

BOOSTING INFRASTRUCTURE RESILIENCE WITH BIM AND DIGITAL TWIN AMID RISING FLOODS

SPEAKING TODAY



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AGENDA

01

INTRODUCTION

Symetri and Autodesk
Water Infrastructure

02

WHY WATER?

Why flood risk should be
considered in early
stages of construction

03

INDUSTRY CHALLENGES

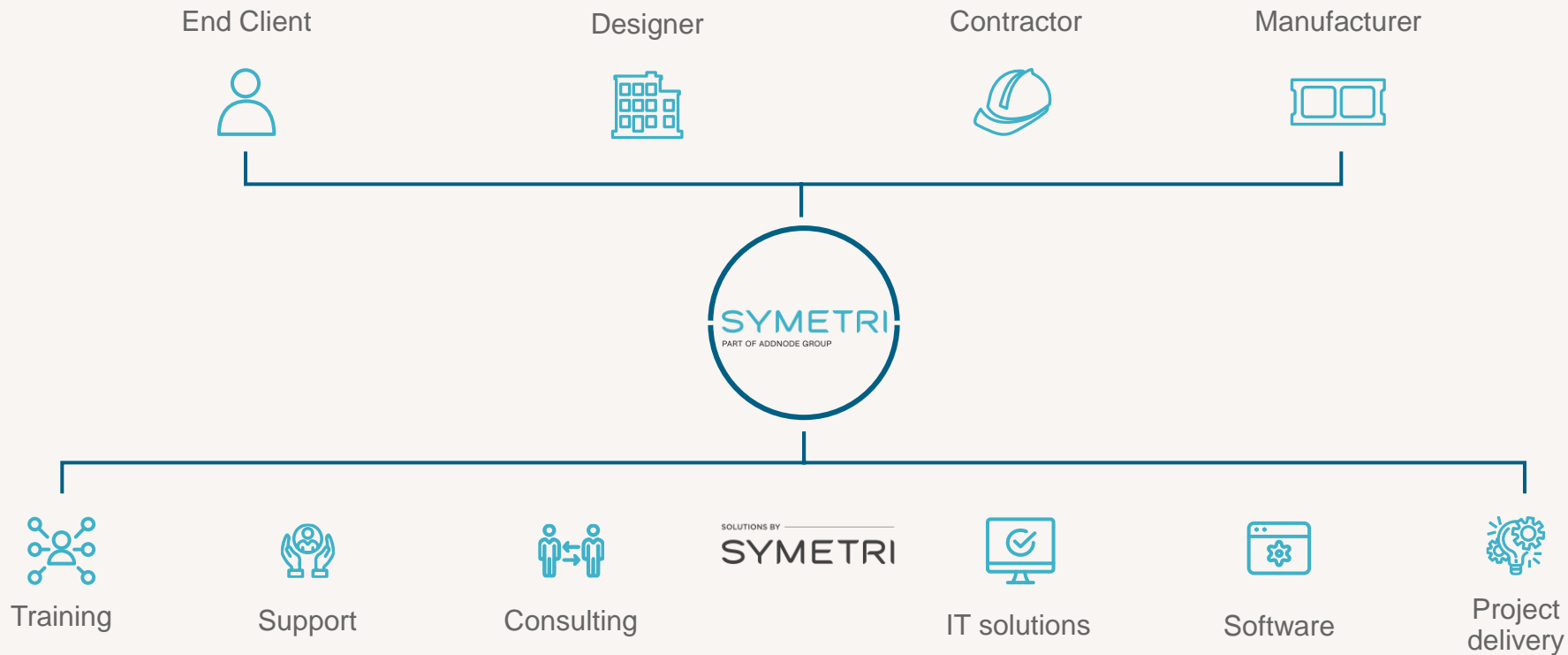


01

WHO IS SYMETRI?

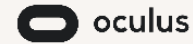


WHAT WE DO



TECHNOLOGY

SOLUTIONS BY
SYMETRI



At Symetri we have continuously expanded to provide even better leading-edge solutions and services to more markets.

1000
EMPLOYEES

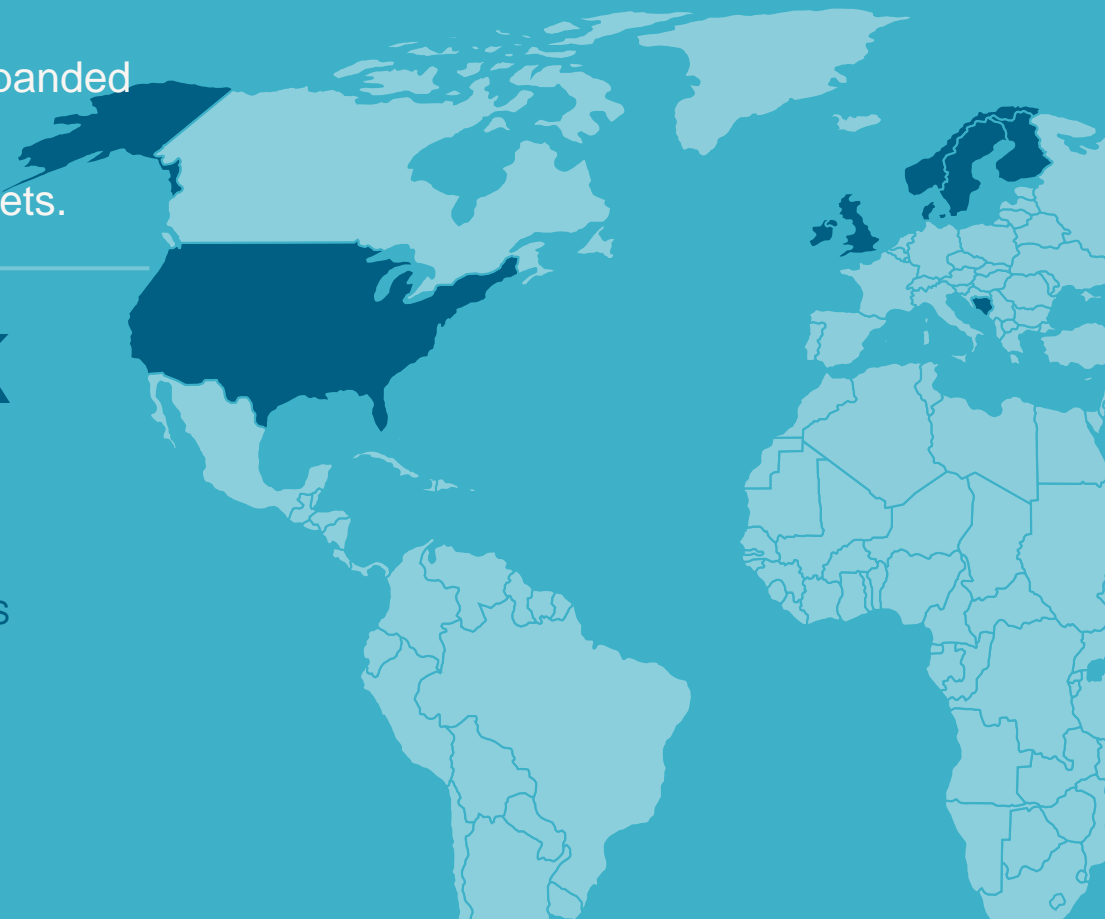
400K
USERS DAILY

7
COUNTRIES

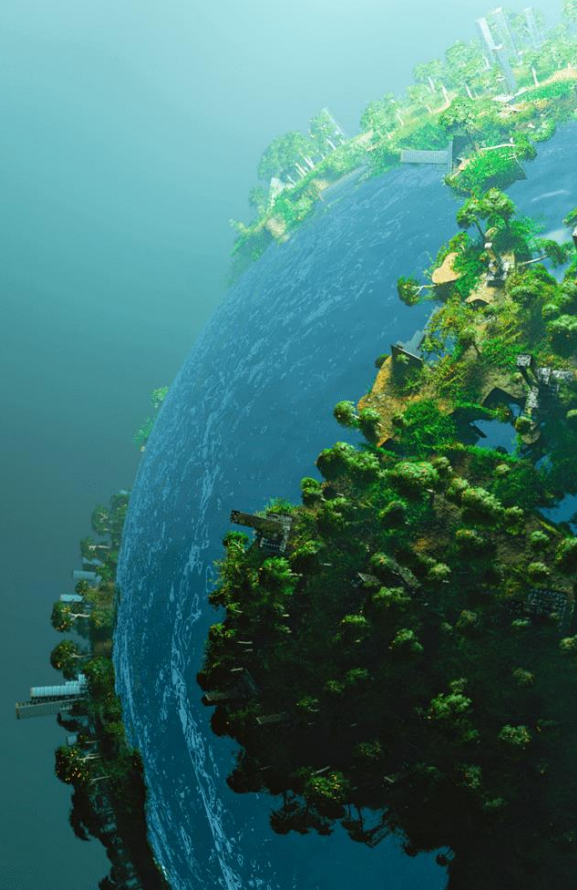
23
ACQUISITIONS

33
OFFICES

3.1
BILLION SEK



**WE CHALLENGE PEOPLE
TO WORK SMARTER
FOR A BETTER FUTURE**





 **AUTODESK**
Platinum Partner

#1 Autodesk Solution
Provider Globally

SYMETRI TECHNOLOGY

Symetri Technology solutions are developed with the mission to help companies to be more productive in their daily operations and remove waste from their business processes.



NAVIATE®



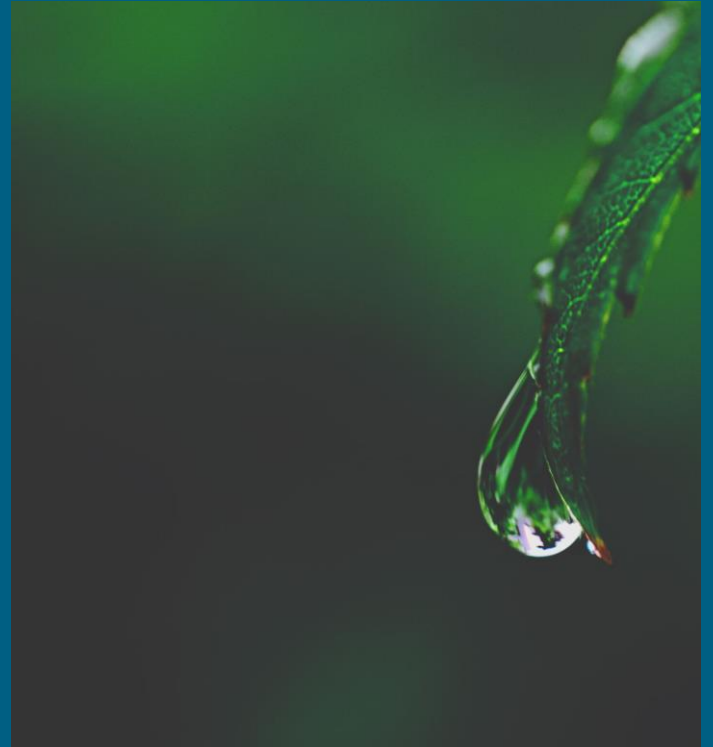
SOVELIA®



CQ™

HERE COMES THE RAIN!

- Recent winter a stark reminder of climate change impacts
- Intense rainfall, river surges and rising sea levels
- Munich Re's estimates global losses due to extreme weather is \$100bn

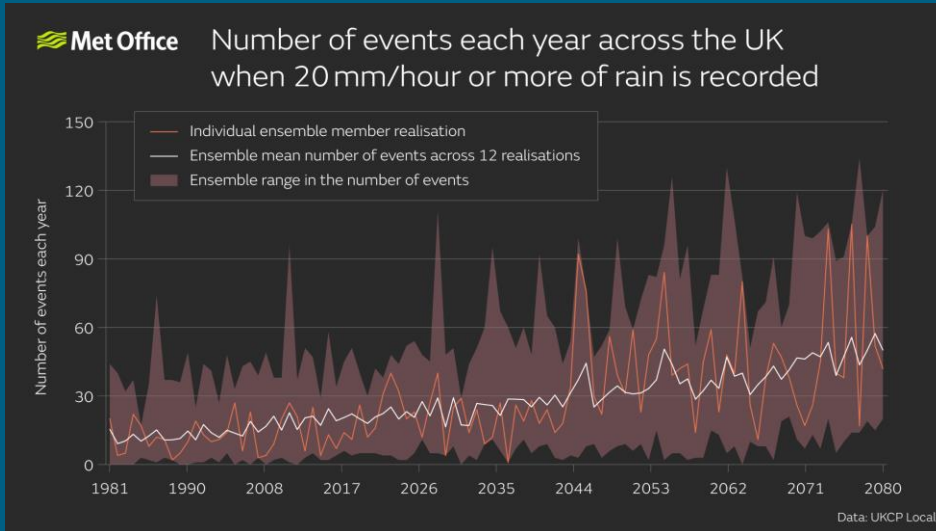




**FLOOD RISK IS A COMBINATION OF THE PROBABILITY AND
POTENTIAL CONSEQUENCES OF FLOODING**



CLIMATE CHANGE



- Weather patterns are changing globally
- Increasing number of weather events in the UK
- Extreme rainfall events predicted to be as high as 4x higher by 2080, when compared to 1980s



EXTREME RAINFALL EVENT

- 29% more rainfall between December 2023 and February 2024
- More rainfall event particularly in central and eastern England and Scotland
- Some areas received more than one and a half times the average rainfall
- Met Office observations show that winters are getting warmer and wetter as a result

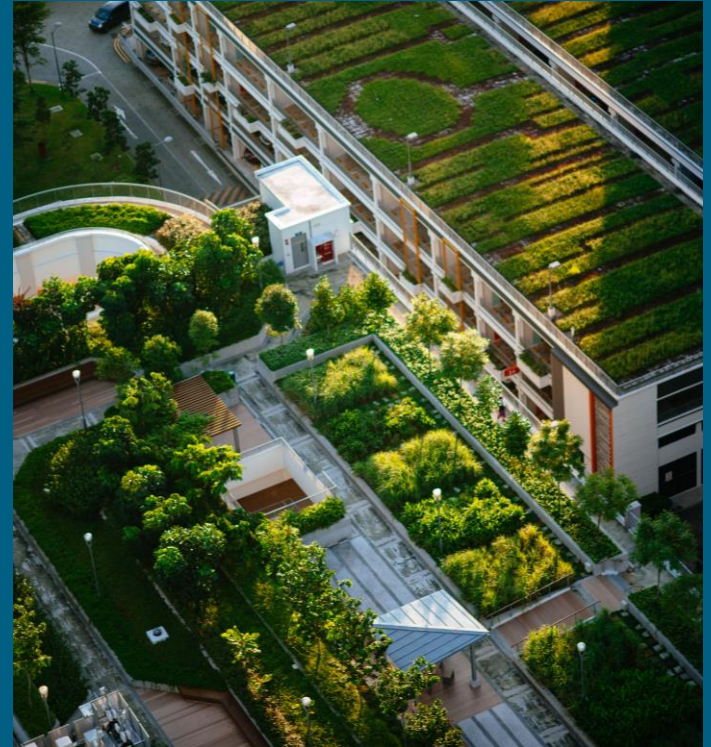
OTHER SOURCES OF FLOODING

- Rivers and Sea
- Rising Groundwater
- Overwhelmed Sewers and Drainage Systems
- Urbanisation



IMPACT ON CRITICAL INFRASTRUCTURE

- Transportation and infrastructure
- Utilities and services
- Buildings and property
- Environmental impact
- Economic impact

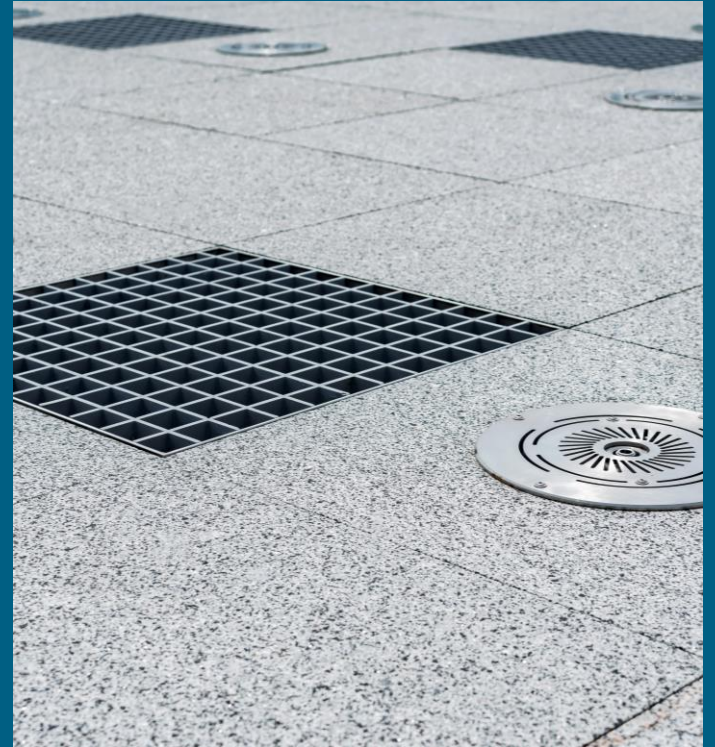


A blurred office scene with two people working at a computer. A teal banner is overlaid at the bottom with the text "THE NEED FOR PROACTIVE PLANNING" and a right-pointing arrow. The background is a soft-focus office environment with computer monitors and people working.

THE NEED FOR PROACTIVE PLANNING >

THE NEED FOR PROACTIVE PLANNING

- Engineers need to be able to plan and adapt to all different sources of flooding
- Integrated catchment models provide a clear visualisation of the entire drainage catchment area
- This allow engineers to swiftly gain precise insights into the areas most at risk of flooding and devise flood mitigation strategies



NEXT UP...

CARYN NOVAK

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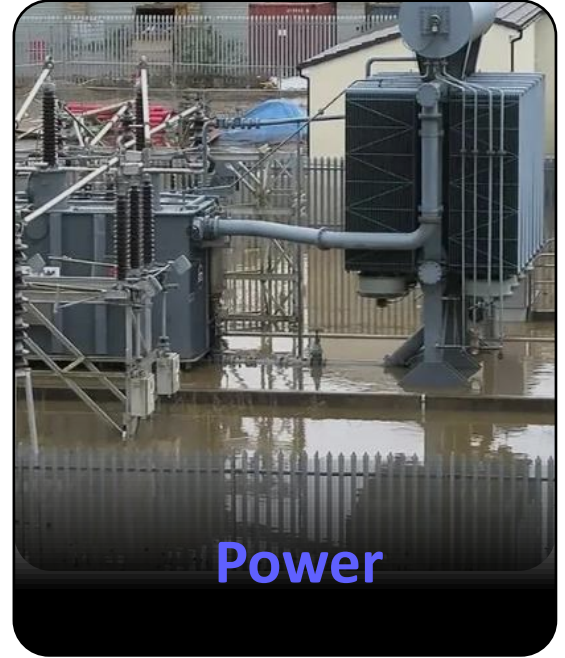
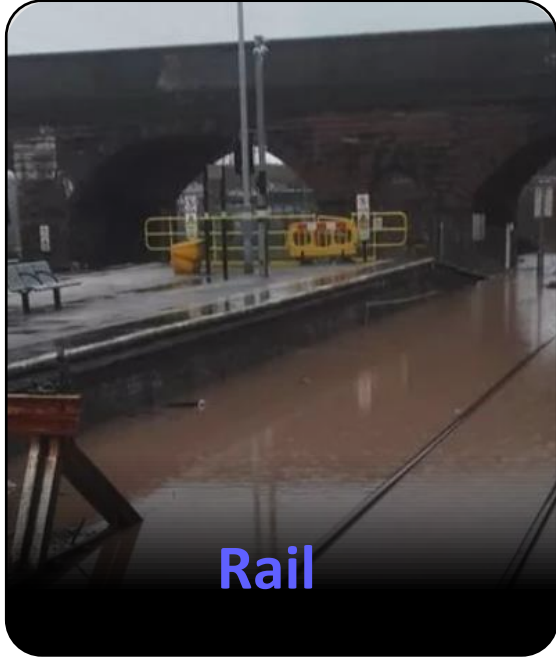


Agenda

- 1 Flood and resilience
- 2 Autodesk Water Infrastructure
- 3 Digital Stormwater Management
- 4 What's Next



Flood and Civil Infrastructure





Autodesk Water Infrastructure



AUTODESK Water

6,500+
Clients

60+
Countries

35+
Years

Water Distribution

Drainage

Stormwater, Sewer & Flood

Asset Management

Operational Analytics

98 of the 100
largest cities in
America are
customers

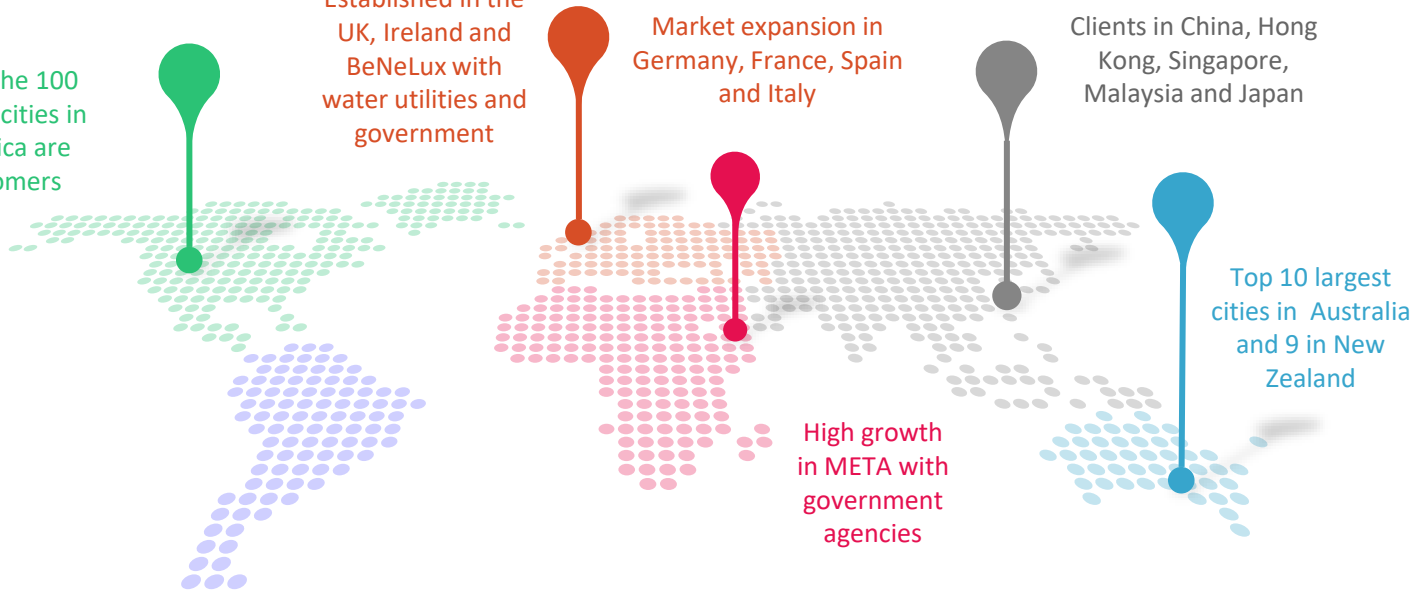
Established in the
UK, Ireland and
BeNeLux with
water utilities and
government

Market expansion in
Germany, France, Spain
and Italy

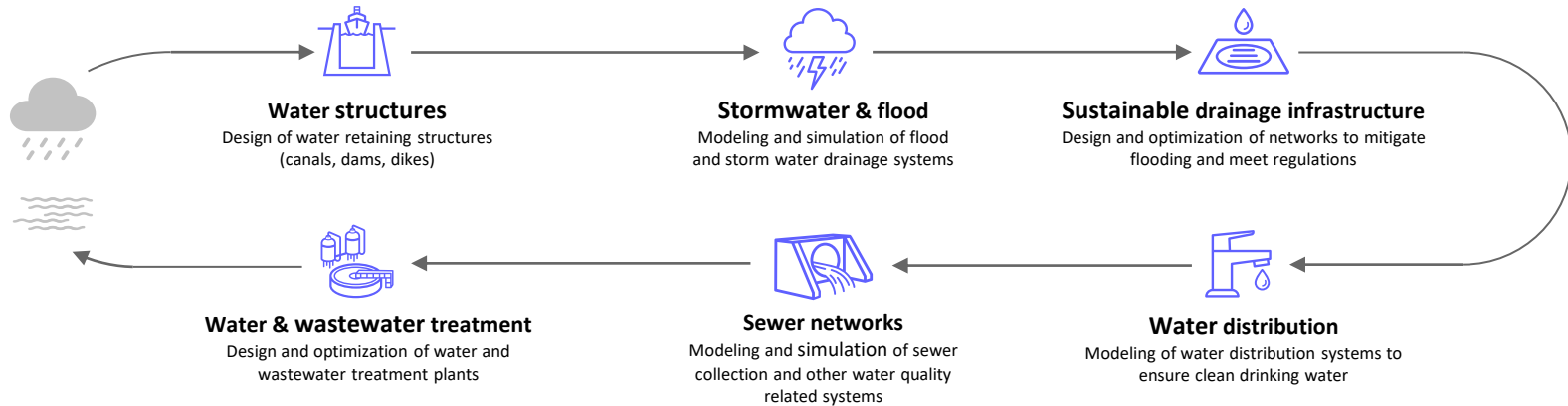
Clients in China, Hong
Kong, Singapore,
Malaysia and Japan

High growth
in META with
government
agencies

Top 10 largest
cities in Australia
and 9 in New
Zealand

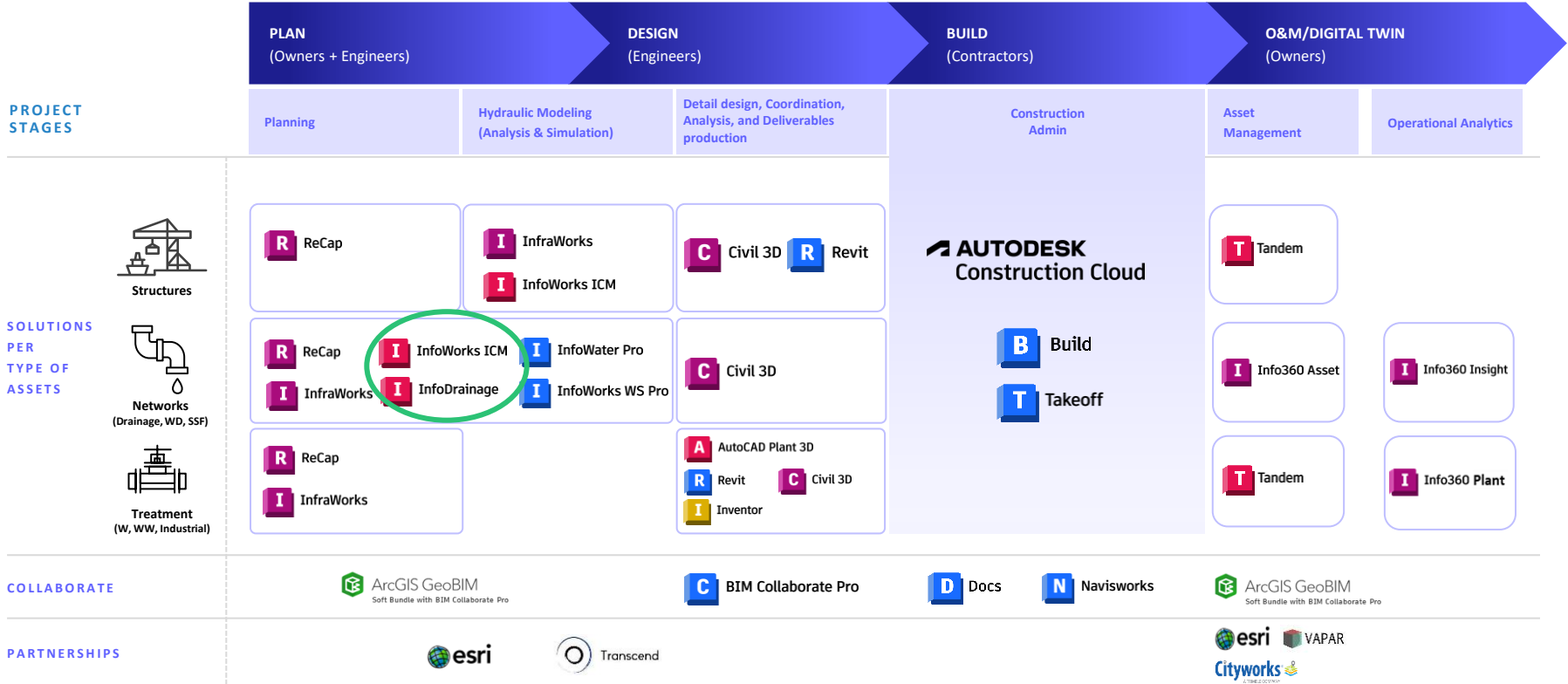


Digitalizing water management from cloud to sea



Autodesk End-to-End Water portfolio

Across the project lifecycle



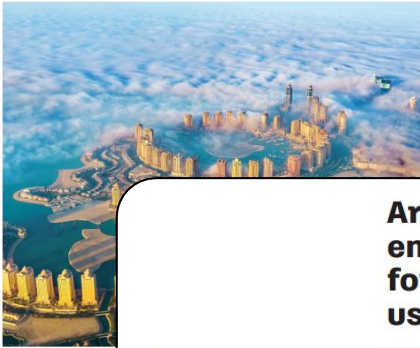
Expertise in models for infrastructure planning

Qatar's massive infrastructure and landscaping requires specialized software

COMPANY
SEERO

LOCATION
Qatar

SOFTWARE
InfoWorks ICM

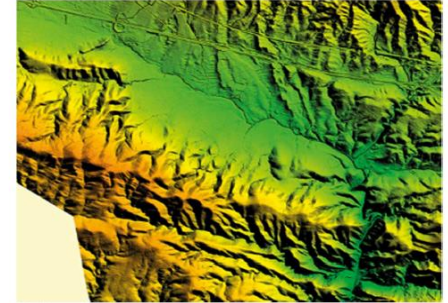


Improving safety for high-speed rail using flood risk models for better drainage planning

COMPANY
Spain - High Speed Rail

LOCATION
Madrid

SOFTWARE
InfoWorks ICM



<https://www.cemint.es/portal/portal.jsp>

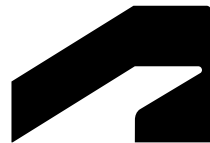
Arcadis helps Hong Kong ensure security of service for extreme weather events using InfoWorks ICM

COMPANY
Arcadis

LOCATION
Hong Kong

SOFTWARE
InfoWorks ICM



A close-up, low-angle shot of a metallic structure, possibly a piece of machinery or a modern architectural element. It features a prominent glass-like panel that is slightly tilted, reflecting light and showing some internal details. The metal has a brushed or polished finish, and the overall composition is clean and industrial.

Digital stormwater management

With hydraulic models, operational digital twin and machine learning

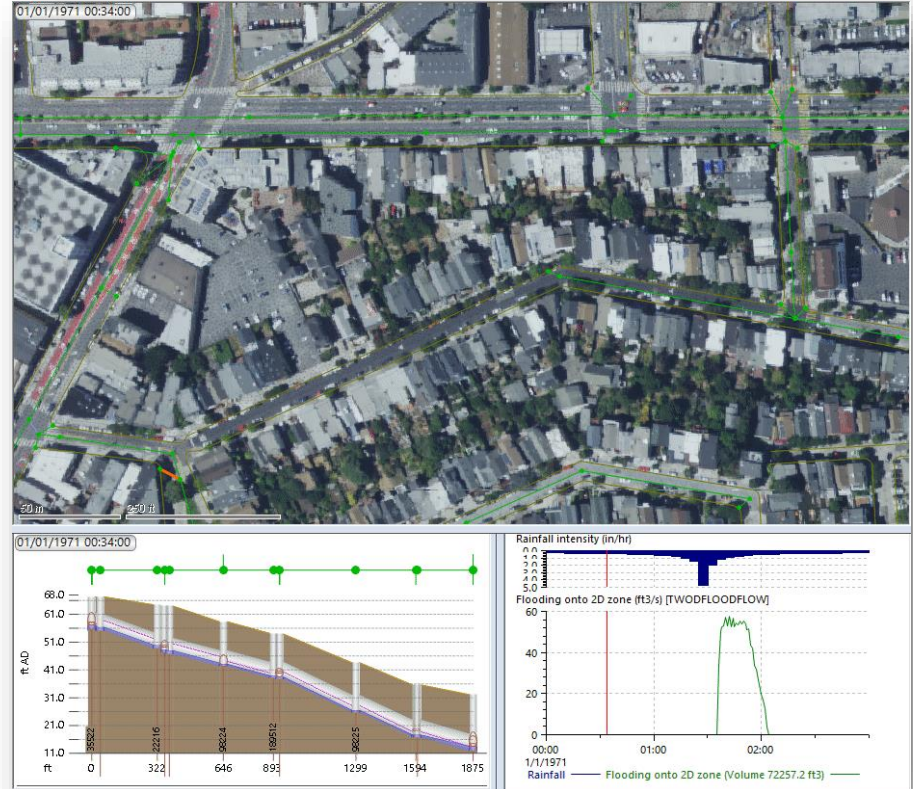
Hydraulic model: InfoWorks ICM

Integrated Catchment Model

- Master Planning
- Identify flood risks
- Understand points of failure
- Resilience & climate adaptation
- Population growth
- Test scenarios

Path to Operational Digital Twin

Use real time weather feeds and connect live data from sensors for an advance warning system.



Example: Flash Flood Response

Tasmania, State Emergency Service

Record flood October 2022

- Impact maps produced 48 hours before for planning
- Predictive impact maps used 12 hours before flood peak for operational response and public warnings.

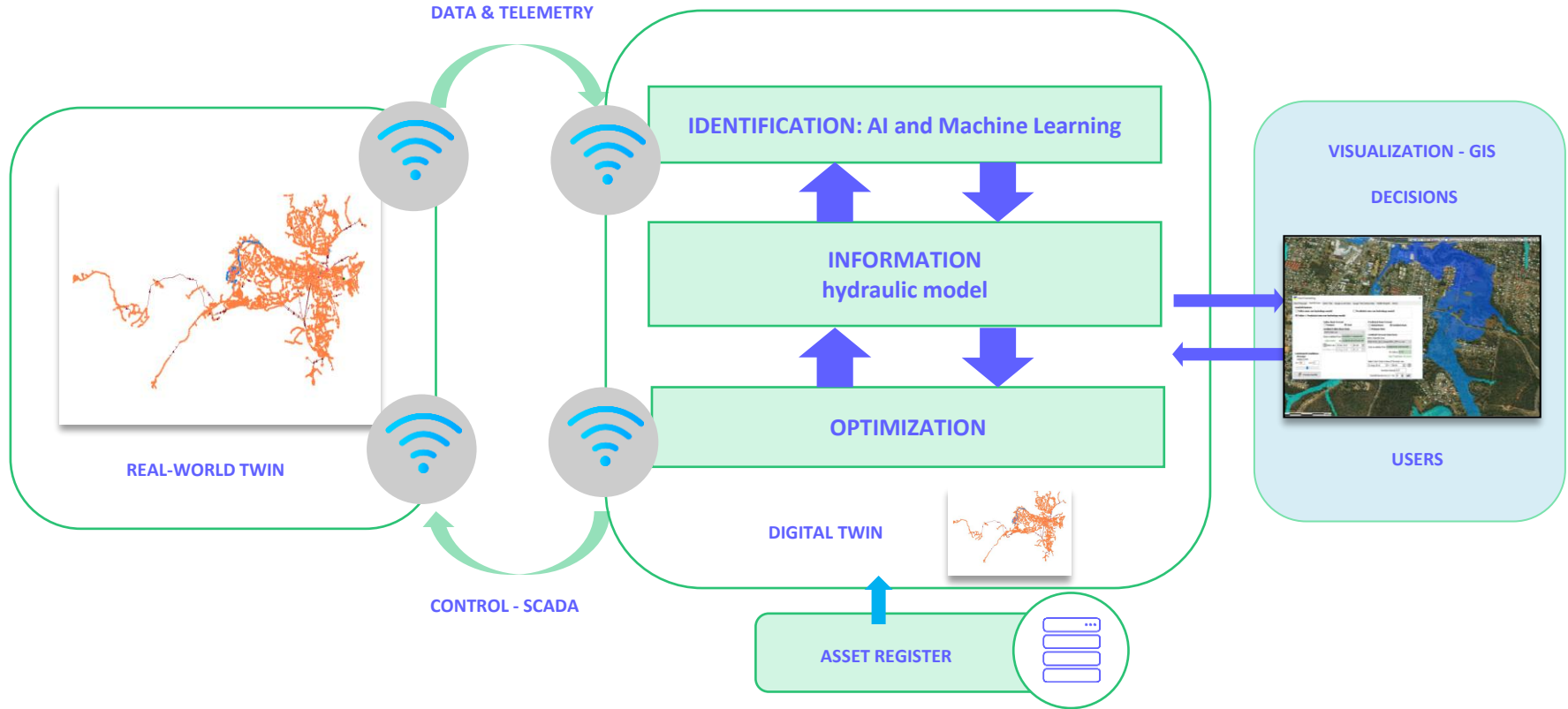


A comparison of the InfoWorks ICM peak extent output using forecast rainfall and drone images against the actual peak for the major flood at Deloraine in October 2022.




Drone images of the peak flood with the red outline of modeled area of impact. Very close match.

Operational Digital Twin: ICMLive



Digital Twin

The image shows the interior of a large tunnel under construction. The scene is dominated by a complex network of yellow safety railings and walkways. In the background, there are concrete structures and various pieces of construction equipment. The lighting is somewhat dim, with a bright light source visible on the right side, creating a strong contrast and highlighting the textures of the metal and concrete.

Thames Tideway Tunnel

Managing safety during tunnel construction using a digital twin

Challenge

Crews need to travel deep into tunnels where flash floods can create hazardous conditions.

Solution

Latest conditions and forecasts from digital twin are used to manage safety and to provide evacuation time.

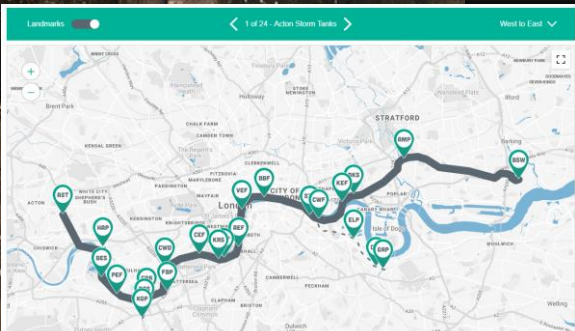
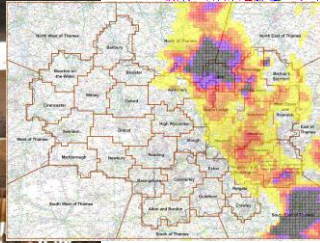
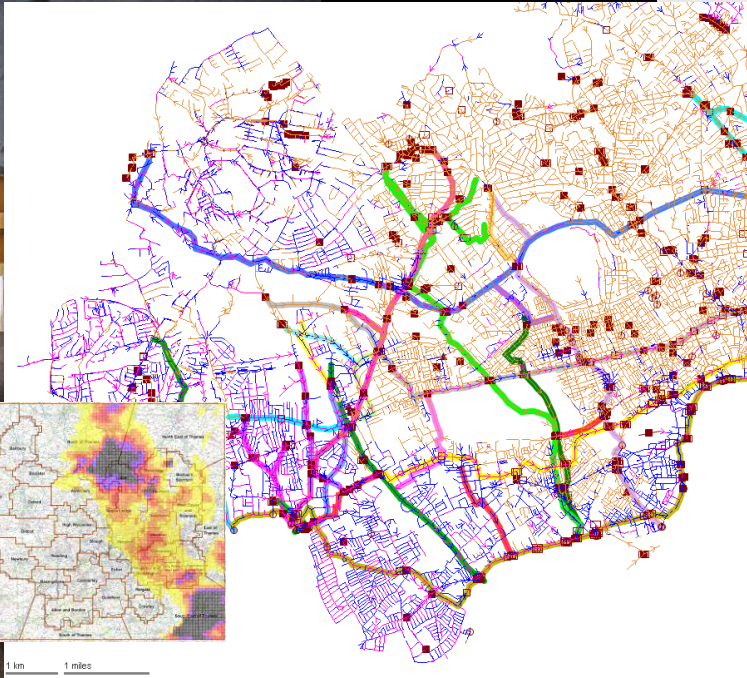
Impact

Safe system of working at all times.

Outcomes

Safety.

- Forecasting tunnel conditions for 5 days, 48 hours and 24 hours.
- Generate alerts to keep control centre informed for emergency planning.
- Inform time-sensitive commissioning activities.
- What-If scenario planning for schedule flexibility.



Machine Learning: InfoDrainage Deluge Tool

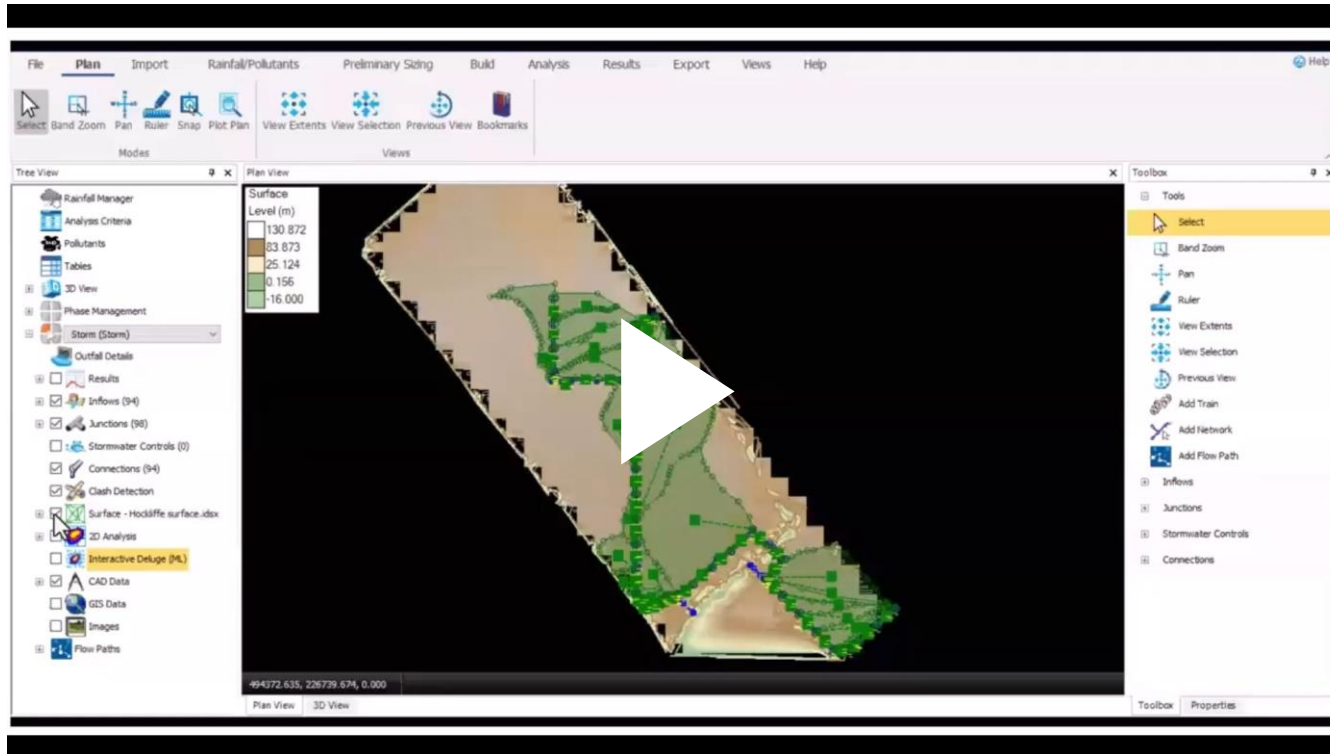
Client: Project Centre Ltd

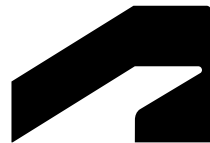
- Drainage across a 43ha 20 MW solar farm.
- Site plan: greenfield, access road, existing watercourse with requirement to maintain flows.
- Challenges: lack of space, power cables.



Image courtesy of Project Center

2 Minute Simulation

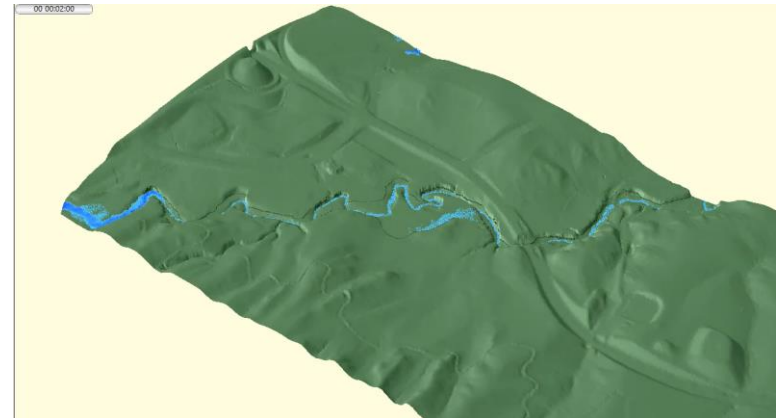
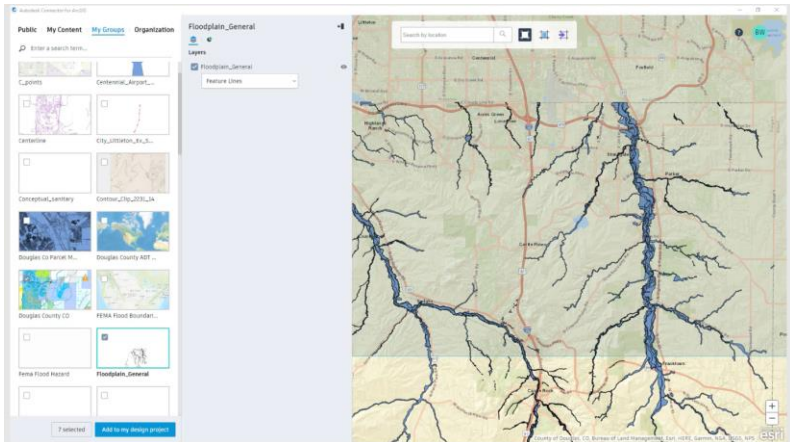
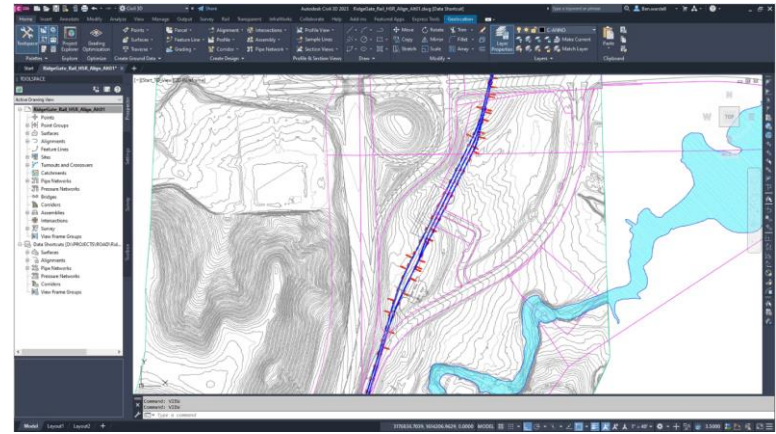
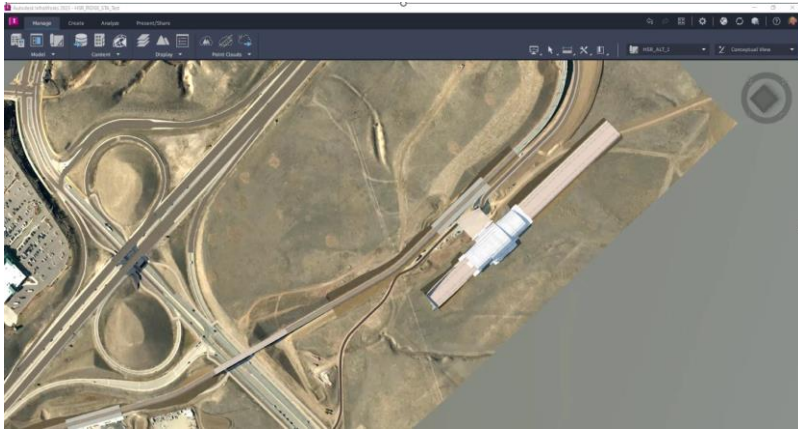


A 3D architectural rendering of a glass structure, possibly a window or a modern building facade, shown in a perspective view. The glass is clear and reflects light, with dark frames. The structure is positioned on the left side of the slide, extending from the top left towards the bottom center.

What's Next

Design for resilience to climate change with BIM

Bringing it all together with BIM – Rail example



THANK YOU!



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