

[CASE STUDY]

Building Resilience Through **Digital Innovation** in San Marcos, Texas



FIRM SIZE

385+

FIRM TYPE

Public Sector
/ **Municipal Government**

FOCUS AREA

**Flood Modeling
& Risk Analysis**

TOOLS



SOLUTIONS



Training &
Enablement



Support
Services



Workflow
Optimization



Digital
Transformation
Consulting

IMPACT

- ✓ Enabled access to advanced Autodesk water infrastructure solutions
- ✓ Supported implementation of digital modeling workflows
- ✓ Provided consulting and guidance on hydraulic modeling strategy
- ✓ Helped bridge data integration across GIS, modeling, and real-world inputs
- ✓ Contributed to building a scalable digital twin approach for long-term planning

ABOUT LOCKWOOD ANDREWS NEWMAN

LAN is a national, full-service civil engineering firm, offering planning, engineering and program management services. We deliver creative solutions, exceptional quality and measurable value for the nation's infrastructure. We help our clients move their unique projects from idea to execution.

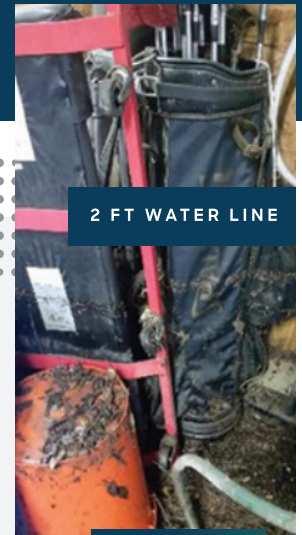
Our purpose is more than what we do on paper and more than the delivery of a set of drawings. Our purpose is the impact our work has on people.

Transforming a complex visual system into a clear and engaging experience.

The Challenge

San Marcos faced a growing need to address recurring flooding while supporting continued urban development. Aging stormwater infrastructure, combined with unpredictable weather patterns and complex terrain, made it difficult to accurately assess risk and prioritize improvements.

Traditional methods lacked the ability to fully visualize system performance or simulate real-world conditions at scale. City leaders needed a more advanced, data-driven approach to understand vulnerabilities, evaluate infrastructure capacity, and make informed investment decisions.



“With the right modeling and data, cities can shift from reactive responses to proactive infrastructure planning.”

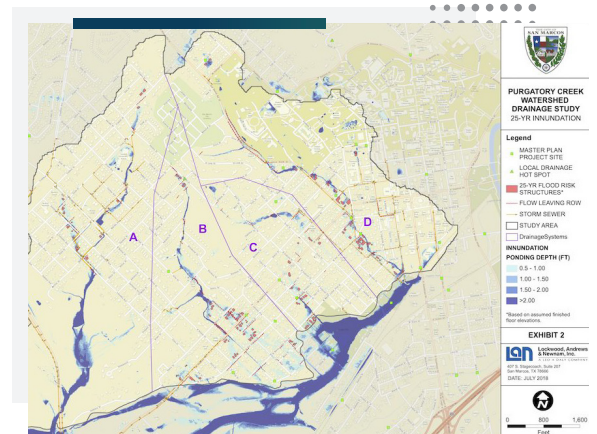
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The Solution

To address these challenges, the city partnered with engineering firm LAN and leveraged Autodesk InfoWorks ICM to develop a comprehensive hydraulic model of the Purgatory Creek watershed.

By integrating GIS data, historical flood information, and rainfall analysis, the team created a detailed 1D/2D model capable of simulating storm events and visualizing system performance.

Supported by ARKANCE, the initiative brought together advanced modeling technology with expert consulting and implementation guidance. This enabled the city to translate complex data into clear, actionable insights while laying the groundwork for a scalable digital twin.



Inundation map for the Purgatory Creek watershed. Courtesy of LAN.

The Results

With a more complete view of its stormwater system, San Marcos was able to identify critical infrastructure gaps and better understand flood risk across the city. The model revealed underperforming storm drains, highlighted areas of vulnerability, and showed that nearly 100 homes were at high risk during major storm events.

At the same time, the analysis confirmed that key portions of the network were performing as intended, with more than 12,000 linear feet of storm sewer meeting required thresholds.

Beyond immediate findings, the city gained a long-term asset: a living digital model that continues to support planning, emergency response, and infrastructure investment decisions. This data-driven approach allows San Marcos to move forward with greater confidence—prioritizing improvements, reducing risk, and building a more resilient future.

“This project demonstrates how digital modeling can transform stormwater planning, giving municipalities the ability to simulate real-world conditions, identify risk, and make more confident infrastructure decisions.”

ARKANCE
Consultant

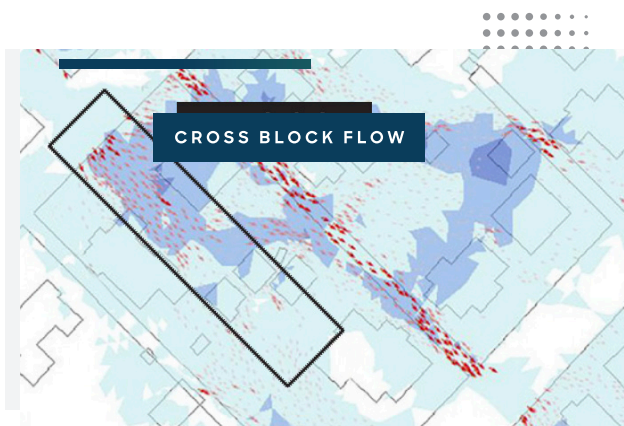
IDENTIFIED
critical weaknesses in stormwater infrastructure.

ENABLED
simulation of a 25-year storm event for risk analysis

REVEALED
that nearly 100 homes were at high flood risk

VALIDATED
that 12,000+ linear feet of storm sewers met performance thresholds

DELIVERED
a living digital twin to support future planning, emergency response, and investment decisions



Looking Ahead

San Marcos has established a strong foundation for smarter infrastructure planning by embracing digital modeling and integrated data. With continued support from ARKANCE, the city is positioned to expand its use of these tools, further enhancing its ability to respond to changing conditions and protect its growing community.

This project demonstrates how municipalities of any size can leverage advanced technology and expert guidance to better understand their infrastructure, mitigate risk, and deliver more resilient outcomes.

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