

**NORTH CAROLINA**

Department of Transportation

# OpenX Migration

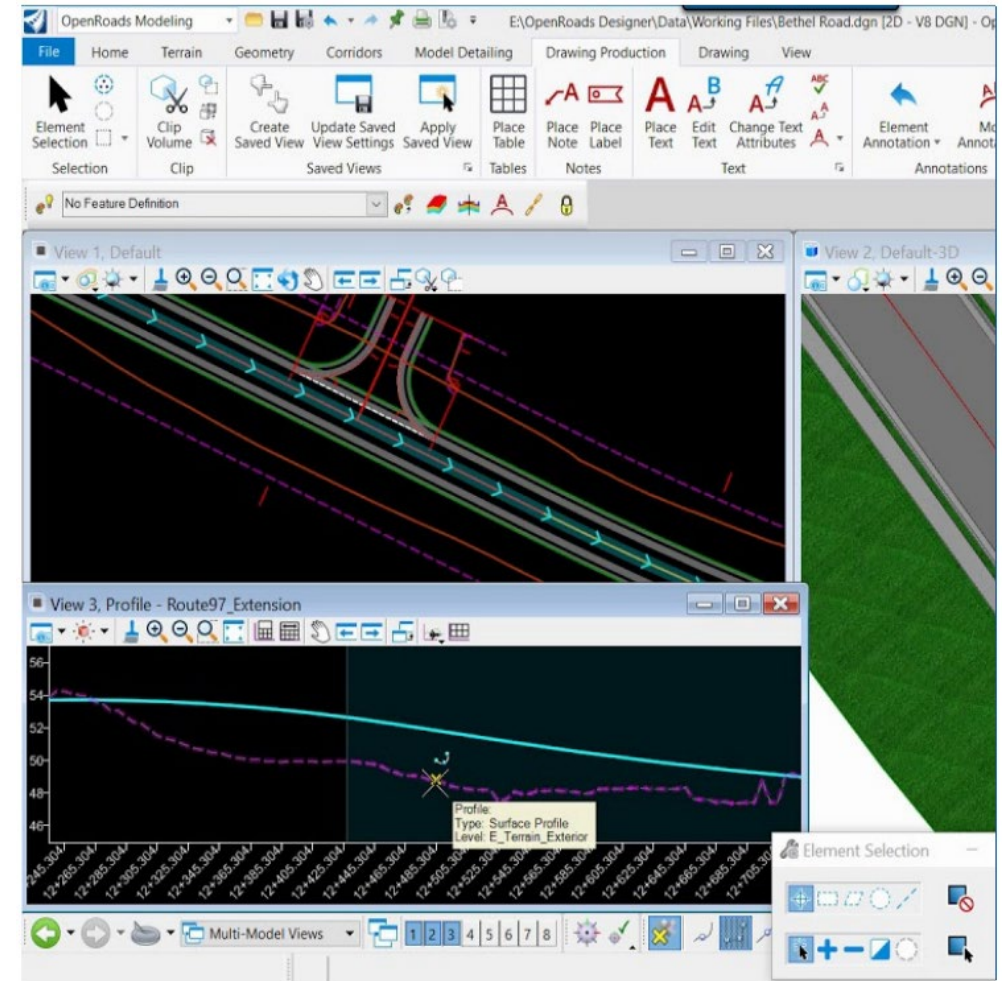
## Lunch & Learn Update: Status of OpenX Transition and Looking Ahead

September 28, 2023

Connecting people, products and places safely and efficiently with customer focus, accountability and environmental sensitivity to enhance the economy and vitality of North Carolina

# Overview

- Learn what OpenX Implementation is, why it's important, and NCDOT's efforts to fully transition.
- NCDOT's outlook ahead (training opportunities, workspace integration, ProjectWise update, and digital transformation).



# Quick Refresher

## What makes OpenX different?

- Integrate multiple disciplines into one model.
- A single model representing the life of a project.
- Model as a legal document/3D deliverable.



OpenRoads  
Designer



OpenBridge  
Modeler



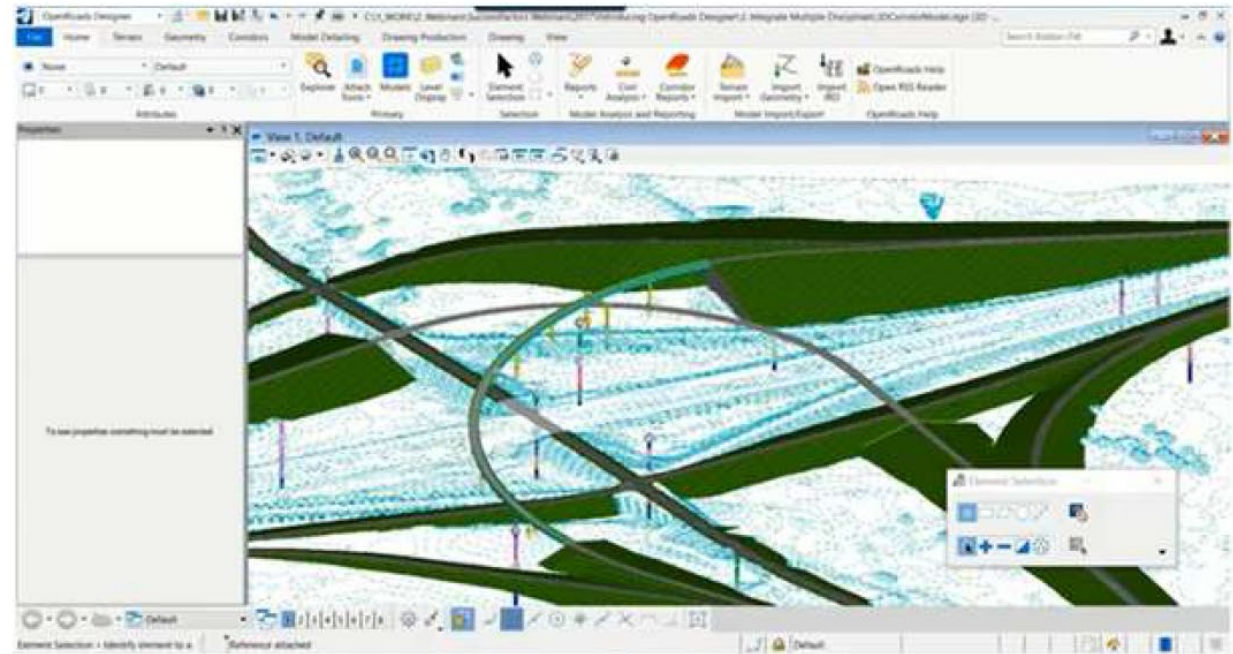
OpenRail  
Designer



gINT



Drainage &  
Utilities



# Quick Refresher

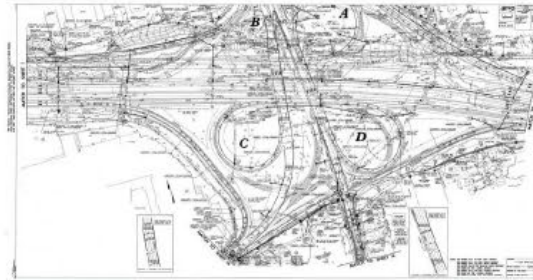
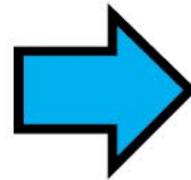
## What makes OpenX a Paradigm Shift?

- EVOLUTION = *Just like hand-drafted to CADD*
- The design intelligence is stored **with** the graphical element.

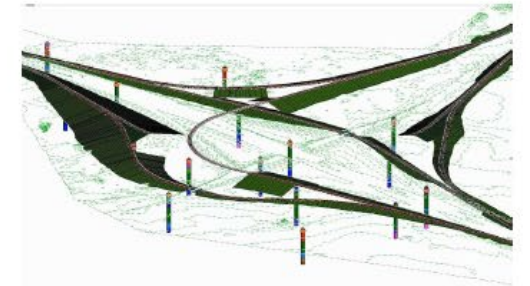
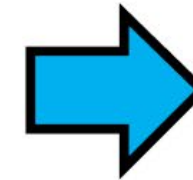
**V8i  
(Previous)**



2D Design Workflows

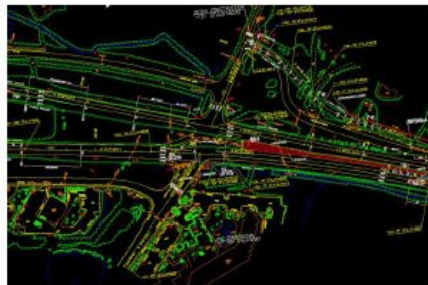


Sheets (PPXS)

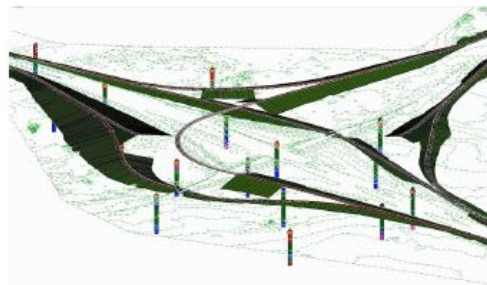
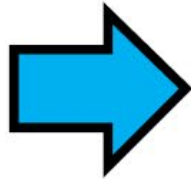


3D Model (Incidental)

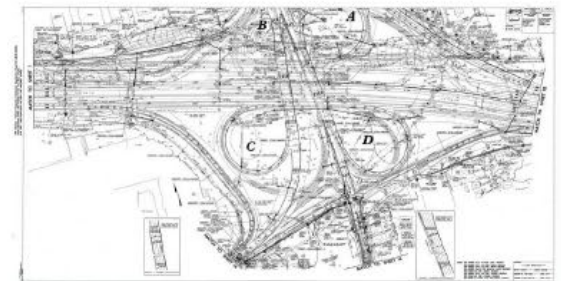
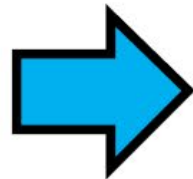
**ORD  
(Current)**



2D/3D Design Workflows



3D Model



Sheets (Incidental)

# Why is converting to OpenX important?

Bentley has ceased support for the V8i Select Series product line.

Support Status	Continuous Support	Full Support	Expiring Support	Support Discontinued
CONNECT Edition <sup>1</sup>	<b>X</b>			
V8i SELECTseries 10				<b>X</b>
V8i (Earlier SELECTseries)				<b>X</b>
<b>V8, XM, 2004,...</b>				<b>X</b>

<sup>1</sup> CONNECT Edition versions released prior to January 1, 2023, will be supported at least until December 31, 2025 (If an application enters Expiring Support before December 31, 2024, the support period will last until the end of the Expiring Support phase, which may be prior to December 31, 2025).

# Why is converting to OpenX important?

- Microsoft will no longer support Windows 10 on October 14, 2025.
  - It is likely the NCDIT will transition NCDOT out of Windows 10 prior to this date.
- Previous design software (V8i) will be even further at risk once we transition to Windows 11.

# Why is converting to OpenX important?

Having **NO** implementation plan **WILL** lead to project delivery delays and additional project expenses.




# OpenX Migration Initiation



August 14, 2018

- [OpenRoads Designer \(ORD\) Migration](#) memorandum tentatively sets the ORD implementation timeframe for the first quarter of 2019.
- The memo states that there were still some significant items that needed to be addressed prior to full implementation.



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION

ROY COOPER  
GOVERNOR

JAMES H. TROGDON, III  
SECRETARY

August 14, 2018

**MEMORANDUM**

TO: Division Engineers  
Business Unit Heads  
Multi-Modal Division Directors

FROM: T. M. Little, PE  
Chief Engineer

SUBJECT: OpenRoads Designer (ORD) Migration

For the last two years, the Department has been engaged in the migration of its CADD operations to OpenRoads Designer (ORD). ORD is a comprehensive, multi-discipline 3D modeling application that advances the delivery of roadway projects from conceptual design through construction. It blends traditional engineering workflows for plan, profile, and cross sections with 3D parametric modeling to enable the model-centric creation of design deliverables. Since it is 3D model-centric design, many of the Department's current applications and workflows do not translate directly into the new software.

**Implementation Timeframe**  
NCDOT has tentatively set the ORD implementation timeframe to be the first quarter of 2019. This should provide sufficient time to pilot a few projects to address remaining configuration and workflow issues, develop internal training content, and allow for a couple more ORD quarterly updates that will help mature the product.

**Training**  
CADD Services will provide general ORD training for all internal users. Some units may provide their own unit-specific training, if necessary. Also, Bentley provides anytime online training that is freely available to all NCDOT users through the Bentley LEARN server.

No general ORD training for external private engineering firms (PEFs) is planned. PEFs are encouraged to explore the capabilities of Bentley LEARN online training as a resource for ORD training. There may be NCDOT specific ORD workflow training provided at NCLUG events or at any time as deemed necessary.



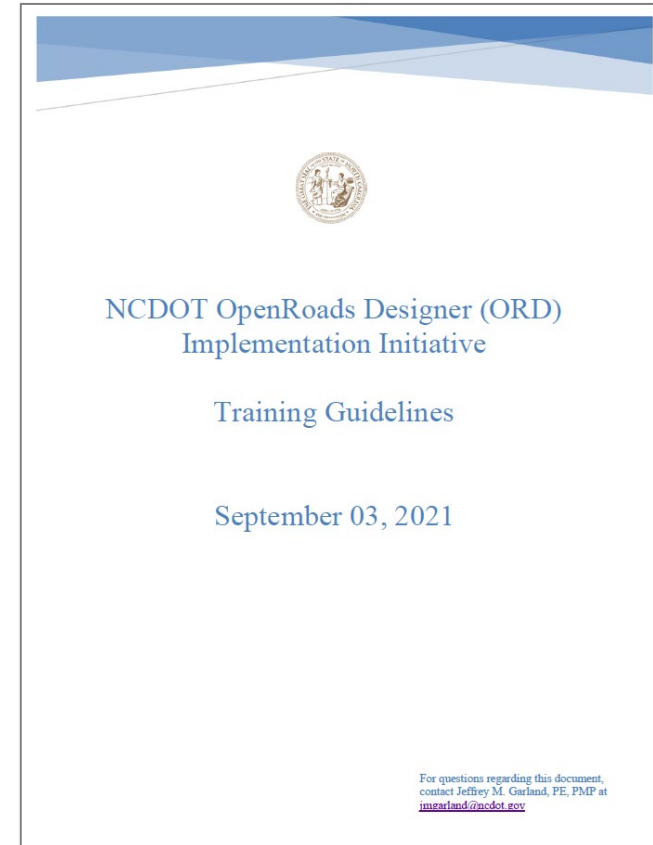
# OpenX Migration Efforts



September 3, 2021

Training Guidelines, CADD Conversion Guidelines, other guidance documents developed to help guide NCDOT and its partners.

Extensive coordination between NCDOT and Bentley to resolve bugs in the OpenX software.



# PEF Readiness Survey



- Online survey completed to assess PEF readiness to transition to OpenX
- Feedback from 44 firms, including 11 (25%) Small Professional Service Firms (SPSFs).

# PEF Readiness Survey



Loss of Productivity



Additional cost likely needed



Need for strong / integrated NCDOT support during transition



Training opportunities for staff



Bentley software issues (bugs, functionality on certain items)



Some discipline-specific features are not yet ready.

# OpenX Steering Committee



January 2023

OpenX Steering Committee formed in Jan 2023

- Multi-disciplinary with both NCDOT & PEF reps
- Goals:
  - Guide NCDOT in implementation of OpenX
  - Provide support to project delivery teams during implementation.

# Risk Management Process



Feb 2023 - Present

Focused on ongoing risk assessment to:

- Reduce uncertainty
- Improve communication
- Identify ownership
- Improve continuity



# Risk Assessment

- Risks assessed based on probability of occurrence and likely impact of the risk.
- Action Plan (and risk owners) then developed

Risk Identification				Risk Assessment			Response Strategy		
Risk Description IF	Risk Description THEN	Threat / Opp.	Status	Probability	Impact	Score	Strategy	Action Plan	Deliverables Produced / U
If timelines and requirements are not clearly defined, communicated, and enforced with both internal and external stakeholders or if project teams are not clear how to escalate OpenX issues,	then delays to making the department's transition to Open X will occur, project timelines may be impacted, partners may be frustrated, or rework may be needed.	T	Active	High	High	●	Avoid	1. Update Open X transition plan and timelines 2. Assign owner for Open X transition schedule so risks to overall implementation are tracked and reported on to the steering committee 3. Share schedule and requirements with all stakeholders 4. Identify business owners to serve as main point of contact for Open X issues.	A) Memo and/or nice one-p handout from Steering Com with proposed cutoff date ar reasons. B) Updated "SS2 to ORD C Conversion Guide" C) Decision Matrix for Proje Managers D) Updated scope template workday estimates to updat project schedules & costs. E) One-stop location for re issues/ requesting help for a OpenX on the CADD servic website that allows for track have flexibility in ALL sched due to ORD issues
If department-wide and discipline-specific guidelines and standards (such as design manuals, PDN documentation, standard	then teams may use out-of-date standards for their projects leading to quality issues or rework, teams may have issues	T	Active	High	High	●	Avoid	1. Identify guidelines and standards that require update.	A) Updated guidelines and

# Piloting Efforts

## V8i to ORD Conversions



May 2023 – Present

- Committee is currently leading a multi-discipline effort to convert a handful of projects to OpenX.
- A diverse group of projects have been selected that vary based on the project's:
  - Size,
  - Complexity,
  - Stage of development,
  - Schedule
- **Desired Outcome:** to support project managers and project delivery teams.

# Piloting Efforts

## V8i to ORD Conversions

### Projects being Piloted:

- **BR-0074**
  - ✓ Bridge replacement with dual structures on 4-lane divided facility (Principal Arterial)
  - ✓ Right of Way
  - ✓ Project Management, Roadway, Hydraulics, Erosion Control, WZTC, Pavement Marking, & Signing
- **I-5707**
  - ✓ Roadway widening to add an auxiliary lane on I-40 (Interstate)
  - ✓ Right of Way
  - ✓ Project Management, Roadway, Hydraulics, Erosion Control, WZTC, Pavement Marking, & Signing
- **U-5753**
  - ✓ Roadway widening 2-lane and 4-lane divided facility for 4.5 miles (Urban Collector)
  - ✓ Right of Way
  - ✓ Project Management, Roadway, Hydraulics, Erosion Control, Structures, Utilities, WZTC, Pavement Marking, & Signing
- **BR-0054 & BR-0086**
  - ✓ Bridge replacement projects by NCDOT Roadway Design Unit
  - ✓ Design Recommendation Plan Set
  - ✓ Roadway & Hydraulics



# Piloting Efforts

## V8i to ORD Conversions: Scope of Work

- The scope of work is to convert Microstation V8i **files** to OpenX.
- Goal is to have a standard scope of work for project managers to use when migrating projects to OpenX.
- Goals:
  - Identify inter-discipline workflows,
  - Determine level of effort required,
  - Identify potential roadblocks in the conversion efforts

**TIP: PROJECT DESCRIPTION**  
 Contract Assignment: Convert Project from MicroStation GEOPAK V8i to OpenRoads Designer (ORD)

**Contract Information:**  
 This task order is cost-plus. NCDOT will be billed for the actual time spent and any reimbursable expenses incurred.

[KIMLEY-HORN]			
<i>Contract #</i> _____	<i>Contract Type: Limited Services Contract</i>	<i>Payment Type: Cost Plus</i>	<i>WBS</i> _____

**Project Contacts**

NCDOT CONTACTS			
PRIME CONSULTANT CONTACTS (PEF NAME)			

# Piloting Efforts

## V8i to ORD Conversions: Workflows

- Inter-discipline workflows being developed.
- Will help project teams better understand how to manage an ORD project.
- Identify potential roadblocks in the conversion efforts.

### Erosion Control

#### Draft Workflow

1. Create a new 2D file.
2. Reference in V8i Erosion Control files: make sure to use Global LineStyle Scale: Reference. See page 13 and 14 of the *NCDOT ORD SS2 to ORD CADD Conversion Guide Version 1.0*.
3. Merge into master.
4. Review line scale and label sizes. See page 13 through 20 of the *NCDOT ORD SS2 to ORD CADD Conversion Guide Version 1.0*.
5. Reference V8i old layout file. Merge into master.
6. Rotate view to desired sheet. Use Place Named Boundary Civil Plan by Element. Choose drawing seed of 50 scale plan. Select “Use View Rotation,” “Create Drawing”, and “Show Dialog”. Reset to skip. Then select desired sheet boundary. Left click to accept.

**Place Named Boundary Civil Plan by Element**

Drawing Seed: 50 Scale Plan

Name: L

Description:

Group: L

Overlap: 0.000000

Use View Rotation

Create Drawing

Show Dialog

7. Create drawing. Add appropriate Annotation Group.

**Create Drawing**

Mode: Plan

One Sheet Per Dgn:

View Name: L - Plan 1

Drawing Seed: 50 Scale Plan

View Type: Civil Plan

Discipline: Civil

Purpose: Plan View

**Drawing Model**

Model Name: L - Plan 1

Seed Model: Plan Only 50 Scale.dgnlib, PLN\_D-

Filename: (Active File)

1"=50'

Annotation Group: NC\_Plan Annotation NAD 83 NSRS 2007

**Sheet Model**

Model Name: L - Plan 1

Seed Model: Plan Only 50 Scale.dgnlib, PLN\_S-

Filename: (Active File)

Sheets: (New)

Full Size 1 = 1

Drawing Boundary: PLN-

Detail Scale: 1"=50'

Add To Sheet Index

Make Sheet Coincident

Open Model

OK Cancel

# Piloting Efforts

## V8i to ORD Conversions: Level of Effort

- Developing documents to help determine level of effort required.
- Will help project managers factor the cost of conversion when making migration decisions.



# Piloting Efforts

## V8i in Windows 11

- Ongoing testing of V8i in Windows 11 to better understand magnitude or potential risk.
- So far, test results have been encouraging.

### Microstation SS2 Issue Log using Windows 11 (R-3434 Test Project)

Discipline	Item/Tool Checked	Problem Found? (Yes/No)
Roadway	Created the appropriate design files using Design File Generator (ie dsn, pfl, ss, cmd, xsc, etc.)	No
Roadway	Created a proposed horizontal alignment using Store Graphics	No
Roadway	Used the DNC Manager to station and label proposed horizontal and vertical alignments	No
Roadway	Checked proposed horizontal and vertical alignment stationing using Plan/Profile Labeler	No

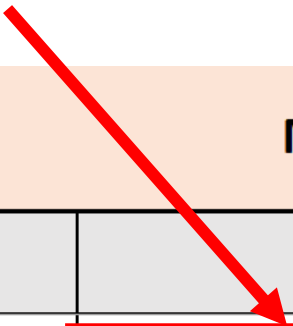
# Piloting Efforts

## V8i in Windows 11

- Our reviews included coordination with PEFs who reported issues and troubleshooting if an issue was identified.
- Hydraulics review example of an issue discovered.

**Microstation SS2 Issue Log using Windows 11 (R-3434 Test Project)**

Discipline	Item/Tool Checked	Problem Found? (Yes/No)
Hydraulics	Run "report" VBA to create inlet/storm drain report	Yes
Hydraulics	Re-run "Report" VBA with new Microstation image	No
Hydraulics	Run vba "Pay Item Utility" to add Ad hoc data to GeoPak drainage features	No
Hydraulics	Run vba "Station and Offset" to add Ad hoc data to MicroStation lines such as "pipe removal" lines	No

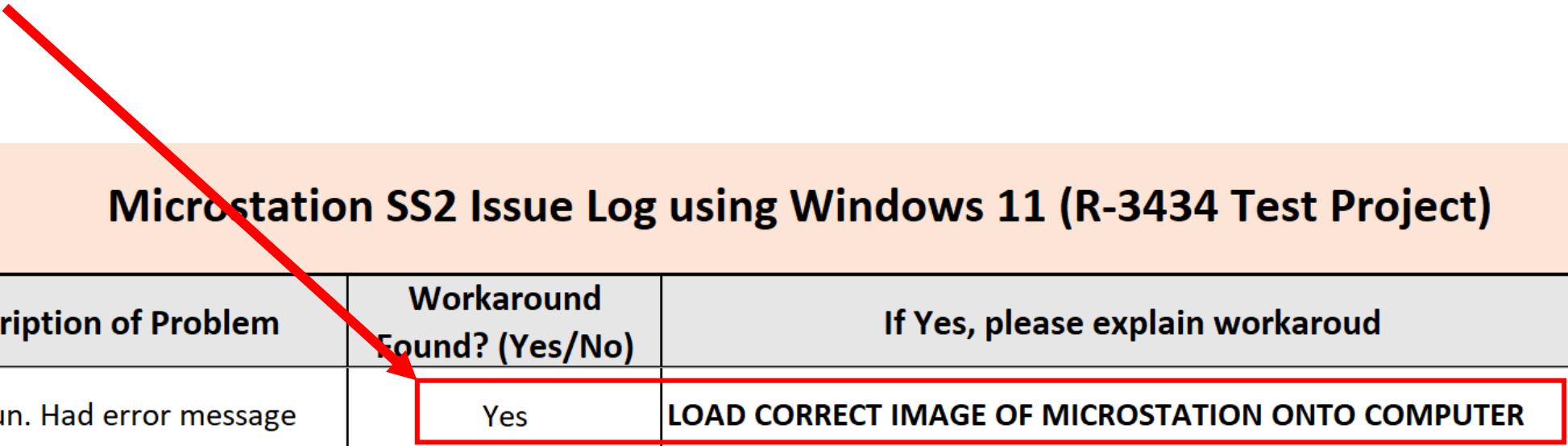


# Piloting Efforts

## V8i in Windows 11

- Hydraulics example (continued)
- Success troubleshooting the issue identified.

### Microstation SS2 Issue Log using Windows 11 (R-3434 Test Project)




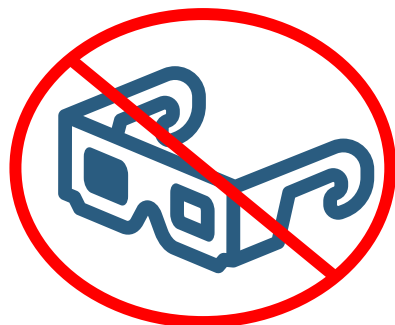
If Yes, Description of Problem	Workaround Found? (Yes/No)	If Yes, please explain workaroud	Level of Importance
VBA would not run. Had error message	Yes	LOAD CORRECT IMAGE OF MICROSTATION ONTO COMPUTER	High

# Streamlining Migration to OpenX



August 2, 2023

- [\*OpenX Migration \(August 2023 Update\)\*](#) memorandum provides a measured approach for how to migrate to OpenX.
- Is focused on 2D deliverables ONLY.




STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION

ROY COOPER  
GOVERNOR

J. ERIC BOYETTE  
SECRETARY

MEMO TO: Project Managers  
Business Unit Heads

FROM: Matthew Clarke, PE, Director of Technical Services 

DATE: August 2, 2023

SUBJECT: OpenX Migration (August 2023 Update)

I appreciate everyone's efforts over the past 5 years to migrate NCDOT's CADD Operations to OpenRoads Designer since the distribution of the [\*OpenRoads Designer \(ORD\) Migration\*](#) memorandum. The Department has made headway, and we still have work to do. The OpenX Steering Committee was formed to provide direction and support for NCDOT project delivery teams in their implementation of OpenX. The information below describes the next steps that ~~Project Managers and project teams are to take to fully utilize the OpenX platform (e.g., OpenRoads~~

# OpenX Migration Memo

## OpenX Migration Memo

- The earlier in the life of a project that the migration to the OpenX platform occurs, the lesser the effort and cost.
- Goal is to migrate as many projects as possible while doing it in a manner that will not impact major milestones, project schedules, or be overly costly.
- Must weigh competing risks:
  - Continuing to use a software long-term that is currently unsupported by Bentley
  - Delaying project schedules and incurring additional costs.





# OpenX Migration Memo

## OpenX Migration Memo

- Documentation:
  - Identify the software platform currently being used
  - Determine a recommended action to migrate to OpenX or keep in V8i will be noted for each project.
- Coordination:
  - Projects with Design Recommendation Plan Set completed but RPC not final
  - “On the fence” projects that could be left in V8i or migrated to OpenX depending on project context.
- Implementation:
  - The software platform for each project will be noted.
  - By October 31, a migration plan and schedule will be in place for the projects that will transition to the OpenX Platform.

# Looking Ahead

---

Current 2D file conversion efforts are part of a bigger strategy to:

- Integrate workspaces
- Provide appropriate ORD training opportunities
- Incorporate best digital delivery practices into a project's life cycle.

# Looking Ahead

## Workspace Integration

- How can NCDOT best integrate multiple discipline workspaces to fully take advantage of the OpenX platform?
- OpenX Steering Committee completed a gap analysis.
- Technical Services is developing new CADD Support Group to guide implementation.

# Looking Ahead

## Workspace Integration

### Current Workspace

#### Roles

- Aviation
- EAU
- EC
- Hydro
- Geotech
- Photo
- Rail
- Roadway
- Structures
- Survey
- Congestion Management
- WZTC
- Safety
- Signals
- Signals Management
- TSMO
- Utilities

### Potential Workspace

#### Roles

What integrated workspaces should NCDOT establish to best utilize OpenX?

# Looking Ahead

## ProjectWise Update

- How should NCDOT use ProjectWise for Efficient Project Delivery?
- Need for Consistent Processes
- Gathering Input from Divisions, Central Units, and Industry Partners

# Looking Ahead

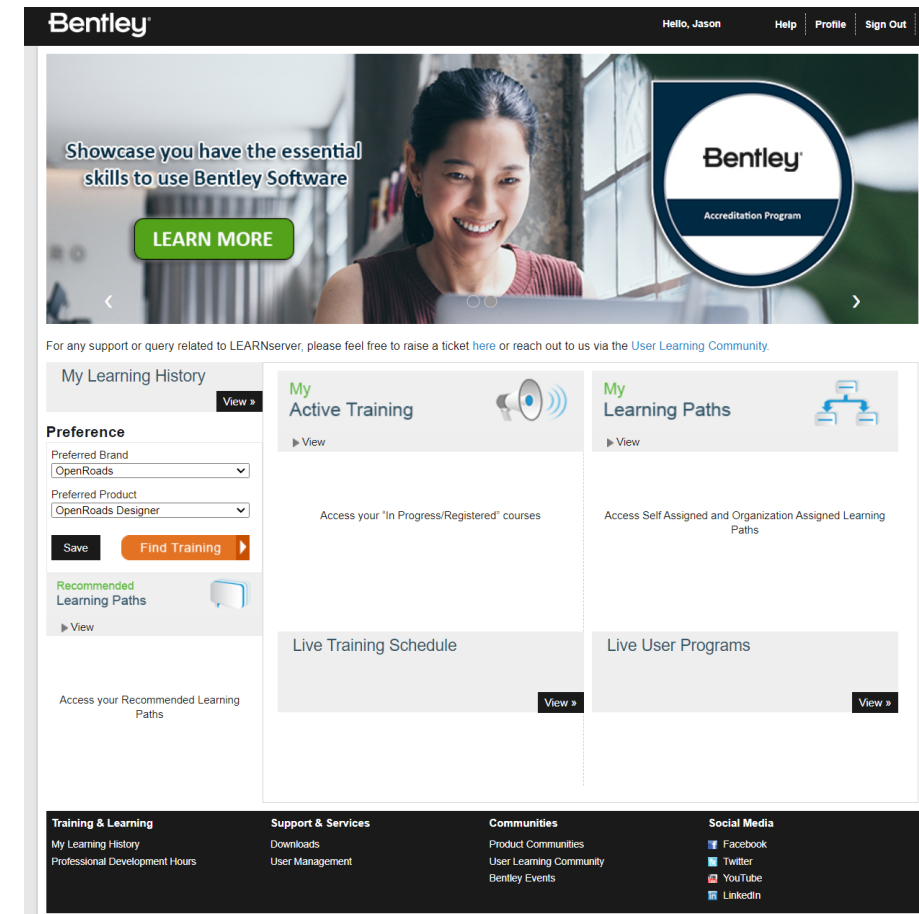
## Current OpenX Training Opportunities

Did you know?



LEARNserver

Learn.Bentley.com



Bentley

Hello, Jason Help Profile Sign Out

Showcase you have the essential skills to use Bentley Software

LEARN MORE

Bentley Accreditation Program

For any support or query related to LEARNserver, please feel free to raise a ticket [here](#) or reach out to us via the [User Learning Community](#).

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Brand **OpenRoads** Product **OpenRoads Designer** Search

Search

OpenRoads [X] OpenRoads Designer [X]

Type	Generation	Language	Level	Learning Path Status	Course Status
Select	Select	Select	Select	Select	Select

**LEARNING PATH** Enrolled

**"Bentley Civil User Accreditation - OpenRoads Modeling Core Skills"** » (CONNECT Edition - English - Fundamental - In Progress)

The OpenRoads Modeling Core Skills accreditation is a fundamental level verification of OpenRoads Designer knowledge and skills as it relates to the tools found in the OpenRoads Modeling workflow. It ... [More >](#)

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**COURSE**

**Bentley Civil User Accreditation - OpenRoads Modeling Core Skills Accreditation** » (CONNECT Edition - English - Fundamental - In Progress)

The OpenRoads Modeling Core Skills accreditation is a fundamental level verification of OpenRoads Designer knowledge and skills as it relates to the tools found in the OpenRoads Modeling workflow.

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**LEARNING PATH**

**"Bentley Civil User Accreditation - Road Design Modeling"** » (CONNECT Edition - English - Fundamental - In Progress)

The Road Design Modeling accreditation is an intermediate level verification of OpenRoads Designer knowledge and skills as it relates to roadway design. It consists of a skills assessment test a... [More >](#)

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**COURSE**

**Introduction to OpenRoads Designer Concepts and Capabilities** » (CONNECT Edition - English - Fundamental - Not Started)

This course is a basic introduction to OpenRoads Designer for New Users and existing GEOPAK, InRoads, and MXROAD OpenRoads Technology users.

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**COURSE**

**Migrating from MX to OpenRoads Designer and OpenRail Designer** » (CONNECT Edition - English - Fundamental - Not Started)

This course was created to summarize reasons to migrate and to allay concerns about the process of migrating from MX to OpenRoads Designer or OpenRail Designer. This document is designed for MX Users ... [More >](#)

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**COURSE**

**Simply Faster: Increasing Your Productivity with OpenRoads Designer** » (CONNECT Edition - English - Fundamental - Not Started)

What is all this push to use OpenRoads Designer? I am successful with what I have been doing for years so why should I change? Today we dig in and see what OpenRoads Designer brings to the table, how ... [More >](#)

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**LEARNING PATH**

**"Migrating to OpenRoads Designer CONNECT Edition"** » (CONNECT Edition - English - Fundamental - In Progress)

In this Learning Path, you will learn about the migration path options for moving to OpenRoads Designer from InRoads, GEOPAK, MXROAD, and PowerCivil SELECTSeries 2, 3, and 4 software. Learn ... [More >](#)

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**COURSE**

**Moving to OpenRoads Designer - Where to Start** » (CONNECT Edition - English - Fundamental - Completed)

This presentation discusses the migration path options for moving to OpenRoads Designer from InRoads, GEOPAK, MXROAD, and PowerCivil SELECTSeries 2, 3, and 4 software. Learn what can be done, the mini... [More >](#)

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**COURSE**

**QuickStart for Geometry - Road** » (CONNECT Edition - English - Fundamental - Not Started)

In this course, you will be creating a horizontal and vertical alignment using the geometry tools. You will learn how to create, edit, review and annotate geometric elements. This course will also ... [More >](#)

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**COURSE**

**QuickStart for Corridor Modeling - Road** » (CONNECT Edition - English - Fundamental - Not Started)

In this course, you will be creating a Corridor and 3D model for a 2 lane rural road. You will learn how to create a Corridor, assign template drops, create dynamic cross sections and review the Co... [More >](#)

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**COURSE**

**Beyond Centerline Geometry** » (CONNECT Edition - English - Fundamental - Not Started)

Pavement Edges are particularly important: they are required in Plan Sheets and the streamline modeling corridors (a single template can follow edges wherever they meander). In this class you create s... [More >](#)

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**COURSE**

**Using and Editing Templates** » (CONNECT Edition - English - Fundamental - Not Started)

This course teaches how to efficiently modify and use existing templates, such as those delivered in the Bentley Civil Workspace, for your project situations. You will learn how to manage template lib... [More >](#)

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**COURSE**

**Quantities Work** » (CONNECT Edition - English - Fundamental - Not Started)

In this course, you will learn various tools and how to use them to create quantities for the corridor model. You will learn how to assign unit costs and create an estimate cost report for ... [More >](#)

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**COURSE**

**OpenRoads - Ask an Instructor** » (CONNECT Edition - English - Fundamental - Not Started)

Discuss various topics that are important to you in OpenRoads. This topic is driven by the knowledge of our students. Students ask questions of their instructors and the instructors answer them.

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**COURSE**

**QuickStart for Terrain Display** » (CONNECT Edition - English - Fundamental - In Progress)

Learn how to display terrain model features including the boundary, triangles, and contours using feature definitions, and how to modify the default display parameters. You will also learn how to lab... [More >](#)

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**LEARNING PATH**

**00 - Roadway Design & Modeling - Fundamentals** » (CONNECT Edition - English - Fundamental - In Progress)

This learning path is intended for new users just getting started with OpenRoads Designer. It will provide you with the basic skills for roadway design and modeling.

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**COURSE**

**Navigating the Interface** » (CONNECT Edition - English - Fundamental - Completed)

This course was previously called "QuickStart - Navigating the Interface". This course is designed for all users just getting started with the software. You will learn how to open a file, working w... [More >](#)

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**COURSE**

**Drawing Production - Creating Plan and Profile Sheets** » (CONNECT Edition - English - Fundamental - Completed)

\*This course was formerly part of the QuickStart for OpenRoads Designer Drawing Production course. Learn how to create and annotate plan and profile sheets. You will also learn to add individual annota... [More >](#)

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**COURSE**

**Drawing Production - Creating Cross Section Sheets** » (CONNECT Edition - English - Fundamental - Completed)

\*This course was formerly part of the QuickStart for OpenRoads Designer Drawing Production course.\* Learn to create and annotate cross section sheets and plan and profile sheets. You will also learn ... [More >](#)

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**COURSE**

**Overlay, Stripping, and Widening** » (CONNECT Edition - English - Fundamental - Not Started)

During this course you will learn to create and use templates that incorporate overlay and stripping components. You will also learn to use the Overlay Vertical Adjustments tool to calculate new verti... [More >](#)

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**COURSE**

**Item Types** » (CONNECT Edition - English - Fundamental - Not Started)

This course will take you through the fundamentals of Item Types. What are Item types and why are they used. You will learn different properties of Item Types with basic tips and tricks. Further, you ... [More >](#)

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**COURSE**

**Creating and Manipulating the Corridor** » (CONNECT Edition - English - Fundamental - Not Started)

In this course, you will create a roadway corridor and then explore the many tools and techniques to edit and manipulate the corridor. We will take a look at how to add multiple templates drops along ... [More >](#)

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**COURSE**

**Site Modeling and Non-Corridor Modeling** » (CONNECT Edition - English - Fundamental - Not Started)

This course demonstrates how to turn 2D elements into 3D elements by adding profiles and elevations to civil elements that are typically found outside the limits of a roadway corridor (i.e. civil sit... [More >](#)

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**COURSE**

**Channel Modeling** » (CONNECT Edition - English - Fundamental - Not Started)

In this course you will learn how to model a drainage channel that is adjacent to an existing roadway. You will learn how to create the horizontal and vertical geometry for the drainage channel. You w... [More >](#)

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**LEARNING PATH**

**01 - Roadway Design & Modeling - Intermediate** » (CONNECT Edition - English - Fundamental - Completed)

This learning path is intended for users that have completed the Roadway Design & Modeling Fundamentals learning path and would like to learn more detailed tools and processes.

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**LEARNING PATH**

**02 - OpenRoads Designer for Existing v8i SELECTSeries 3, 4 & 10 Users** » (CONNECT Edition - English - Fundamental - In Progress)

This learning path is for existing SS3, SS4 & SS10 users are already familiar with basic OpenRoads Technology concepts such as terrains, geometry, superelevation, templates and corridors. ... [More >](#)

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**LEARNING PATH**

**03 - Best Practices** » (CONNECT Edition - English - Fundamental - Not Started)

This learning path contains video presentations on OpenRoads Designer Best Practices.

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**COURSE**

**OpenRoads Best Practice - Drawing Production** » (CONNECT Edition - English - Fundamental - Not Started)

Join Bentley experts for tips and tricks using the new OpenRoads Designer cross section and plan sheet layout and annotation tools.

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**COURSE**

**OpenRoads Best Practice - Making the Model More Visual** » (CONNECT Edition - English - Fundamental - Not Started)

Learn how to increase the visual impact of your models with minimal effort. Create models using realistic materials, pavement markings, guardrail, barriers, fences, traffic control and more. The techn... [More >](#)

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**COURSE**

**OpenRoads Best Practice - Project Management** » (CONNECT Edition - English - Fundamental - Not Started)

Join Bentley experts as they share recommendations for organizing OpenRoads project data, files, and references. Federating and organizing project data, files, and references properly can make all the... [More >](#)

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**COURSE**

**OpenRoads Best Practice - Terrain Modeling** » (CONNECT Edition - English - Fundamental - Not Started)

Tips and tricks for working with terrain models including the best way to create a single terrain from multiple corridors and linear templates, how to create and use graphical filters to create a sing... [More >](#)

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**COURSE**

**OpenRoads Best Practice - Corridor Modeling** » (CONNECT Edition - English - Fundamental - Not Started)

This presentation discusses best practices for Corridor Modeling.

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**COURSE**

**OpenRoads Designer - Tips and Tricks** » (CONNECT Edition - English - Fundamental - Not Started)

This presentation discusses some tips and tricks for OpenRoads Designer.

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**COURSE**

**OpenRoads Best Practice - Civil Cells** » (CONNECT Edition - English - Fundamental - Not Started)

This presentation discusses best practices for Civil Cells.

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**COURSE**

**Understanding Georeferenced Coordinate Systems and Point Cloud Tools** » (CONNECT Edition - English - Fundamental - Not Started)

Come explore Georeferenced Coordinate Systems and the LIDAR tools under the reality modeling tab in OpenRoads Designer. We will take a look into what a Georeferenced Coordinate System is and why setti... [More >](#)

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**COURSE**

**Using and Editing Terrain Models** » (CONNECT Edition - English - Fundamental - Not Started)

In this course you will review terrain model feature display and learn how to create thematic height displays. You will also learn how to create terrain models by importing graphic elements, identify... [More >](#)

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**COURSE**

**Understanding Terrain Models** » (CONNECT Edition - English - Fundamental - Not Started)

In this presentation, you will learn about the fundamental features of a terrain model and various techniques for creating and managing multiple terrain models. You will learn how to create a complex... [More >](#)

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**LEARNING PATH**

**04 - Terrain Modeling** » (CONNECT Edition - English - Fundamental - In Progress)

This learning path contains hands-on courses and various Learn Conference, Special Interest Group (SIG) and Tech Talk videos related to Terrain Modeling.

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# OpenRoads Designer - Roadway Design & Modeling Learning Path



Fundamentals Roadway Design Path for OpenRoads Designer

✓ Added to My Learning Paths Personalize

## Navigating the Interface

This course was previously called "QuickStart - Navigating the Interface"; This course is designed for all users just getting started with the software. You... [More»](#)

▼ Find Training (1)

### On-Demand

Title	Language	Generation	Release Detail	Type	Duration	Status	Launch
▼ Navigating the Interface	English	CONNECT Edition	2020 Release 2 2021 Release 1 2022 Release 1				
Getting Started with the Interface				Lecture	9m	●	<a href="#">Review</a>
Using Element Selection to Explore Civil Elements and Features				Lecture	15m	●	<a href="#">Review</a>
Element Properties and Explorer				Lecture	4m	●	<a href="#">Review</a>
Navigating Multiple Views and Models				Lecture	10m	●	<a href="#">Review</a>
View Controls				Lecture	11m	●	<a href="#">Review</a>
Analyzing Civil Data				Lecture	4m	●	<a href="#">Review</a>
Navigating the Interface PDF and Dataset Download (2020 Release 2)				Hands-on	1h		<a href="#">Free Download</a>
Navigating the Interface Skills Assessment				Skills Assessment		●	<a href="#">Skills Assessment</a>



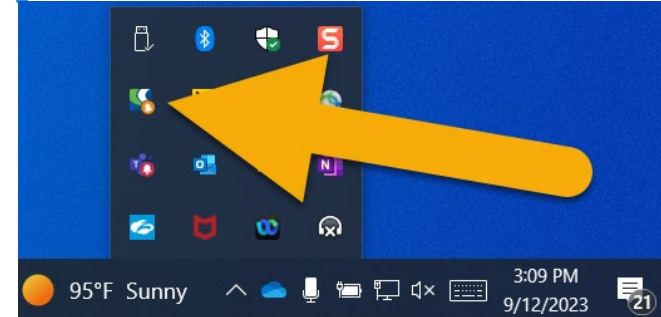
# Looking Ahead

## Current OpenX Training Opportunities

Did you know?



# Bentley Connection Client



The image displays three sequential screenshots of the CONNECTION Client software interface. The first screenshot shows the main dashboard with a 'Learning' section highlighted by a yellow arrow. The second screenshot shows the 'Learning' section with 'Live Webinars' and 'On Demand Webinars' circled in red. The third screenshot shows a list of training events, with '2023 Roads & Bridges Virtual Conference: Integrating Solutions...' circled in red.

Event Title	Date	Time
2023 Roads & Bridges Virtual Conference: Civil Design Review...	Sep 13, 2023	11:00 AM
2023 Roads & Bridges Virtual Conference: Bridge & Tunnel - Tips...	Sep 13, 2023	12:30 PM
2023 Roads & Bridges Virtual Conference: Integrating Solutions...	Sep 13, 2023	03:00 PM
Coffee Corner: OpenRoads - What's New in OpenRoads Designer ...	Oct 04, 2023	01:00 AM
Coffee Corner: OpenRoads - What's New in OpenRoads Designer ...	Oct 11, 2023	01:00 PM

# Looking Ahead

## Current OpenX Training Opportunities

Did you know?



portal.osc.nc.gov

The screenshot displays the NC Learning Center portal interface. At the top, there is a navigation bar with links for Home, Learning, Leadership Training, My Team, Reports, Performance, and New Connect. A search bar is located in the top right corner. The main content area is divided into two columns. The left column features a detailed view of the 'MicroStation Connect I (ORD)' event, including its duration (18 hours) and a list of details. Below this, there are 'Upcoming Sessions' listed by date, with options to view details for each session. The right column shows a similar view for the 'ORD 101' event, with a 'Select a Session' dropdown and an 'Assign' button. A search bar is also present in the top right of this section.

# Looking Ahead

## Current OpenX Training Opportunities

Did you know?



### Roadway Design ORD Training Modules

# connect.ncdot.gov/projects/Roadway/ORD/Forms/

Connect NCDOT BUSINESS PARTNER RESOURCES

Home Help Team Sites Site Map

Doing Business Bidding & Letting **Projects** Resources Local Governments

Search...

### Roadway Design > ORD

Connect NCDOT > Projects > Roadway Design

#### Planning

- State Transportation Improvement Program (STIP) Revisions
- Municipal Bridge Program
- Air Quality & Transportation Conformity
- CMAQ Project Website
- Project Level Traffic Forecasting
- Model Research and Development
- Strategic Transportation Corridors (STC)
- Integration Project
- Functional Classification of Highways
- Transportation Planning Program and Services
- Comprehensive Transportation Plans
- State Transportation Improvement Program (STIP) Division Maps
- CTP - Comprehensive Transportation Planning Manual

#### All Documents

Find a file

Name	Modified	Modified By
Appendix B - Project Conversion Guidelines	June 7, 2022	Jason Moore
Creating 2D Microstation Custom Line Styles	July 12, 2022	Jason Moore
Design Scripts & Pen Tables_9-8-22_Presentation	September 8, 2022	Jason Moore
Earthwork with Oak_4-19-22_Meeting Recording	September 7, 2022	Jason Moore
Module 1 - File Management	April 12	Oak O. Thamavong
Module 10 - Intermediate Corridor Modeling	December 5, 2022	Oak O. Thamavong
Module 11 - Detailed Modeling	December 7, 2022	Oak O. Thamavong
Module 13 - Sheeting	September 6, 2022	Oak O. Thamavong
Module 13A - Design Scripts and Pen Tables	September 8, 2022	Oak O. Thamavong
Module 2 - Existing Terrain Model	April 12	Oak O. Thamavong
Module 3 - Horizontal Alignment	April 12	Oak O. Thamavong
Module 4 - Vertical Alignment	April 12	Oak O. Thamavong
Module 6 - Initial Corridor Modeling	November 23, 2022	Oak O. Thamavong
Module 7 - Plan Geometry	April 12	Oak O. Thamavong
Module 8 - Superelevation	April 12	Oak O. Thamavong
Monthly Agency Call_06-09-22	June 10, 2022	Jason Moore
NCDOT ORD Migration Plan_11-1-2019	July 12, 2022	Jason Moore
ORD Civil Geometry	May 20, 2022	Amye Holley
ORD QuickStart	May 20, 2022	Amye Holley
ORD Workspace Setup Flashcard 10_12	August 20	Jason Moore
ORD-Templates	May 20, 2022	Amye Holley
STREAM Video Captures - How to modify access	May 20, 2022	Amye Holley

# Looking Ahead

## Current OpenX Training Opportunities

- Currently working with project managers, designers, and team leads to determine ORD training needs.
- Will determine what different tracks or “levels” of ORD training to make available to staff.

### NCDOT ORD Training Needs

NCDOT is working to determine what different tracks or "levels" of Open Roads Designer (ORD) training to make available to staff. Please complete this short survey by [September 27](#) to help us identify what ORD training topics should be prioritized in this effort.

**Note:** Most questions in this survey relate to the **ORD** software. There is an additional question towards the end that addresses **additional OpenX software** platforms (Open Bridge Designer, Open Bridge Modeler, Open Ground, Open Rail).

**What entity do you represent? \***

- NCDOT Division
- NCDOT Central - Project Management Unit
- NCDOT Central - Roadway Design Unit
- NCDOT Central - Hydraulics Unit
- NCDOT Central - Structures Management Unit
- NCDOT Central - Utilities Unit
- NCDOT Central - Geotechnical Engineering Unit
- NCDOT Central - Location & Surveys Unit
- NCDOT Central - Mobility & Safety Unit
- NCDOT Central - Environmental Analysis Unit
- NCDOT Central - Photogrammetry
- Private Firm
- Other

**What is the title of your position? \***

- Project Manager
- Team Lead
- Project Development Engineer

# Looking Ahead

## Digital Transformation

### Digital Transformation:

- The transition away from traditional paper/pdf plan sets to digital 3D models (digital twins).
- Includes focus on both design and asset information.



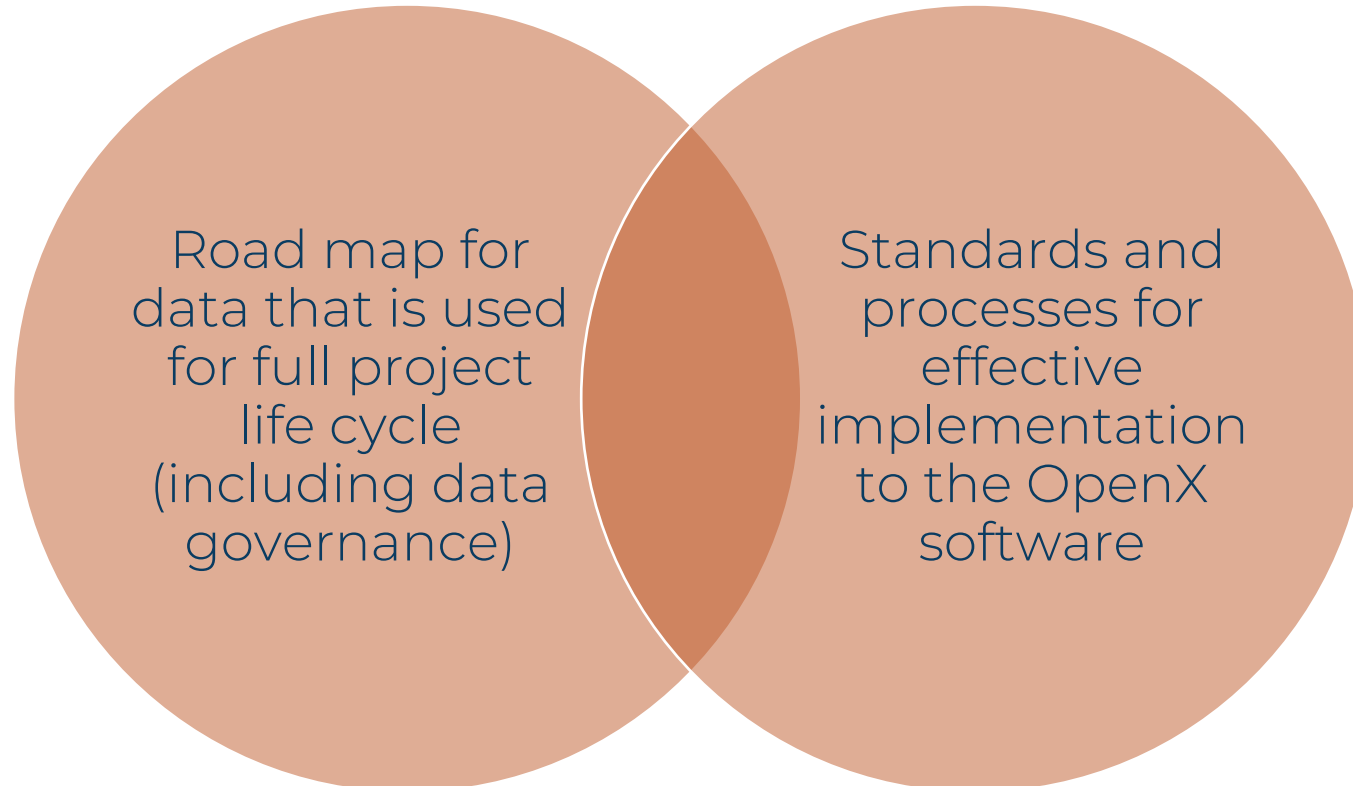
# Looking Ahead

## Digital Transformation

Contrasting the two different initiatives that are both led by steering committees:

Digital Transformation

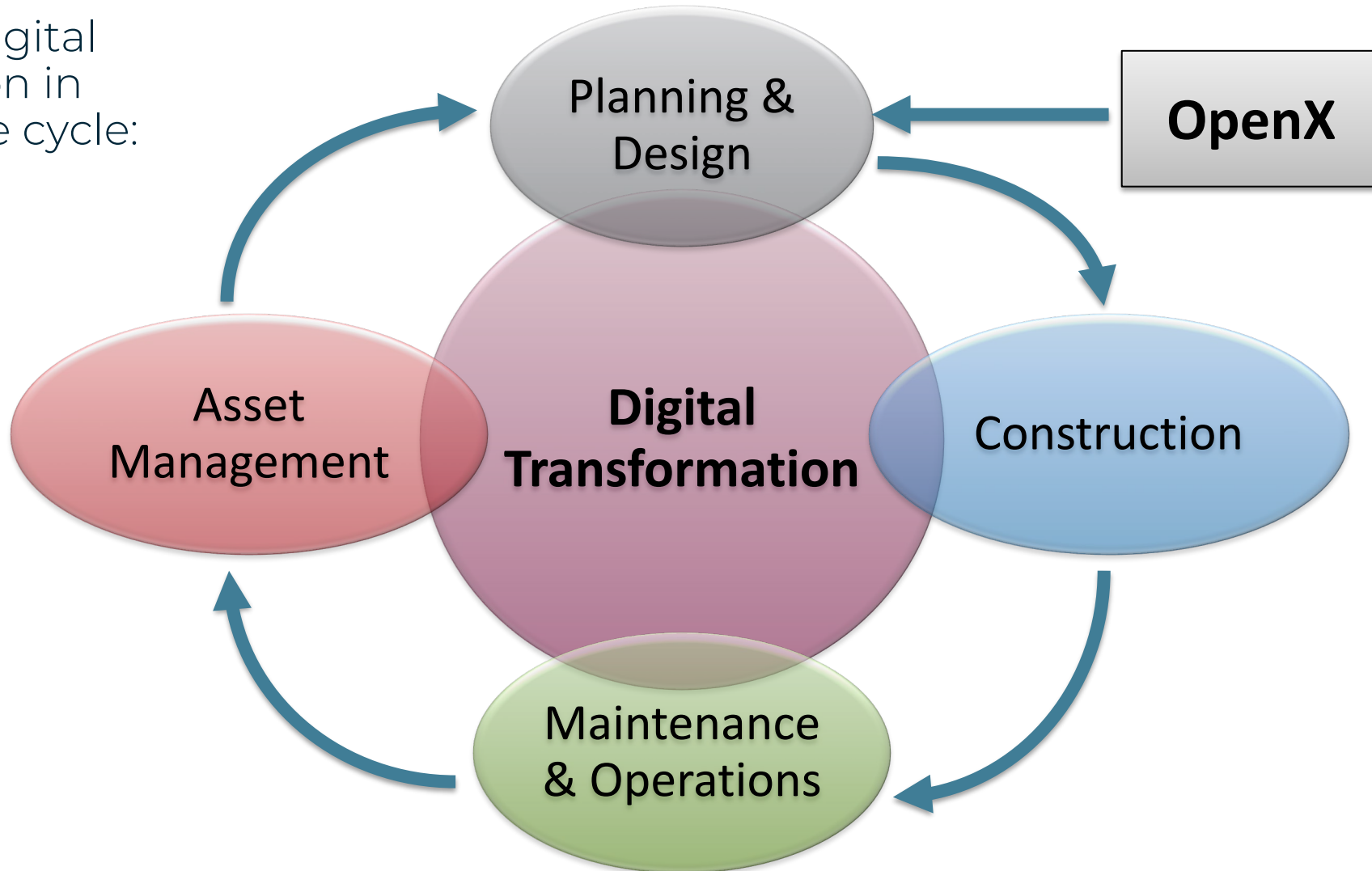
OpenX Implementation



# Looking Ahead

## Digital Transformation

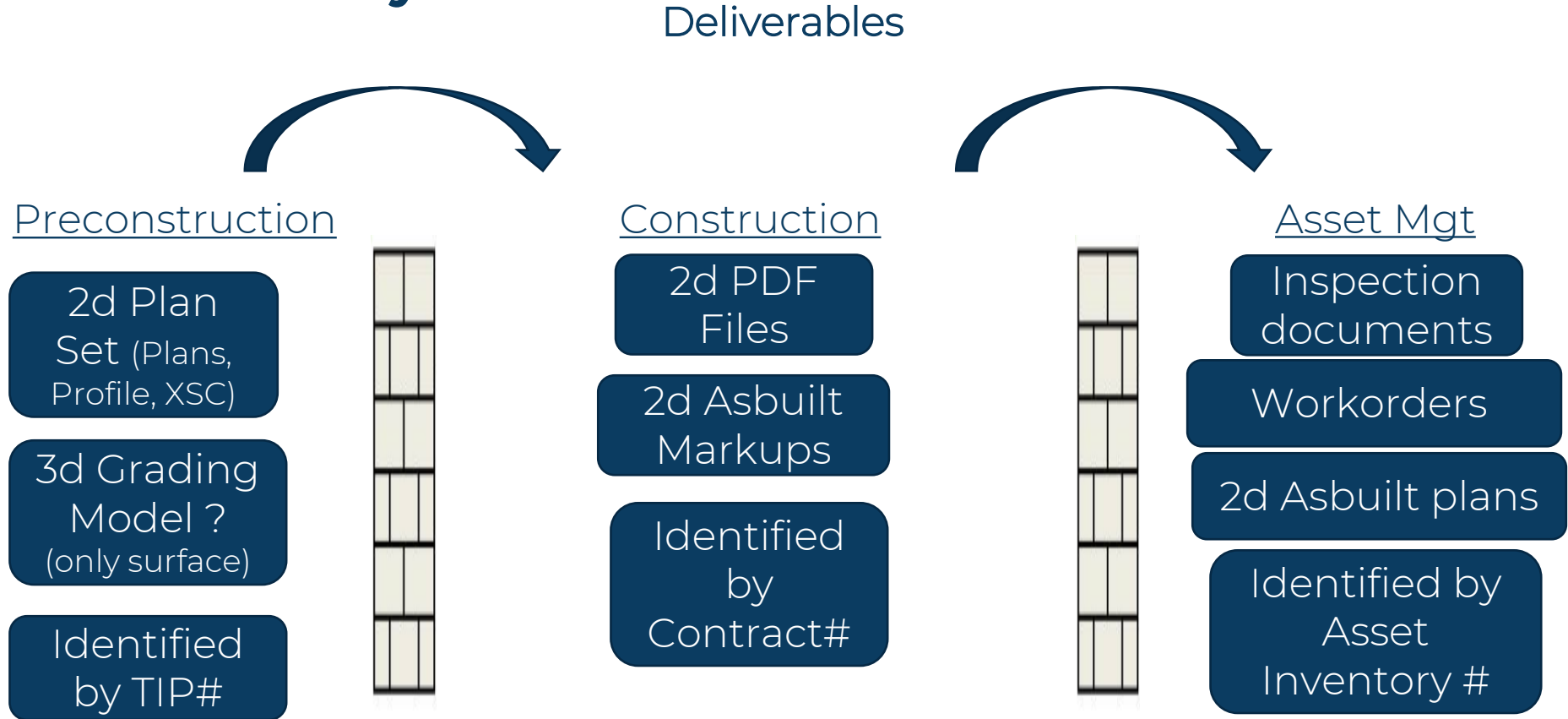
OpenX and Digital Transformation in the project life cycle:



# Looking Ahead

## Digital Transformation

### Where **NCDOT** is today

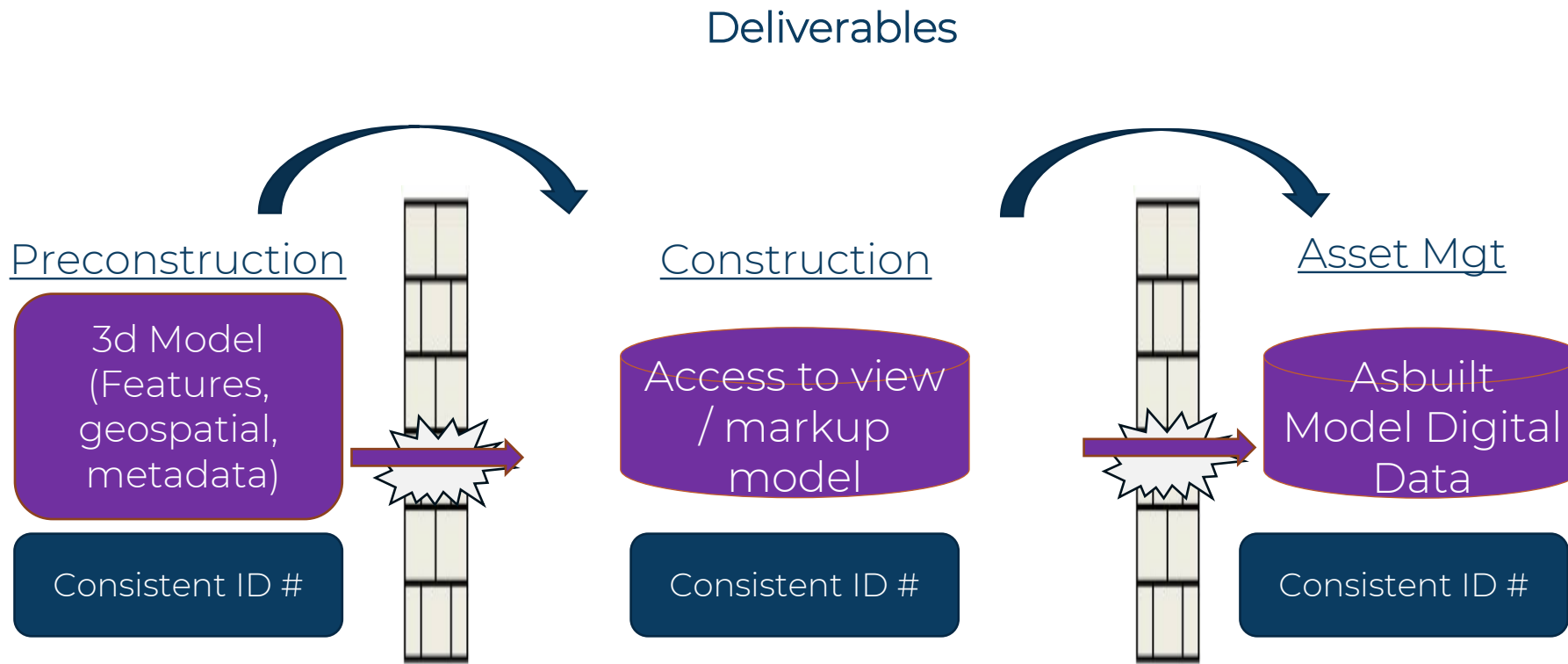




# Looking Ahead

## Digital Transformation

### OpenX Model Delivery

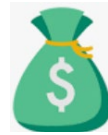
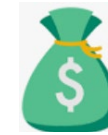


# Looking Ahead

## Digital Transformation

### Benefits of Digital Transformation

- More design information passed to construction = reduced risk
- Modeling of subsurface in design = reduced conflicts in construction
- Better asset visibility and reportability
- Improved inventory tracking
- Digital Twin of what is constructed can provide value years down the road when future changes occur



# Looking Ahead

## Digital Transformation

### NCDOT's Approach to Digital Transformation

- Project Charter – posted on DDT Website
- Executive Sponsorship
- Partner firms to assist
- Work closely with OpenX
- Work closely with Industry
- Not a project but a business transformation

# Conclusion

- The OpenX Steering Committee has been hard at work to guide all NCDOT and its partners in the migration to the OpenX software.
  - e.g., guidance documents, training opportunities, targeted coordination meetings, etc.
- Testing and coordination efforts are still ongoing. We will continue to weigh the risks relative to the latest information available and provide updates as needed.

**We will continue to need your help and cooperation as we move forward.**

- The current efforts to convert 2D files from Microstation V8i to ORD is part of a bigger strategy to fully incorporate best digital transformation practices into a project's life cycle.

# Contact Us

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