



# OpenRail Designer

## Onboarding Guide

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Version: 1.0

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# 1. About OpenRail Designer

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OpenRail Designer introduces a new, comprehensive modeling environment for streamlined project delivery of rail network assets. This environment unifies design and construction from concept through commissioning and completion. The application delivers a high performance, immersive, 3D modeling environment that enables instantaneous and interactive parametric modeling of rail corridors.

OpenRail Designer provides modeling and design capabilities for metro, light rail, commuter rail, or high-speed rail design projects. You can save time on the design and maintenance of track, station, and yard design, as well as overhead line electrification (OLE), while significantly increasing productivity.

- Bring real-world settings to your project by gathering context data quickly from a variety of sources, such as point clouds, 3D reality meshes, terrain data, images, and geospatial information.
- Enable project information sharing across teams, locations, and disciplines with precision and security.
- Perform regression analysis, horizontal and vertical alignment, cant design, and turnout placement to international standards.
- Design OLE systems with customizable design standards and 3D modeling of wires and structures.
- Improve asset quality and reduce rework with a fully localized application.
- Share realistic visualizations with the public and stakeholders to gather feedback, improve public engagements, and speed project approvals.

## 1.1 System Requirement for OpenRail Designer

<b>Operating System</b>	Windows 10 (64-bit) Windows 8 and 8.1 (64-bit) Windows 7 (64-bit)
<b>Processor</b>	Intel® or AMD® processor 1.0 GHz or greater. OpenRail Designer is not supported on a CPU that does not support SSE2.
<b>Memory</b>	8 GB minimum 16 GB recommended. More memory almost always improves performance, particularly when working with larger models.
<b>Hard Disk</b>	9 GB free disk space (which includes the 5.6 GB install footprint for a complete installation)
<b>Screen Resolution</b>	1600 x 1200 or higher

## 2. Quick Start Workflows - OpenRail Designer

This section covers complete workflows, which would help you to understand to use OpenRail Designer in your projects quickly. To learn in detail, please refer to the next section where we have covered each & every topic in detail.

### 2.1 Complete Workflow from Survey to Drawing Production

SN	Topic	Link
1.	Referencing/Importing a Terrain model file	<a href="#">Click Here</a>
2.	Create/Edit Horizontal Alignment	<a href="#">Click Here</a>
3.	Create/Edit Vertical Alignment	<a href="#">Click Here</a>
4.	Create a new Template (Typical Cross Section)	<a href="#">Click Here</a>
5.	Apply End Conditions to Templates (Cut and Fill conditions)	<a href="#">Click Here</a>
6.	Create a Corridor	<a href="#">Click Here</a>
7.	Creating Cross-Section Drawings	<a href="#">Click Here</a>
8.	Creating Plan and Profile Drawings	<a href="#">Click Here</a>
9.	Component Quantities	<a href="#">Click Here</a>
Rail Workflows		
1.	Selecting the Workspace	<a href="#">Click Here</a>
2.	Regression	<a href="#">Click Here</a>
3.	Speed Table	<a href="#">Click Here</a>
4.	Cant	<a href="#">Click Here</a>
5.	Siding Geometry	<a href="#">Click Here</a>
6.	Modeling	<a href="#">Click Here</a>
7.	Create Rails	<a href="#">Click Here</a>
8.	Create Sleepers	<a href="#">Click Here</a>

## 3. Microstation for Civil Designers

### 3.1 Introduction to MicroStation CONNECT Edition

SN	Topic	Description	Link
1	Introduction to MicroStation CONNECT Edition Course Introduction	In this video, you will learn about the Introduction to MicroStation CONNECT Edition course	<a href="#">Click Here</a>
2	Welcome to MicroStation	In this video you will learn how to access the Welcome Page, interact with a WorkSpace and WorkSet, open and “brand” MicroStation design file to the active WorkSet and navigate the MicroStation CONNECT user interface.	<a href="#">Click Here</a>
3	The MicroStation CONNECT Edition User Interface	Continuing with our introduction to MicroStation, we find ourselves in need of becoming familiar with the basic layout, tool locations, and functionality found in the MicroStation CONNECT Edition. This video covers that information	<a href="#">Click Here</a>
4	Create the Proposed Site Plan	In this video you will learn how to create a MicroStation design file and how to select and apply a seed file when a design file is created	<a href="#">Click Here</a>
5	Explore Design File Settings	In this video you will learn how to view and adjust a variety of design file setting and where the initial settings are derived from. This includes working units, angle readout, geographic coordinate system (GCS) data and also how to save design file settings.	<a href="#">Click Here</a>
3	Models	Models can be either 2D or 3D, will be a design, drawing, or sheet model, and are stored as a discrete object within the design file. It is also possible to have an unlimited number of any model type in a DGN. In this video you will learn the role of models and how they relate to MicroStation design files.	<a href="#">Click Here</a>
4	Working with Multiple Models	MicroStation provides for an unlimited number of models, of any type, to be stored in a DGN file. In this video you will learn to work with multiple models within a design file.	<a href="#">Click Here</a>

### 3.2 Controlling the Display of Designs for Civil Designers

SN	Topic	Description	Link
1	Controlling the Display of Designs Introduction	Now that you have all the necessary project related references attached, you will need to adjust the display in a more detailed way. You will begin by turning on several levels from the Baseline reference and then setting the Annotation Scale to the desired plan scale.	<a href="#">Click Here</a>
2	Reference Project Related Data	Now that you have created your new file derived from the settings of the seed file, you need to reference in the project related data before you can begin the actual layout of the subdivision and proposed site.	<a href="#">Click Here</a>
3	Control the Display by Setting the Level Display	Now that you have all the necessary project related references attached, you will need to adjust the display in a more detailed way. You will begin by turning on several levels from the Baseline reference and then setting the Annotation Scale to the desired plan scale.	<a href="#">Click Here</a>
4	Control the Display by Setting the View Attributes	Now that you have located the proposed site location and displayed the appropriate levels, you will now create a Display Style, which in turn, you will then match it up to a Display Rule. A display rule is a set of display criteria which is processed on any view of a design model. Display rules allow you to control the symbology, appearance, and display of design elements; this control is based on the property of the element, view, model, reference, or file.	<a href="#">Click Here</a>
5	Clip Volume	Due to the extent of the attached references, the total viewable area is far more than necessary. You will need to limit the range of these graphics that you are viewing by creating a clip volume which will limit an area to be displayed to just around the vicinity of your subdivision.	<a href="#">Click Here</a>
6	Creating a Saved View	Now that you have changed many of the settings relative to the view, to preserve all these, it is a great idea to create what is called a Saved View. A Saved View is a view definition, which includes the level display for both the active model and references, the clip volume, and other view attributes.	<a href="#">Click Here</a>

### 3.3 Using General Tools in MicroStation CONNECT Edition for the Civil Designer

SN	Topic	Description	Link
1	Using General Tools Course Introduction	This video is an introduction to the Using General Tools course. You will learn what will be covered in the following videos, and in the course itself.	<a href="#">Click Here</a>
2	Basic Tool Operations	MicroStation contains a variety of different types of placement tools. These are meant to accommodate different requirements when working with design geometry. Regardless of the active tool, the same basic principles of tool operation may be applied. In this video you will explore basic tool operation.	<a href="#">Click Here</a>
3	Clean Up Utility Line Geometry	When working with designs, it is inevitable that changes to the design geometry will be required. Attributes such as level, color, line style and weight are easily modified in a variety of ways. Modifications can be applied individually or to multiple elements. In this video you will observe utility line information and make changes to element attributes.	<a href="#">Click Here</a>
4	Verify Your Work	As a member of the site development team, you have been tasked with verifying the preliminary building design to better determine the building placement on the site. This will be done by measuring the proposed building that was obtained from the architect.	<a href="#">Click Here</a>

### 3.4 Drawing with MicroStation for Civil Designers

SN	Topic	Description	Link
1	Drawing with MicroStation Introduction	This video is an overview for the video series that makes up the course. In this course, you will discover how to create new drawing elements efficiently and accurately using tools such as the Place SmartLine	<a href="#">Click Here</a>
2	Creating the Subdivision Road	In this video you will lay out the roadway centerline for the subdivision utilizing the Place SmartLine tool, aided by AccuDraw for precision placement of the points. Along with that you will also incorporate some of the shortcuts that are built into AccuDraw that make placement more streamlined and efficient.	<a href="#">Click Here</a>
3	Offsetting to Create the Roadway Features	Continuing in the workflow, now that you have constructed the roadway centerline for the subdivision, in this video you will offset this centerline to create roadway features.	<a href="#">Click Here</a>
4	Creating the Proposed Building's Parcel	In this video, you will construct the parcel for the proposed building site with the subdivision.	<a href="#">Click Here</a>
5	Creating the Centerline for the Proposed Building Site	In this final video of the course, you will layout the centerline for the proposed building site	<a href="#">Click Here</a>

### 3.5 Manipulating and Modifying Elements for Civil Designers

SN	Topic	Description	Link
1	Manipulating and Modifying Elements Introduction	This video is an overview for the video series that makes up the course. In this course, you will discover how to manipulate and modify existing elements by using the tools in the Manipulate toolbox and the Modify toolbox.	<a href="#">Click Here</a>
2	Move and Rotate	In this video you will begin by bringing in the proposed building footprint. With a setting toggled in the References dialog, you can use the standard Manipulate Element tools to operate on a reference as if it were a element such as a line or a shape. In this case, you will move and rotate the building onto the building pad.	<a href="#">Click Here</a>
3	Copy Parallel	In this video you will begin the layout of your proposed site plan by utilizing the Copy Parallel tool to construct curb lines and parking stalls. You can use this tool when you want to move or copy an element, or portion of an element, parallel to the original.	<a href="#">Click Here</a>
4	Copy	In this video you will continue using the Copy Parallel tool to layout the parking lot features but will also start utilizing the Copy Element tool as well. Here you will use along with it, AccuDraw for precision placement.	<a href="#">Click Here</a>
5	Fillet and Trim	In this video, you start to use some of the Modification tools such as the Construct Circular Fillet tool to further layout out the proposed site plan. You will also use trimming tools such as Trim to Intersection and Trim Multiple to clean up extra line work.	<a href="#">Click Here</a>
6	Mirror	The Mirror tool can be used to mirror elements about a horizontal line, a vertical line, or a user-defined line, or about the element center. In this video, you will utilize the Mirror tool to create a mirrored copy of the geometry that you've created thus far to quickly generate the other half of the site.	<a href="#">Click Here</a>



7	Shorten Elements with Trim to Element	The Trim to Element tool lets you extend or shorten an open element, or multiple open elements simultaneously, to their intersection with one other element.	<a href="#">Click Here</a>
8	Break Element	Break Element is used to remove unwanted portions of elements. In this section, continue to create the proposed curbing near the entrances. Then you will utilize the Break Element tool to break up the continuous line work of the curbing at the proposed site and subdivision's entrances in order to then create the curb returns	<a href="#">Click Here</a>
9	Construct Chamfer	To construct a chamfer between two lines or adjacent segments of a line string or shape, you can use the Construct Chamfer tool. In this video you will use the Construct Chamfer to clean up the property line at the entrance of the subdivision.	<a href="#">Click Here</a>

### 3.6 Working with Cells for Civil Designers

SN	Topic	Description	Link
1	Working with Cells Course Introduction	This video is an introduction to the Working with Cells course.	<a href="#">Click Here</a>
2	Place Landscaping Cells	Placing symbols, or cells, is performed using the Place Active Cell tool. There are a variety of settings to control size, rotation, and AccuDraw can also be useful in aligning cells correctly. In this video you will place landscaping cells on the proposed site plan.	<a href="#">Click Here</a>
3	Creating Site Development Symbols	Symbols provide the ability to place objects in your designs that may be used to identify specific features without the need to recreate these graphics each time they are used. In MicroStation, symbols are known as cells and are stored in cell libraries. In this video a cell library will be created, and cells added to the library.	<a href="#">Click Here</a>
4	Landscape and Lighting Cells	In the previous video, cells were created for a bollard, wheel stop, accessibility symbol and more. Those cells will now be used to embellish the proposed site design.	<a href="#">Click Here</a>
5	Placing Drainage Symbols	The Proposed Site Plan is almost complete. To complete the cell placement, drainage symbols need to be added to the drainage system and bollards placed next to the dumpster pad. In this video you will use the Place Active Line Terminator command to place drainage cells.	<a href="#">Click Here</a>
6	Updating Existing Cells	The End Wall cell requires several modifications. Extra lines need to be removed and intersections cleaned up. This cell, however, has already been used in the proposed site design. In this video the cell will be edited and the existing instances of the cell in the site plan updated.	<a href="#">Click Here</a>
7	Document a Cell Library	Documenting the content of a cell library is often a necessary task but can be a tedious process that is prone to errors and update issues. If new cells are added or the graphics of a cell are updated, the documentation needs to be updated as well. In this video we will "document" a cell library using Place Cell Index	<a href="#">Click Here</a>

## 4. Setting up the Workspace (CAD Administrator)

### 4.1 Workspace Development

SN	Topic	Description	Link
1	Workspace Development Overview	Learn why you need a Workspace and how Bentley recommends you setup base standards, company/department standards, and project standards to ensure maximum flexibility to share WorkSpaces. You will also learn how to use the Workspaces delivered with OpenRail designer as a template when creating your Workspace.	<a href="#">Click Here</a>
2	Demonstration of Workspace Setup	A demonstration of using the Workspace delivered with OpenRail Designer to create a new base standards Workspace and a Project environment.	<a href="#">Click Here</a>

### 4.2 Step 1 - Understanding Feature Definitions

SN	Topic	Description	Link
1	Exploring Feature Definitions and Symbolologies	Gain a general understanding of the types and organizational structure of the OpenRail Designer CONNECT Edition features and their symbolologies.	<a href="#">Click Here</a>
2	Point Feature Definition and Symbology Properties	Gain a general understanding of a Point feature definition and corresponding properties.	<a href="#">Click Here</a>
3	Linear Feature Definition and Symbology Properties	Gain a general understanding of a Linear feature definition and corresponding properties.	<a href="#">Click Here</a>
4	Alignment Feature Definition and Symbology Properties	Gain a general understanding of an Alignment feature definition and corresponding properties.	<a href="#">Click Here</a>
5	Mesh Feature Definition and Symbology Properties	Gain a general understanding of a Mesh feature definition and corresponding properties.	<a href="#">Click Here</a>
6	Terrain Feature Definition and Symbology Properties	Gain a general understanding of a Terrain feature definition and corresponding properties.	<a href="#">Click Here</a>
7	Superelevation Feature Definition and Symbology Properties	Gain a general understanding of a Superelevation feature definition and corresponding properties.	<a href="#">Click Here</a>
8	Surface Template Feature Definition and Symbology Properties	Gain a general understanding of a Surface Template feature definition and corresponding properties.	<a href="#">Click Here</a>
9	Corridor Feature Definition and Symbology Properties	Gain a general understanding of a Corridor feature definition and corresponding properties.	<a href="#">Click Here</a>
10	Linear Template Feature Definition and Symbology Properties	Gain a general understanding of a Linear Template feature definition and corresponding properties.	<a href="#">Click Here</a>

### 4.3 Step 2 - Preparing the folder structure

SN	Topic	Description	Link
1	Understanding the Workspace Folder Structure	Learn the basics behind the delivered folder structure and how to implement your specific standards.	<a href="#">Click Here</a>
2	Creating a Customized Network Workspace Environment	Learn how to develop your customized workspace for a network environment.	<a href="#">Click Here</a>
3	Preparing the Server Folders	Learn how to prepare your server folder structure for standards migration.	<a href="#">Click Here</a>

## 4.4 Step 3 - Preparing the files for feature migration

SN	Topic	Description	Link
1	Creating Seed Files	Learn how to create new seed files for OpenRail Designer CONNECT Edition.	<a href="#">Click Here</a>
2	Adding Custom Linestyles	Learn how to bring forward your custom linestyles from SELECTseries 4.	<a href="#">Click Here</a>
3	Preparing the Levels and Element Templates	Learn how to bring forward your levels and element templates from SELECTseries 4.	<a href="#">Click Here</a>
4	Preparing the Graphical Filters	Learn how to bring forward your graphical filters from SELECTseries 4.	<a href="#">Click Here</a>
5	Preparing the Design Standards	Learn how to bring forward your design standards from SELECTseries 4.	<a href="#">Click Here</a>

## 4.5 Step 4 - Feature Migration

SN	Topic	Description	Link
1	Converting SELECTseries 4 Feature Definitions	Upgrade SELECTseries 4 DGN Library files to OpenRail Designer CONNECT Edition.	<a href="#">Click Here</a>
2	Preparing for Bulk Editing Feature Definitions	Learn how to prepare for bulk editing all of your OpenRail Designer CONNECT Edition Feature Definitions.	<a href="#">Click Here</a>
3	Exporting Feature Definitions and Symbologies	Learn how to export Feature Definitions and Feature Symbologies from OpenRail Designer CONNECT Edition.	<a href="#">Click Here</a>
4	Converting the XML files to Excel	Learn how to convert exported Feature Definition and Symbology XML files to Microsoft Excel files using the provided application.	<a href="#">Click Here</a>
5	Bulk Editing the Feature Symbologies	Learn how to bulk edit OpenRail Designer CONNECT Edition Feature Symbologies using Microsoft Excel. Additionally, see how to merge in some of the new OpenRail Designer feature types.	<a href="#">Click Here</a>
6	Bulk Editing the Feature Definitions	Learn how to bulk edit OpenRail Designer CONNECT Edition Feature Definitions using Microsoft Excel. Additionally, see how to merge in some of the new OpenRail Designer feature types.	<a href="#">Click Here</a>
7	Bulk Editing Element Templates	Learn how to bulk edit MicroStation Element Templates.	<a href="#">Click Here</a>
8	Importing the New Feature Definitions and Symbologies	Learn how to import OpenRail Designer CONNECT Edition Feature Definitions and Symbologies.	<a href="#">Click Here</a>
9	Finalizing the Folder Structure	Learn how to finalize your folder structure.	<a href="#">Click Here</a>

## 4.6 Step 5 – Annotation

SN	Topic	Description	Link
1	Creating Text Styles	Discover the Text Styles included in the delivered workspace and their requirements for creating Text Favorites and Annotation Groups.	<a href="#">Click Here</a>
2	Creating Element Templates	Discover the Element Templates included in the delivered workspace and their requirements for creating Annotation Groups. In addition, learn how to copy Element Templates to your DGNLib.	<a href="#">Click Here</a>
3	Understanding MicroStation Text Favorites	Learn how Text Favorites are created and their functionality.	<a href="#">Click Here</a>

4	Understanding OpenRail Labeler	Learn the basic functionalities of the OpenRail Designer CONNECT Edition Labeler.	<a href="#">Click Here</a>
5	Creating Annotation Cells	Learn how to create the Annotation Cells used for the OpenRail Designer CONNECT Edition Labeler.	<a href="#">Click Here</a>
6	Creating Dimension Styles	Learn how to create the Dimension Styles used for the OpenRail Designer CONNECT Edition Labeler.	<a href="#">Click Here</a>
7	Introduction to Annotation Groups	Discover all of the aspects of Annotation Groups such as the different types, properties, and how to create.	<a href="#">Click Here</a>
8	Annotation Group Importing and Exporting	Learn how to import and export Annotation Groups from one DGNLib to another.	<a href="#">Click Here</a>
9	Modifying the Features to use Annotation Groups	Learn how to modify the Feature Symbolologies to include the Annotation Groups for sheet creation.	<a href="#">Click Here</a>

## 4.7 Step 6 – Survey Annotation

SN	Topic	Description	Link
1	Control Point Annotation	Discover how to setup annotation for a mapped Survey Point. This example uses a control point.	<a href="#">Click Here</a>
2	Size and Type Annotation	Discover how to use field attribution to custom label the size and type of mapped survey items such as trees.	<a href="#">Click Here</a>
3	Building Annotation	Discover how to use field attribution to custom label buildings. In this example, the number of stories and frame type will be shown.	<a href="#">Click Here</a>
4	Feature Description Annotation	Discover how to setup annotation along the center of a mapped Survey Chain. This shows how to label the Survey Feature's description.	<a href="#">Click Here</a>
5	Culvert Annotation	Discover how to setup annotation for a mapped survey culvert. This includes slope, linear 3D length, flow arrow showing flow direction, upstream and down stream inverts and pipe size and type.	<a href="#">Click Here</a>

## 4.8 Step 7 – Drawing Production Sheet

SN	Topic	Description	Link
1	Drawing Seed Creation	Learn how to create the seed DGN libraries to use for drawing production - plan, profile, and cross section dgn files.	<a href="#">Click Here</a>
2	Sheet Seed Creation	Learn how to create the sheet seed file to use for all sheets.	<a href="#">Click Here</a>
3	Adding Configuration Variables	Learn which configuration variables to modify for your specific seed file names.	<a href="#">Click Here</a>
4	Border Cell Library	Learn how to develop the title block cells.	<a href="#">Click Here</a>
5	Creating Plan or Profile Start Seed	Learn how to create the seed file to use for all plan and or profile sheet combinations.	<a href="#">Click Here</a>
6	Creating Plan-Plan Sheet Definition DGNLib	Learn how to create the seed file for creating plan-plan combination sheets.	<a href="#">Click Here</a>
7	Creating Plan Sheet Definition DGNLib	Learn how to create the seed file for creating plan only sheets.	<a href="#">Click Here</a>
8	Creating Profile Sheet Definition DGNLib	Learn how to create the seed file for creating profile only sheets.	<a href="#">Click Here</a>
9	Creating Profile-Profile Sheet Definition DGNLib	Learn how to create the seed file for creating profile-profile combination sheets.	<a href="#">Click Here</a>

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10	Creating Plan and Profile Sheet Definition DGNLib	Learn how to create the seed file for creating plan-profile combination sheets.	<a href="#">Click Here</a>
11	Creating Cross Section Start Seed	Learn how to create the seed file to use for cross section sheets.	<a href="#">Click Here</a>
12	Creating Cross Section Sheet Definition DGNLib	Learn how to create the seed file for creating cross section sheets.	<a href="#">Click Here</a>

## 5. End to End Training - OpenRail Designer

This section covers all the topic about OpenRail Designer starting from getting familiar with new interface until delivering the sheets in the best possible way

### 5.1 Navigating Interface

SN	Topic	Description	Link
1	Selecting the Workspace, Workset, and Opening the Class dgn File	See how to Start a work session, selecting the Workspace and Workset, and opening the class dgn file	<a href="#">Click Here</a>
2	Can I work through the class if I don't have the workspace? Yes.	Workspaces and Worksets control file and software settings. You can complete this class (review a "random" file), regardless of whether your workspace matches that used to create the file	<a href="#">Click Here</a>
3	Help Dialogs	Learn how to open the "traditional" Help Dialogs.	<a href="#">Click Here</a>
4	CONNECT Advisor - an Introduction	CONNECT Advisor will transform how you learn. Here's a very brief introduction and how to get help.	<a href="#">Click Here</a>
5	Ribbons, Searching the Ribbons, and Quick Access	See how the Tool Ribbons are organized. Learn how to search for tools. See the Quick Access Toolbar.	<a href="#">Click Here</a>
6	Why Do Files have 2D and 3D Models in them?	OpenRail/OpenRail files often have 2D and 3D Models in them. Why two? Civil Engineering 3D Geometry is defined by combining two separate rule systems: Horizontal and Vertical (often arc-based and parabola-based, respectively). By storing the horizontal graphics and rules in 2D Models, Profile graphics and rules in separate 2D Models, and the resulting 3D graphics in a 3D Model, OpenRail provides a very clean, intuitive design and information modeling environment.	<a href="#">Click Here</a>
7	Multiple Views, Multiple Models	Any of the Eight Views can "look into" any of the Models available in the design file (as shown in the Models dialog).	<a href="#">Click Here</a>
8	View Groups: Manage Multiple Views and Models	View Groups are a way to manage multiple Views, Models, Display Styles, and so forth. "Multiple Models" is the default for training.	<a href="#">Click Here</a>
9	Customize How the Data looks via Display Styles	Display Styles allow you to change how the data looks. From Photorealistic (Smooth) to simple (Wireframe), the native 3D Immersive Design Environment can be customized to enrich your design and evaluation experience	<a href="#">Click Here</a>
10	Hover over a Graphic to Find out about It	Hovering over a graphic reveals a tooltip. All elements will show a Type and Level. OpenRail Features will additional show its Name, Feature Definition, and Active Profile, if any	<a href="#">Click Here</a>
11	Click: The Amazing Heads-Up Display	Click on a Feature triggers the Heads-Up Display (HUD) - an amazing evaluation and editing tool. Designed to provide access to a wide range of editing capabilities without having to find toolsets, it also is an intuitive evaluation, troubleshooting and documentation tool. You can learn to read how a feature was built from the HUD.	<a href="#">Click Here</a>

12	Click and Hover to Open a Civil Context Menu	OpenRail/OpenRail provides a Civil Engineering-oriented Context Menu for all graphics.	<a href="#">Click Here</a>
13	Exploring the Explorer	The Explorer is a core tool in reviewing and editing OpenRail/OpenRail Features and Settings. It provides shortcuts to capabilities beyond what is available in the Properties dialog. For example, it allows you to search for an Element by Name, zoom to it or Isolate it from the view of other Features.	<a href="#">Click Here</a>
14	A "Project File" Typically has a lot of Reference Files	This video shows us opening the Geometry.Dgn - a typical "Project" file. The "Introducing Geometry" file was this file, but with all the Reference files turned off for clarity. "Real" files typically have a LOT of information in them, much of which is in read-only Reference files.	<a href="#">Click Here</a>
15	Reference Files - Turning Display On and Off	When exploring a design file, it is often good to know what's in the (editable) Active file and what is in (non-editable) Reference Files. Here we show how to turn off the Display of Reference Files.	<a href="#">Click Here</a>
16	Reference Files - Turning Snap and Locates On and Off	Sometimes you want to see a Reference File, but don't want to "interact" with it. You can set its Snap and Locate toggles to prevent snapping to or being able to select a reference element.	<a href="#">Click Here</a>
17	Reference Files - Making them "Subtle"	Sometimes you have a great deal of reference graphics that you need to see, but you want to make them "blend into the background", or be less prominent or more subtle, so that they're less "distracting". Here we show some techniques that allow the active file graphics to stand out, while still seeing as much of the reference data that you need.	<a href="#">Click Here</a>
18	Reference Files - Turning Off Properties like Lineweight	Another way to make Reference Files less "intrusive" is using Reference Presentation. You can turn off properties like Lineweight or Linestyle or object types like Text, Fill or Patterns.	<a href="#">Click Here</a>
19	Reference Files - Making them "Subtle"	Sometimes you have a great deal of reference graphics that you need to see, but you want to make them "blend into the background", or be less prominent or more subtle, so that they're less "distracting". Here we show some techniques that allow the active file graphics to stand out, while still seeing as much of the reference data that you need.	<a href="#">Click Here</a>

## 5.2 Terrain

SN	Topic	Description	Link
1	Introduction to Terrain Display	An overview of terrain models and terrain display, and a review of the ribbon interface.	<a href="#">Click Here</a>
2	Displaying Terrain Features and Changing Contour Intervals	Learn how to toggle on and off the display of terrain features and change contour intervals using the context sensitive menu and the Properties window.	<a href="#">Click Here</a>
3	Using Feature Definitions to Display Terrains	Learn how to set and change the terrain model feature definition to control how the terrain is displayed.	<a href="#">Click Here</a>
4	Referencing a 3D Terrain Model to a 2D Project File	Learn how to create a 2D project file and reference in a 3D terrain model, set the terrain active, and view the 2D and 3D models.	<a href="#">Click Here</a>
5	Using Override Symbolology and Element Templates	Learn how to control the display of a referenced terrain model with element templates and display styles.	<a href="#">Click Here</a>
6	Label Contours and View Background Map	Learn how to add manual contour labels and display a background map with streets and aerial imagery.	<a href="#">Click Here</a>
7	Label and Analyze Terrain Points	Learn how to manually label and analyze terrain points.	<a href="#">Click Here</a>
8	Viewing and Clipping LIDAR Data	In this video, you will learn how to extract a project specific POD from a larger LiDAR data set and save it to a separate file.	<a href="#">Click Here</a>
9	Filtering and Editing LIDAR Data	In this video, you will learn how to use the Ground Extraction tools to filter a large majority of unwanted shots and manually edit the rest to produce a final Terrain Model.	<a href="#">Click Here</a>

## 5.3 Understanding Georeferenced Coordinate Systems & LIDAR

SN	Topic	Description	Link
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1	Reality Modeling Lecture	In this video we discuss some of the common issues not setting the GCS can cause, including the differences between systems and what they have in common.	<a href="#">Click Here</a>
2	Reality Modeling Walkthrough	In this video we review the Geographic Library and how to apply a specific GCS to your project	<a href="#">Click Here</a>
3	LiDAR Terrain Lecture	In this video we discuss one method to take a raw LiDAR data file and create a terrain model useful to our project.	<a href="#">Click Here</a>
4	Lidar Terrain Clip	In this video we learn how to take a large, raw LiDAR file from a clearinghouse and clip it to an area specific to our project.	<a href="#">Click Here</a>
5	Lidar Terrain Edit	In this video we discuss the problem(s) with an unclassified LiDAR file and the process to utilize it.	<a href="#">Click Here</a>
6	Lidar Terrain Final	In this video we discuss how to create the final terrain model from the edited points.	<a href="#">Click Here</a>

## 5.4 Geometry Design

SN	Topic	Description	Link
1	Introduction to QuickStart for OpenRail Designer Geometry	: In this exercise, you will learn how to select the proper WorkSpace and WorkSet, create a new dgn and review the ribbon interface.	<a href="#">Click Here</a>
2	Create Horizontal Tangent Elements	In this exercise, you will learn how to create horizontal geometric elements.	<a href="#">Click Here</a>
3	Create/Edit Horizontal Curves and Create Horizontal Alignment	In this exercise, you will learn how to create horizontal curve geometric elements and also how to create the horizontal alignment.	<a href="#">Click Here</a>
4	OpenRail Model Explorer and Horizontal Geometry Reports	In this exercise, you will learn how to review geometric elements stored in the dgn file and also how to create a horizontal geometry report of your alignment.	<a href="#">Click Here</a>
5	Define Stationing and Annotation	In this exercise, you will learn how to define the horizontal alignment stationing and also how to annotate the alignment.	<a href="#">Click Here</a>
6	Existing Terrain Model and Define 2D and 3D Views	In this exercise, you will learn how to attach the existing terrain model, set the terrain model active and define 2D and 3D views.	<a href="#">Click Here</a>
7	Define Profile Model View	In this exercise, you will learn how to define a profile model view.	<a href="#">Click Here</a>
8	Create, Edit, and Review Vertical Geometry	In this exercise, you will learn how to create, edit and review vertical geometry.	<a href="#">Click Here</a>

## 5.5 Beyond Centerline Geometry

SN	Topic	Description	Link
1	OpenRail Remembers. Shown in 4 Lines	What's the fundamental differentiator between OpenRail Features and plain graphics? OpenRail Remembers! Four Lines in two Tees drive home the difference in 90 seconds. You will never see plain graphics the same way again.	<a href="#">Click Here</a>
2	Obedient Road Features vs. Oblivious Graphics	Here we manipulate a road with the right side built with plain graphics and the left side build with smart OpenRail tools. The result: OpenRail Remembers!	<a href="#">Click Here</a>
3	Heads Up Display and Properties: everything visible and editable	: The Properties dialog extends what you can see and do with the Heads-Up Display. Simply clicking a feature shows its relationships and values.	<a href="#">Click Here</a>
4	Edges of Pavement: Very Fast and Really Smart	Here we show how fast we can get (smart) Pavement Edges offset from Centerlines.	<a href="#">Click Here</a>
5	Curb Returns: Very Fast and Really Smart	Here we show how fast we can get (smart) Curb Returns using the Simple Arc tool.	<a href="#">Click Here</a>
6	Part of my line is gone: what the heck?	Gaps and Intervals: What they are and how to edit. Gaps are created when the original feature is truncated, fillet or otherwise has a part that needs to be invisible. We show how to see the gaps and how to edit the original element.	<a href="#">Click Here</a>
7	Introducing Taper #1: Variable Offset Tapers	Your engineering will require a taper that's controlled either by the Offset Values or the Taper Ratio. Here we explore how to build tapers where the Offsets rule.	<a href="#">Click Here</a>
8	I want just a part of an element offset...	When you only need part of a feature offset, use Single Offset Partial to create it. Use Snaps when you can to establish relationships.	<a href="#">Click Here</a>
9	Manipulating a Pavement Edge with a Taper	Pavement Edges tend to have a lot of dependencies (relationships). Here we edit a lot of things to show how the taper behaves in a manner we would expect (honoring our Design Intent).	<a href="#">Click Here</a>



10	Introducing Taper #2: Ratio Offset Tapers	Your engineering will require a taper that's controlled either by the Offset Values or the Taper Ratio. Here we explore how to build tapers where the Ratio rules.	<a href="#">Click Here</a>
11	Another Curb Return	You've mastered this, but the next video is cool.	<a href="#">Click Here</a>
12	Curb Return: 3-Center Arc	See how easy it is to Place a 3-Center Arc.	<a href="#">Click Here</a>
13	Changing a Simple Arc to Something More Impressive	You put in a Simple Arc, but need a 3-Center Arc or need Spirals? No problem: you can use the Properties dialog to make changes. All Arcs are stored with all the fields required to model even the most complex curve. The Properties dialog makes it easy to make it what you want it.	<a href="#">Click Here</a>
14	Creating Cul-de-Sacs	Creating a Cul-de-Sac in less than a minute.	<a href="#">Click Here</a>
15	Driveway #1: No tie-in to existing	Create a "smart" driveway perpendicular to a road. The driveway can be "slid" along the road, maintaining its (perpendicular) geometry. You can adjust the Skew angle if desired. This technique works for larger side road as well.	<a href="#">Click Here</a>
16	Driveway #2: Tie into Existing Centerline	Create a driveway of a given length that ties into an existing centerline perpendicular to the road. If the road moves the driveway remains perpendicular to the road from a new location along the existing centerline.	<a href="#">Click Here</a>
17	Driveway #3: Match Existing Edges	Create a driveway of a given length whose new edges match the existing edges. Moving the Road adjusts the portion of the existing edges used.	<a href="#">Click Here</a>
18	Conjunction Junction: Hook Up Individual Elements into a Single Complex Element	Conjunction Junction: Hook Up Individual Elements into a Single Complex Element. Complex by Element groups individual geometry into a single chain. It's easier for us humans to manage long clearly named entities than their individual components. We can use the Manual Method to select each component or let Automatic connect them for you.	<a href="#">Click Here</a>
19	Using Complex Redefine	This video shows how to use the Complex Redefine tool to redefine a portion of the Pike Rd. Alignment	<a href="#">Click Here</a>
20	Create Geometry Using Civil AccuDraw	This video shows how to create lines and arcs using Civil AccuDraw and snaps.	<a href="#">Click Here</a>
21	Editing Geometry with the Table Editor	This video shows how to use the Table Editor to make changes to the horizontal geometry.	<a href="#">Click Here</a>
22	Applying and Verifying Design Standards	This video shows how to apply design standards to the horizontal alignment using the Design Standard tool and also how use the Civil Message Center to review any errors or warnings and how to fix them.	<a href="#">Click Here</a>
23	Creating Vertical Curves	This video shows how to create vertical curves.	<a href="#">Click Here</a>

## 5.6 Using and Editing Templates

SN	Topic	Description	Link
1	Welcome and Workspace Setup	This lecture introduces the basic theory behind templates and demonstrates how to setup the proper civil training workspace required for the exercises in this course.	<a href="#">Click Here</a>
2	Review and Edit a Template	Learn how to open and navigate the Create Templates dialog to review and edit existing templates, review and modify point properties, and examine point constraints.	<a href="#">Click Here</a>
3	Assemble a New Template Backbone from Existing Components	Learn how to create a new template by assembling existing components already in the template library.	<a href="#">Click Here</a>
4	Using the Template Library Organizer	Use the Template Library Organizer to copy templates from the standards template library to the project template library.	<a href="#">Click Here</a>
5	Adding End Conditions to a Template	Add a fill ditch end condition.	<a href="#">Click Here</a>
6	Modify a Template to Meet Project Needs	Learn to modify a template with a good "backbone" and replace the end conditions to meet project specifications which include a fill ditch solution when limited right of way is available for desirable slope selections to intersect the existing ground.	<a href="#">Click Here</a>
7	Introduction to Templates	Introduction to Template Points, Components and Constraints	<a href="#">Click Here</a>
8	Create a Single Lane Pavement Component	In this exercise, you will learn how to create a simple 12-foot lane component as well how to create parametric constraint labels	<a href="#">Click Here</a>
9	Create a Two-Lane Pavement Component	In this exercise, you will learn how to create a two-lane component by inserting a new point and using a vector offset to control the directional slope of that point.	<a href="#">Click Here</a>
10	Create a Simple Curb	In this exercise, you will learn to create a simple curb component.	<a href="#">Click Here</a>
11	Define Shoulder Rollover Locks	In this exercise, you will learn how to add to a Rollover Lock to a shoulder to set a maximum grade break between the shoulder and the pavement.	<a href="#">Click Here</a>

12	Create a Widening Template that Matches Existing Pavement Slope	In this exercise, you will learn how to create a widening template that matches the existing pavement slope.	<a href="#">Click Here</a>
13	Create a Median Barrier	In this exercise, you will learn how to create a barrier and ensure that it remains a minimum height above both the left and right pavement edges.	<a href="#">Click Here</a>
14	Create Display Rules to Display and Undisplay Median Barrier and Median Ditch	In this exercise, you will learn to create a template that will display a median ditch when the median width is 20' or greater and only display the median barrier when the median width is less than or equal to 20'. You will accomplish this by using Component Display Rules.	<a href="#">Click Here</a>

## 5.7 Defining Template End Conditions

SN	Topic	Description	Link
1	Introduction to End Conditions	Provides a brief introduction into what makes End Conditions tick. How properties and priority feature in the operation and resulting geometry.	<a href="#">Click Here</a>
2	Exercise 1 – Build and Test a Multiple-Slope End Condition (Part One)	In depth instruction on End Conditions and how to create a multiple slope End Condition.	<a href="#">Click Here</a>
3	Exercise 1 – Build and Test a Multiple-Slope End Condition (Part Two)	In depth instruction on End Conditions and how to create a multiple slope End Condition.	<a href="#">Click Here</a>
4	Exercise 2 – Create a Multi-Slope Cut & Fill with a Cut Ditch	Add a cut ditch to a Multiple cut/fill End Condition Solution.	<a href="#">Click Here</a>
5	Exercise 3 – Build a Constant Width/Varying Slope Clear Zone	Build a template that ties into the existing ground at a set offset.	<a href="#">Click Here</a>
6	Exercise 4 – Build and Test a Template that Places a Cut Wall	Build and test an End Condition that places a wall based on a found feature definition.	<a href="#">Click Here</a>
7	Exercise 5 – Create a forced Right of Way End Condition	Build and test an End Condition that places a 2:1 slope unless the Right of Way line feature falls within the tie point.	<a href="#">Click Here</a>

## 5.8 Corridor Modeling for Rail

SN	Topic	Description	Link
1	Introduction to Corridor Modeling for Rail	In this course you will learn how to create a 3D model of the Track Main corridor using the Corridor Modeling tools. The Track Main corridor is a Single Track with Concrete Sleepers. The existing terrain and geometry will be provided as a starting point.	<a href="#">Click Here</a>
2	Create Corridor	In this exercise, you will create a corridor for the Track Main. and assign template drops to the corridor. You will also learn how to view the corridor in 2D & 3D and view the corridor cross sections.	<a href="#">Click Here</a>
3	Create Template Drop	In this exercise, you will learn how to add another Template Drop to the Corridor.	<a href="#">Click Here</a>
4	Modify Corridor	In this exercise, you will learn how to modify the corridor and review the modifications	<a href="#">Click Here</a>
5	Create Cant	In this exercise, you will learn how to create a cant alignment for Main Line Corridor. using the cant tools. Cant is the rotation of the rails on the approach to and through a horizontal curve. Cant tools compute how the rails will transition from normal cant to a fully canted section and back again.	<a href="#">Click Here</a>
6	Review Cross Sections	In this exercise, you will learn how to review the cross sections to ensure that the Cant has been applied correctly to the corridor.	<a href="#">Click Here</a>

## 5.9 Regression Analysis- Rail

SN	Topic	Description	Link
1	Create the Left and Right Rail DGN Files		<a href="#">Click Here</a>
2	Import the Rail Points and Create a Sorted Line	In this video you will learn how to import the existing horizontal rail points from an ASCII file using the import wizard. You will also learn how to create a sorted line to represent both the left and right rails to a set of criteria.	<a href="#">Click Here</a>

3	Create the Horizontal Curvature Diagram	In this exercise, you will learn how to convert the rails to a centerline and also how to create and view the Horizontal Curvature Diagram.	<a href="#">Click Here</a>
4	Create the Rail Centerline Alignment	you will learn how to use the Single Horizontal Regression tool to create the tangent and curve elements. You will also learn how to create the connecting spiral elements and how to create the rail centerline alignment.	<a href="#">Click Here</a>
5	Reporting and Annotating	you will learn how to create horizontal alignment reports and also how to annotate the rail alignment.	<a href="#">Click Here</a>
6	Create Vertical Alignment Using Define Profile by Best Fit	you will learn how to create a vertical alignment using the Design Profile by Best Fit tools	<a href="#">Click Here</a>

## 5.10 Creating a Rail Siding yard

SN	Topic	Description	Link
1	Create Siding Yard Tracks	In this exercise, you will learn how to use the geometry tools to create two siding tracks both horizontally and vertically. We will use Civil AccuDraw to place the tracks at a set distance along the main track and with a set offset.	<a href="#">Click Here</a>
2	Getting Started	In this exercise, you will learn to start OpenRail Designer, select the proper WorkSpace and WorkSet.	<a href="#">Click Here</a>
3	Place Turnouts, Place Crossover and Place Crossing	you will learn how to place a single turnout, place diamond, single slip crossing, place crossover geometry, between 2 parallel tracks. Also, you learn how to connect the turnouts, crossover, and crossings to other tracks.	<a href="#">Click Here</a>
4	Create Complex Geometry	we will join the different sections of track and turnouts into one piece of geometry. To do this we will use the Complex Geometry > Complex By Element tool.	<a href="#">Click Here</a>
5	Create Corridor for Siding Yard	In this exercise, you will learn to create a Corridor for the Yard using the Corridor Tools.	<a href="#">Click Here</a>
6	Add Rails and Sleepers	In this exercise, you will learn to add Rails and Sleepers to the Corridor for the Yard using the Rail > Miscellaneous Tools.	<a href="#">Click Here</a>

## 5.11 Modeling - Retaining Walls, Benching, and Complex End Conditions

SN	Topic	Description	Link
1	General Principles	An overview of general modeling principles.	<a href="#">Click Here</a>
2	Variable Slope - Fixed Width	Learn how to model a slope that ties to a fixed width such as a right of way or wall.	<a href="#">Click Here</a>
3	Fixed Depth and Width Ditch	Learn how to model a ditch with a fixed depth and width.	<a href="#">Click Here</a>
4	Retaining Walls	Learn to model a variable height retaining walls.	<a href="#">Click Here</a>
5	Stepped Retaining Walls	Learn to model a stepped retaining wall that increases in height at a fixed interval.	<a href="#">Click Here</a>
6	Gabion Retaining Walls	Learn to model a gabion or other stepped wall that has a horizontal setback for each step of the wall.	<a href="#">Click Here</a>
7	Benching	Learn to model benching end conditions.	<a href="#">Click Here</a>

## 5.12 Template Triggers and Switches

SN	Topic	Description	Link
1	Exercise 1 - Create Template Null Points	In this video, you will learn how to create template null points and apply horizontal feature constraints.	<a href="#">Click Here</a>
2	Exercise 1 - Create Component Display Rules	In this video, you will learn how to create component display rules that will automatically turn off curb & gutter, berm, sidewalk and end condition components when an intersection matchline element is added as a corridor reference.	<a href="#">Click Here</a>
3	Exercise 1 - Create Parent-Child Relationships Between Components	In this video you will, learn how to create parent-child relationships between the sidewalk berm, sidewalk and end condition components so that they turn off automatically when the curb & gutter components turn off. Parent-child relationships allow for multiple components to be associated to one component. This is useful when assigning Component Display Rules (you assign rules to parent component and child components will follow rule automatically).	<a href="#">Click Here</a>
4	Exercise 1 - Add Corridor References	In this video, we will synchronize the template and add corridor references.	<a href="#">Click Here</a>

5	Exercise 2 - Review Template and Create Template Null Points	In this video, you are going to learn how to create a component display rule to hide the turn lane as the default template condition. A null point will then be used to control when the turn lane (or auxiliary lane) will be displayed.	<a href="#">Click Here</a>
6	Exercise 2 - Create Turn Lane Component Display Rule	In this video, we will show how to create component display rules so that when the EOP_R point moves to the right of the LL_R point the turn lane and all of its components turn on automatically.	<a href="#">Click Here</a>
7	Exercise 2 - Create Template Drop and Review Cross Sections	In this video, we will create a new template drop and add a corridor reference that will widen the template and create the turn lane.	<a href="#">Click Here</a>
8	Exercise 3 - Create Right of Way End Condition Switch	In this video, we will create an end condition that will search horizontally for the existence of a right of way feature.	<a href="#">Click Here</a>
9	Exercise 3 - Apply Right of Way End Condition to Fill Slopes and Wall Template	In this video, we will show how to add the right of way end condition switch to the wall template.	<a href="#">Click Here</a>
10	Exercise 3 - Apply Fill Slopes and Wall to Turn Lane Template	In this video, we will apply the EC-Fill Slopes + Wall template to the 2 Lanes + Turn Lane + Aux Lane-RT-Urban w/ROW template.	<a href="#">Click Here</a>

## 5.13 Understanding the Power of the Bentley Template Library

SN	Topic	Description	Link
1	Organization and Standards	A discussion on how to use spreadsheets to plan and organize data when creating a template library.	<a href="#">Click Here</a>
2	Components and Pavements	A discussion on best practices for creating components such as curbs, pavements, and shoulders.	<a href="#">Click Here</a>
3	Component Combinations	A discussion how to bring together individual components and assign Display Rules, Rollover locks, and Alternate Surface paths.	<a href="#">Click Here</a>
4	Overlay Components	A discussion of creating overlay components for cross slope corrections and milling.	<a href="#">Click Here</a>
5	Linear and Surface Templates	A discussion of linear and surface templates.	<a href="#">Click Here</a>
6	Corridor Templates	A discussion of how the final corridor templates are assembled.	<a href="#">Click Here</a>
7	Shoulder Rollover	A discussion of the five ways shoulder rollover calculation can be computed.	<a href="#">Click Here</a>

## 5.14 Corridor Modelling

SN	Topic	Description	Link
1	Introduction and Getting Started	In this exercise, you will learn how to start OpenRail Designer, select the proper Workspace and WorkSet, create a 2D dgn file, attach reference files, set the active terrain model, and define 2D and 3D Model Views.	<a href="#">Click Here</a>
2	Create Corridor	In this exercise, you will create a corridor for London Rd. and assign template drops to the corridor. You will also learn how to view the corridor in 2D and 3D.	<a href="#">Click Here</a>
3	Review the 3D Model and Create Dynamic Cross Sections	In this exercise you will learn how to view the corridor in 3D and view the corridor cross sections.	<a href="#">Click Here</a>
4	Modify the Corridor	In this exercise, you will learn how to modify the corridor and review the modifications.	<a href="#">Click Here</a>
5	Create Superelevation	In this exercise, you will learn how to create Superelevation for London Rd. using the Superelevation tools. Superelevation is the rotation of the pavement on the approach to and through a horizontal curve. Superelevation tools compute how the road will transition from normal cross slope to a fully super elevated section and back again.	<a href="#">Click Here</a>
6	Assign Superelevation to Corridor and Review Cross Sections	In this exercise, you will learn to assign Superelevation to a corridor and review the cross sections to ensure the Superelevation has been applied correctly to the corridor.	<a href="#">Click Here</a>
7	Exercise 1: Create the Corridor and Assign Template Drops	In this video, you will learn to create a corridor and assign template drops to the corridor. You will also learn how to view the corridor in 2D & 3D.	<a href="#">Click Here</a>

8	Exercise 2: Add, Copy and Edit Template Drops	In this video, you will learn how to add template drops between the two driveways and also how to transition the curb height across the driveways. We will use 2 different methods to place the templates drops. The first method will be to create a new template drop and then edit the template drop and the second method will be making a copy of a template drop. We will not cover the detailed modeling of the driveway at this time. That will be covered in a separate course.	<a href="#">Click Here</a>
9	Exercise 2: Create Parametric Constraints to Create Dropped Curb & Transition Curb Height	In this video, we will use parametric constraints to override the default curb height so that we can place a dropped curb at the driveway and also transition between dropped curb and full height curb.	<a href="#">Click Here</a>
10	Exercise 2: Create Key Stations at Driveways	This video will show how to Create Key Stations at Driveway 1 and Driveway 2.	<a href="#">Click Here</a>
11	Exercise 2: Copy Edited Template from the Corridor to the Template Library with Template Library Organizer	This video will show you how to copy the edited template from the corridor and save it to the template library using the Template Library Organizer.	<a href="#">Click Here</a>
12	Exercise 3: Create Point Control for Right Edge of Pavement	This video will show how to create a horizontal point control to follow the right edge of pavement geometry.	<a href="#">Click Here</a>
13	Exercise 3: Create Secondary Alignment for Left Edge of Pavement Taper	This video will show how to create a secondary alignment to change the direction of template processing to go perpendicular from the left edge of pavement taper geometry.	<a href="#">Click Here</a>
14	Exercise 3: Import and Export Parametric Constraints	This video will show how import parametric constraints to adjust the pavement depths by importing the values from an ASCII text file and you will also learn how to export parametric constraints to an ASCII text file.	<a href="#">Click Here</a>
15	Exercise 3: Create Turn Lane Template Drops and Add Corridor References	In this video we will create additional template drops in the areas where right turn lanes are needed and also add the left edge of pavement geometry as a corridor reference to control the left edge of pavement turn lane.	<a href="#">Click Here</a>
16	Exercise 3: Create Parametric Constraints for Center Turn Lane Width, Shoulder Slope & Ditch Width	In this video we will show how to use parametric constraints to change the width of the center turn lane and also adjust the shoulder slopes to transition from the existing slopes to -4.00%. We will also show how to use parametric constraints to adjust the ditch width.	<a href="#">Click Here</a>
17	Exercise 4: Target Aliasing	In this video you will learn how to target other corridors and terrain using Target Aliasing. You will learn how to target the abutment wall corridors and the existing terrain with the target aliasing tool.	<a href="#">Click Here</a>
18	Exercise 4: End Condition Exceptions	This video will show how to override the default template end conditions using End Condition Exceptions.	<a href="#">Click Here</a>
19	Exercise 4: OpenRail Model Explorer	This video will show how to review the Corridor Model and all the data associated to the corridor with the OpenRail Model Explorer.	<a href="#">Click Here</a>
20	Exercise 4: Corridor Clipping	In this video we will take a look at how to use Corridor Clipping to clip out a portion of the S.R. 97 corridor where it crosses over the London Rd. corridor	<a href="#">Click Here</a>

## 5.15 Civil Cells

SN	Topic	Description	Link
1	Exercise 1: Using Civil Cells in OpenRail Designer	Learn how to place a civil cell and understand the rules to the reference elements that are created.	<a href="#">Click Here</a>
2	Exercise 1: Reviewing a Civil Cell	Learn how to review civil cells in the 3D model and using the Explorer.	<a href="#">Click Here</a>
3	Exercise 1: Using Alternatives when Placing Civil Cells	Learn how the Alternatives prompts allow civil cells to adapt to different geometry configurations.	<a href="#">Click Here</a>
4	Exercise 1: Placing Civil Cells in Different Geometry Configurations	Learn how civil cells can be placed on different geometry configurations.	<a href="#">Click Here</a>
5	Exercise 2: Editing Geometry in a Civil Cell	Learn how to edit geometry in a civil cell such as pavement widths or curve radii.	<a href="#">Click Here</a>
6	Exercise 2: Editing Linear Templates in a Civil Cell	Learn how to edit linear templates in a civil cell and how to adjust Parametric Constraints to affect the model.	<a href="#">Click Here</a>
7	Exercise 3: Place the T-Intersection Civil Cell in a Design Scenario	Placing a T-intersection civil cell into an existing project including clipping the mainline corridor to create an intersection model	<a href="#">Click Here</a>
8	Exercise 4: Place Sidewalk ADA Ramp Civil Cell	Learn how to place the reference geometry and a sidewalk ADA ramp civil cell.	<a href="#">Click Here</a>
9	Exercise 5: Place Pond Civil Cell	Learn how to place a pond from a civil cell that is defined in the active DGN file.	<a href="#">Click Here</a>

## 5.16 Computing Earthwork Volumes

SN	Topic	Description	Link
1	Overview of Computing Earthwork Volumes	An overview of computing earthwork volumes.	<a href="#">Click Here</a>
2	Feature Definition	Feature Definitions control how earthwork volumes are calculated. In this video we review the Feature Definitions options.	<a href="#">Click Here</a>
3	Create Cut and Fill	Using the Create Cut and Fill command to create cut and fill 3d volumes mesh objects.	<a href="#">Click Here</a>
4	Unsuitable Materials	Explore how to define and create unsuitable material 3d volumes mesh objects.	<a href="#">Click Here</a>
5	Report by Named Boundary	Use the Report by Named Boundary tool to extract and report data from the 3d volume mesh objects.	<a href="#">Click Here</a>
6	End Area Volume Report	Use the End Area Volume Report tool to extract and report data from the 3d volume mesh objects.	<a href="#">Click Here</a>
7	Comparing Methods	A comparison of the various different tools that can be used to define and report on earthwork volumes.	<a href="#">Click Here</a>
8	Mass Haul	Learn to create a mass haul diagram.	<a href="#">Click Here</a>
9	Volumes from Other Software	See how volumes can be created from objects created in other software such as Civil 3D.	<a href="#">Click Here</a>
10	What is Next	Get a glimpse into some of the capabilities that will be coming to future OpenRail Designer Releases.	<a href="#">Click Here</a>

## 5.17 Quantities and Earthwork

SN	Topic	Description	Link
1	Component Quantities	In this video, we will show how to use the Component Quantities tool to compute corridor quantities. You will learn how to assign unit costs to the materials in the corridor and how to generate a quantities report that includes a total estimated cost. We will also take a look at how to verify cut and volumes by displaying the cut and fill volumes on the dynamic cross sections.	<a href="#">Click Here</a>
2	Element Component Quantities	In this video, you will learn how to use the Element Component Quantities tool which computes quantities directly from 3D elements.	<a href="#">Click Here</a>
3	3D Volumes & Earthwork	In this video, you will learn how to create 3D mesh elements that represent the cut and fill volumes between the existing terrain model and the corridor model.	<a href="#">Click Here</a>
4	Feature Definition Volume Options	In this video, you are going to learn how the Feature Definitions and the Volume Options work with earthwork calculations.	<a href="#">Click Here</a>
5	Advanced 3D Volumes & Earthwork	In this video, you will learn how to create more advanced 3D volumes & earthwork that consider existing pavement removal and removal of muck material.	<a href="#">Click Here</a>
6	Create Quantities and Earthwork from Multiple Corridors	In this video, you will learn how to create quantities and earthwork from multiple design files (.dgn) that contain corridors, linear templates, civil cells and terrain models.	<a href="#">Click Here</a>
7	Create Quantities Report by Named Boundary	: In this video, you will learn how to compute quantities using the Named Boundaries and Quantities Report by Named Boundary tools. The Named Boundary tool allows the user to create custom boundary shapes along the corridor, quantities can then be calculated within a Named Boundary using the Quantities Report by Named Boundary tool. This exercise will focus on how to create Named Boundaries along the northbound side and southbound side of the corridor model and then how to calculate quantities within each Named Boundary.	<a href="#">Click Here</a>
8	End Area Volumes Report	In this video, you will learn how to create the End Area Volumes Report for the London Rd. corridor. By creating Cross Section Named Boundaries.	<a href="#">Click Here</a>
9	Mass Haul Diagram	In this video, you will learn how create a Mass Haul Diagram.	<a href="#">Click Here</a>

## 5.18 Drawing Production - Plan-Profile

SN	Topic	Description	Link
1	Creating Plan Sheets	Learn how to create plan and double plan sheets.	<a href="#">Click Here</a>
2	Creating Plan and Profile Sheets	Learn how to create plan and profile sheets.	<a href="#">Click Here</a>
3	Deleting Sheets and Named Boundaries	Learn to delete sheets and named boundaries.	<a href="#">Click Here</a>
4	Creating Rectangular Plan and Profile Sheets	Learn to create plan and profile sheets using rectangular plan named boundaries.	<a href="#">Click Here</a>
5	Create Plan and Profile Sheets in Separate Files	Learn how to create drawing and sheet models in separate files from the named boundaries.	<a href="#">Click Here</a>
6	Create Single Plan Roll Sheets	Learn how to create long or roll plots that include the whole project length.	<a href="#">Click Here</a>
7	Place Labels	Learn how to add manual annotations with the Place Label tool.	<a href="#">Click Here</a>
8	Sheet Index	Learn what the sheet index is and how it can be used.	<a href="#">Click Here</a>

## 5.19 Drawing Production - Cross- Sections

SN	Topic	Description	Link
1	Introduction to Cross Sections	An overview of the sheet creation process and an introduction to creating cross section sheets.	<a href="#">Click Here</a>
2	Creating Cross Sections	An in-depth look at creating cross section sheets including different size cross sections for different areas of the project.	<a href="#">Click Here</a>
3	Updating and Annotating Cross Sections	Learn how cross sections and annotations are updated when the design model changes.	<a href="#">Click Here</a>

## 5.20 Setting up Sheets & Drawing Seeds

SN	Topic	Description	Link
1	Under the Hood - Setting up Sheets - Part 1	Calling all administrators, you don't want to miss this session where we take a deep dive into configuring the drawing seed files that make creating Plan, Profile, and Cross Section sheets a breeze for your production teams. A little detail works up front provides your production team a select and go solution to matching your standards.	<a href="#">Click Here</a>
2	Under the Hood - Setting up Sheets - Part 2	Calling all administrators, you don't want to miss this session where we take a deep dive into configuring the drawing seed files that make creating Plan, Profile, and Cross Section sheets a breeze for your production teams. A little detail works up front provides your production team a select and go solution to matching your standards.	<a href="#">Click Here</a>
3	Drawing Model File Creation	Learn how to setup a new Drawing Model seed file that will be used by the Drawing Production tools	<a href="#">Click Here</a>
4	Sheet Model File Creation	Learn how to setup a new Sheet Model seed file that will be used by the Drawing Production tools.	<a href="#">Click Here</a>
5	Adding Config Variables	Learn which configuration variables need to be defined for the Drawing and Sheet Models seed files.	<a href="#">Click Here</a>
6	Preparing the Sheet Border	Learn how to setup the sheet border that will be used by the Drawing Production tools.	<a href="#">Click Here</a>
7	Preparing the Cross Section Start Seed	Learn how to create a seed file that will later be used to create Drawing Seeds for creating Cross Section sheets.	<a href="#">Click Here</a>
8	Preparing the Plan Profile Start Seed	Learn how to create a seed file that will later be used to create Drawing Seeds for creating Profile sheets.	<a href="#">Click Here</a>
9	Creating a Drawing Seed for a Plan only Sheet	Learn how to setup a Drawing Seed for a Plan sheet.	<a href="#">Click Here</a>
10	Creating the Plan-Plan Sheet Seed Definition File	Learn how to setup a Drawing Seed for a Plan-Plan or Double Plan sheet.	<a href="#">Click Here</a>
11	Creating the Profile Sheet Seed Definition File	Learn how to setup a Drawing Seed for a Profile sheet.	<a href="#">Click Here</a>
12	Creating the Plan and Profile Sheet Seed Definition File	Learn how to setup a Drawing Seed for a Plan-Plan or Double Plan sheet.	<a href="#">Click Here</a>
13	Creating the Cross-Section Sheet Seed Definition File	Learn how to setup a Drawing Seed for a Cross Section sheet.	<a href="#">Click Here</a>

## 5.21 Setting up Annotations

SN	Topic	Description	Link
1	Under the Hood: Configuring Annotation in ORD - Part 1	Learn how to setup annotation for plan, profile, and cross section views. Setup the software once and all of your team will be sure to produce drawings that match your standards.	<a href="#">Click Here</a>



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2	Under the Hood: Configuring Annotation in ORD - Part 2	Learn how to setup annotation for plan, profile, and cross section views. Setup the software once and all of your team will be sure to produce drawings that match your standards.	<a href="#">Click Here</a>
3	Horizontal Annotation	Learn how to annotate horizontal geometry.	<a href="#">Click Here</a>
4	Vertical Annotation	Learn how to annotate vertical geometry.	<a href="#">Click Here</a>
5	Cross Section Annotation	Learn how to annotate cross sections.	<a href="#">Click Here</a>
6	Creating a Text Favorite	Learn how to create and use a text favorite that includes Text Fields.	<a href="#">Click Here</a>
7	Setting up the Place Label Tool	Learn how to create a cell that includes Text Fields and why you should consider using cells for labels instead of Text Favorites.	<a href="#">Click Here</a>
8	Creating an Annotation Definition	Learn how to use the Annotation Manager to create Annotation Definitions.	<a href="#">Click Here</a>
9	Exporting and Importing	Learn how to export and import Annotation Definitions.	<a href="#">Click Here</a>
10	Exploring the Annotation Manager	Learn about each of the properties that are defined for an Annotation.	<a href="#">Click Here</a>



## 6. Online resources for OpenRail Designer

SN	Resource Detail	Description	Link
1	File a new Service request	Use this link to create new service request regarding product issues, problems & any questions	<a href="#">Click Here</a> <a href="#">Example: Log a Service Request</a>
2	Product Downloads	Use this link to download latest builds	<a href="#">Click Here</a>
3	OpenRail Designer Youtube Channel	Various channels on Youtube.com for various workflows & steps by step videos. Please subscribe to these channels to get new workflows & videos	<a href="#">Bentley OpenRail</a> <a href="#">CivilTSG</a> (More India specific) <a href="#">Bentley Systems Hong Kong</a> <a href="#">Bentley Civil</a> <a href="#">Bentley Institute</a>
4	Bentley Communities & Forums	This is the place to access the information and experts you need to get the most out of your planned migration to OpenRail Designer CONNECT Edition including forum discussions and FAQ's and articles and documentation	<a href="#">Click Here</a>
5	Guide for License Activation	How to activate products under Subscription Entitlement Service	<a href="#">Click Here</a>