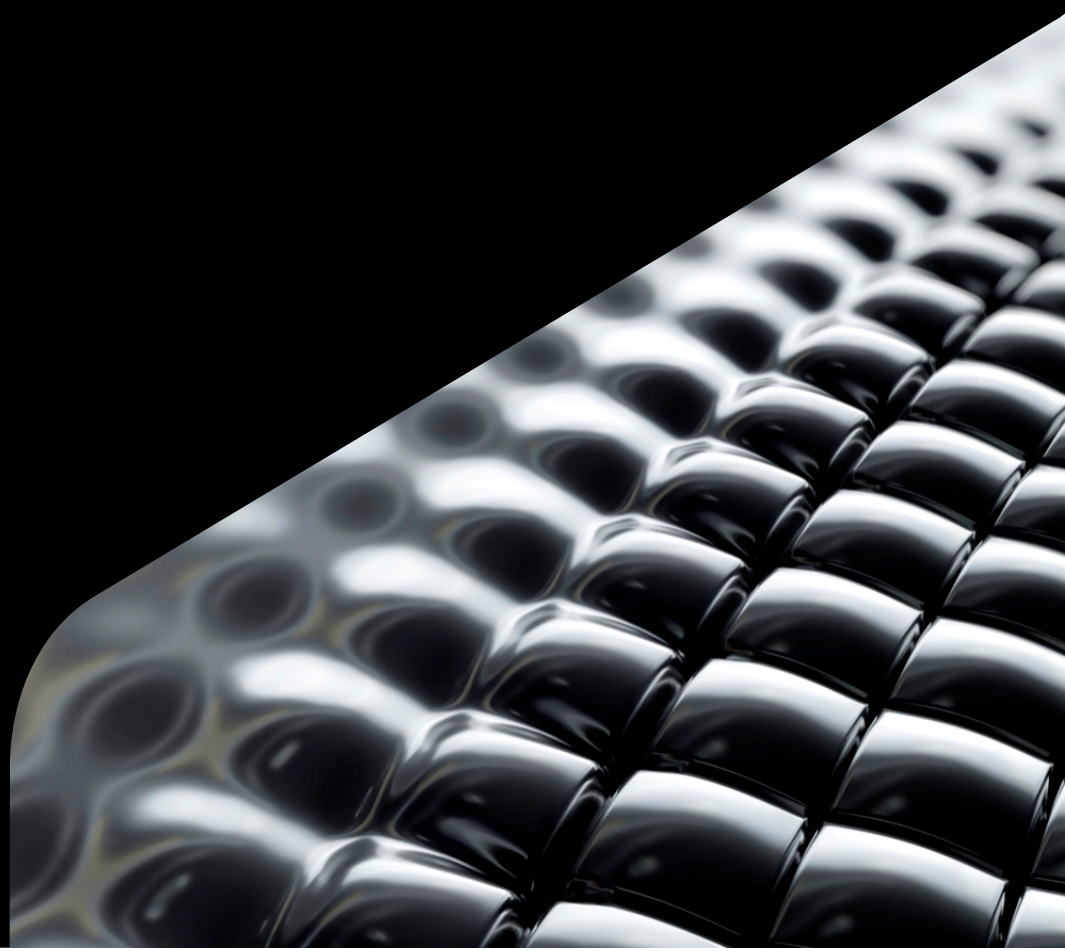
AUTODESK UNIVERSITY

Under the Radar

Complex Tunnel Design in InfraWorks

Kyle Gerke
BIM Manager
Scott Lecher
BIM Manager
Ara Ashikian
Product Manager



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- This presentation and/or product demo may make statements regarding future events and development efforts for our products and services. These statements reflect our current expectations based on what we know today. Our plans are not intended to be a promise or guarantee of future delivery of products, services or features and purchasing decisions should not be made based upon these statements.

HNTB | Technology Solutions Center

A Quick Introduction to our Service Patterns

PM/CM Digital Delivery

Program Management
Construction Management

Geospatial Solutions

Asset Management & Resilient Infrastructure

Enterprise & Emerging Technologies

VDC & VIZ

Virtual Design & Construction
Rapid Visualization Services

Virtual Engagement Solutions

We Are Hiring!

Introduction

Kyle Gerke | HNTB BIM Manager

- Second year at AU, first year speaker
- Nine years in AEC industry; three with HNTB
- Experience: Multi-discipline modeling, coordination and visualization support on large scale projects including Water Treatment Plants, Bridges, Tunnels, and Airports
- Skills: Revit, InfraWorks, Inventor, Software Integration & BIM Implementation

Introduction

Scott Lecher, P.E. | HNTB BIM Manager / Systems Lead

- First year AU attendee
- Twenty years in AEC industry; five with HNTB
- Experience: Parametric surface modeling for highway design, software development for automation and systems integration
- Skills: Navisworks, InfraWorks, Civil 3D, Forge

Introduction

Ara Ashikian, P.Eng | Autodesk Product Manager

- Senior Product Line Manager for the Autodesk Civil Structures product development teams.
- Prior to joining Autodesk in 2013, over 20 years of experience as a bridge engineer and a software developer
- Bridge design experience in preliminary, detailed and construction engineering design aspects for a wide range of bridge types.
- Projects included the detailed construction engineering of the EG LNG suspension bridge in Africa, as well as for the New Bay Bridge (self-anchored suspension bridge in California), the detailed engineering for the launching of the Kicking Horse Canyon in the Canadian Rockies as well as for the cable-stayed Coast Meridian bridge.

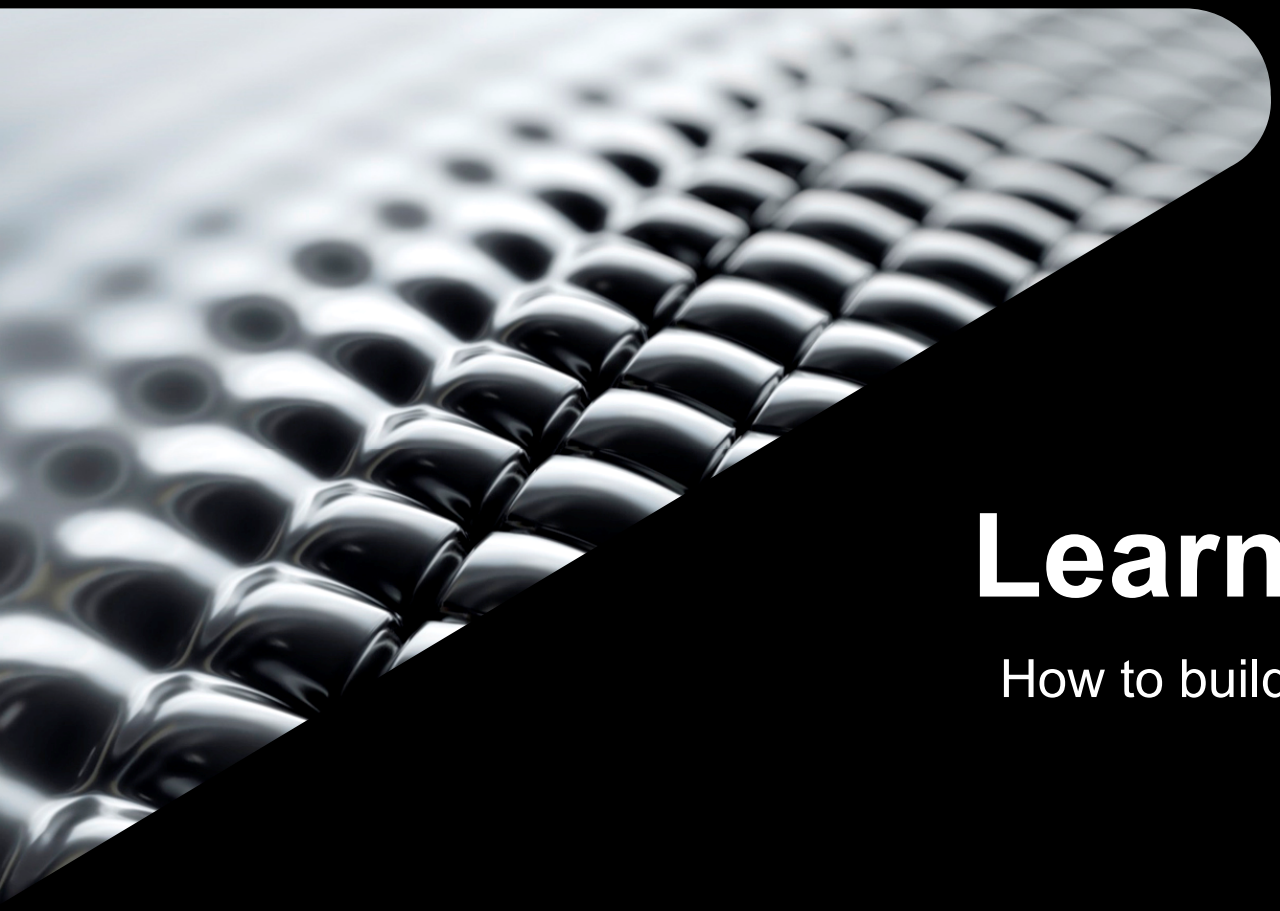
Learning Objectives

1. How to build complex tunnels with Autodesk Infraworks & Inventor

2. How Infraworks Tunnel Models integrate with Inventor, Civil 3D & Revit

3. HNTB lessons learned using Infraworks

4. What's new and What's Next…The future of Infraworks for Tunnels (Demo)

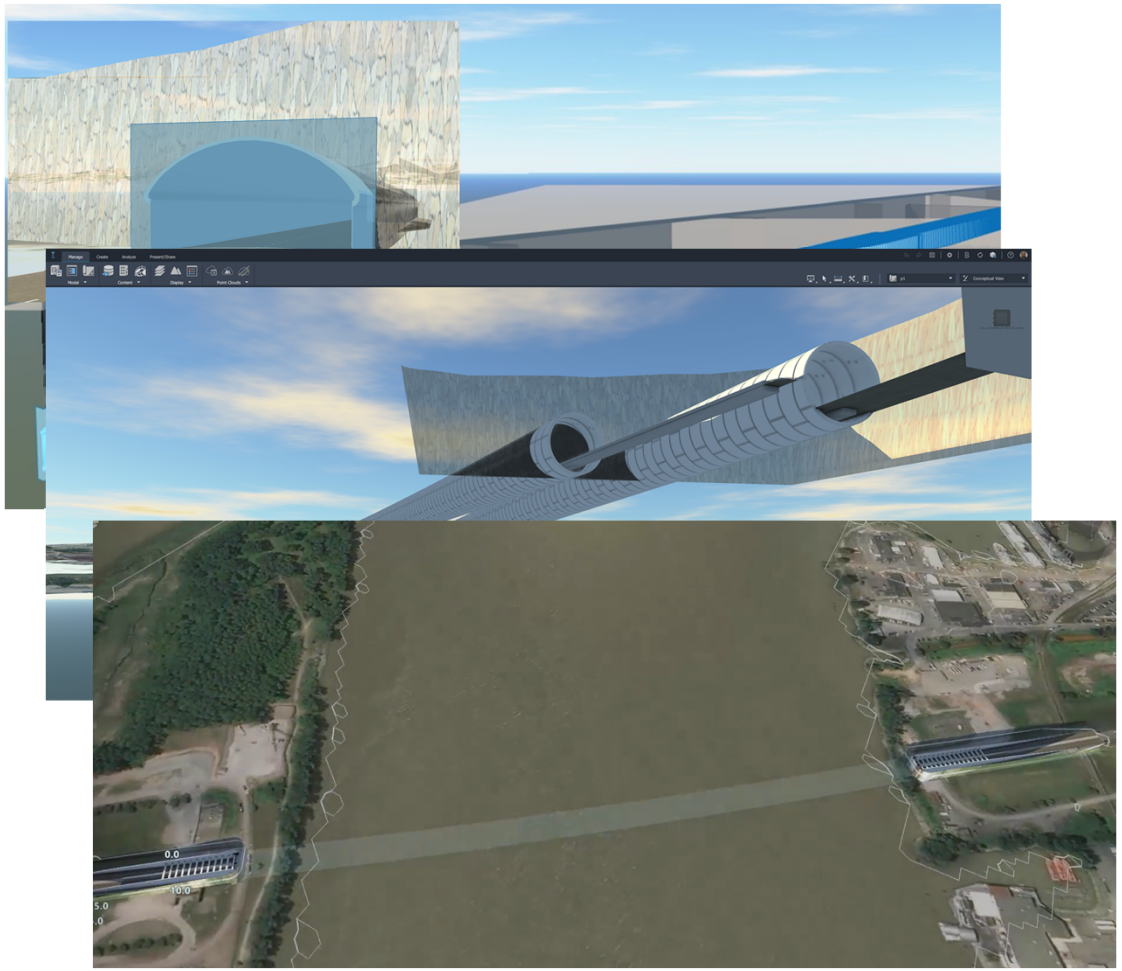


Learning Objective

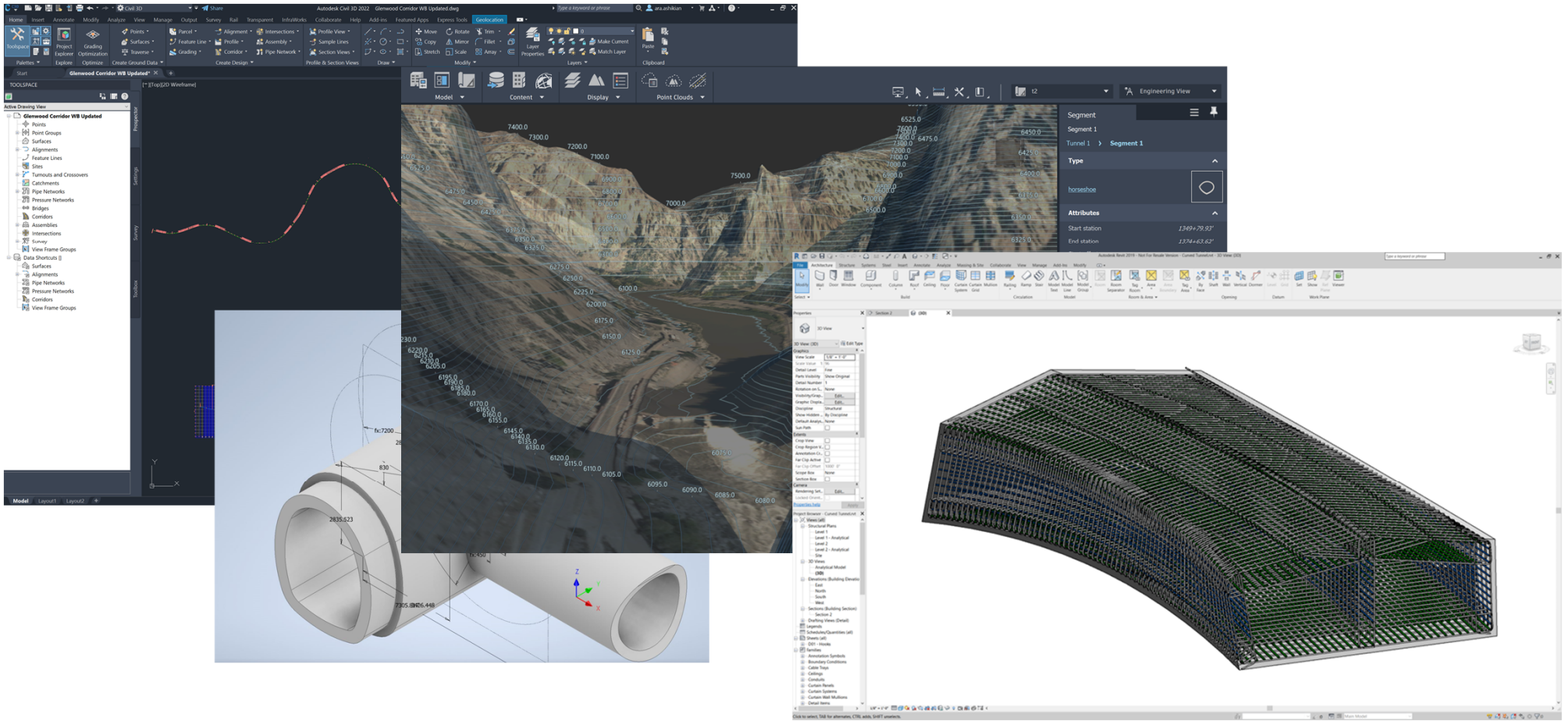
How to build complex tunnels with Autodesk Infraworks & Inventor

InfraWorks Tunnels Overview

- In-context modeling of tunnels
- Parametric modeling of multiple tunnel types
- Cut and cover tunnels with multiple sections
- Detailed bored tunnels with precast rings
- Submerged tunnels with detailed end portals

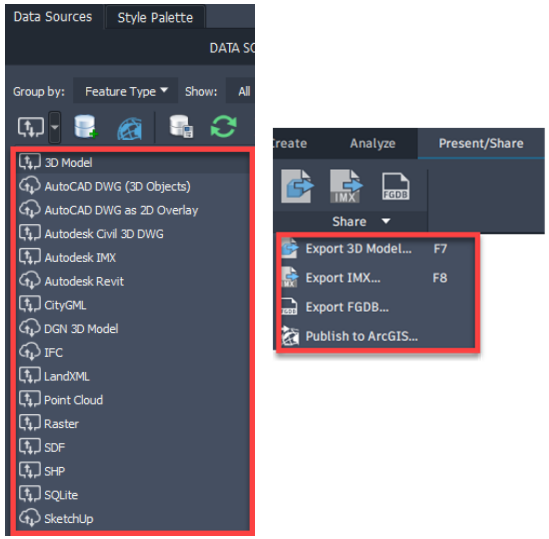


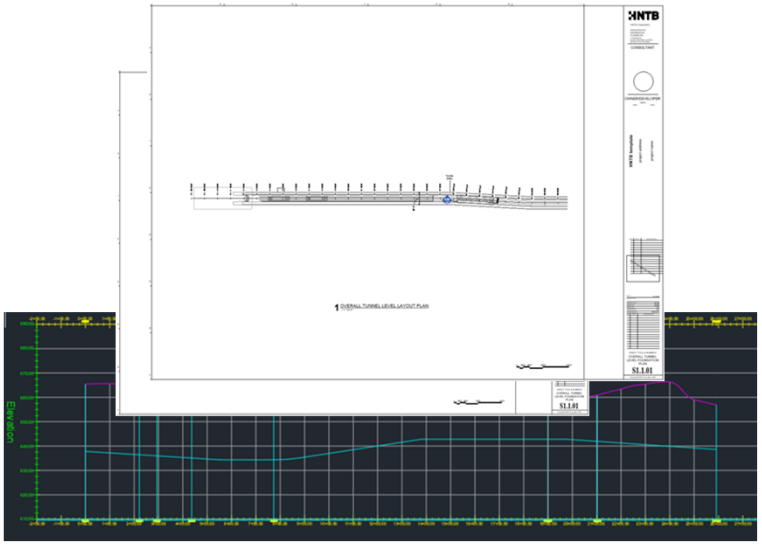
InfraWorks Tunnels Workflow



Purpose

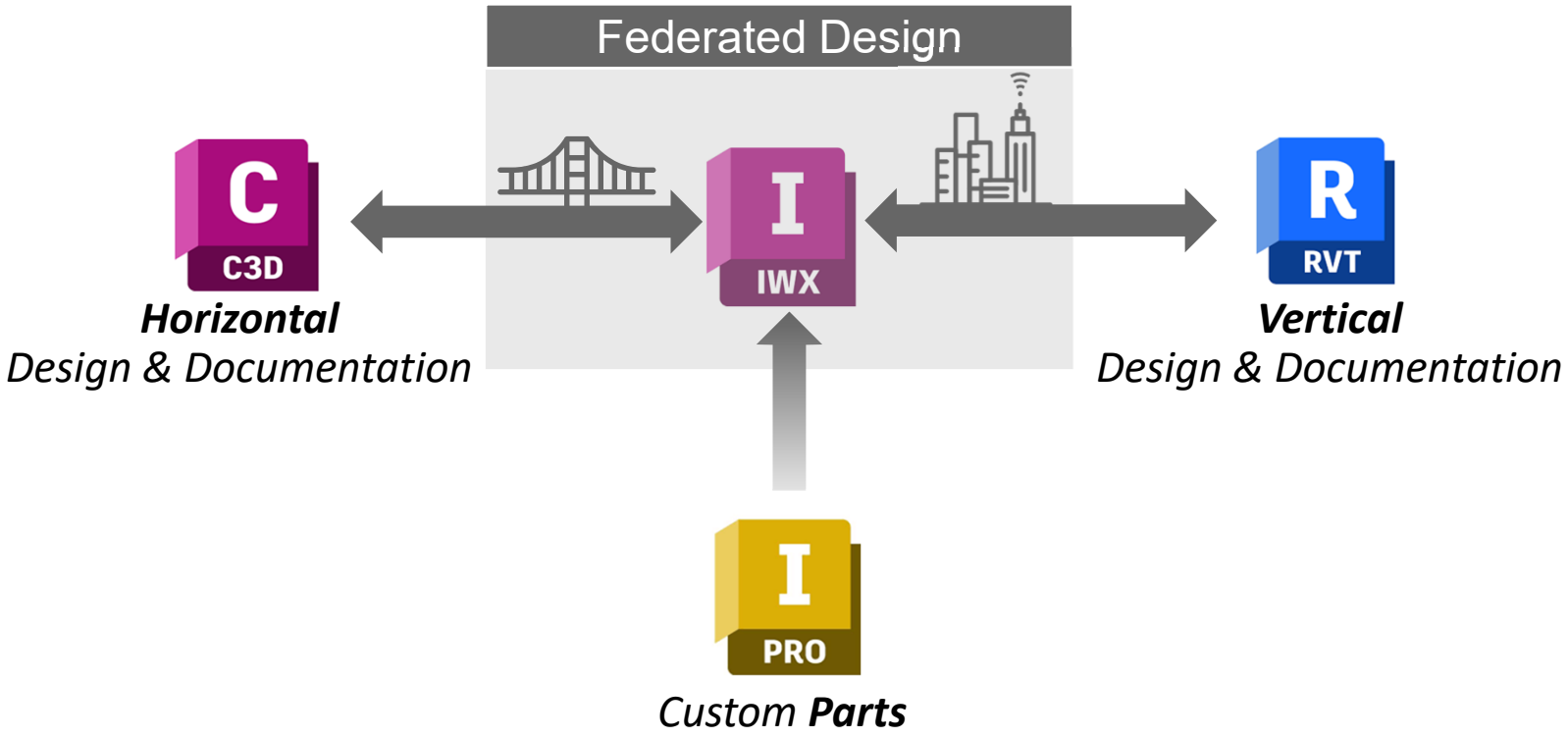
Integration Capabilities → **Multi-Software Leverage**





Not all Software is created equal

Process

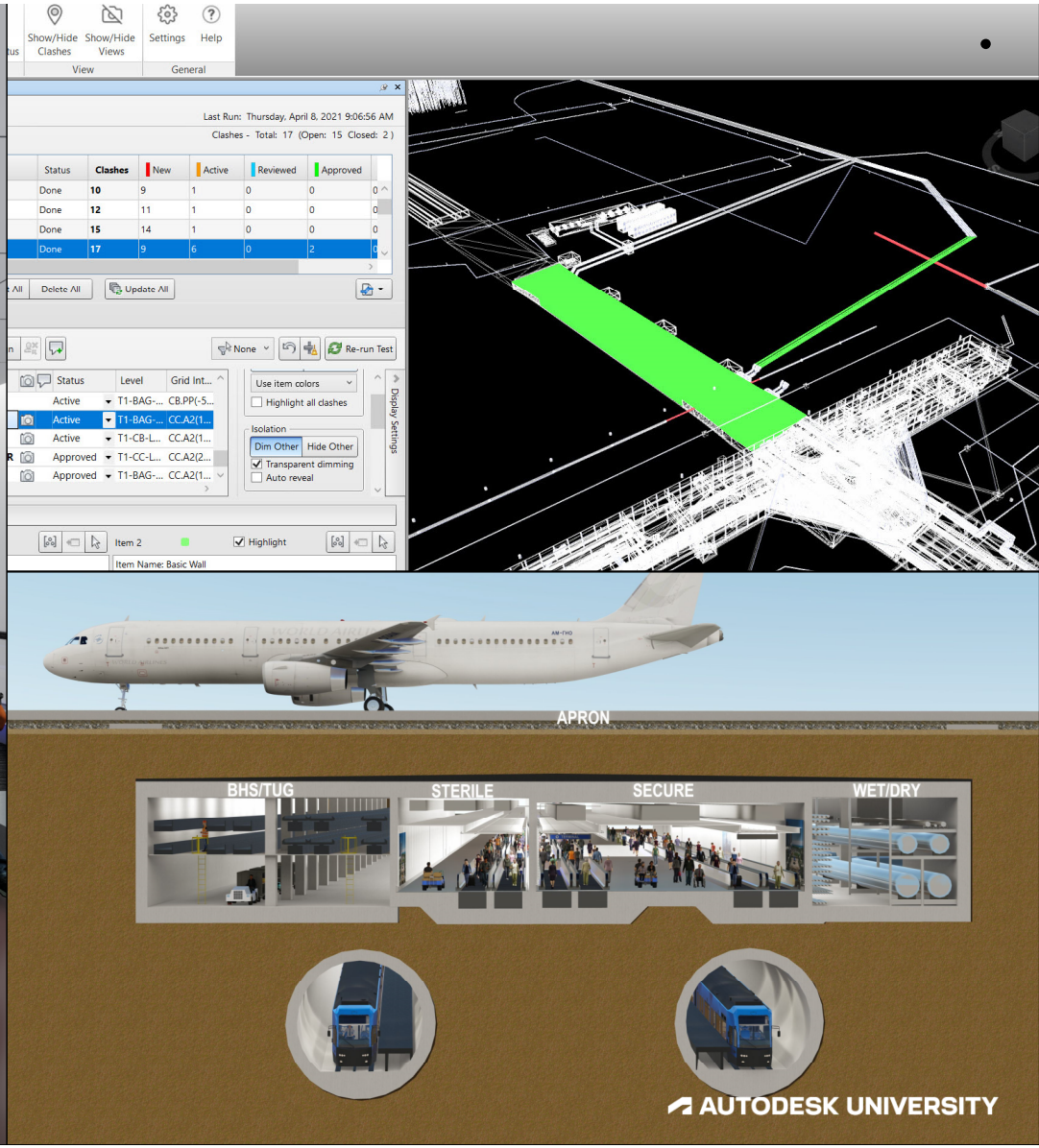


Horizontal
Design & Documentation

Vertical
Design & Documentation

*Custom **Parts***

Payoff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Show/Hide Views
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Delete All
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Use item colors
Highlight all clashes
Isolation
Dim Other
Hide Other
Transparent dimming
Auto reveal
Display Settings
Item 2
Highlight
Item Name: Basic Wall
APRON
BHS/TUG
STERILE
SECURE
WET/DRY
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Without InfraWorks & Inventor

Connected Workflow

- Excel data exchange & Dynamo scripting to update models via feature lines and point codes
- Information: Connected Bridge Design | Autodesk University 2019

CivilConnection “Linear Structures Workflow”

- Data is exchanged using custom Dynamo nodes and graphs
- Information: Linear Structures Workflow Guide

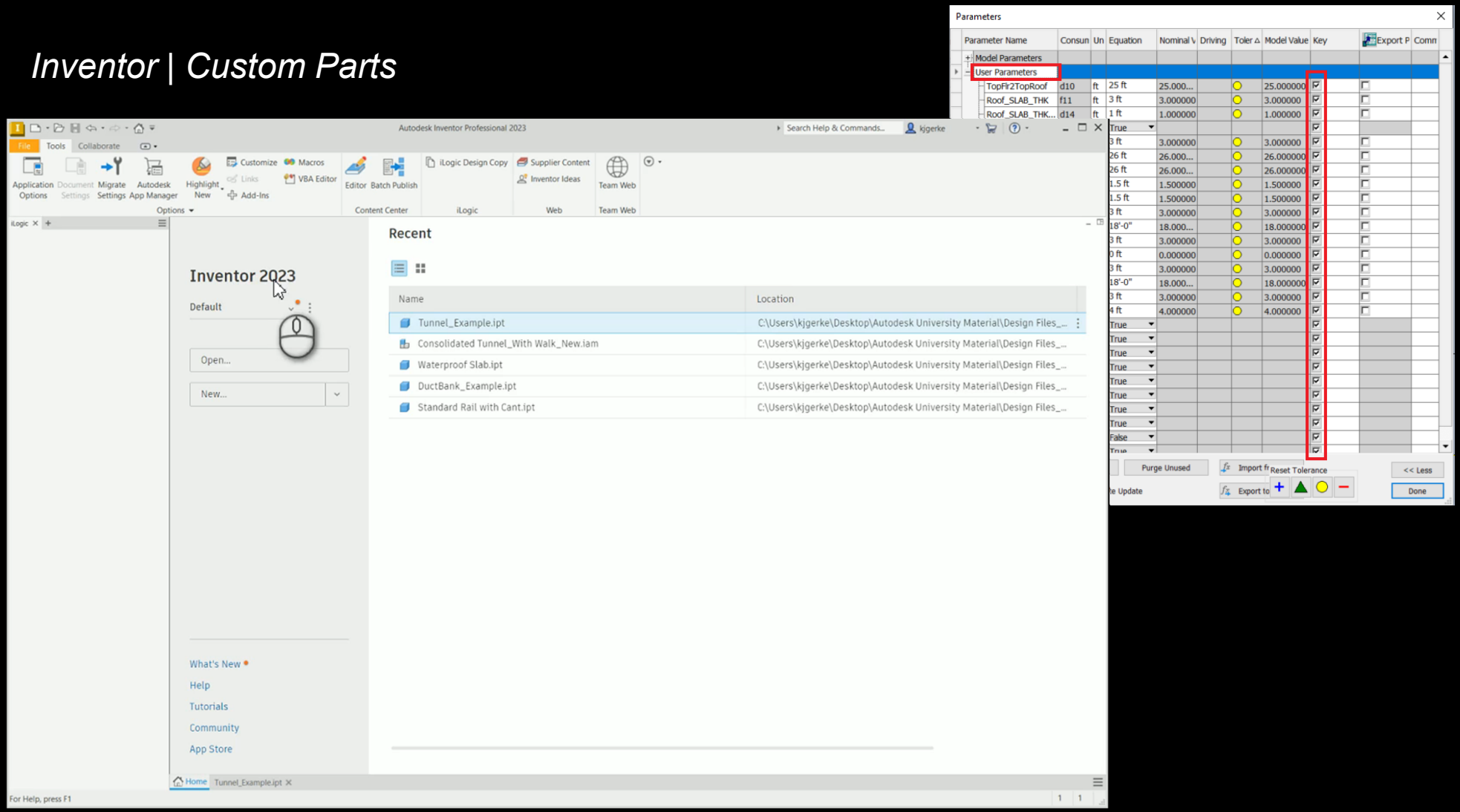
Speckle Connectors

- Open-source data sharing at the object (not file) level
- Information: https://speckle.systems/

Learning Objective

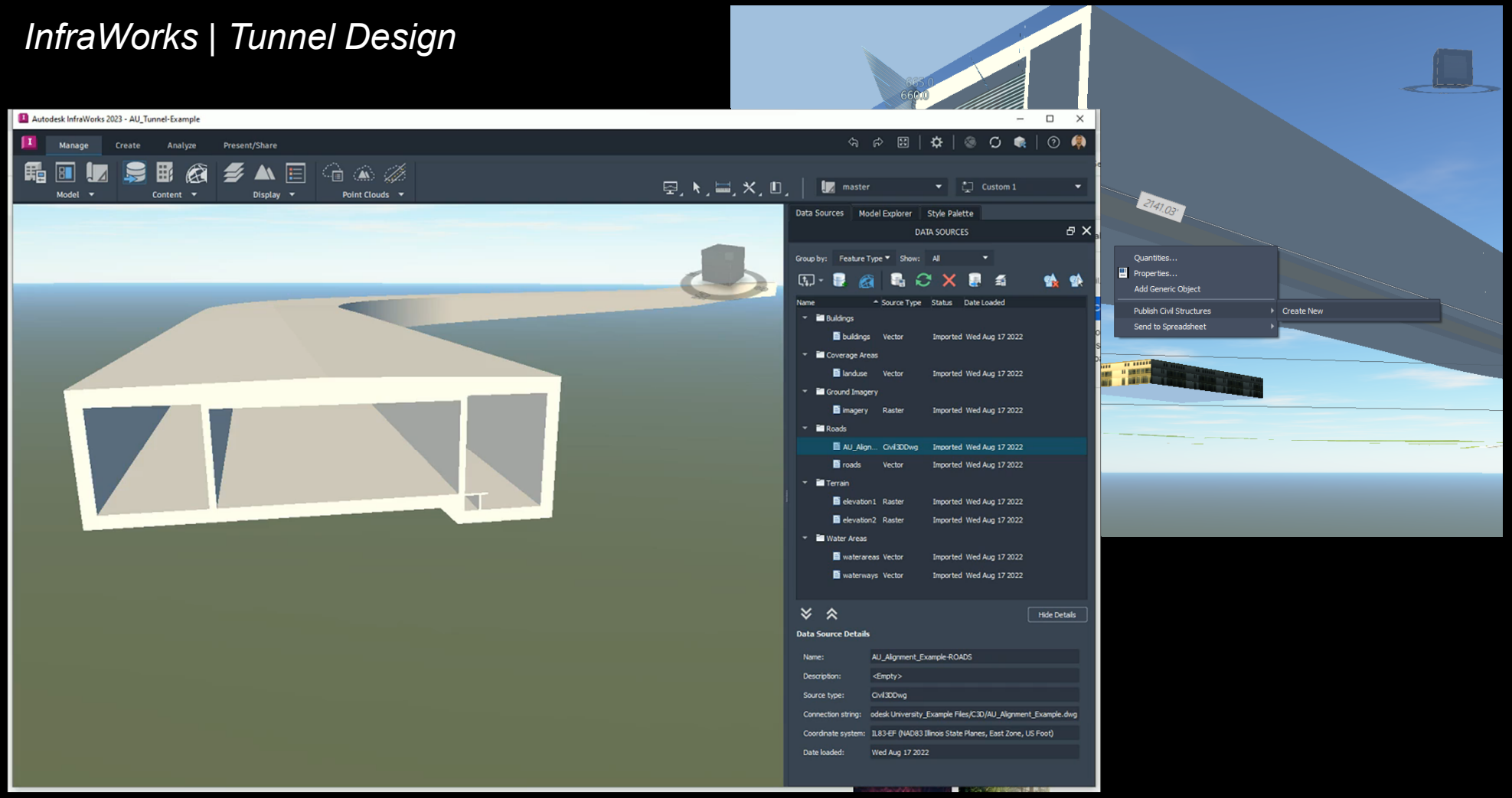
Integration with Inventor, Civil 3D & Revit

Inventor | Custom Parts

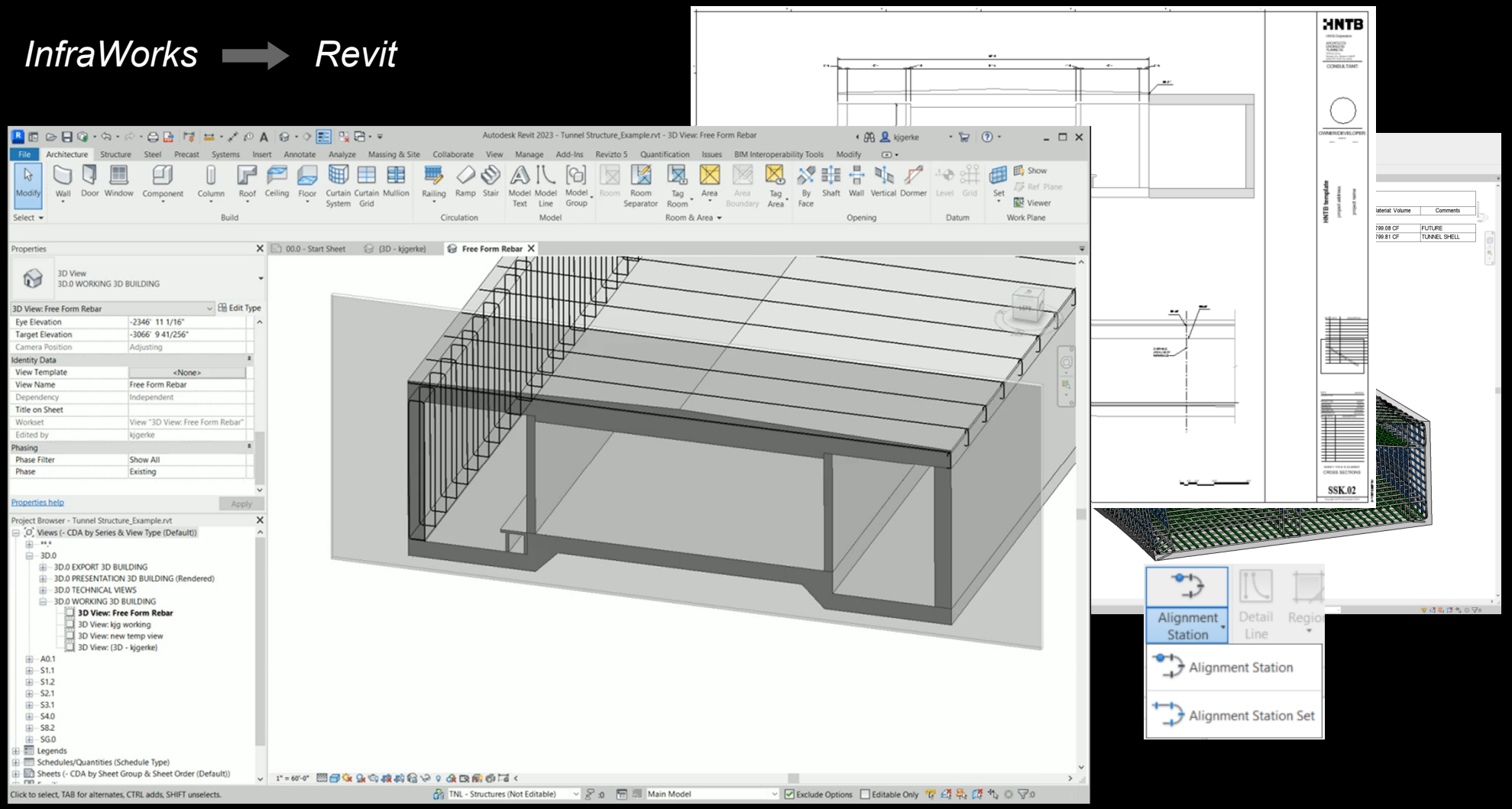


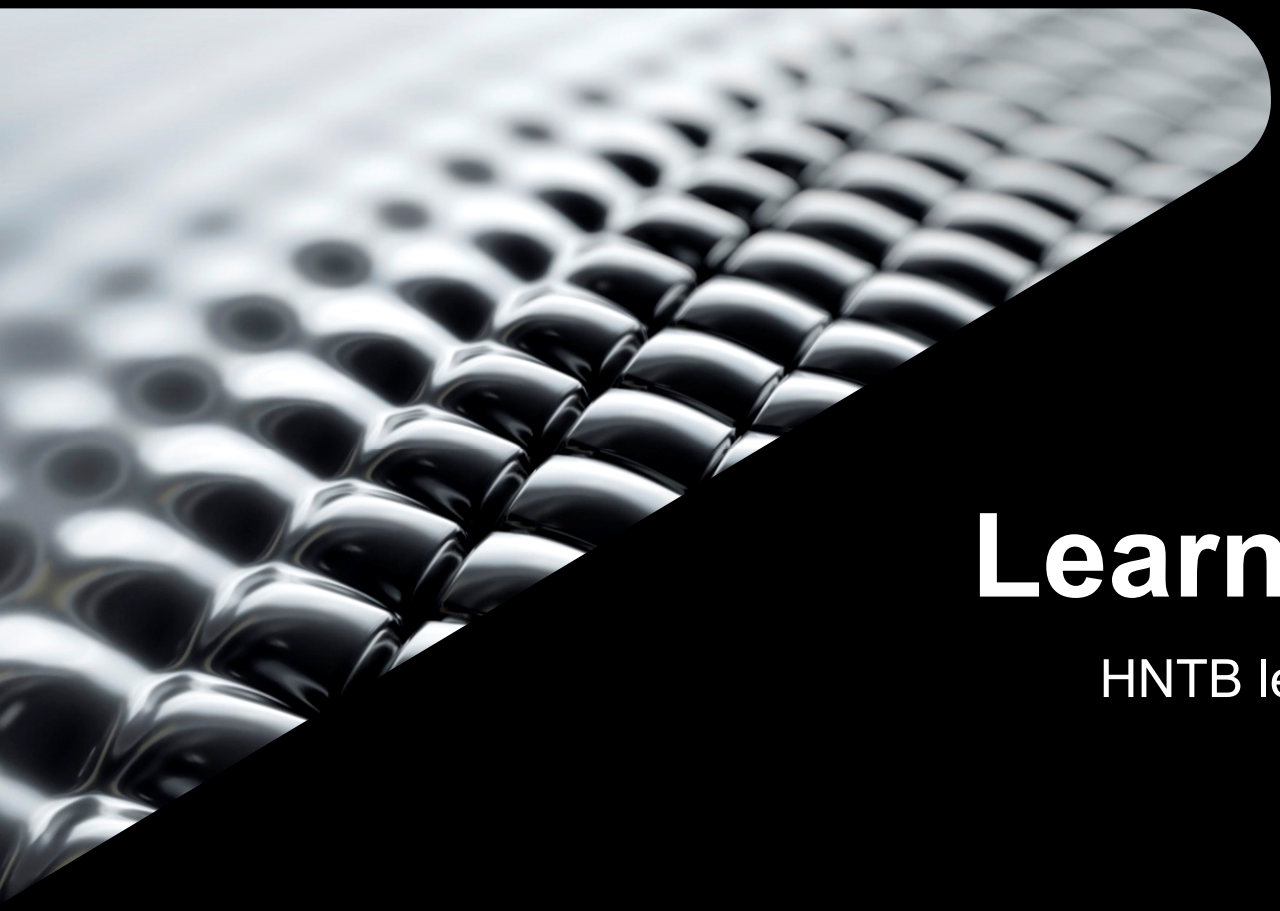
InfraWorks | Building the Tunnel

InfraWorks | Tunnel Design



InfraWorks → *Revit*





Learning Objective

HNTB lessons learned using Infraworks

Limitations | Civil Structures

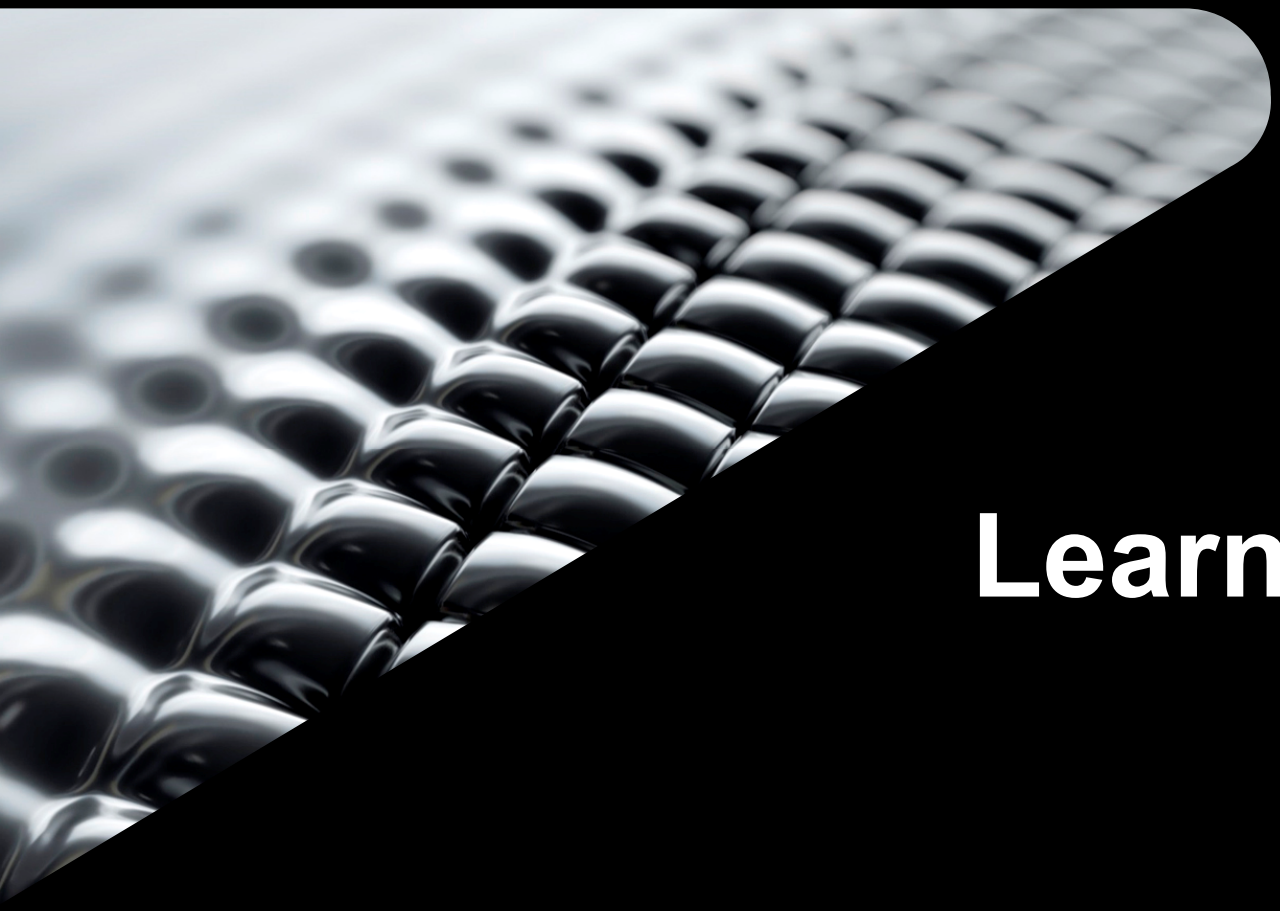
- **Cannot modify Civil Structure geometry**
- **Category Mapping**
- Limited Type Parameter control
- Station offset labels

Limitations | Tunnels in InfraWorks

- **Cross sections lost when switching tunnel segments** (.ipt files)
- Inventor Learning Curve
- Alignment on top of alignment
- Placement of objects must be relative to an alignment
- Visibility of Tunnel within cross section view
- Cannot change material of slice-based geometry in InfraWorks

Lessons Learned | Non-InfraWorks Tunnels

- Subassembly configuration pre-requisites
- Programming skills and mindset required
- Bypass other features of InfraWorks



Learning Objective

What’s new and What’s Next…

Q&A | Product Demo

The future of Infraworks for Tunnels