PennDOT Digital Delivery Directive

Wilkes University

April 22, 2025

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Pennsylvania
Department of Transportation

Today's Agenda

1. Introduction to Digital Delivery
2. Project Lifecycle
3. Pilot Project Program
4. Technology
5. Summary
6. Discussion

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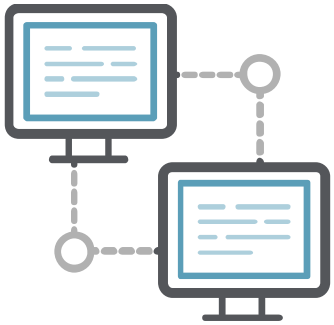
1 Introduction to Digital Delivery

What is Digital Delivery

A modernized approach to project delivery processes and contract media that incorporates digital data.

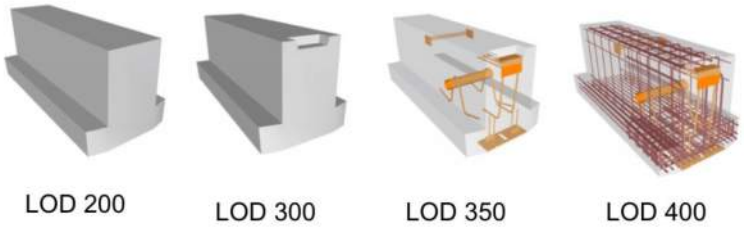


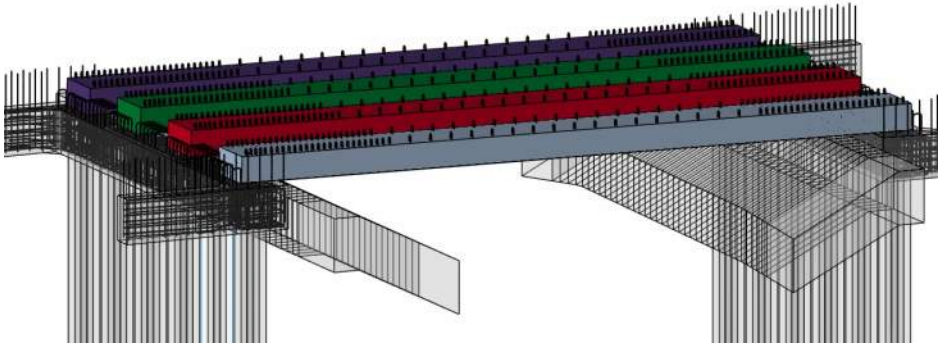
DIGITAL WORKFLOWS are data-based exchanges, in which information can be easily transferred to a computer system with little to no manual entry.

DIGITAL DELIVERY of project data in which 3D models and other files are created and delivered to enhance design, facilitate construction and incorporate digital information to support the asset management lifecycle

Building Information Modeling

BIM is the process that involves generating and managing digital representations of the physical and function characteristics of a physical asset.





LEVEL OF DEVELOPMENT describes a qualitative designation that communicates the degree of engineering intent behind a 3D model element.

MODEL BASED DESIGN shifts away from models as a parallel workflow to traditional drawing-based workflows and puts the model data at the center of the design process.

Level of Development

Level of Detail

Color: Brown

Shape: Rectangle

Weight: 1.55 oz

Metadata

Made by: The Hershey company

Bought: November 17, 2022

Level of Information

Name: Milk Chocolate Bar

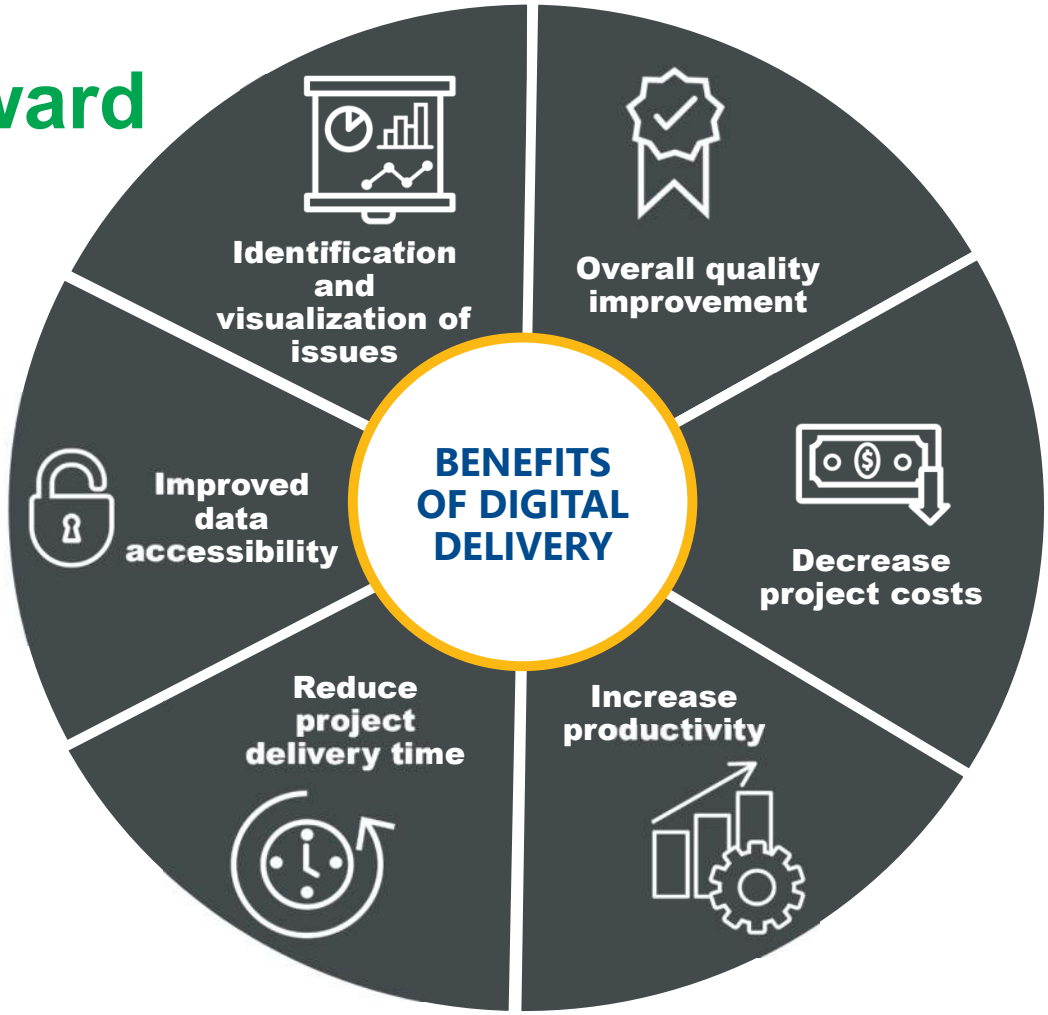
Quantity: One

Ingredients: Milk chocolate, sugar, milk

Taste: Delicious

Moving the Industry Forward

- Digital Transformation
- Technology Advancements
- Interoperability
- Collaboration
- Automation
- Repeatability



DIGITAL DELIVERY DIRECTIVE

By 2025, construction projects will have the ability to be bid using 3D technology and will no longer be in a traditional construction plan format.

Digital Delivery Directive 2025 ROADMAP

3D DIGITAL DELIVERY DIRECTIVE 2025

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Our Vision

By 2025, construction projects will be bid using 3D technology and no longer be in a traditional construction plan format

Our Mission

To support the digital transformation of project development within PennDOT developing modeling requirements, processes, and workforce development to enable improved asset information transfer by using 3D data-rich information models

Goals

- **Implement 3D Technology**
- **Advance the Use of Accessible Digital Processes and Tools**
- **Capture Data-Rich Asset Models**

Keys to Success

- Manage Pace of Change
- Help People Perceive Progress
- Create Safe Space for Experimentation
- Empower Pilot Project Teams
- Use Construction Partnering

Strategic Approach

- Assess Stakeholder Needs, Desires and Priorities
- Align Technical Solutions with Stakeholder Input
- Advance Technical Solutions Incrementally

2020
Strategic Plan
- Stakeholder Workshops
- Implementation Plan
- Digital Delivery Web Page
- Communication Plan

2021
Quick Start Tools
- Model Review Checklist
- Procurement Language
- Project Execution Plan Template
- ConceptStation Pilot
- Guiderail As-built Pilot

2022
Roadway Modeling Requirements
- Modeling Standards
- Education and Training
- Continued Pilot Projects

2023
Bridge and Construction Modeling Requirements
- Modeling Standards
- Education and Training
- Continued Pilot Projects

2024
Drainage and Asset Management Requirements
- Modeling Standards
- Education and Training
- Continued Pilot Projects

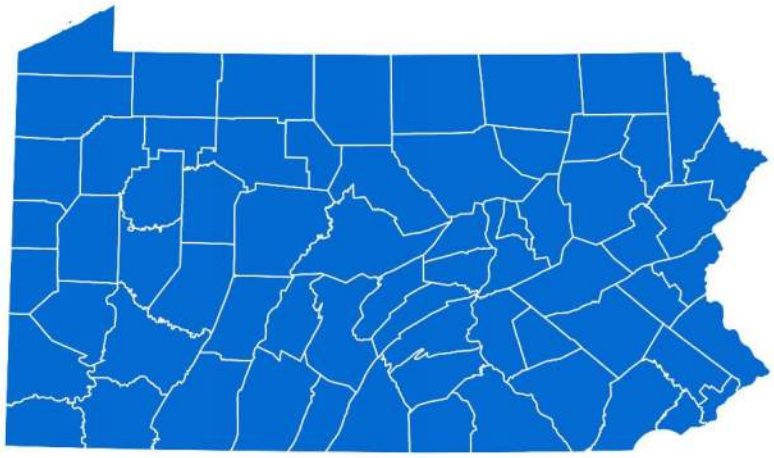
2025
Digital Delivery Implemented
- Standardized Digital Delivery Process

Email: RA-PDDIGITALDELIVERY@pa.gov

Roadmap to 2025

Mission:

To support the digital transformation of a project development within PennDOT developing modeling requirements, processes, and workforce development to enable improved asset information transfer by using 3D data-rich information models



Goal 1

Implement 3D Technology

Goal 2

Advance the use of Accessible Digital Processes and Tools

Goal 3

Capture Data-Rich Asset Models

Strategic Plan

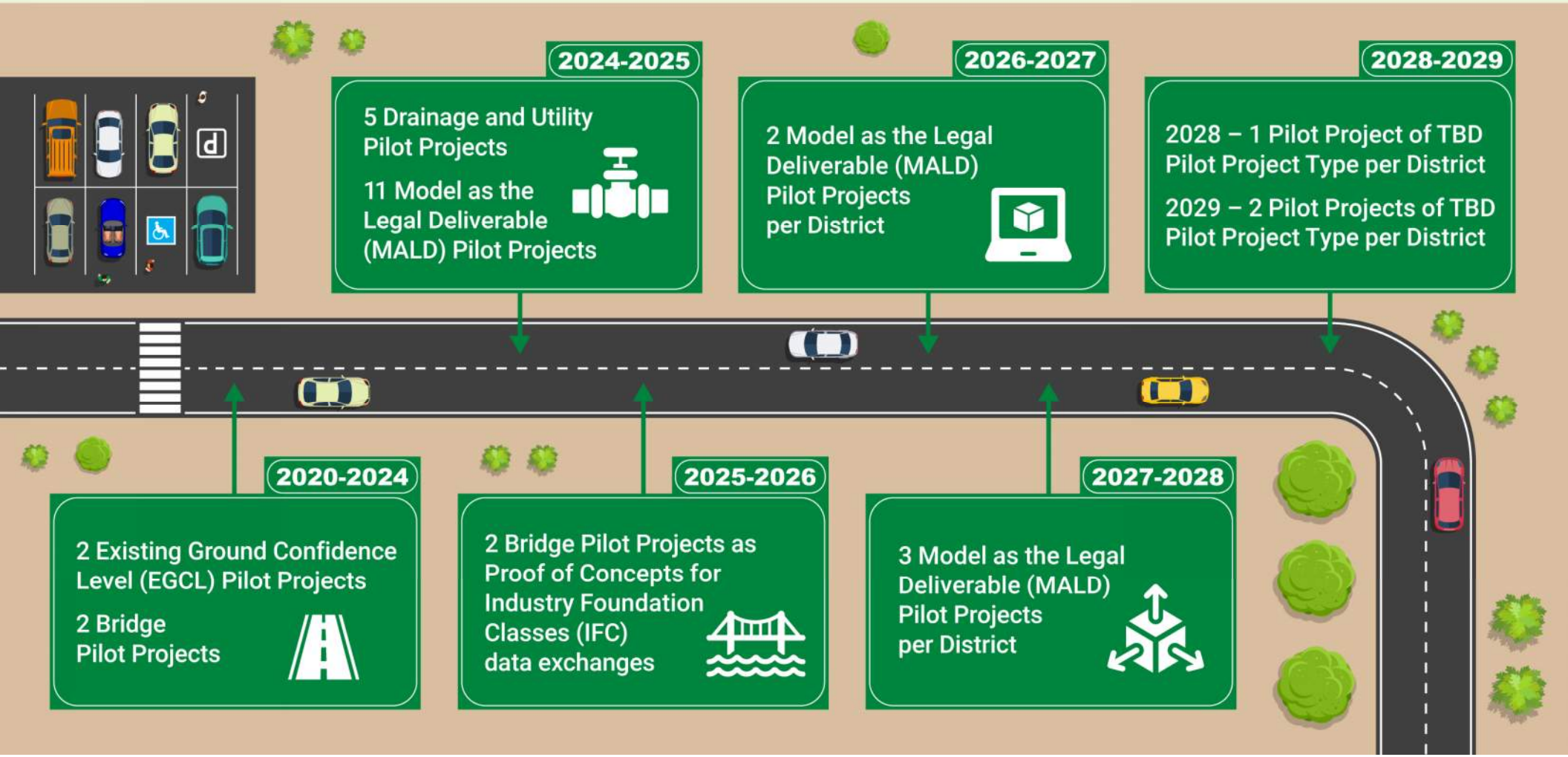
Stakeholder workshops
Implementation Plan
Communication Plan

Quick Start Tools

Checklists, Guidance documents, Modeling Standards, Training and Education

Digital Delivery Directive

Pennsylvania
Department of Transportation



2 Project Lifecycle

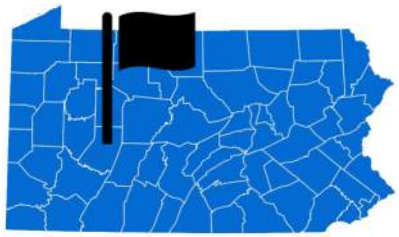
Project Lifecycle Overview

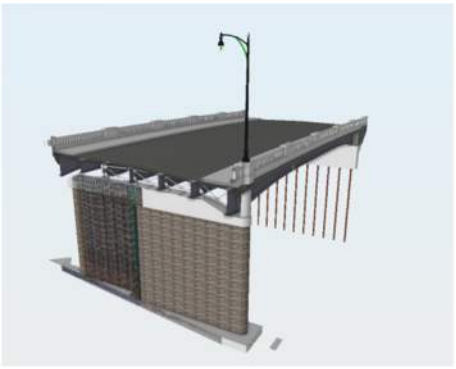
Planning

Design

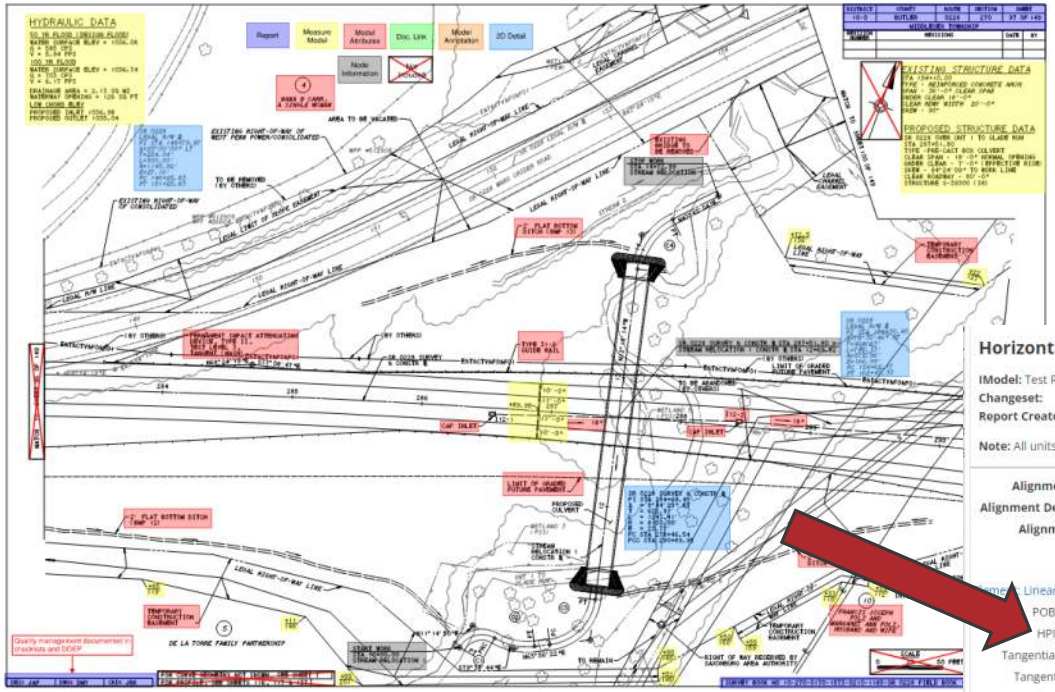
Construction

Asset Management





Shifting an Agency



Industry shift from paper based design to model based design

Horizontal Alignment Review Report

IModel: Test Roadway
Changeset:
Report Created: Wed Mar 29 2023

Note: All units in this report are in feet unless specified otherwise.

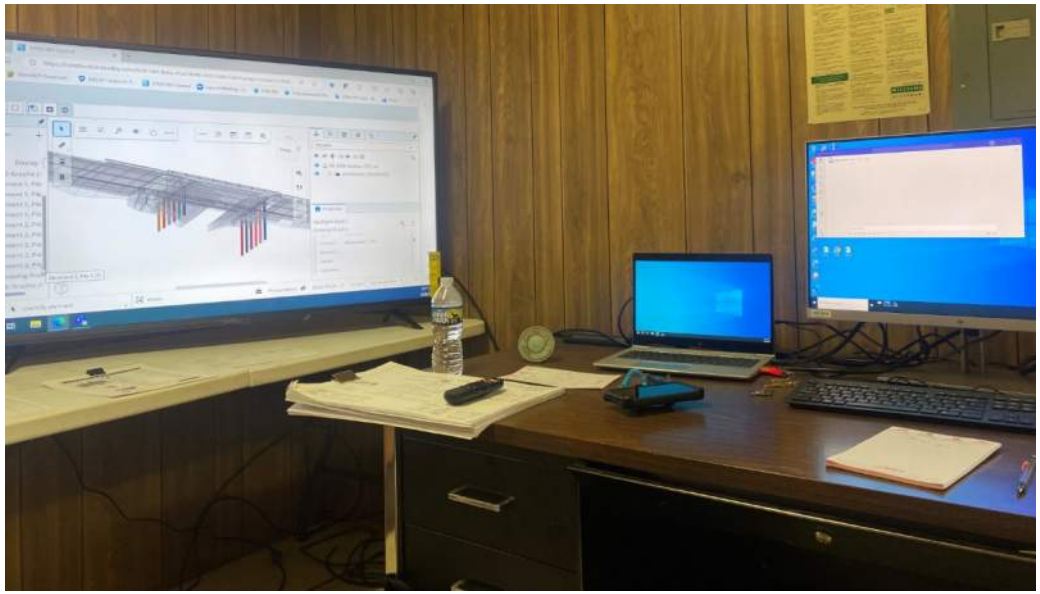
Alignment Name: 2S4010A02_Hershey
Alignment Description:
Alignment Style:

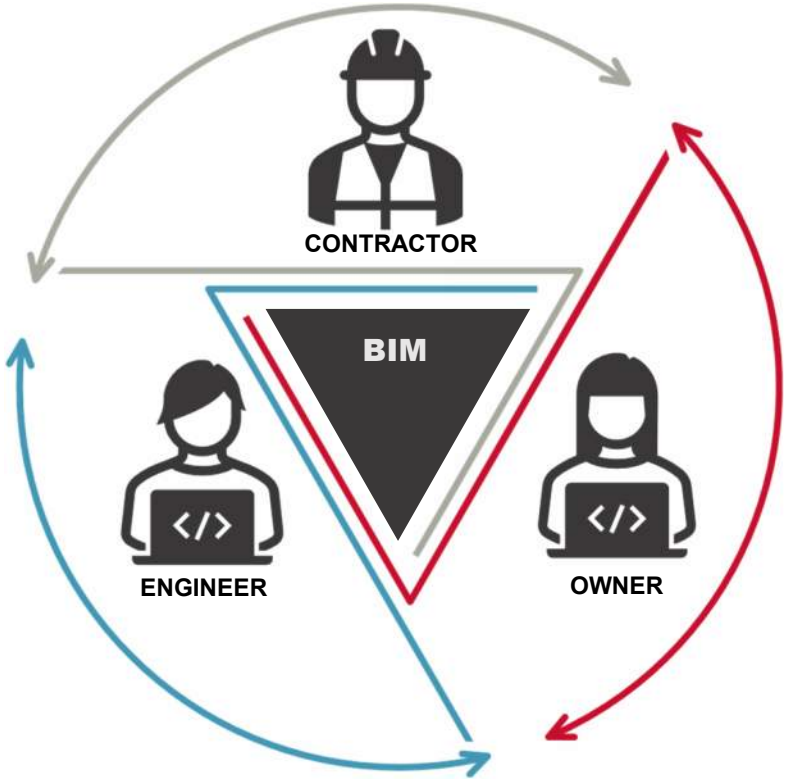
		Station	Northing	Easting
Element: Linear				
POB	()	0+00.00	693509.0672	1327465.2598
HPI	()	8+04.43	693944.2045	1328141.8429
Tangential Direction:		N57.253°E		
Tangential Length:		804.4309		
Element: Linear				
HPI	()	8+04.43	693944.2045	1328141.8429
PC	()	13+57.64	694245.9812	1328605.4937
Tangential Direction:		N56.941°E		
Tangential Length:		553.2099		
Element: Circular				
PC	()	13+57.64	694245.9812	1328605.4937
HPI	()	15+68.07	694360.7728	1328781.8598
CC	()		695473.8124	1327806.3344

Connecting data beyond just design and construction

Working with Consultants and Contractors

The importance of collaboration with the design team, contractors, and inspectors during construction





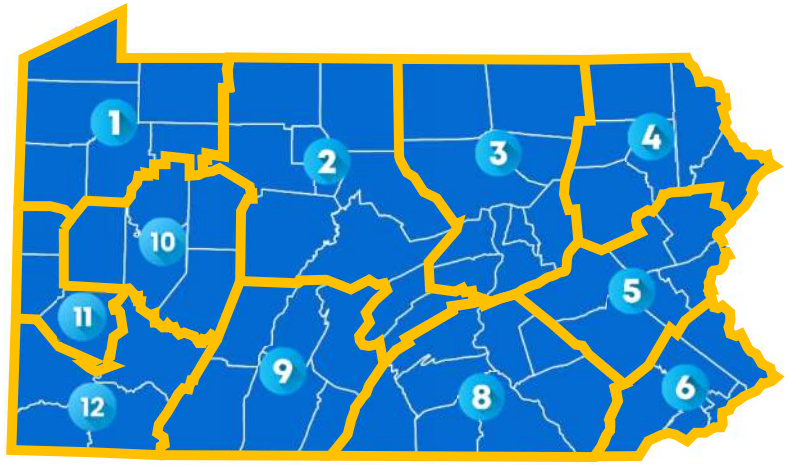
3 Pilot Project Program

Purpose of Pilot Project Program

EGCL/Roadway → Bridge → Drainage & Utilities → Model as the Legal Deliverable

Phased Approach

- Develop standardized processes, such as roll plans, design modeling, quality management, bidding, and inspection.
- 24+ pilot projects provide numerous opportunities for staff and contractors to interact on projects.



District 1 EGCL Pilot Project - Lessons Learned

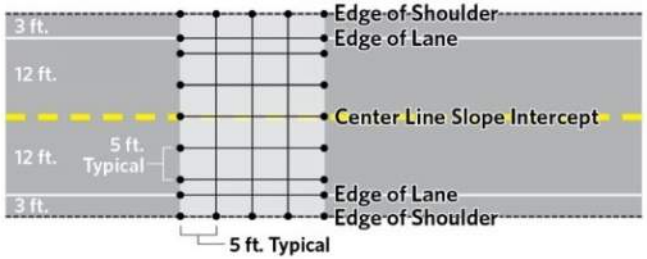
PA 173 and Yankee School Road Intersection

Existing Ground Confidence Level
Ability to define a confidence level of the accuracy and density of existing survey model.

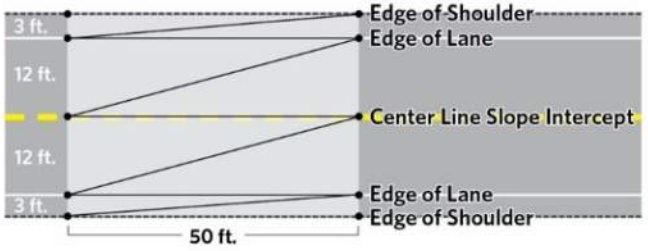
Project Scope Change
Originally the project was a mill and overlay project which changed into an intersection safety improvement project for sight distance and superelevation.

Survey Accuracy
With the project scope change, additional survey was needed to meet the digital deliverable.

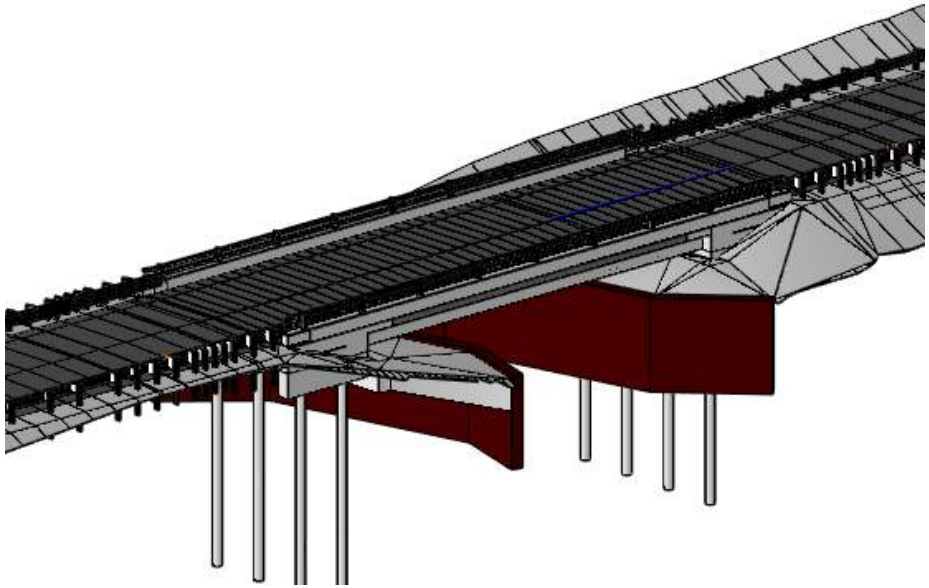
3D Model-based Methods



Traditional 2D Methods



BRIDGE PILOT PROJECTS



District 1 – Bridge
SR 1032 Bridge over Shirley Run

District 4 – Bridge
SR 3006 over Gardner Creek

DESIGNER PERSPECTIVE

MODEL AS THE LEGAL DOCUMENT

SR 68 – Dolby Street Roadway Improvement Project

District 10

1. Roadway realignment project with structure replacement over Trout Run

2. New sidewalks and ADA ramps to enhance mobility

3. Incorporated utility work and new drainage features

4 Technology

Digital Delivery Software

DESIGN AUTHORING SOFTWARE is used by designers to create 2D and 3D models and plan sheets

IMPORTANT ASPECTS

- Design intent
- Modeling standards
- Software interoperability with data exchanges
- Quality Management

OPENROADS

OPENBRIDGE

Students and educators get full access to learning licenses of Bentley applications.

Bentley Education

Cloud Based Tools for Design and Construction

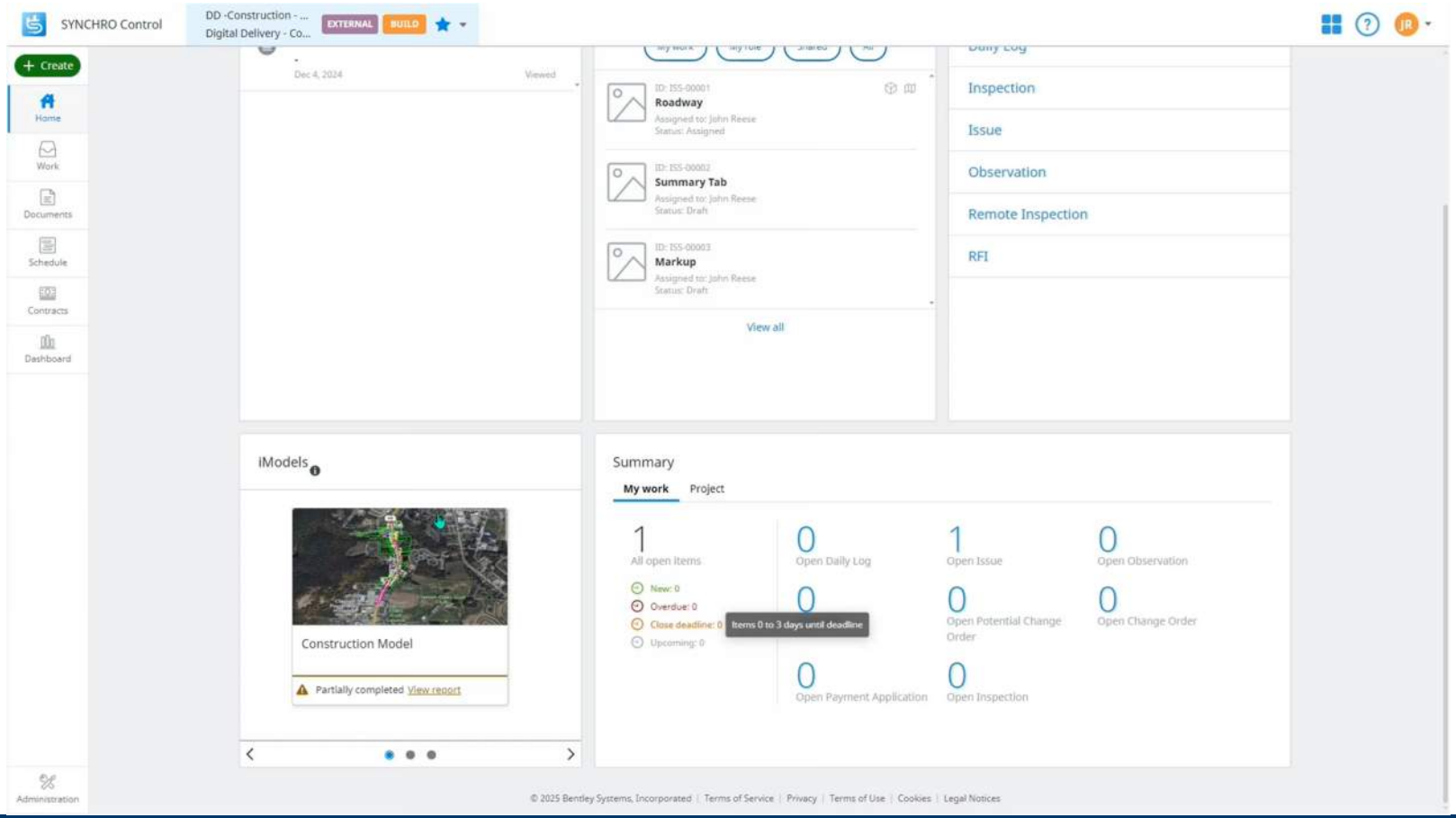
Infrastructure Cloud Platform

- Web browser platform that can be synchronized to ProjectWise, a common data environment
- Tools incorporated for design review, asset management, and construction management

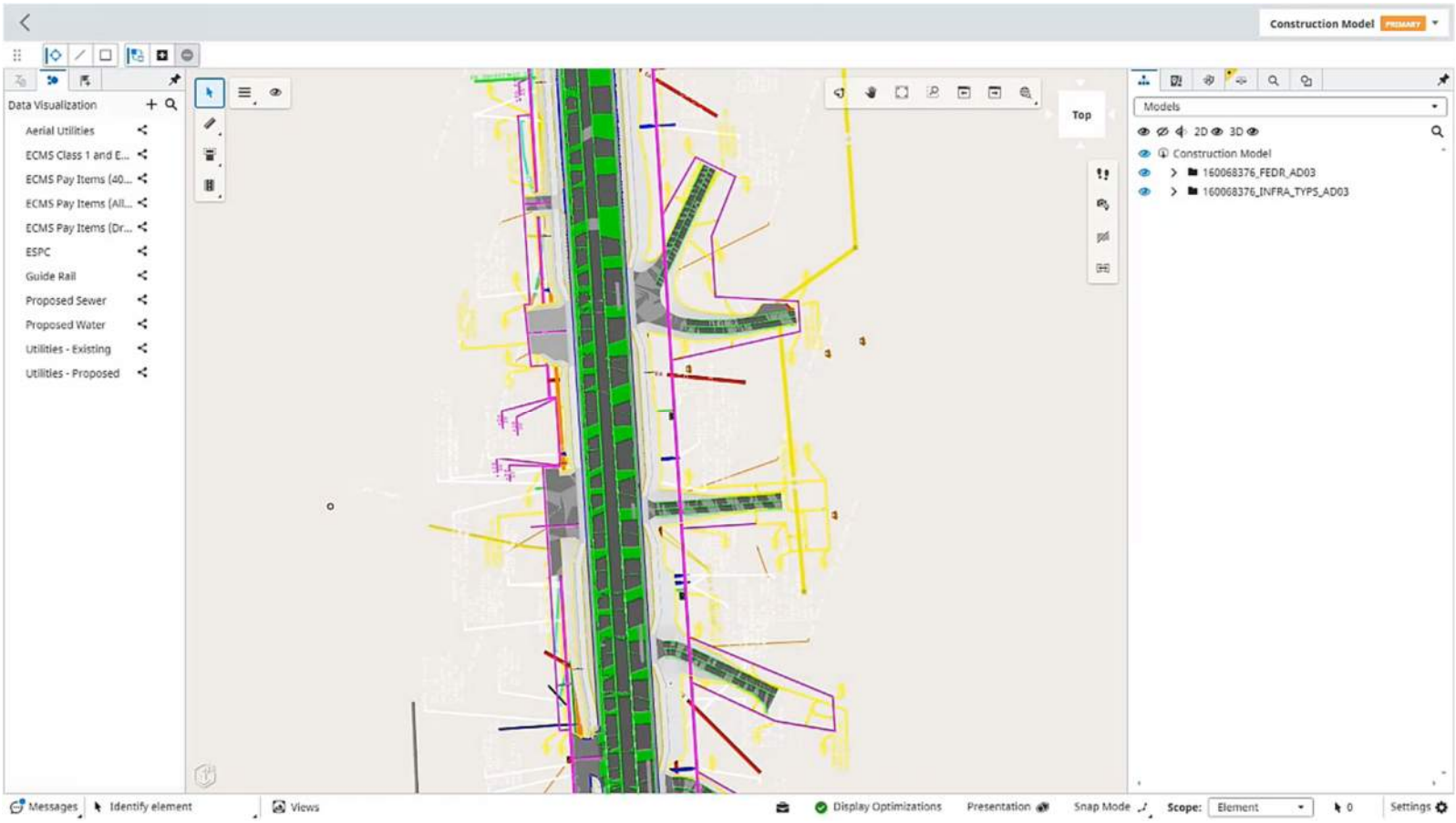
Synchro Control

- Construction Management software which can be used to view 3D models, documents, and link to inspection workflows and field applications

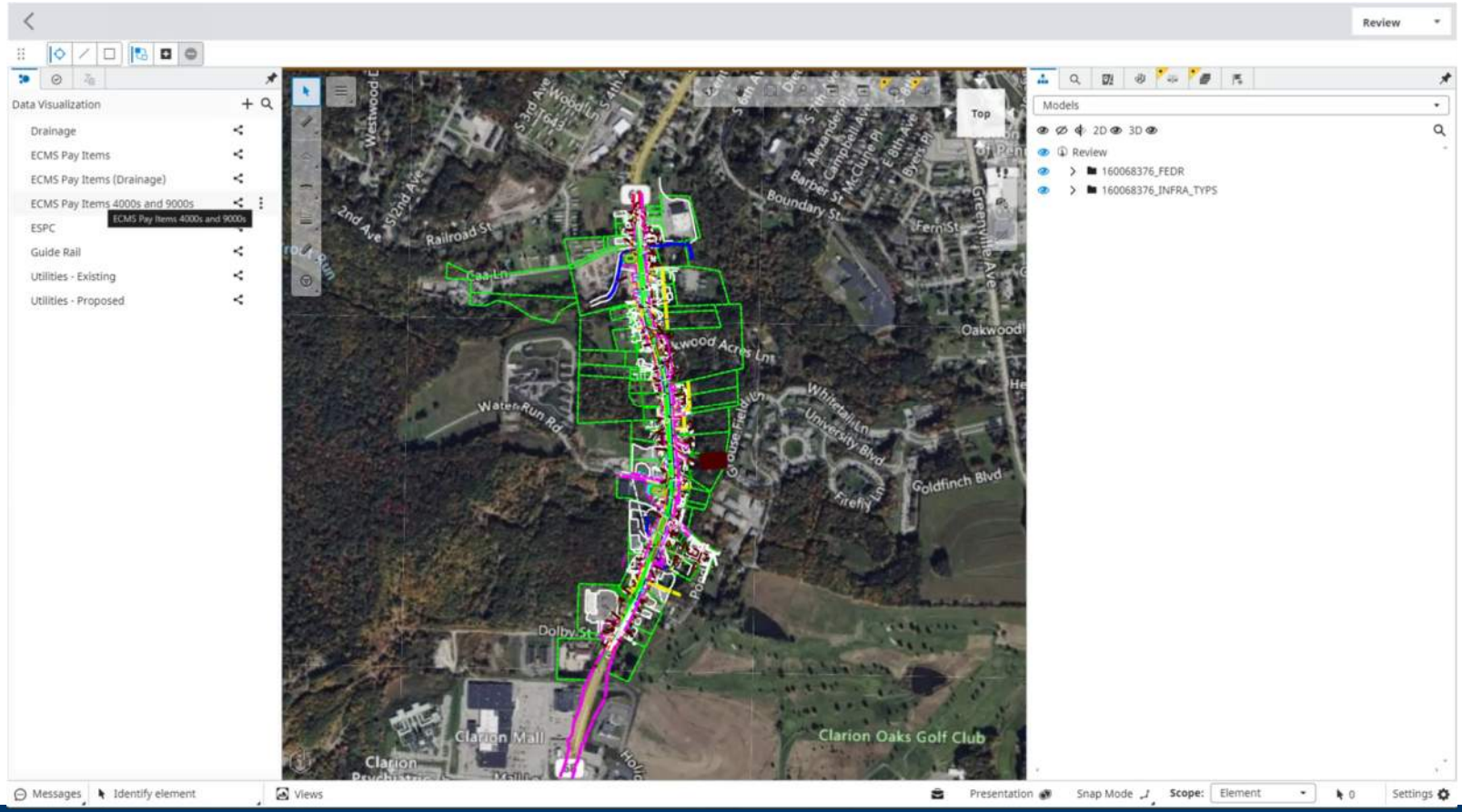
Infrastructure Cloud - Overview



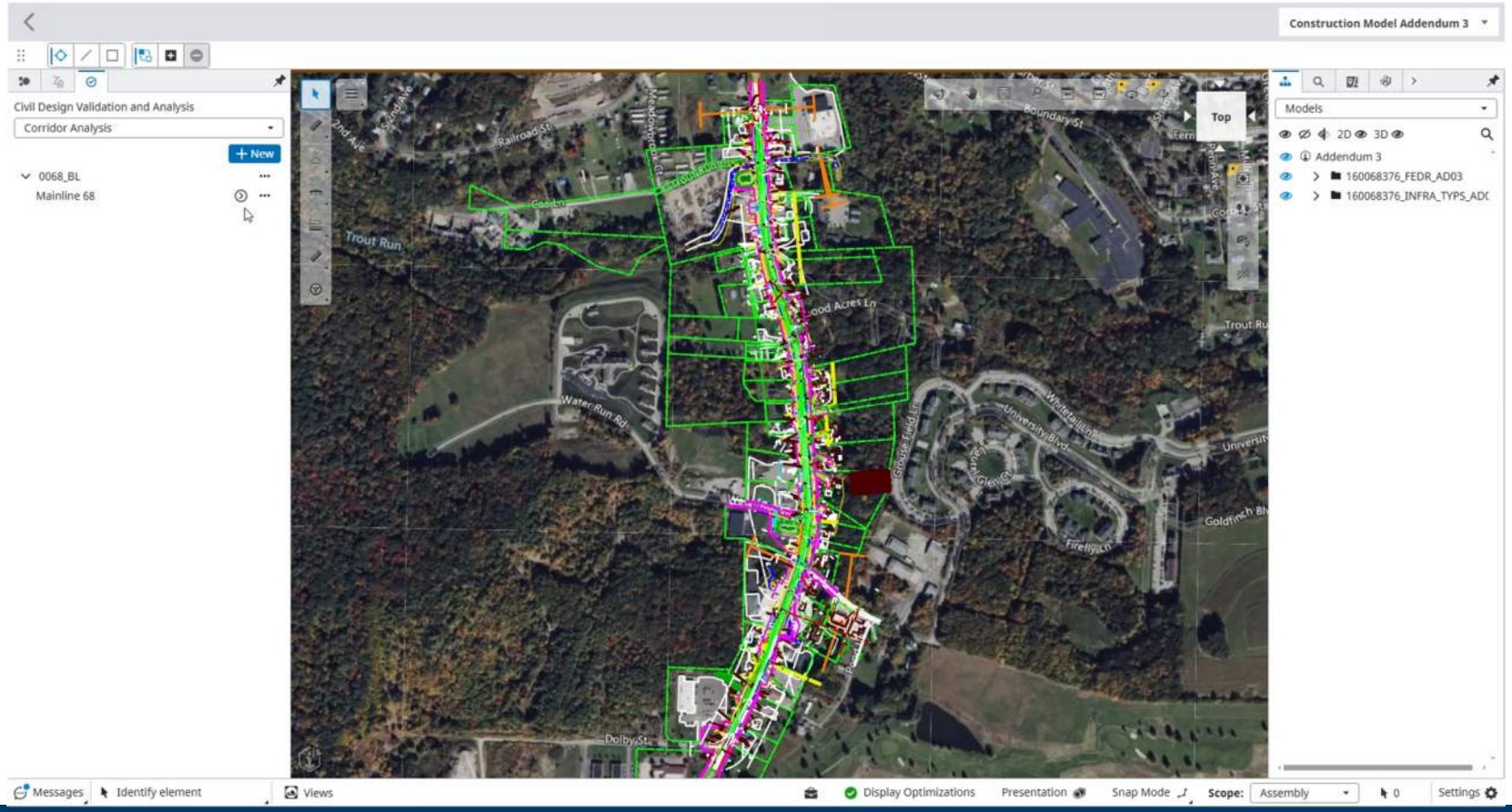
Infrastructure Cloud - Profile



Infrastructure Cloud – Data Visualization

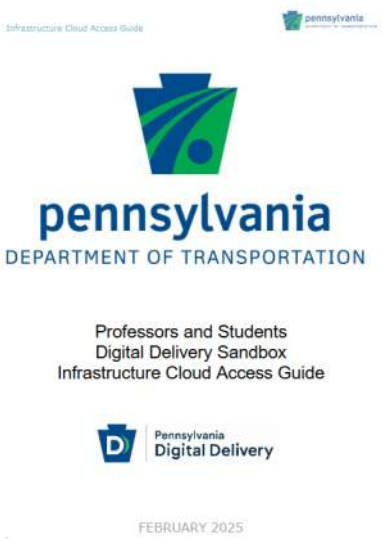


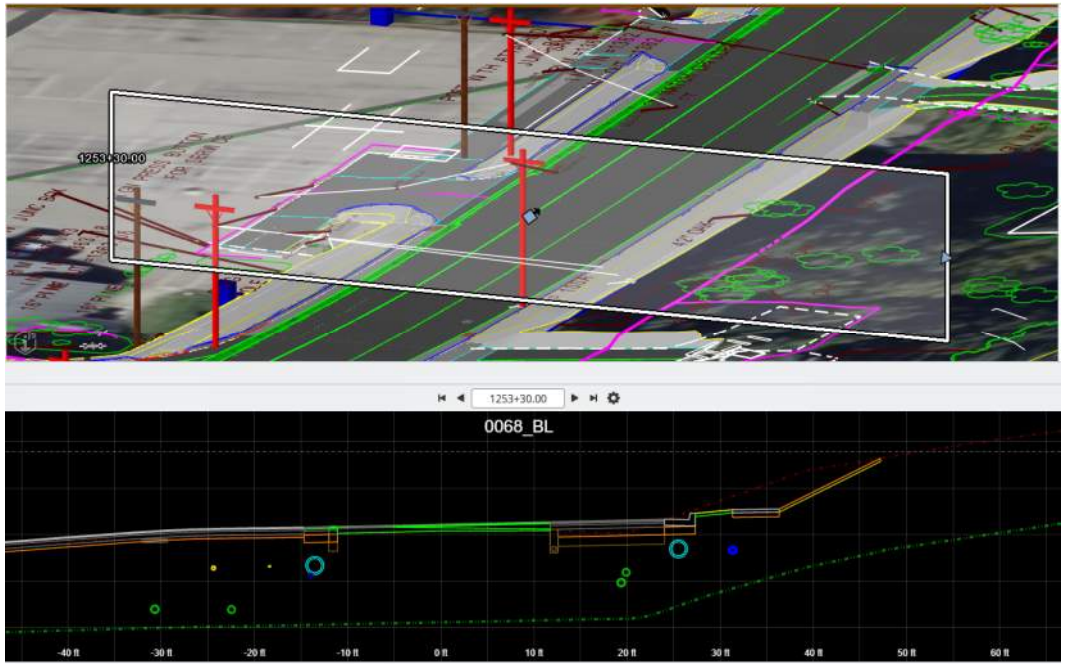
Infrastructure Cloud – Corridor Analysis



Infrastructure Cloud Sandbox

A sandbox was created with project data for anyone to request access and explore the tools.

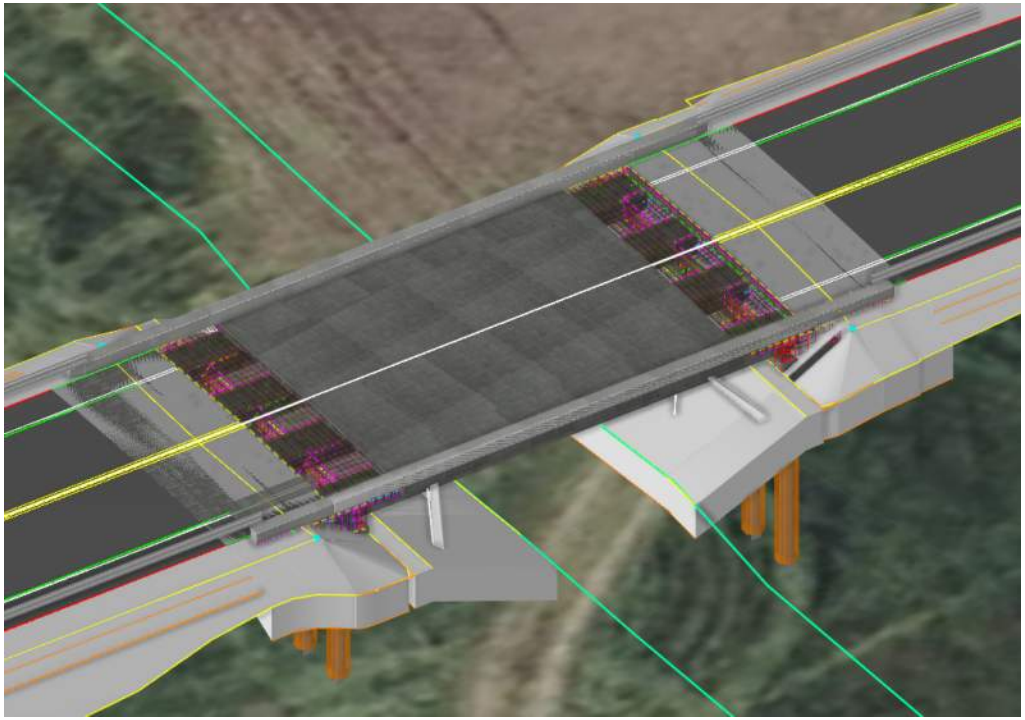




Students can request access using the access guide that will be distributed. A software guide is available on the resources page of the PennDOT Digital Delivery Website.

5 Summary

Overview



- Digital Delivery Terminology
- Shifting the Industry
- Software & Technology
- How to get involved in digital delivery

Staying Informed

Digital Delivery

PennDOT Digital Delivery Website

Digital Delivery Email: RA-PDDigitalDelivery@pa.gov

Newsletters & Webinars

6 Discussion

Discussion


"If this is the future why not jump in the pool right now from a more feasible aspect."
-Tom Stepanski, Minichi