



Bentleyuser.dk meeting - 2022

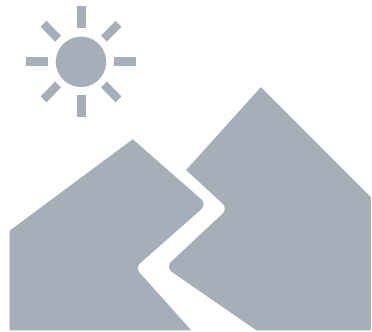
*Working Together: OpenRoads Designer,  
OpenBridge Designer, ProjectWise and iTwin  
Integration*

Scott Urbas, PE, Manager, Civil Content Development / Don Lee, Senior Consultant / Adrian Crowfoot, PE, Senior Consultant

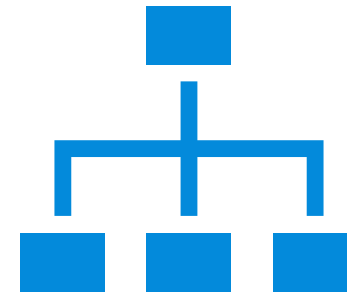
Presented by: Matthias Heise, Consultant, Civil Engineering Success Services



# Purpose



Share a sample highway project that several Bentley colleagues have been developing for the conference data.



Discuss how ProjectWise, OpenRoads Designer, OpenBridge Designer, Synchro, and iTwin technology were integrated.

# Why?

- Users are sometimes confused about how some of our applications are supposed to be connected and integrated.
- We want to show how our applications can be integrated in a connected environment for a civil infrastructure project.



# Topics

- Project Details
- Project Considerations
- Project Common Data Environment

# Project Details

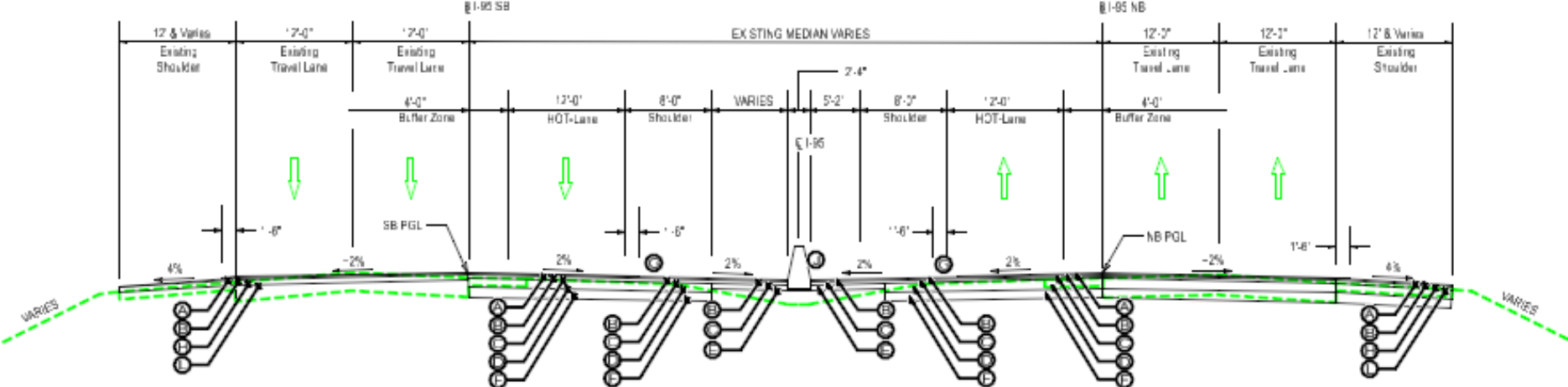
## Highway Improvement Project

- I-95 Widening & Resurfacing
- Partial reconstruction of I-95
- Reconstruction of ramps
- Reconstruction of S.R. 97

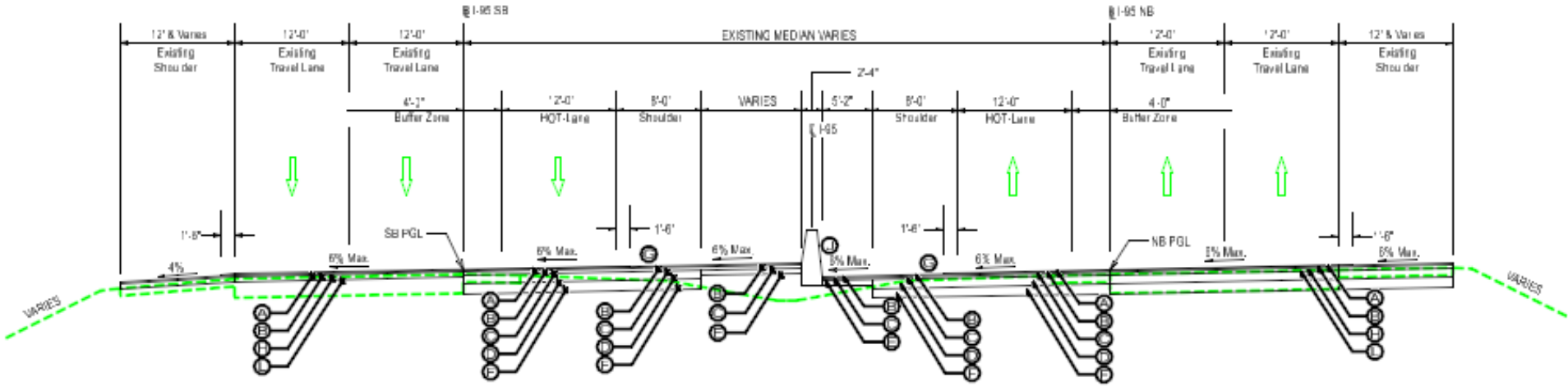
\*Disclaimer: Project design and model are for training and demo purposes only.



# Project Details – Typical Sections



TYPICAL SECTION  
I-95 MAINLINE - NORMAL SECTION

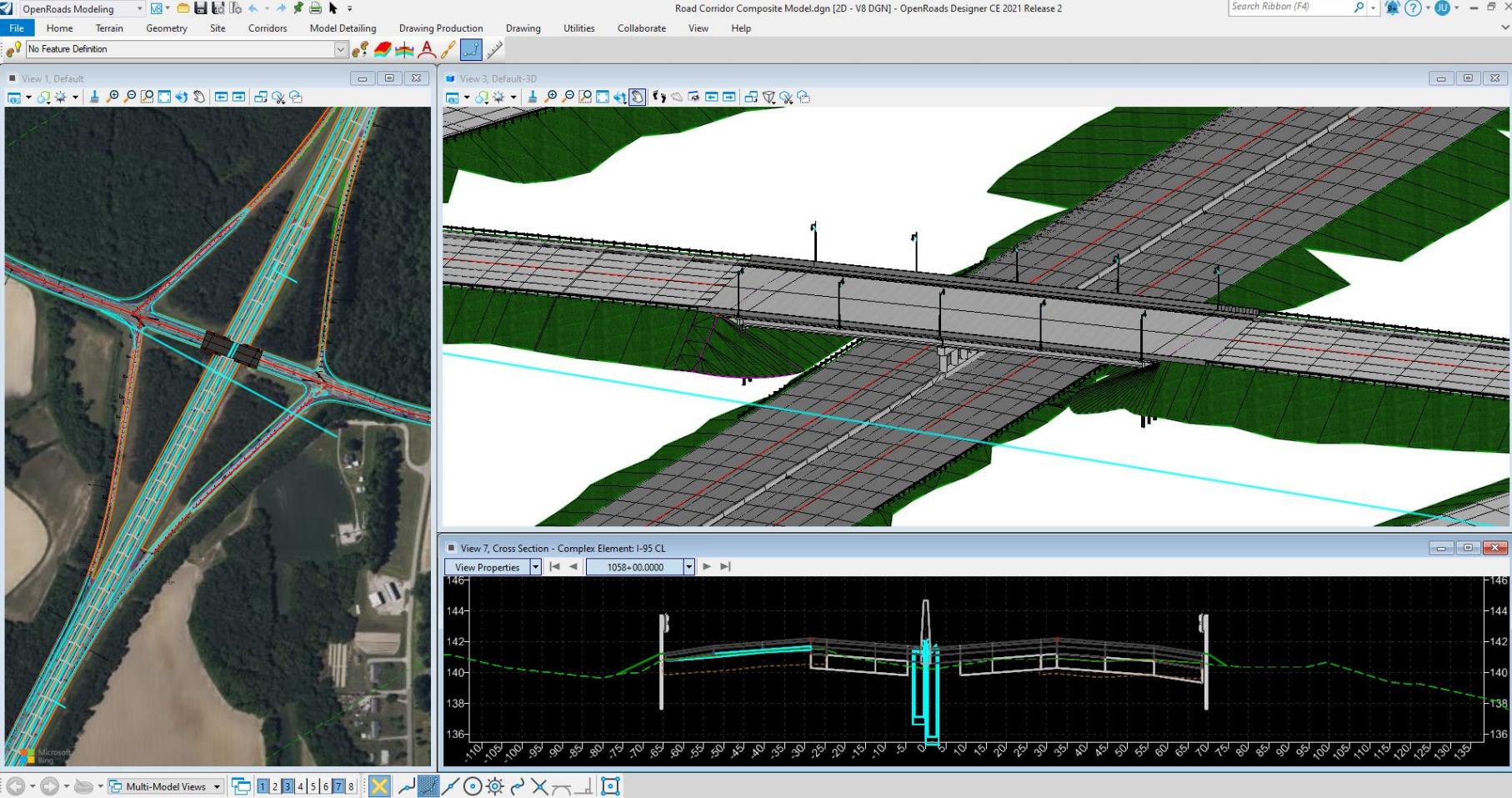


TYPICAL SECTION  
I-95 MAINLINE - SUPERELEVATED SECTION

PROJECT DETAILS



# Project Details – 3D Model



PROJECT DETAILS



# Project Details – Reality Model

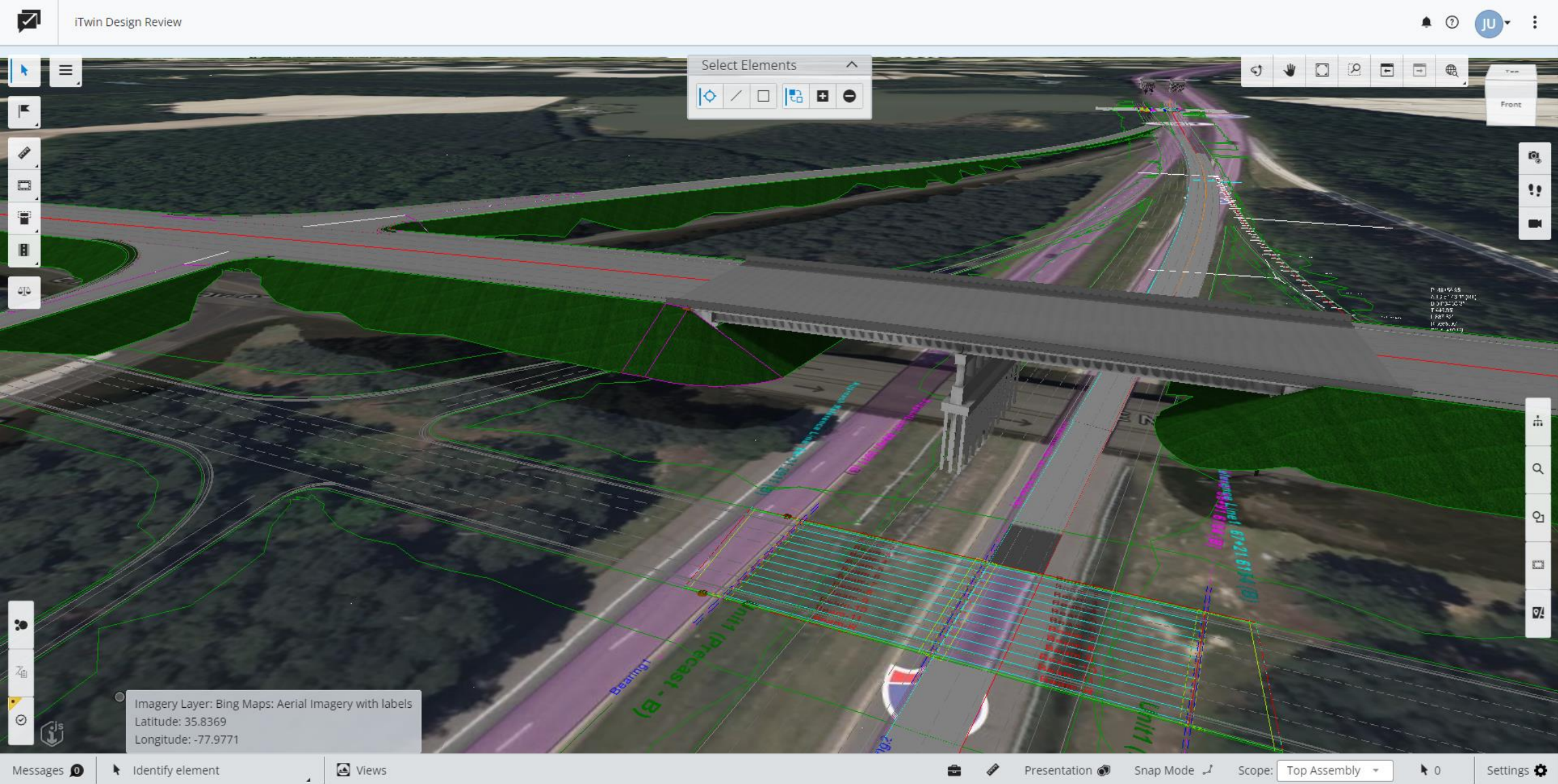


PROJECT DETAILS





# Project Details - iTwin



PROJECT DETAILS



# Project Details - iTwin

The screenshot displays the ProjectWise 365 web interface. The main view is a 3D model of a highway corridor, showing various pavement layers in different colors (blue, green, orange). A tooltip is visible over a blue pavement element, displaying the following information:

- TC\_Concrete Pavt
- Category: TC\_Concrete Pavement
- Model: Ref-1, SR97\_Corridor.dgn, Default-3D

The right-hand side of the interface features a detailed property panel for the selected element, titled "TC\_Concrete Pavt [2-CVG]". The panel is organized into sections:

- Physical Object**
  - Selected Item(s)
  - Category: TC\_Concrete Pavement
  - Code:
  - Model: Ref-1, SR97\_Corridor.dgn, Default-3D
  - Physical Material:
  - User Label: TC\_Concrete Pavt
- Pay Item - Pavement**
  - Description: CONCRETE PAVEMENT CLASS A
  - Item\_Number: 40-60108
  - Unit: SY
  - Mix Name:
  - Density: 0.0 lb/ft<sup>3</sup>
  - Design\_Volume: 211546.608658 ft<sup>3</sup>
  - Design\_Area: 282202.732332 ft<sup>2</sup> (US Survey)
  - Design\_Weight: 0.0 tn (short)
- Station**
- Source Information**

The bottom status bar shows "Messages", "Identify element", "Views", "Presentation", "Snap Mode", "Scope: Top Assembly", and "Settings".



# Project Team – Working Together

- ProjectWise Administration – Adrian Crowfoot and Don Lee
- Roadway Design and Modeling – Scott Urbas
- Bridge Design and Modeling – Steve Willoughby
- Drainage Design and Modeling – James Anding
- Existing Utility Modeling – Jordan Hatfield
- Item Type Setup – Dan Ahern
- iTwin – Joey LouAllen and Ian Rosam
- Construction Modeling – Dan Sheldon



# Project Related Sessions on Civil User Conference 2022

These sessions will feature the same project dataset:

- Roadway Plans Methodology and More - Tuesday 9/20/22 10:00 am - 11:00 am
  - Don Lee
- OpenBridge Plans Production Tools – Tuesday 9/20/22 2:30 pm – 3:30 pm
  - Steve Willoughby
- Item Types Enhancements in OpenRoads Designer 2022R1 – Wednesday 10:00 am – 11:00 am
  - Dan Ahern
- Civil Workflows with Digital Twins – Wednesday 11:30 am – 12:30 pm
  - Ian Rosam/Joe LouAllen
- Identify and Manage Utility Clashes in Transportation Projects Wednesday 2:30 pm – 3:30 pm
  - Jordan Hatfield
- OpenRoads Designer to SYNCHRO Construction – Wednesday 4:00 pm – 5:00 pm
  - Dan Sheldon

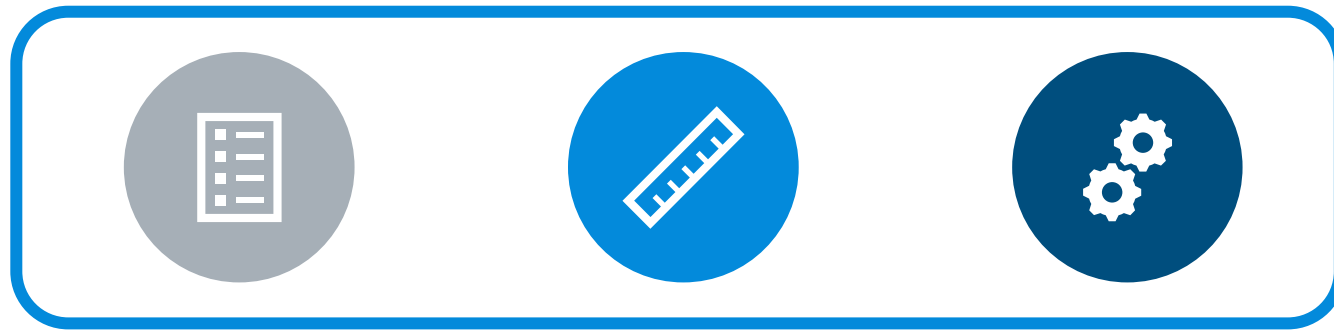


# Project Considerations

- Scope/Schedule
- Stakeholders
  - Owner/Operator
  - Design Team(s)
  - Review Team(s)
  - Contractor(s)
- Standards
  - Design
  - Documents
  - Workflow/Process
- Solutions
  - Applications



# Stages



PLAN

DESIGN

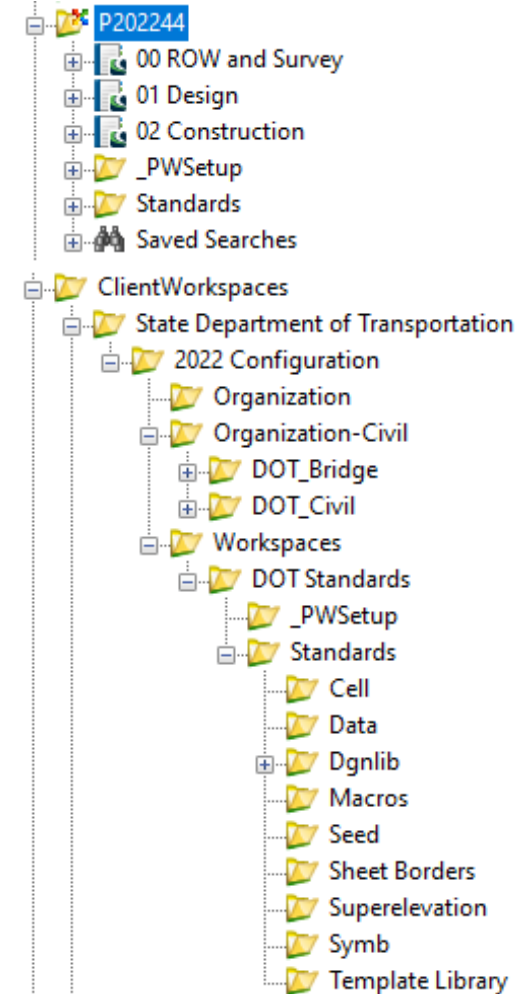
CONSTRUCT

OPERATE

MAINTAIN

# Standards – Design (PW Managed WorkSpace)

- Establishes CAD standards governance
  - Dynamic configuration (new)
- Applied to all project stakeholders
- Supports solutions and their versions
- Organized by client and their releases
  
- Keeps everyone consistent!





# Standards – Workflow/Process (ISO 19650)

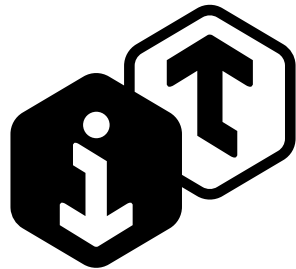
- What is ISO 19650?
  - a series of international standards which define a common unified framework for the effective collaborative production and management of information across the full lifecycle of a built asset using *Building Information Modelling* (BIM).
- ProjectWise can manage ISO 19650



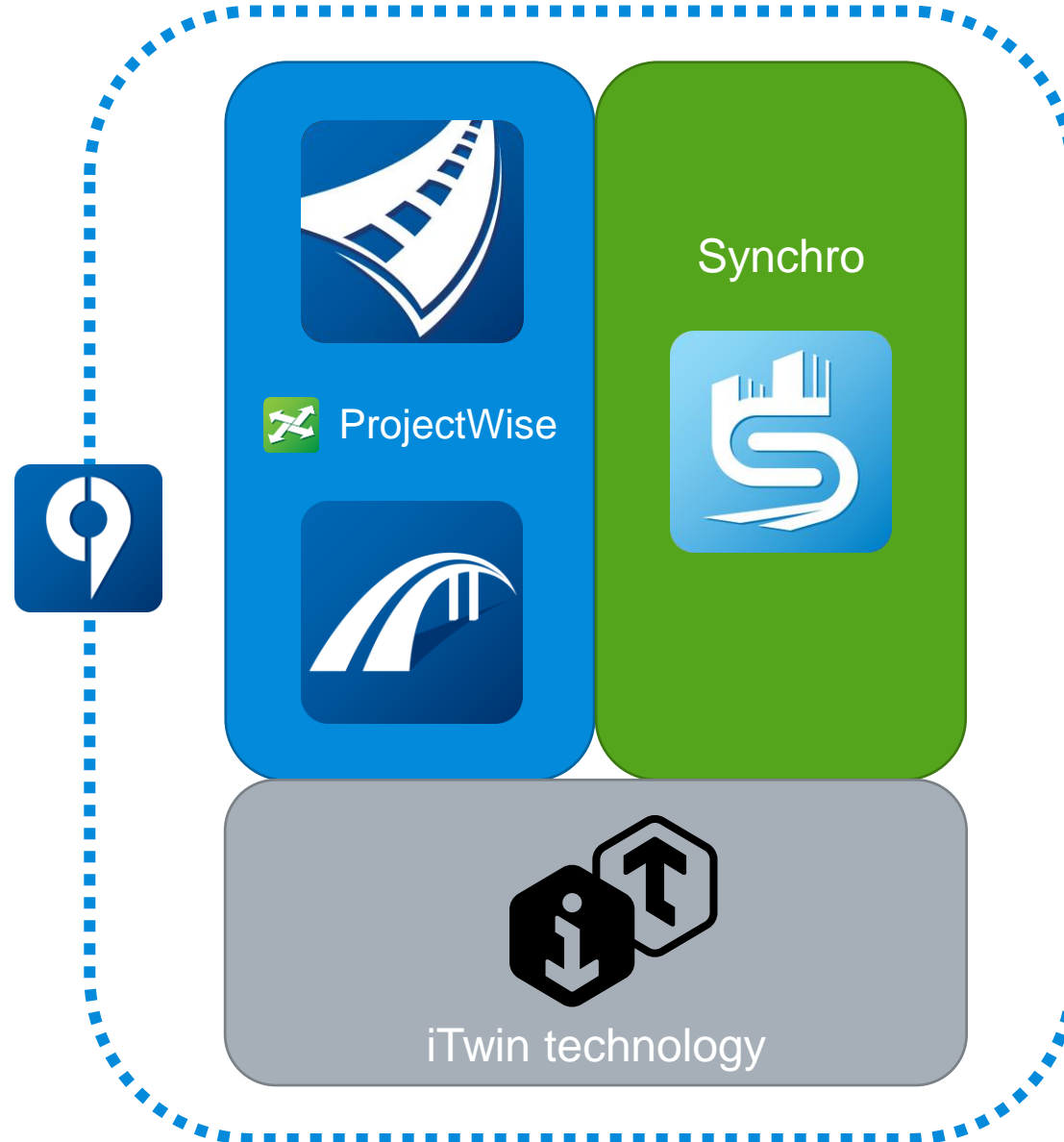


## Solutions

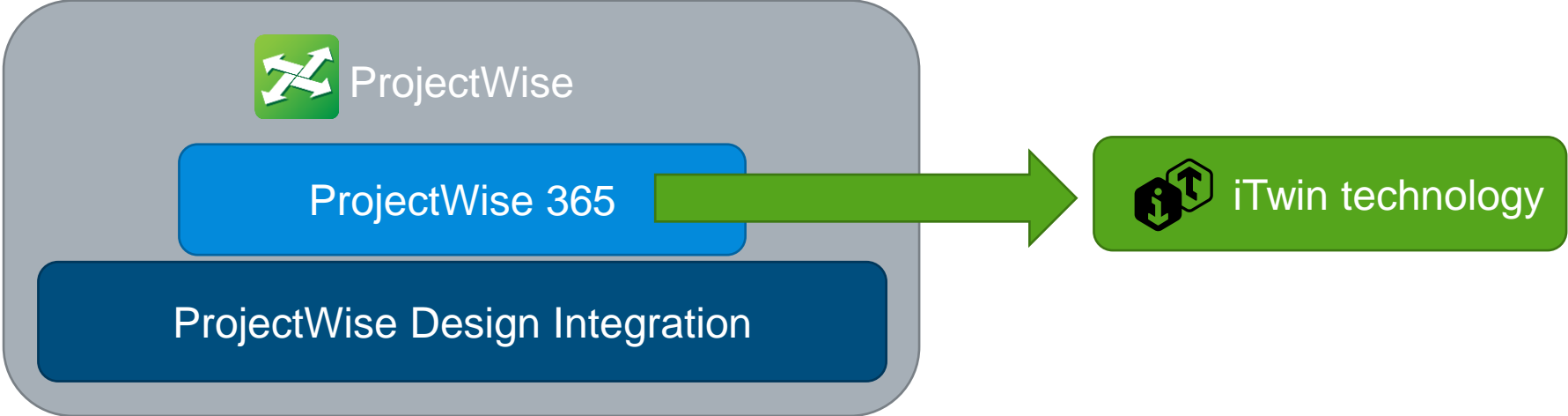
- OpenCities Planner
- OpenRoads Designer
- OpenBridge
- Synchro
- ProjectWise
  - ContextShare
  - iTwin technology



# Putting it together



# ProjectWise -> Infrastructure Digital Twins



# PW Users/Capabilities

---

ProjectWise 365

PW Drive

## User

- Project Managers
- Reviewers
- All Users

## Capabilities

- Work Inbox
  - Design Tasks
- Document
  - **non-CAD (no MWS)**
- Reviews
- Issue Tracking
- Deliverables Management
- Dashboards

ProjectWise

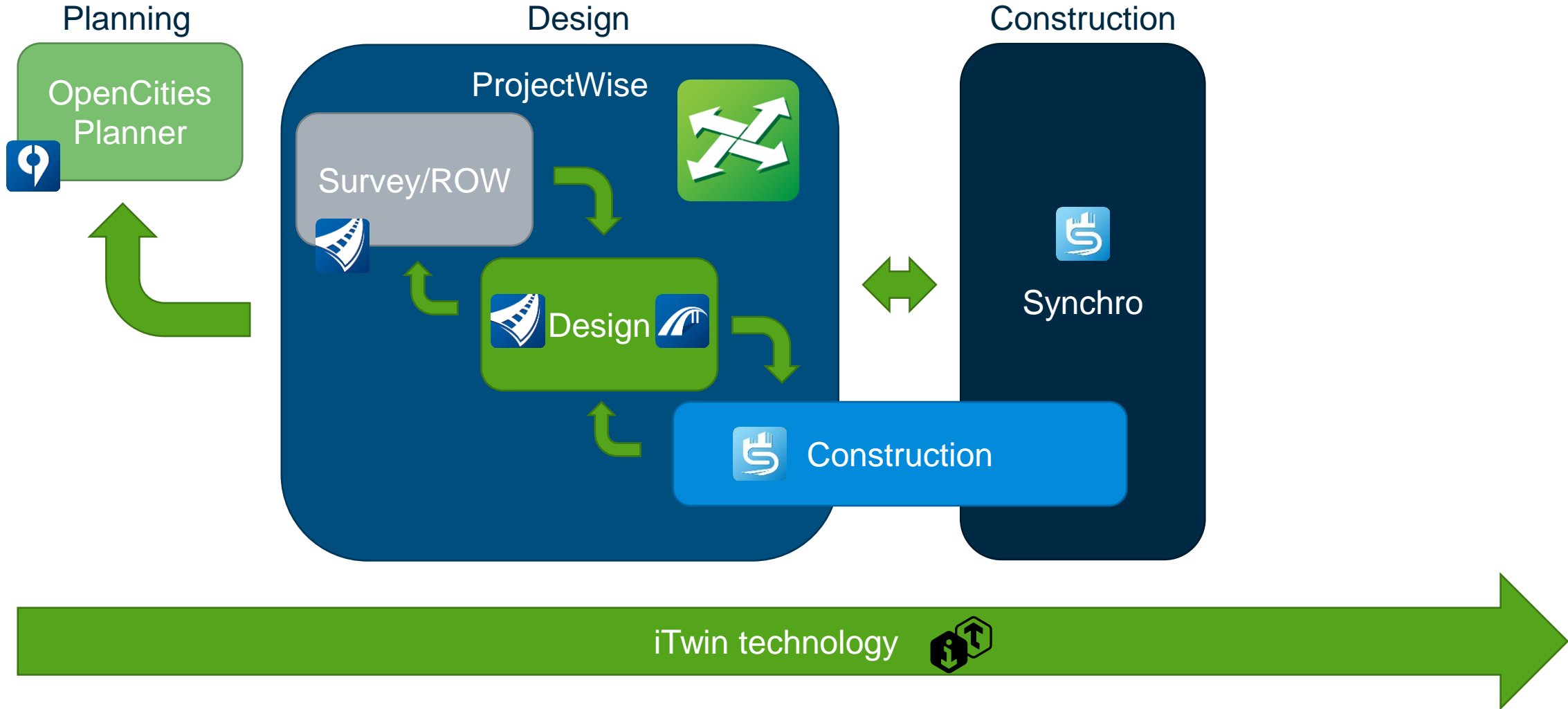
## User

- **Designers**
- Project Managers
- Reviewers
- All Users

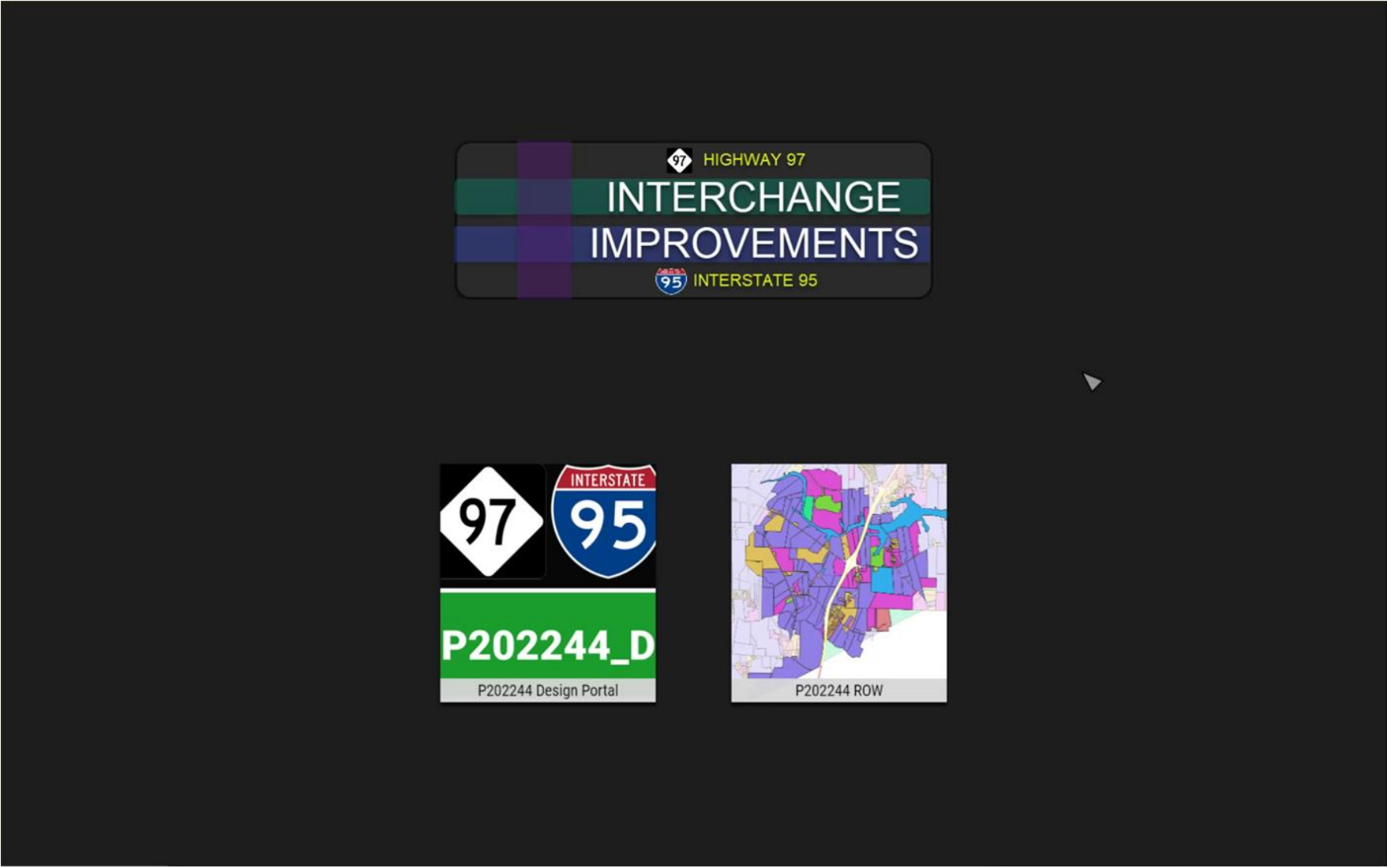
## Capabilities

- Work Inbox
  - Design Tasks
- Document
  - **CAD access (MWS)**
- Reviews
- Issue Tracking
- Deliverables Management
- Dashboards

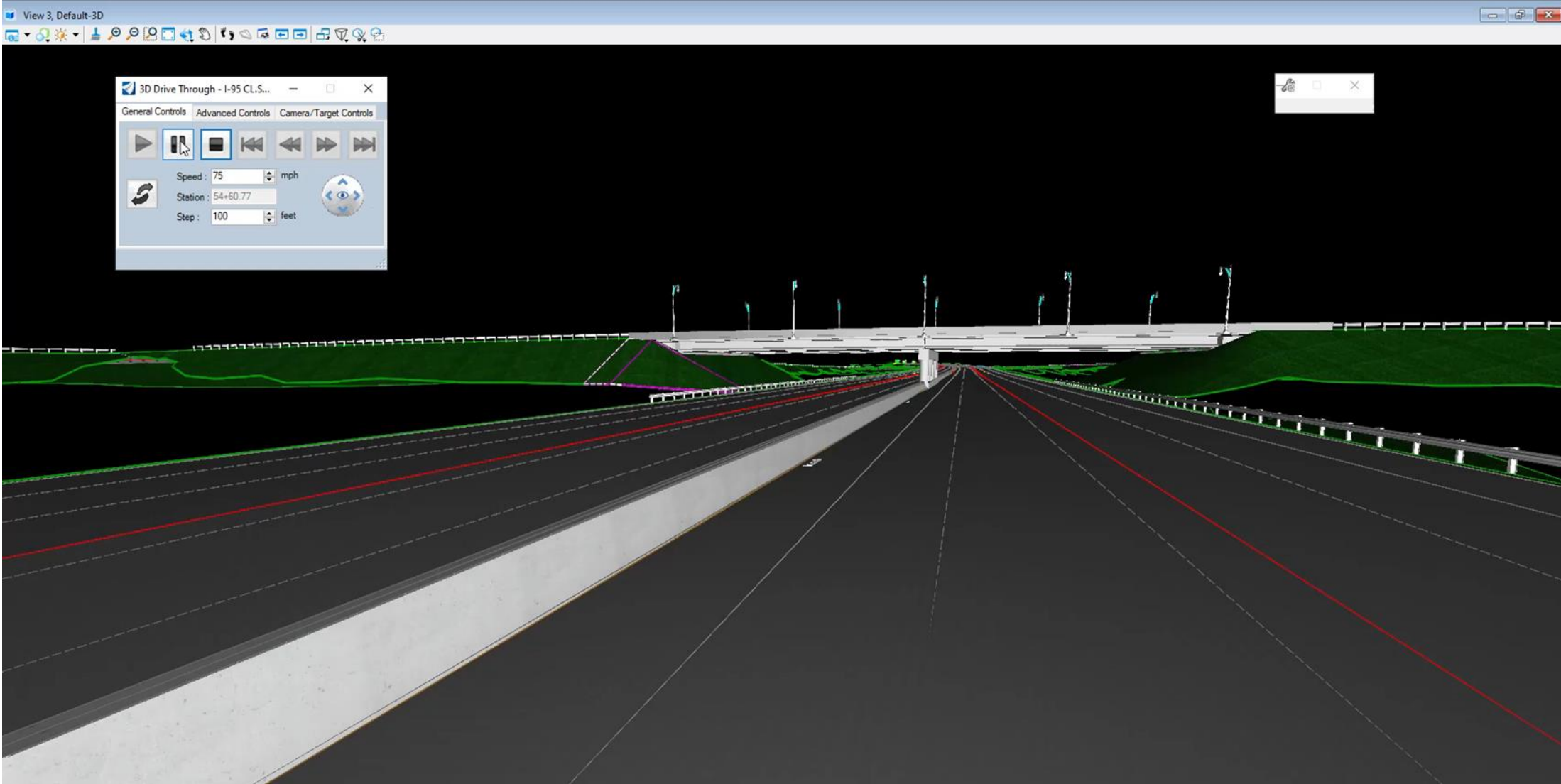
# Workflow



# OpenCities Planner



# OpenRoads/OpenBridge



# PW365 -> iTwin

The screenshot displays the ProjectWise 365 interface for a specific project. The top navigation bar includes the ProjectWise 365 logo, the project name 'P202244\_D I95 and SR97 Highway Improvements', and user information 'DL'. A vertical sidebar on the left contains navigation icons for Home, Recent, My Work, My Design Review, My Design Tasks, My Issues, My Document Review, My Deliverables, and a search icon.

The main content area is divided into several sections:

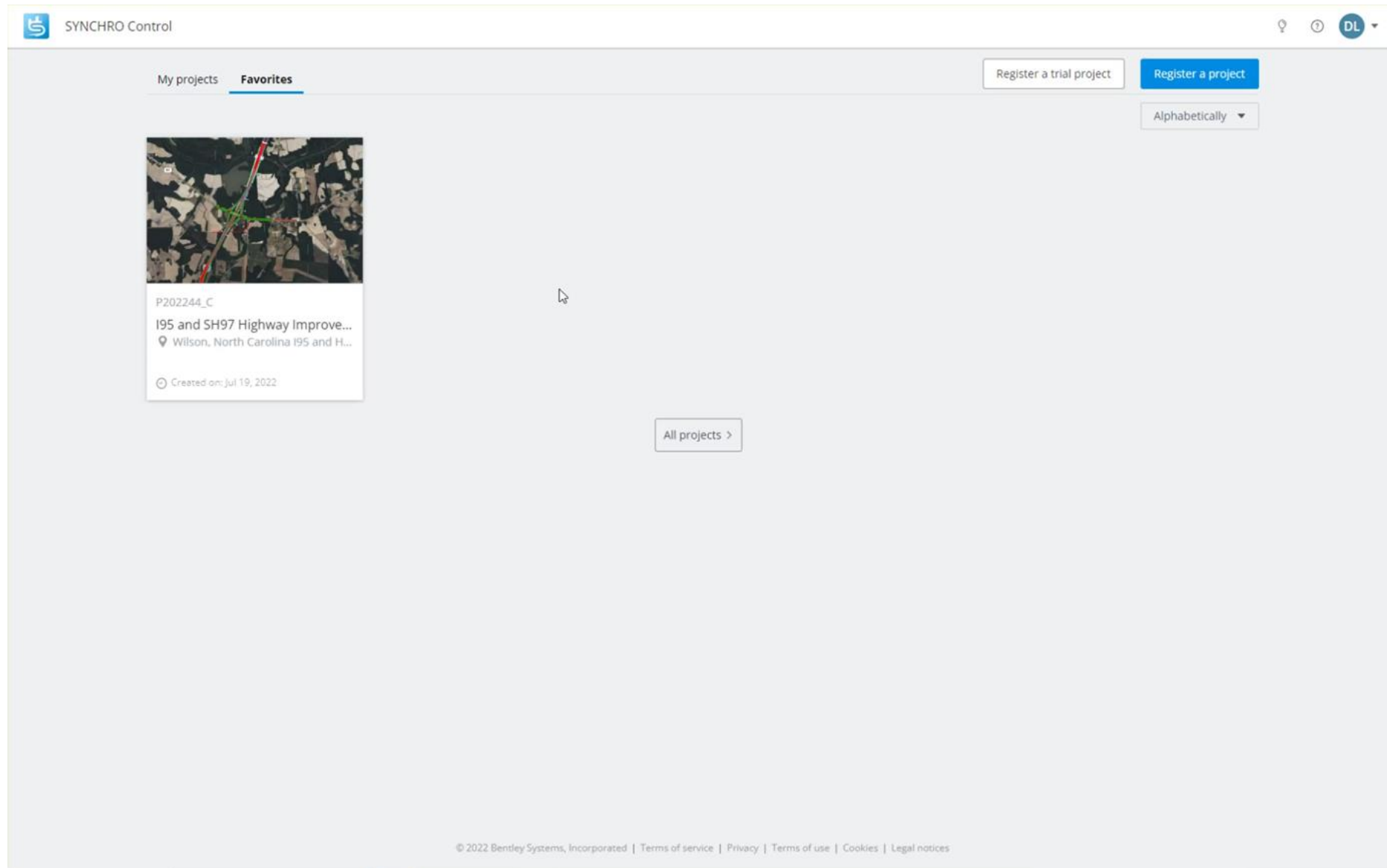
- Project Summary:** A dashboard showing key metrics: New: 0, Overdue: 2, Close deadline: 0, Upcoming: 0, and a total of 5 All Items. It also features six summary cards: Issues (1), Reviews (0), Submittals (1), RFIs (0), and Design Tasks (3).
- My Work Inbox:** Lists tasks such as 'Set up Project Design iModel' (overdue) and 'Create Parcel Map' (upcoming).
- My Design Review:** Lists design review items including 'I-95 and SR97', 'I-95 and SR97 Widening Resurfacing and Reconstruct...', 'PROJECT 202244 - I95 & SR97 IMPROVEMENTS', 'SR97 Abutment Grading (Test 01)', and 'SR97 Abutment Grading (Infrastructure Work Area)'. A 'View All' link is at the bottom.
- My Design Tasks:** Lists tasks like 'Set up Project Design iModel' (overdue) and 'Create Parcel Map' (upcoming). A 'View All' link is at the bottom.
- My Issues:** Currently shows 'No issues assigned'.
- My Document Review:** Currently shows 'No Document review assigned'.
- My Deliverables:** Shows a placeholder message: 'Ability to see most urgent items here - coming soon'.

At the bottom of the interface, there is a copyright notice: '© 2022 Bentley Systems, Incorporated | Terms of service | Privacy | Terms of use | Cookies | Legal notices'.





# Synchro



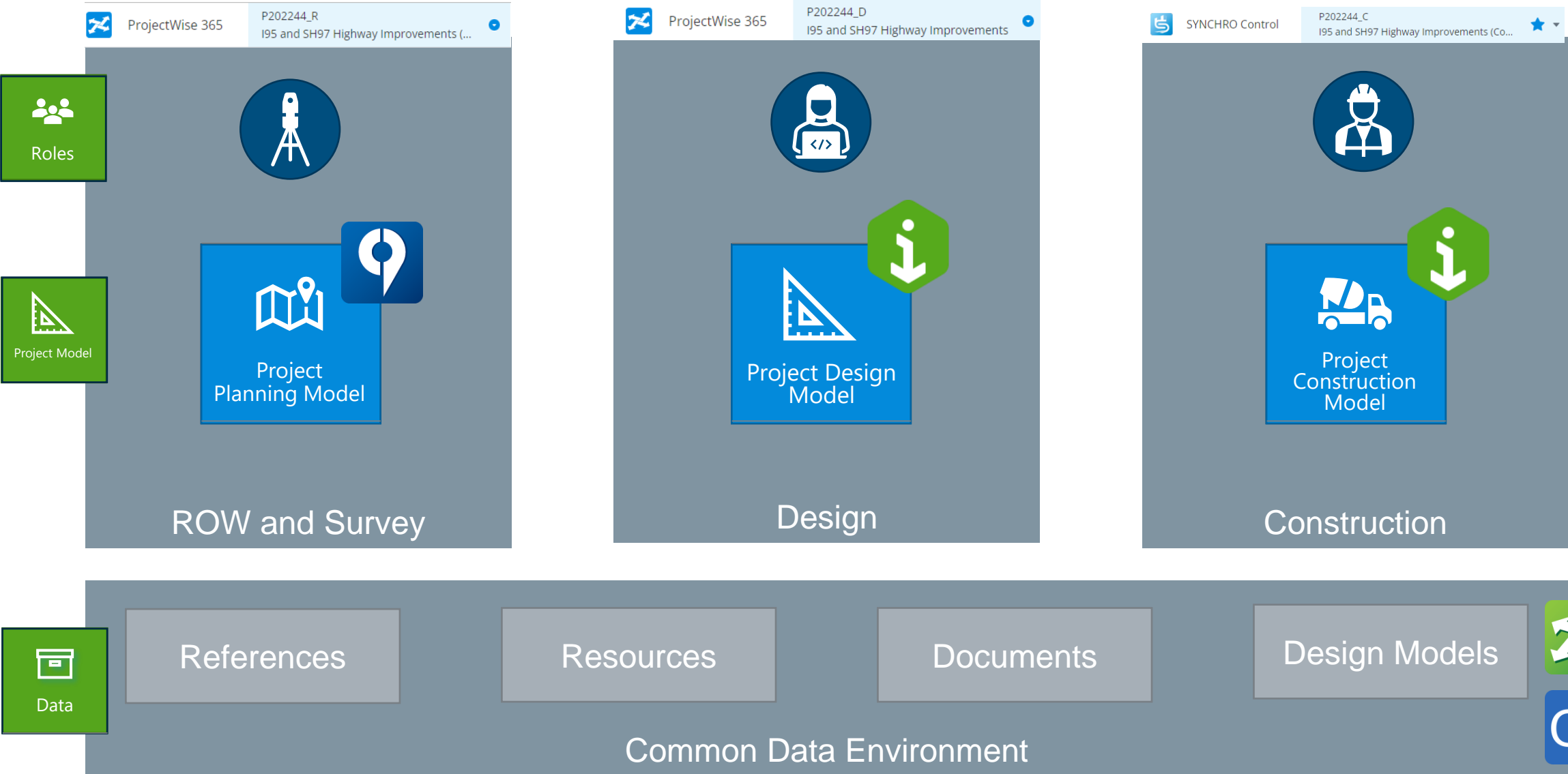
# Common Data Requirements

- Role based applications and entry-points
- Utilize Reality Data from project area
- Deliver a project information model to the DOT post-construction
- Present Project Status to Project Manager

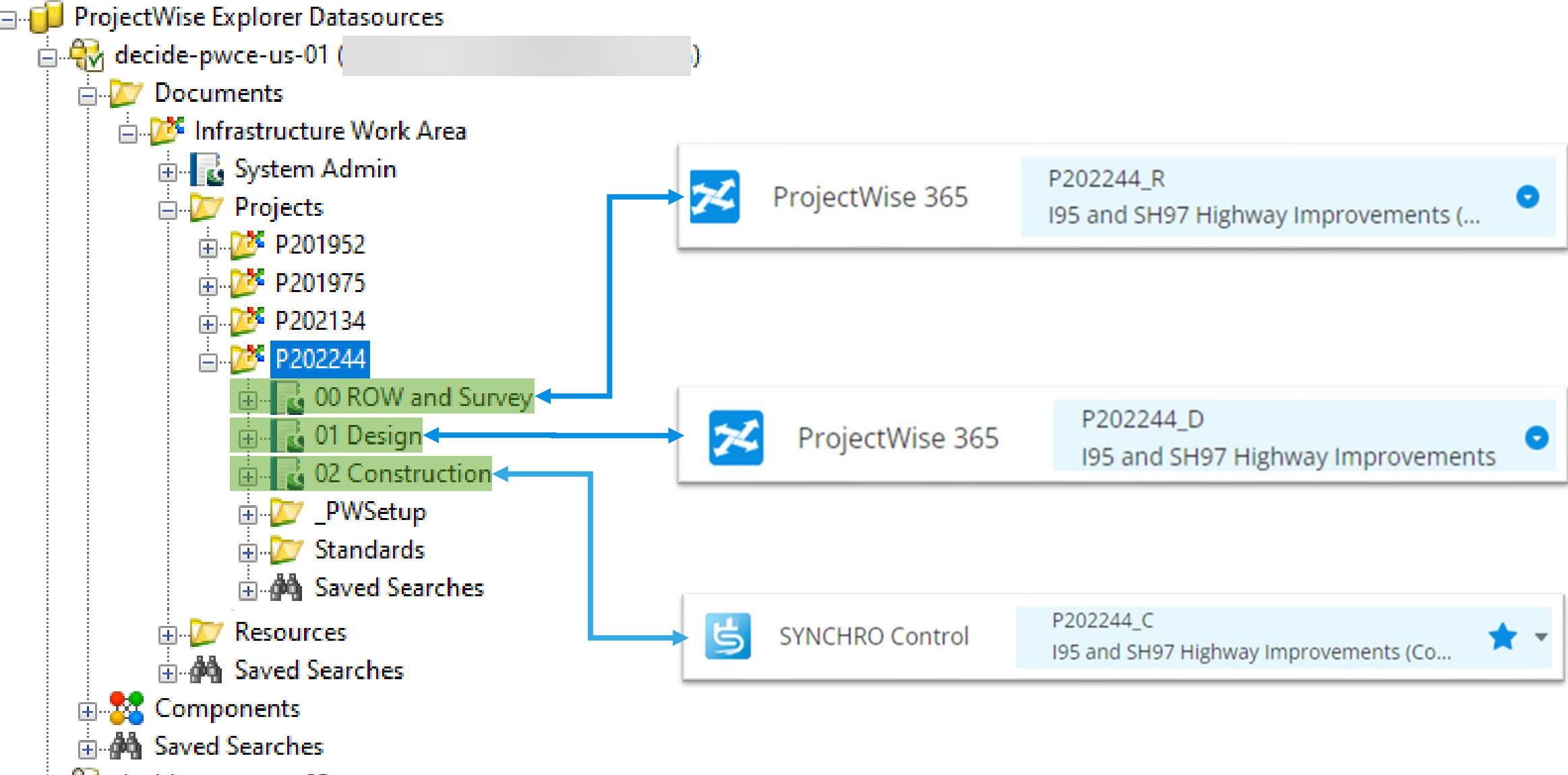
# Project Common Data Environment Setup

- Gathered resources and reference material
- Created framework for the Project Information Model
- Implemented role-based entry points

# Common Data Environment Interaction



# Common Data Environment Setup



# Resources and References

- Reality mesh from ContextShare
- County Parcels from the County's GIS system
- A Civil WorkSpace from the DOT



References



Project Model



Roles

COMMON DATA ENVIRONMENT



# Reality Mesh



ProjectWise ContextShare

Home Bentley Systems Inc Assets Projects P202244\_R 195 and SH97 Highway Improvements (RO... 27 Adrian Crowfoot AC

Associate

Search for Reality Data

<input type="checkbox"/>	Name	Type	Size	Owner	Modified	Last Access	Acquisition Start	Acquisition End	Access Control	Datacenter
<input type="checkbox"/>	IHLRG2	3D Scalable Mesh	35.9 GB	kurt.rasmussen@ben...	Jul 18, 2022, 8:03 PM	Jun 15, 2022			Project/Asset	East US
<input type="checkbox"/>	IHLRG2	Web Ready 3D Scalab...	28.6 GB	kurt.rasmussen@ben...	Jul 18, 2022, 8:03 PM	Sep 19, 2022			Public	East US

Open in the Reality Data Web Viewer

1 - 2 on 2 loaded items

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References



Project Model

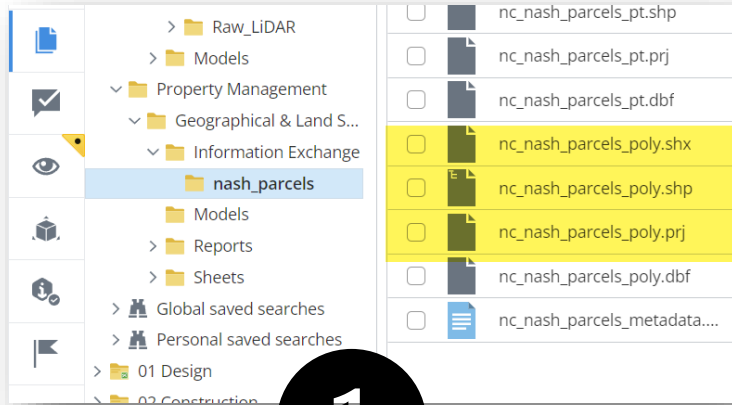


Roles

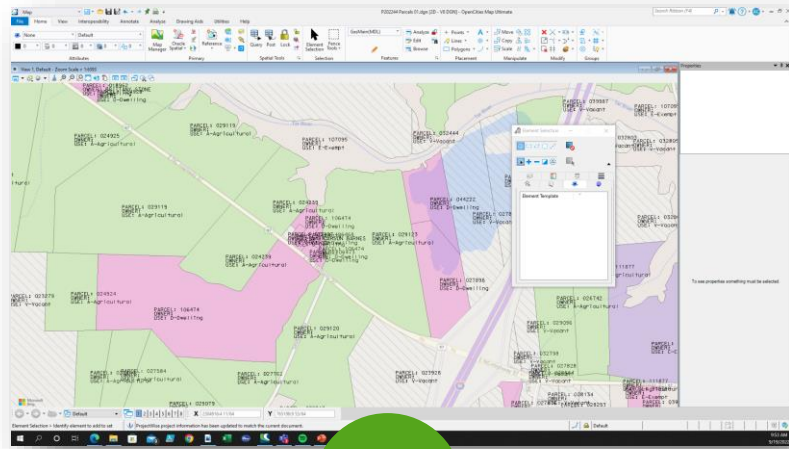
COMMON DATA ENVIRONMENT



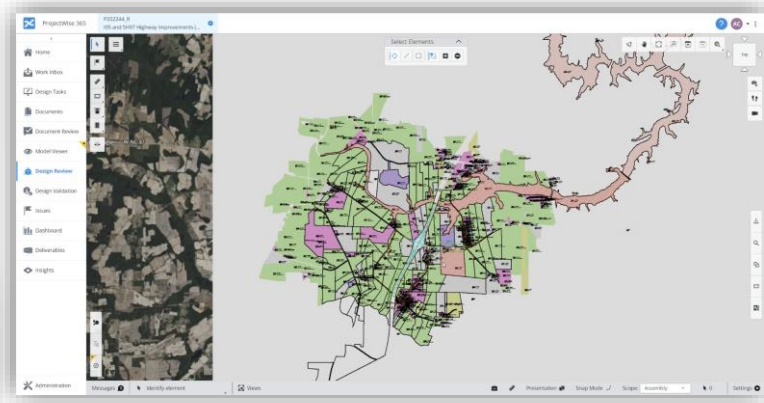
# Parcels from County Data



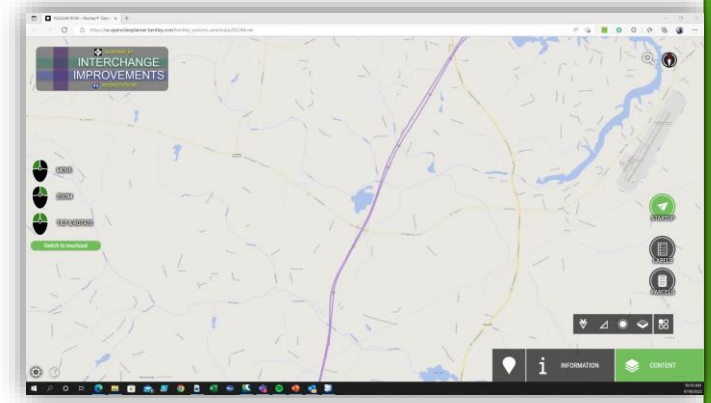
1



2



3

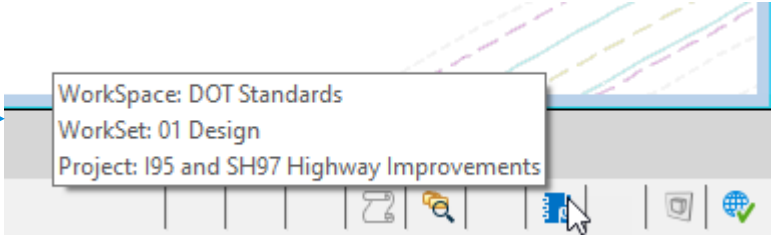
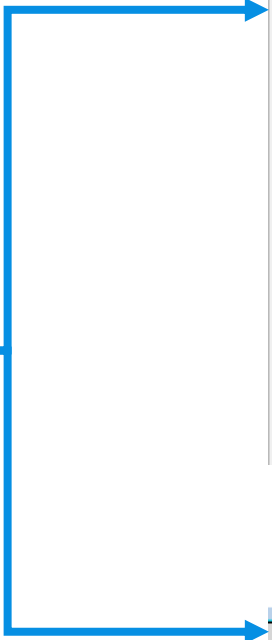
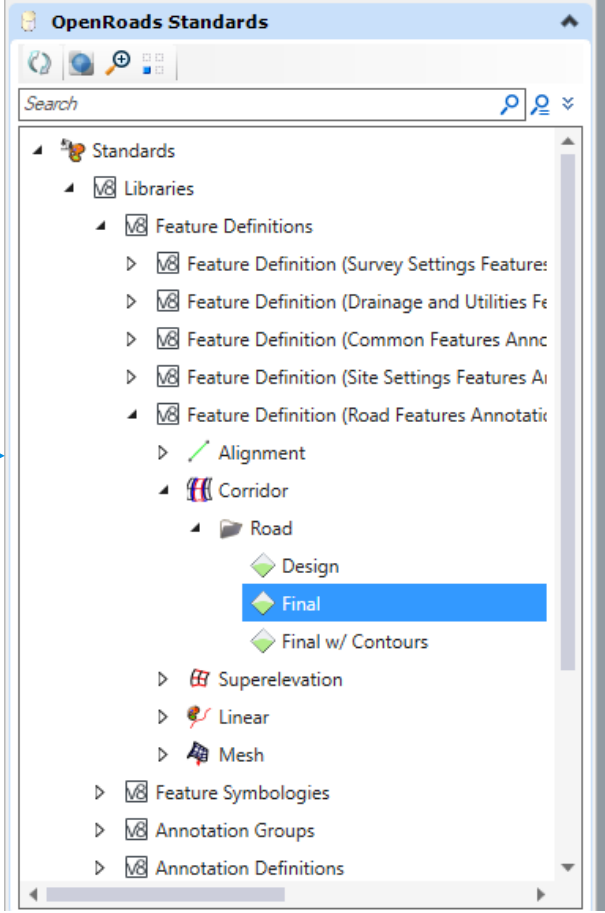
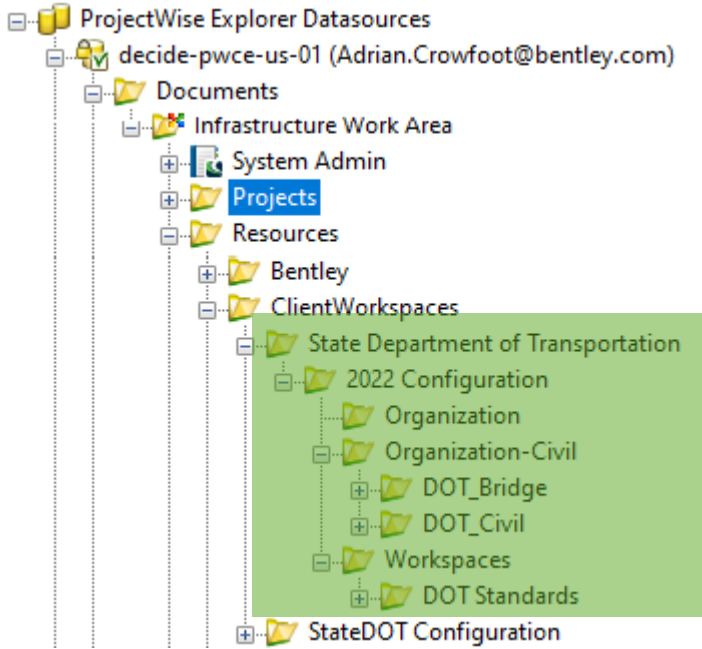


4





# State DOT WorkSpace



# Project Information Model

- What is it?
  - A digital representation of one or more assets during the project delivery phase of the overall asset lifecycle
- How do you make it?
  - Collect small containers of project information



References



Project Model



Roles

COMMON DATA ENVIRONMENT



# Project Information Model

ProjectWise 365 P202244\_R  
I95 and SH97 Highway Improvements (...)

Project Planning Model

ROW and Survey

This screenshot shows the ProjectWise 365 interface for the 'Project Planning Model'. The window title is 'ProjectWise 365 P202244\_R I95 and SH97 Highway Improvements (...)'. The main content area features a blue square with a white map icon and a location pin icon, labeled 'Project Planning Model'. Below the square, the text 'ROW and Survey' is displayed.

ProjectWise 365 P202244\_D  
I95 and SH97 Highway Improvements

Project Design Model

Design

This screenshot shows the ProjectWise 365 interface for the 'Project Design Model'. The window title is 'ProjectWise 365 P202244\_D I95 and SH97 Highway Improvements'. The main content area features a blue square with a white triangle ruler icon and a green hexagon icon with a white 'i' and a downward arrow, labeled 'Project Design Model'. Below the square, the text 'Design' is displayed.

SYNCHRO Control P202244\_C  
I95 and SH97 Highway Improvements (Co...)

Project Construction Model

Construction

This screenshot shows the SYNCHRO Control interface for the 'Project Construction Model'. The window title is 'SYNCHRO Control P202244\_C I95 and SH97 Highway Improvements (Co...)'. The main content area features a blue square with a white concrete mixer truck icon and a green hexagon icon with a white 'i' and a downward arrow, labeled 'Project Construction Model'. Below the square, the text 'Construction' is displayed.



References



Project Model



Roles

COMMON DATA ENVIRONMENT



# Project Information Model Standard: ISO19650

- Break up Project into Information Containers
- Work each Information Container through a QA/QC Process



References



Project Model

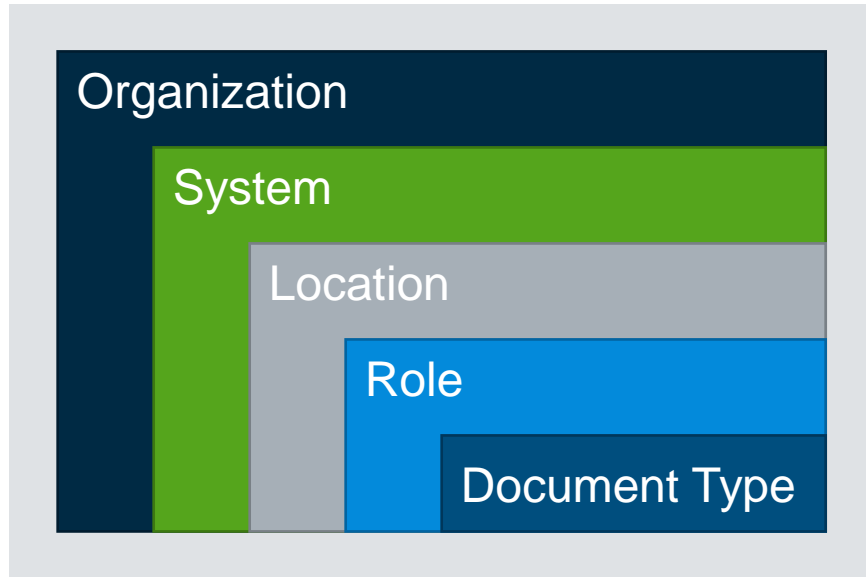


Roles

COMMON DATA ENVIRONMENT



# Information Containers



References



Project Model

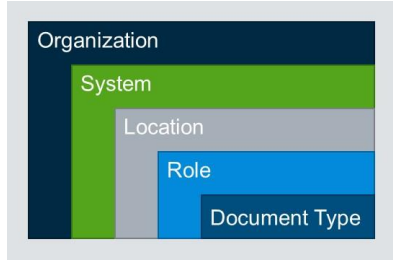


Roles

COMMON DATA ENVIRONMENT



# Information Containers



## Roles

Drainage & Highway Engineer	Contractor
Geographical & Land Surveyor	General (Non-Disciplinary)
Client	Building
Structural Engineer	Civil

## Document Types

2D Model	Calculations
3D Model	Published Reports
Combined Multidiscipline Model	Other



References



Project Model

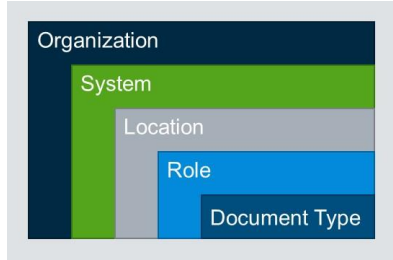


Roles

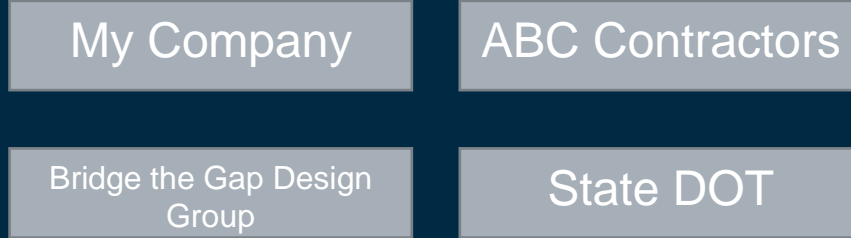
COMMON DATA ENVIRONMENT



# Information Containers



## Organizations



## Roads



## Utilities

Stormwater System

## Bridges

State Road 97

Interstate 95



References



Project Model

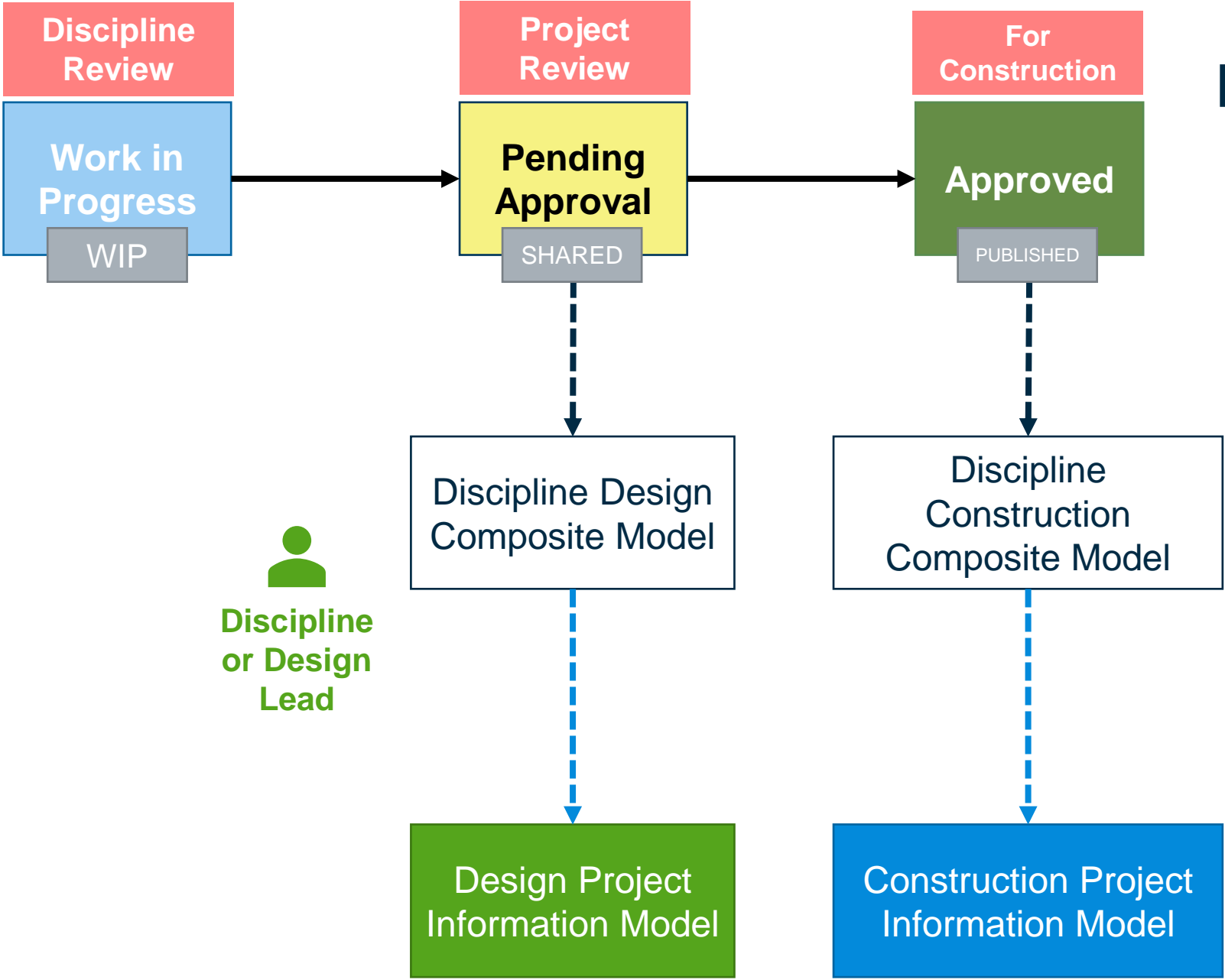


Roles

COMMON DATA ENVIRONMENT



# Design Team Models





# Discipline Review



Modify...  
 Modify Spatial Attributes...  
 Add Comment  
 Set  
 Send To  
 Copy List To  
 Attributes  
 Change State

Approve..  
 Revise/Reject..  
 Next  
 Previous  
 Change...  
 Set Final Status  
 Remove Final Status

Name	UNIQUE DOCUMENT CODING	State	Project	Zone/System
I-95_CL_Corridor_Pavt.dgn	P202244_MCO_D_RD_3DM_I95_00002	Work In Progress	P202244	Roads
I-95_NB_Corridor_Pavt.dgn	P202244_MCO_D_RD_3DM_I95_00006	Work In Progress	P202244	Roads
I-95_SB_Corridor_Complete.dgn	P202244_MCO_D_RD_3DM_I95_00009	Work In Progress	P202244	Roads
I-95_SB_Corridor_Pavt.dgn	P202244_MCO_D_RD_3DM_I95_00010	Work In Progress	P202244	Roads
I-95_SB_Exist Cross Slopes.dgn	P202244_MCO_D_RD_3DM_I95_00011	Work In Progress	P202244	Roads
RampA_Corridor.dgn	P202244_MCO_D_RD_3DM_RAMPA_...	Work In Progress	P202244	Roads
RampA_Gore.dgn	P202244_MCO_D_RD_3DM_RAMPA_...	Work In Progress	P202244	Roads
RampB_Corridor.dgn	P202244_MCO_D_RD_3DM_RAMPB_...	Pending Approval	P202244	Roads
RampB_Gore.dgn	P202244_MCO_D_RD_3DM_RAMPB_...	Work In Progress	P202244	Roads
RampC_Corridor.dgn	P202244_MCO_D_RD_3DM_RAMPC_...	Work In Progress	P202244	Roads
RampC_Gore.dgn	P202244_MCO_D_RD_3DM_RAMPC_...	Work In Progress	P202244	Roads
RampD_Corridor.dgn	P202244_MCO_D_RD_3DM_RAMPD_...	Work In Progress	P202244	Roads
RampD_Gore.dgn	P202244_MCO_D_RD_3DM_RAMPD_...	Work In Progress	P202244	Roads
SR97_Corridor.dgn	P202244_MCO_D_RD_3DM_RPA01_0...	Work In Progress	P202244	Roads

RampB\_Corridor.dgn

Work Space Components Spatial

General Security Attributes More Attributes File Properties Audit Trail

### MyCompany Attributes

Project	Originator	Role	Zone/System	Type	Location/Level	Seq.
P202244	MCO	D	RD	3DM	RAMPB	00003

Sh# 1 OF

P202244\_MCO\_D\_RD\_3DM\_RAMPE  
UNIQUE DOCUMENT CODING

TITLE \* Ramp B Coridor Model Horiz. Scale \* n/a  
Vert. Scale \* n/a

Rev/Ver P01.01 Revision Note \* Initial Revision Revision Date 7/20/2022 12

Design Status 50

QA/QC PROCESS

Designed By * JU	9/1/2022 12:0	Submitted By J.W.Ludwig	9/1/2022 12:0
Drawn By * JU	9/1/2022 12:0	Approved By	
Checked By * DL	9/1/2022 12:0	Rev/Rej By	

Revise/Reject Reason

Save Undo Close

## ProjectWise Explorer

Discipline Lead

Check out  
 Download  
 Get link  
 Rename  
 Workflow  
 Document set  
 Replace file

Roads  
 Roads  
 Roads  
 Roads  
 Approve..  
 Revise/Reject..  
 Set final status

Designer

Checker

## ProjectWise 365 Work Area Connection

## LEGEND - P201975 Update

Approve...  
 Revise/Reject

# Project Roles

## Task Teams

- ROW and Survey
- Design
- Construction

## Personas

- Project Manager
- Designer
- Client



References



Project Model



Roles

COMMON DATA ENVIRONMENT



# Project Manager

**Teams**

Pinned

- P202244 - 00 ROW and Survey Civil Conference 2022
- P202244 - 01 Design Civil Conference 2022
- P202244 - 02 Construction Civil Conference 2022

Your teams

Hidden teams

**P202244 - 01 Design** Posts Files Nash County Map Work Inbox Documents Document Review Design Review Design Insights +

ProjectWise 365

**Project Summary**

- New: 0
- Overdue: 2
- Close deadline: 0
- Upcoming: 0

5 All items

- 1 Issues
- 0 Reviews
- 1 Submittals
- 0 RFIs
- 3 Design Tasks

**My Work Inbox**

- Sample PDF Review

View All

**My Design Review**

- I-95 and SR97
- I-95 and SR97 Widening Resurfacing and Reconstruc...
- PROJECT 202244 - I95 & SR97 IMPROVEMENTS
- SR97 Abutment Grading (Test 01)
- SR97 Abutment Grading (Infrastructure Work Area)

View All

**My Design Tasks**

No design tasks assigned

**My Issues**

- Sample PDF Review

View All

**My Document Review**

No Document review assigned

**My Deliverables**

Ability to see most urgent items here - coming soon

Join or create a team



References



Project Model



Roles

COMMON DATA ENVIRONMENT



# Project Designer

ProjectWise Explorer CONNECT Edition

Datasource Folder Document View Tools Window Help

Background Map: P202244 Background Map

Address: pw:\decide-pwce-us.bentley.com\decide-pwce-us-01\Documents\Infrastructure Work Area\Projects\P202244

ProjectWise Explorer Datasources

decide-pwce-us-01 (Adrian.Crowfoot@bentley.com)

Documents

Infrastructure Work Area

System Admin

Projects

P201952

P201975

P202134

P202244

00 ROW and Survey

01 Design

All Zones

Bridges

Deliverables Management

Property Management

Roads

Client

Contractor

Drainage & Highway Engineer

Calculations

Combined Model

Information Exchange

Models

Corridors

Earthwork

Geometry

Super

Terrain

Reports

Sheets

Stormwater System

Submittal documents

Utilities

Saved Searches

Deliverables Management (Click to log in)

02 Construction

\_PWSetup

Standards

Saved Searches

Name	UNIQUE DOCUMENT CODING	State	Project	Zone/System	Role	Location/Level	Type	Rev.Ver	Design Status
SR97_Corridor.dgn	P202244_MCO_D_RD_3DM_RPA01_00003	Approved	P202244	Roads	Drainage & Highway En...	State Road 97	3D Model	P01	100
SR97_Abutment_Grading.dgn	P202244_MCO_D_RD_3DM_RPA01_00005	Work In Progress	P202244	Roads	Drainage & Highway En...	State Road 97	3D Model	P01.01	9/11/2
RampD_Gore.dgn	P202244_MCO_D_RD_3DM_RAMPD_00003	Approved	P202244	Roads	Drainage & Highway En...	Ramp D	3D Model	P01	100
RampD_Corridor.dgn	P202244_MCO_D_RD_3DM_RAMPD_00001	Approved	P202244	Roads	Drainage & Highway En...	Ramp D	3D Model	P01	100
RampC_Gore.dgn	P202244_MCO_D_RD_3DM_RAMPC_00003	Approved	P202244	Roads	Drainage & Highway En...	Ramp C	3D Model	P01	100
RampC_Corridor.dgn	P202244_MCO_D_RD_3DM_RAMPC_00001	Approved	P202244	Roads	Drainage & Highway En...	Ramp C	3D Model	P01	100
RampB_Gore.dgn	P202244_MCO_D_RD_3DM_RAMPB_00002	Approved	P202244	Roads	Drainage & Highway En...	Ramp B	3D Model	P01	100
RampB_Corridor.dgn	P202244_MCO_D_RD_3DM_RAMPB_00003	Approved	P202244	Roads	Drainage & Highway En...	Ramp B	3D Model	P01	100
RampA_Gore.dgn	P202244_MCO_D_RD_3DM_RAMPA_00002	Pending Approval	P202244	Roads	Drainage & Highway En...	Ramp A	3D Model	P01.01	50
RampA_Corridor.dgn	P202244_MCO_D_RD_3DM_RAMPA_00003	Pending Approval	P202244	Roads	Drainage & Highway En...	Ramp A	3D Model	P01.01	50
I-95_SB_Exist Cross Slopes.dgn	P202244_MCO_D_RD_3DM_I95_00011	Work In Progress	P202244	Roads	Drainage & Highway En...	Interstate 95	3D Model	P01.01	8/22/2
I-95_SB_Corridor_Pavt.dgn	P202244_MCO_D_RD_3DM_I95_00010	Work In Progress	P202244	Roads	Drainage & Highway En...	Interstate 95	3D Model	P01.01	8/22/2
I-95_SB_Corridor_Complete.dgn	P202244_MCO_D_RD_3DM_I95_00009	Work In Progress	P202244	Roads	Drainage & Highway En...	Interstate 95	3D Model	P01.01	8/22/2
I-95_NB_Corridor_Pavt.dgn	P202244_MCO_D_RD_3DM_I95_00006	Work In Progress	P202244	Roads	Drainage & Highway En...	Interstate 95	3D Model	P01.01	8/22/2
I-95_CL_Corridor_Pavt.dgn	P202244_MCO_D_RD_3DM_I95_00002	Work In Progress	P202244	Roads	Drainage & Highway En...	Interstate 95	3D Model	P01.01	8/22/2
I-95_TM_Existing Pavt.dgn	P202244_MCO_D_RD_3DM_I95_00013	Work In Progress	P202244	Roads	Drainage & Highway En...	Interstate 95	3D Model	P01.01	9/14/2

Work Area Properties Folder Properties Project Forms ProjectWise Project Portal Dependency Viewer Access Control

Home Folder Properties

Folder Name

Folder Description

Environment Name

Environment Description

WorkSpace Profile Name

WorkSpace Profile Description

Storage

Owner

Home Folder Statistics

Created By

Creation Time

Updated By

Update Time

Workflow



COMMON DATA ENVIRONMENT



# Construction User

The screenshot shows the SYNCHRO Control web application interface. At the top, the browser address bar displays the URL: <https://construction.bentley.com/1702ca6a-74ae-412a-adb2-d2df06b88b8d/home>. The page title is "SYNCHRO Control" and the current project is "P202244\_C I95 and SH97 Highway Improvements (Co...)".

The interface features a left-hand navigation menu with the following items: Home, Work, Documents, Schedule, Cost, Dashboard, and Administration. A "+ Create" button is located at the top left of the main content area.

The main content area is divided into several sections:

- Project Header:** Displays the project name "P202244\_C I95 and SH97 Highway Improvements (Construction)" and location "Wilson, North Carolina I95 and Highway 97". It also includes a weather forecast for Monday, Sep 19 (83°F, Fair) and the following days (Tue: 88°/61° Clear, Wed: 89°/64° Clear, Thu: 92°/56° Showers Early, Fri: 73°/47° Clear).
- My recent activity:** A section with a clock icon and the text "There are no recent items".
- My work:** A section with an envelope icon and the text "There is no work assigned to you".
- Create:** A vertical list of actions: Daily Log, Inspection, Issue, Observation, and RFI.
- iModels:** A section with a small image of a highway interchange and a notification badge showing the number "4".
- Summary:** A section titled "My work" with a "Project" filter. It displays four metrics: "All open items" (0), "Open Daily Log" (0), "Open Issue" (0), and "Open Observation" (0).



References



Project Model



Roles

COMMON DATA ENVIRONMENT



# Topics

- Project Details
- Project Considerations
- Project Common Data Environment



Bentleyuser.dk meeting - 2022

*Working Together: OpenRoads Designer,  
OpenBridge Designer, ProjectWise and iTwin  
Integration*

Scott Urbas, PE, Manager, Civil Content Development / Don Lee, Senior Consultant /  
Adrian Crowfoot, PE, Senior Consultant

Presented by: Matthias Heise, Consultant, Civil Engineering Success Services

