional Mentor, North Dakota State University Chapter
- Liaison, University of North Dakota Chapter
- Former North Dakota State Representative, Midwest Steering Committee

### **Order of the Engineer**

- Member

### **Project Finance International**

- America's P3 Deal of the Year

### **Proximo**

- North America Water Deal of the Year

### **IJ Global**

- Water Deal of the Year in North America
- Public Sector Project of the Year in North America
- ESG Climate Adaptation Award

### **The Bond Buyer**

- P3 Deal of the Year
- P3 Public Financing Award

### **P3 Awards**

- Public Sector Promoter/Procurer of the Year, Metro Flood Diversion Authority
- Best Financial Structure, Agentis Capital
- Legal Advisor of the Year, Ashurst
- Future Leader of the Year, Runner Up

### **U.S. Army Corps of Engineers**

- Project Delivery Team of the Year

### **Ames Construction**

- Dan W. Renfro Partnering Award

### **Environmental Finance**

- Green, Social and Sustainability Loan of the Year

### **International Financial Law Review**

- Americas Award for Public Finance

### **National Academy of Construction**

- Recognition of Special Achievement Award

### **Associated General Contractors of North Dakota**

- Safety Award, ASN Constructors, 2023

### **North Dakota Ready Mix Concrete Association**

- Gold Star Award, City of Fargo Drain 27

### **Prairie Business Magazine**

- 40 Under 40

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## Project Experience

### Investigations

#### Sanitary Sewer Systems

- Investigated a sanitary sewer overflow at a commercial property during a 2.56-inch thunderstorm immediately upstream of a contractor-operated bypass pumping system serving a lift station reconstruction. Reconstructed the alarm and telemetry timeline and compared the installed three-pump bypass configuration against the design flow of the common header, concluding the proximate cause was the contractor's failure to respond to or report four hours of high-water and backup-pump alarms.
- Evaluated a residential service lateral separation at a wye connection to a municipal main buried approximately 24 feet below finished grade. Determined from CCTV, excavation photographs, and record plans that the fracture was a shear failure driven by differential settlement at a stiffness transition, and that the installed geometry lacked the riser support the municipality's own detail plate contemplates at that burial depth.
- Investigated concurrent-cause sanitary sewer backups at two residences following a rainfall below the one-year recurrence interval. Concluded from PACP-coded CCTV, sulfide and biofilm staining patterns, and backwater sediment deposition that the loss required both upstream construction-related inflow pathways and pre-existing municipal defects, including a chronically ponded junction manhole, a partial outlet obstruction, and sags consuming 70 to 80 percent of downstream pipe diameter.
- Investigated a coincident storm and sanitary sewer failure at a public housing property, attending the excavation and replacement of both lines. Attributed the crushed storm pipe and resulting driveway sinkhole to repeated heavy-truck loading transmitted through a concrete electrical duct bank bearing directly on the pipe, and the separate vitrified clay sanitary failure to construction-era debris left in the trench and later driven into the pipe by backfill settlement.

#### Municipal Water Systems

- Investigated a residential water loss claim alleging that a municipal water main break and associated pump shutdown produced a hydraulic transient that ejected a lavatory faucet. Bounded the transient using the Joukowsky equation against ASME A112.18.1 and CSA B125.1 proof-test levels and modeled discharge volume and iron oxide mass deposition, showing the flow duration required was inconsistent with the claimed window and more consistent with freeze-related failure in an unoccupied, unheated structure.
- Co-authored the causation investigation of a pressurized municipal water main failure that punctured an adjacent low-pressure natural gas main, driving water into interconnected gas distribution and interrupting service to hundreds of customers. Found the water main had been installed with approximately six inches of separation at the same crown elevation as the older steel gas main, that acoustic leak detection failed to identify the progressive leak, and that failure to locate and exercise isolation valves extended uncontrolled discharge more than thirteen hours.

### Buried Pipe and Drainage Systems

- Led a multi-year forensic investigation into inner-liner blistering and delamination of dual-wall corrugated HDPE drainage pipe across four public drainage systems in three counties, documenting approximately 28,500 linear feet of affected pipe in diameters from 12 to 60 inches. Traced all four observed defects to a single upstream manufacturing anomaly and concluded the condition was a latent manufacturing defect nonconforming to ASTM F2648, ASTM F2306, and AASHTO M 294.
- Retrieved and laboratory-tested a 42-inch dual-wall HDPE pipe section that blistered within one year of installation at 15 feet of cover in saturated clay, comparing it against a manufacturer-supplied exemplar. Measured inner-liner thickness reductions of 38 to 41 percent at blister zones, found the majority of ribs missing pressure-equalization vent holes, and demonstrated blister onset at roughly half the rib-cavity pressure required for the conforming exemplar.
- Directed field excavation and chain-of-custody sampling of blistered 12-inch corrugated HDPE pipe, verifying that bedding, embedment, and burial depth conformed to the design. ASTM D2412 parallel-plate testing showed 20 to 30 percent reductions in peak load and stiffness against exemplars, and incremental vacuum testing produced monotonic blister growth, supporting incomplete liner-to-wall bonding rather than installation practice as the cause.

### Stormwater Facilities and Slope Stability

- Peer-reviewed a geotechnical firm's slope stability investigation of a bank failure at a newly constructed municipal stormwater basin. Directed the technical critique at the factor-of-safety criterion applied, the absence of a dedicated seepage analysis of the drawdown phreatic surface, reliance on record drawings rather than as-failed geometry, and the adequacy of the proposed riprap repair section.
- Prepared a preliminary opinion on applicable engineering standards for a river bank sloughing loss, addressing municipal grading and drainage design standards. Applied the principle that added grading, fill, or drainage loading on a marginal slope requires re-analysis.

### Pavements

- Performed a forensic evaluation of a newly constructed residential asphalt driveway exhibiting longitudinal seam depression, a ridge at the garage slab interface, edge drop-off with longitudinal cracking, and basin-shaped ponding. Concluded the distress pattern was not typical post-cure behavior and was consistent with limited aggregate base placed over unexcavated native soil, single-lift placement with seam compaction variability, and inadequate lateral edge confinement.

### **Litigation Support**

#### Sanitary Sewer Class Certification and System-Wide Causation

- Served as engineering expert on class certification in multiple municipal wet-weather sanitary sewer backup class actions, applying a consistent system-level methodology built on sewer records, pump station SCADA telemetry, rainfall and hydrologic data, inflow and infiltration studies, and maintenance histories.

Benchmarked system performance against EPA CMOM, the Ten States Standards, ASCE MOP 60, and WEF FD-6.

- Opined in a municipal class action that a basement flooding event affecting roughly 400 households resulted from system-wide hydraulic overload of the public sewer rather than household-specific conditions. Concluded that characterizing the storm as a 200-year rainfall did not end the engineering inquiry, and that documented geographic clustering of flooded properties within common drainage basins upstream of known bottlenecks supported class-wide causation.
- Prepared the class certification engineering affidavit in a case correlating approximately 317 reported home backups with two sanitary overflows totaling roughly 5.6 million gallons and temporally clustered SCADA responses at multiple facilities. Concluded on comparative causation that infiltration and inflow pathways and deteriorated assets identified in the municipality's own wastewater asset management plan and left uncorrected were the predominant cause.
- Analyzed a single-street sanitary sewer backup and opined that the cause was a persistent hydraulic restriction in the public gravity sewer rather than a private lateral or an isolated clog. Compared a pre-loss CCTV record showing a sag holding standing water at roughly 70 percent of cross-section against post-event CCTV documenting sags, mineral encrustation, defective factory taps, and root intrusion, and concluded condition-based asset management required follow-up the record did not show occurred.

#### Floodplain Management and Regulatory Compliance

- Investigated whether a newly built single-family home complied with the National Flood Insurance Program, state floodplain statutes, and county ordinance after the owners were required to obtain flood insurance and the basement flooded. Established that flooding entered through the drain tile and sump system on the corner opposite the floodplain encroachment, and that the floodplain was never delineated on the certificate of survey or identified by the county at subdivision, permitting, inspection, or certificate of occupancy.

#### Construction Claims and Project Delivery

- Analyzed a contractor's dewatering claim on a municipal sanitary sewer project and opined that the contract allocated dewatering means, methods, and permits to the contractor, which had bid a separate dewatering line item. Found the geotechnical report had warned bidders of the need for high-capacity pumping and groundwater drawdown, that heavy pre-bid rainfall made wetter conditions foreseeable, and that the opposing analysis misapplied a radial-flow well model to trench geometry.
- Co-authored the standard-of-care evaluation of a recreation design consultant on a campground expansion where the owner began construction before obtaining regulatory approvals, converting a design-bid-build project into a de facto fast-track delivery. Concluded the consultant's conceptual site planning and design-team coordination were consistent with its proposal and that final wastewater treatment design, flow-aggregation threshold determination, and permit submittals rested with the licensed engineer of record.
- Evaluated the roles of the engineer of record, owner's representative, and resident project representative after a ductile iron pipe restraint failed during a hydrostatic pressure test at a water treatment plant, injuring

a worker. Determined the contractor had substituted a restraint series across pipe materials without the specified “or equal” shop drawing submittal and had not given the contractually required 24-hour test notice, leaving means and methods responsibility with the contractor.

- Investigated a surveying and construction staking dispute alleging a substantial loss from use of the wrong vertical datum on a multi-building apartment project. Verified through control point comparison and field checks against hydrants, storm structures, and grading benchmarks that the staking matched the datum shown on the civil plan cover sheet, and concluded that embedding a superseded datum in later design files without written notice departed from accepted survey practice.
- Served as the water systems expert on a municipal water treatment plant design and construction dispute, addressing vertical pressure filter design and performance, filter system controls, and hydraulic surge. Found the design gave no consideration to surge relief on the low-service pumping system and that responsibility for the pressure filter hydraulic surge calculations was shared.

## **Design and Operational Experience**

### Floodplain and Stormwater

- Performed a hydrostatic equalization compliance assessment for a riverfront residential community whose garage slabs sit below the base flood elevation without engineered flood openings. Modeled inflow through incidental sill and jamb gaps using orifice hydraulics in a time-marching model of an eight-foot rise, demonstrating a negligible unbalanced lateral demand on the order of 0.6 pounds per square foot even at 80 percent blockage.
- Framed the regulatory compliance pathway for the same community, confirming that FEMA Technical Bulletin 1 does not credit garage doors or incidental cracks as flood openings under 44 CFR 60.3. Recommended that the engineering analysis be submitted with the association flood plan, conditional use permit, and variance record to document that the life-safety intent was met through door-open emergency protocols.

### Coastal Resilience, Governance, and Funding

- Served as project manager and lead author of a study for a major municipal water and sewer commission evaluating public-private partnership models for coastal stormwater adaptation, where rising tides block gravity discharge from coastal outfalls and flood inland areas behind shoreline protection. Recommended a barrier-and-pumping concept, progressive design-build delivery, a special-purpose joint powers authority as the single accountable entity required for levee accreditation under 44 CFR 65.10, and a ring-fenced hybrid funding structure.
- Provides senior advisory support to a port authority coastal protection program on U.S. Army Corps of Engineers and non-federal sponsor governance, federal funding and authorization pathways, cost-share, work-in-kind and real estate crediting, and partnership instruments including project partnership agreements and memoranda of agreement.

### Owner's and Municipal Engineer Services

- Serves as township engineer for two North Dakota townships reviewing federal flood diversion project activities within their boundaries, under memoranda of understanding providing for reimbursement of the townships' engineering review costs.
- Performed, managed, and directed resident project representative and construction administration services for more than a dozen municipalities as their designated city engineer. Later held simultaneous responsibility for more than two dozen resident project representatives as a program executive director.

### **Program Management**

#### Flood Risk Management and Alternative Delivery

- Served as Executive Director of the Metro Flood Diversion Authority from 2019 to 2024, leading the non-federal sponsor of a Congressionally authorized U.S. Army Corps of Engineers split-delivery flood risk management program under the WRRDA 2014 pilot authority. Under the split-delivery allocation the Corps retained the high-hazard southern embankment and gated control structures under design-bid-build while the Authority bundled the diversion channel, aqueducts, and road and rail crossings into a single DBFOM concession, so both tracks advanced in parallel.
- Structured and administered the program's funding and financing, combining federal appropriations, North Dakota and Minnesota grants, local sales tax revenue, EPA WIFIA financing, tax-exempt green bonds, private activity bonds, milestone payments, and long-term availability payments across a program of approximately \$3 billion. Implemented a project partnership agreement mechanism under which non-federal sponsors made annual deposits so federal construction could proceed without waiting on yearly appropriations, with an end-of-project federal true-up.
- Led the regulatory and mapping strategy, including an adaptive management and monitoring plan with performance triggers, an interagency adaptive management team, and monitoring protocols that permitted iterative design refinement under NEPA while construction advanced. Developed a joint FEMA and Corps coordination plan and used iterative hydraulic modeling to secure a Conditional Letter of Map Revision in 2020 ahead of final detailed design.
- Corps of Engineers leadership credited the split-delivery approach with approximately \$330 million in construction savings and roughly ten years of schedule acceleration, and the pilot informed Corps guidance on alternative delivery and public-private partnership. Delivered two first-of-their-kind river aqueducts to maintain ecological connectivity while enabling resilient operations.

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### **Publications**

**“The Fargo-Moorhead Diversion: Flood Protection or Sprawl Promotion?”** N. Pinter, R. G. Miller, and J. Paulsen, River Research and Applications, 2026. <https://doi.org/10.1002/rra.70160>

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## Presentations

**“Collaborating with Experts Pretrial,”** J.A. Paulsen, North Dakota Defense Lawyers Association Annual Meeting, North Dakota Heritage Center & State Museum, Bismarck, ND, September 25, 2026.

**“Coastal Resiliency — Finance and Governance,”** J.A. Paulsen, Save the Harbor/Save the Bay Flood Resiliency Conference, Boston, MA, June 3, 2026.

**“The Impact of Evolving Weather Patterns on Construction Defect Litigation,”** J.A. Paulsen, S.F. Taylor, K.U. Campbell, and D. Gerstberger, claimsXchange Education on Location, Nashville, TN, April 22, 2026.

**“Minnesota Stormwater Best Management Practices and Resilience Planning,”** J.A. Paulsen, HalfMoon Education live webinar, December 18, 2025.

**“The Impact of Climate Change on Professional Claims,”** J.A. Paulsen, American Bar Association Forum on Construction Law, Construction Law Essentials Regional Program, New York, NY, November 13–14, 2025.

**“The Impact of Climate Change on Professional Claims,”** J.A. Paulsen, J. Jorgensen, and A. Burrows, Professional Liability Defense Federation Annual Meeting, Las Vegas, NV, September 18, 2025.

Testimony on regional resilience and flood protection governance, House Bill 3938 and Senate Bill 658, J.A. Paulsen, Massachusetts Legislature Joint Committee on Environment and Natural Resources, Boston, MA, June 2025.

Opening plenary address and Advisory Board service, J.A. Paulsen, P3 Conference, Dallas, TX, March 11–13, 2024.

Guest lecture, J.A. Paulsen, University of North Dakota Department of Civil Engineering, Grand Forks, ND, April 8, 2024.

Testimony on innovative public-private partnership contracting, J.A. Paulsen, United States Senate Committee on Environment and Public Works, Washington, DC, July 20, 2023.

Testimony on water topics, J.A. Paulsen, North Dakota Legislature, Bismarck, ND, September 12, 2023.

Program update, J.A. Paulsen, North Dakota Water Convention, Bismarck, ND, November 8, 2023.

Invited presentation, J.A. Paulsen, Boston Storm Surge Working Group, Boston, MA, October 13, 2023.

Invited presentation, J.A. Paulsen, P3 Water Conference, San Diego, CA, September 21, 2023.

Legislative update testimony, J.A. Paulsen, North Dakota Legislature, Bismarck, ND, March 15, 2023.

Invited presentation, J.A. Paulsen, P3 Conference, Dallas, TX, March 6–8, 2023.

Invited presentation, J.A. Paulsen, City of Moorhead, Moorhead, MN, January 23, 2023.

Invited presentation, J.A. Paulsen, P3 Government Conference, Washington, DC, December 1–3, 2022.

Legislative briefing testimony, J.A. Paulsen, North Dakota Legislature, Fargo, ND, April 26, 2022.

Program update, J.A. Paulsen, North Dakota Water Topics Overview Committee, Bismarck, ND, March 22, 2022.

Guest lecture, J.A. Paulsen, North Dakota State University Contracts and Specifications course, Fargo, ND, March 21, 2022.

Testimony, J.A. Paulsen, North Dakota Legislature, Bismarck, ND, February 1, 2021.