



# OpenRail Designer - Low Voltage Assets

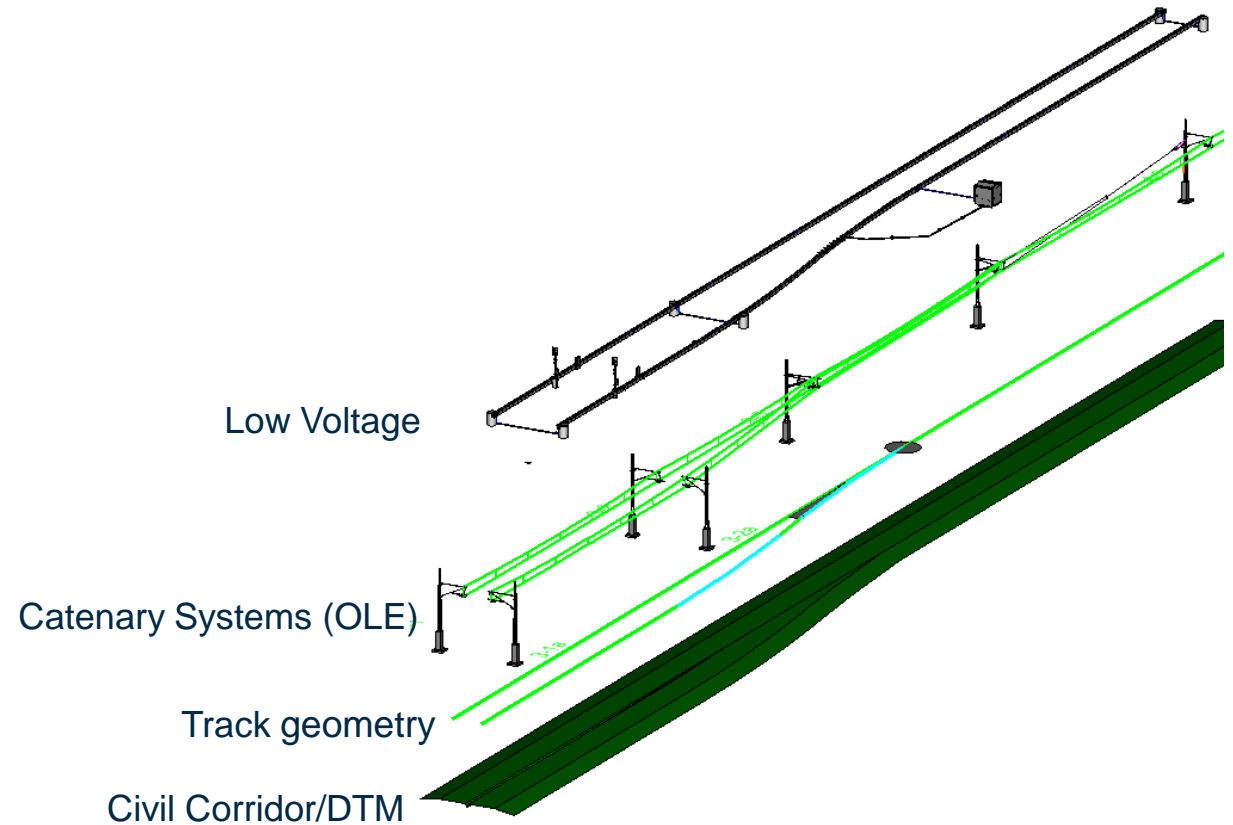
[Signal / Telecom / Electrical / Trench]

Bentley Systems, Civil - Håkan Norling

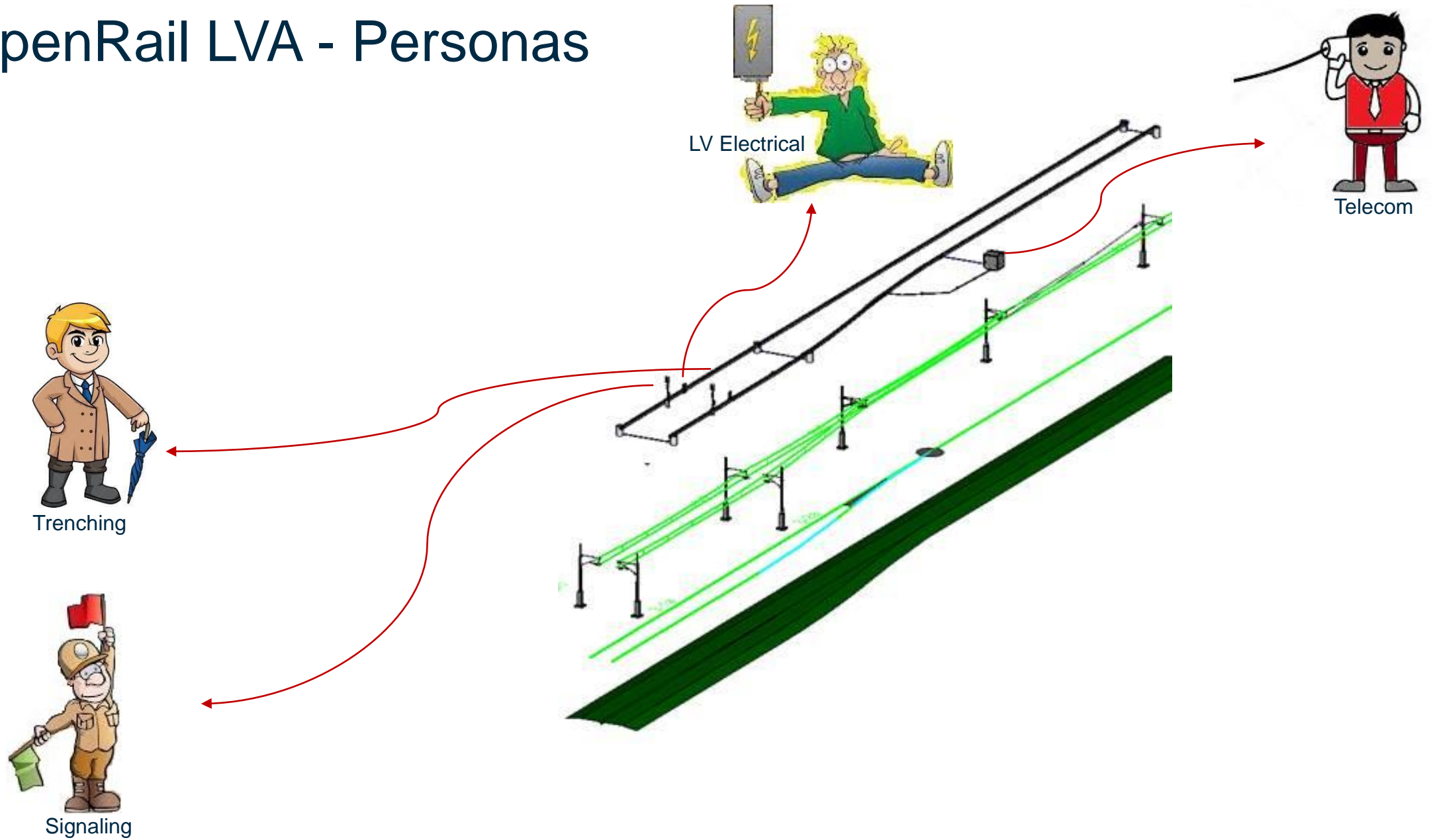
**Bentley**<sup>®</sup>  
Advancing Infrastructure

# Overview, Rail Project

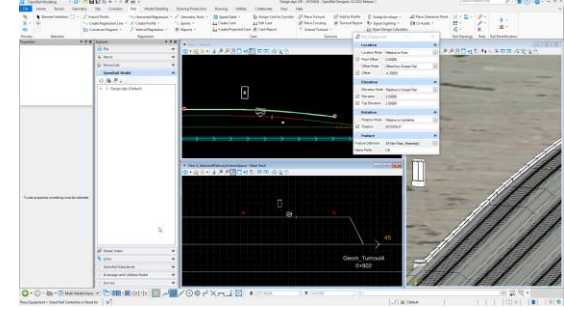
- **Low Voltage Assets (LVA)**
  - Signaling-, Electrical-, Telecom- objects, Trenches, Cables
- **Catenary System/OLE**  
*(OpenRail Overhead Line Designer)*
  - Utilize OLE structures for mounting LV/Signaling objects
  - Signal Sighting
- **Track geometry**
  - Track names, cant, station values, turnouts etc.
- **Civil Corridor/DTM (incl. reality data)**



# OpenRail LVA - Personas



# OpenRail Low Voltage Assets/Signaling



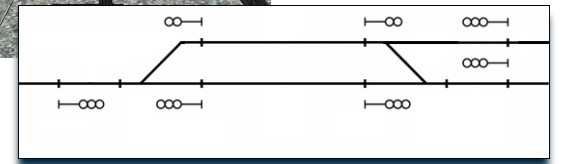
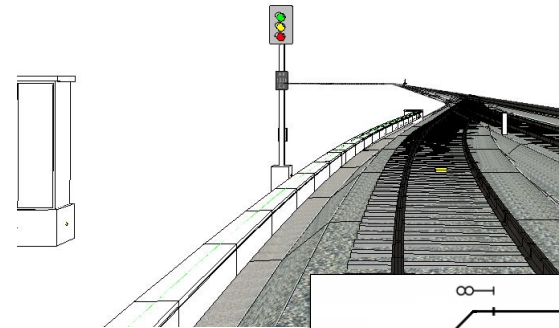
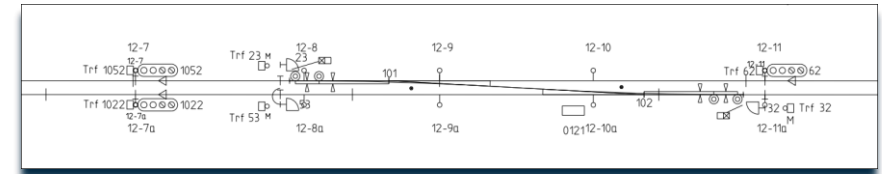
## 4 disciplines/personas,

- Signaling
- LV Electrical
- Telecom
- Trenching



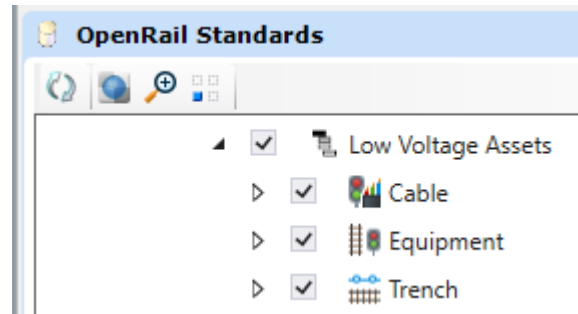
## 3 models,

- 2D Plan/Profile
- 3D
- Schematic

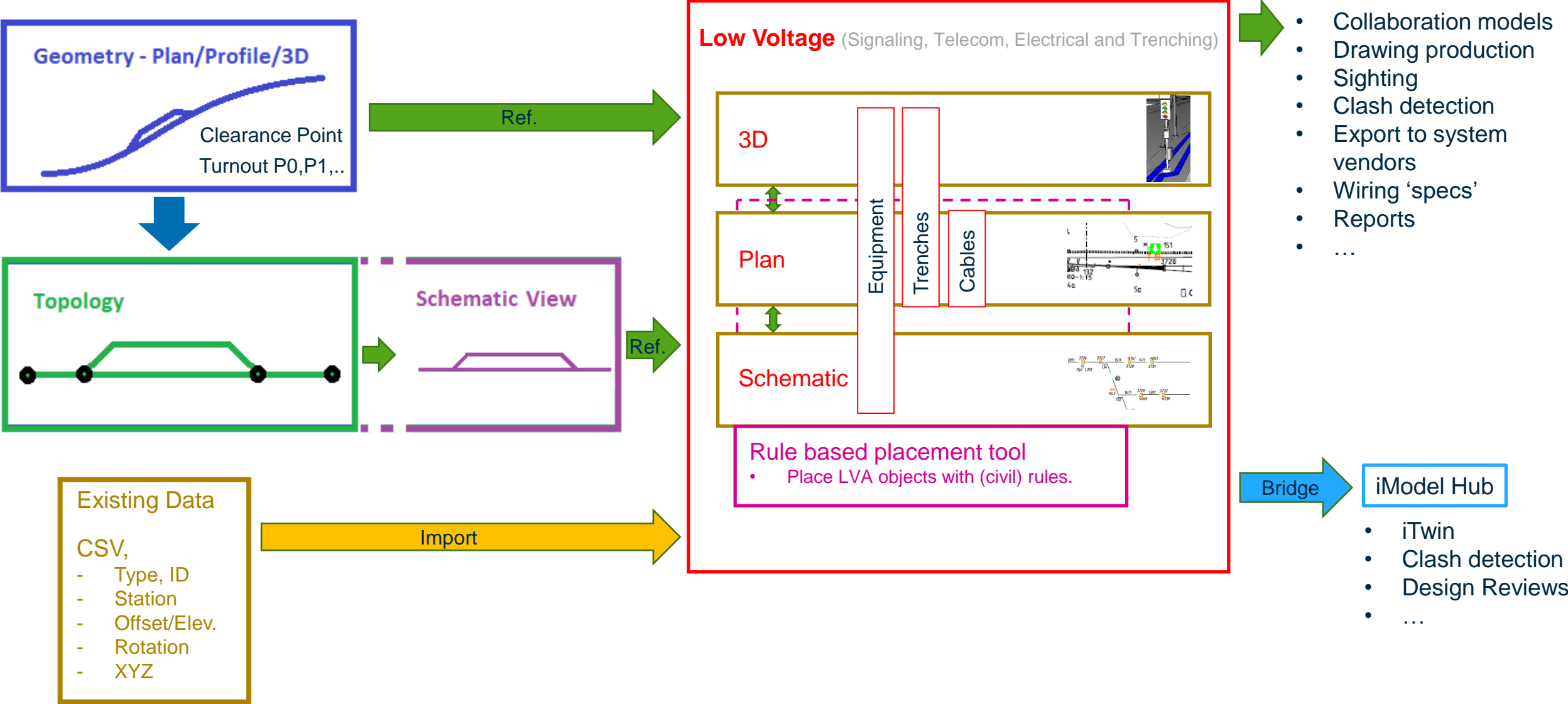


## 3 object types,

- Equipment
- Trenches
- Cables

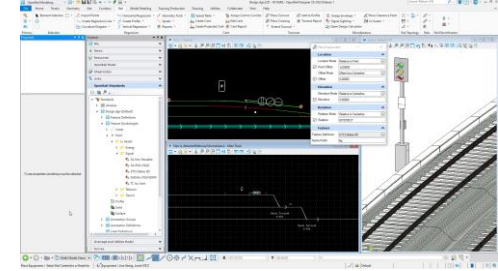


# OpenRail Designer LVA configuration and architecture



# OpenRail Designer – Schematic model

- A new model is introduced,
  - Schematic model



Properties (OpenRail Standards)

Selection (1)  
3A

Selection	
Name	3A

Defaults	
Default Element Template	None

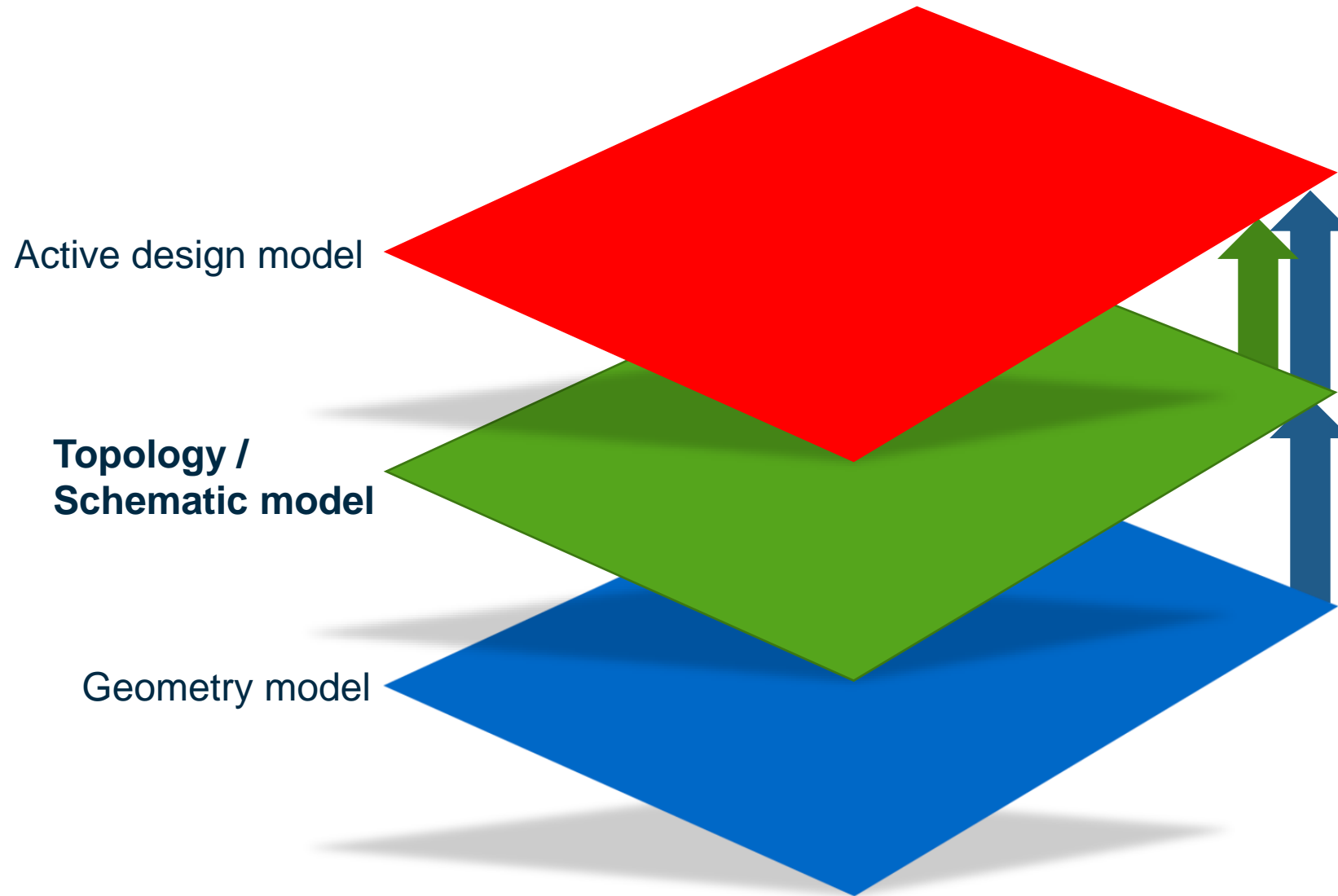
Plan	
Annotation Group	3A
Element Template	LV Assets\Plan\Plan_3A

Profile	
Annotation Group	None
Element Template	None

3D	
Element Template	LV Assets\3D\3D_3A

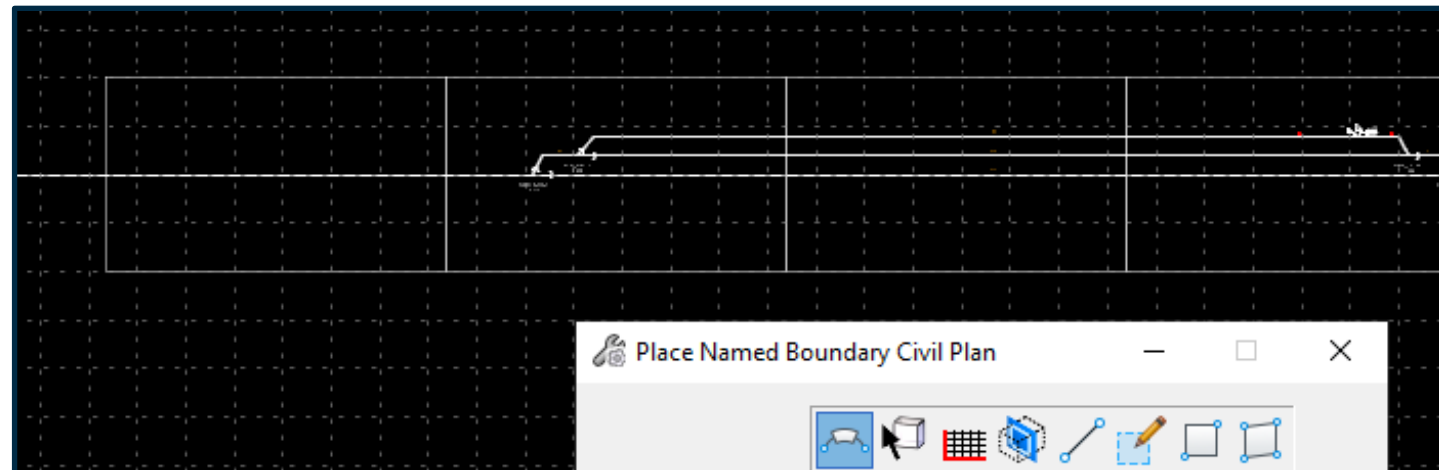
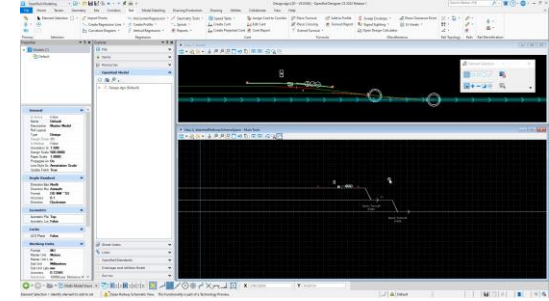
Schematic	
Annotation Group	None
Element Template	LV Assets\Sch\Sch_3A

# Topology/Schematic model - Federate project setup



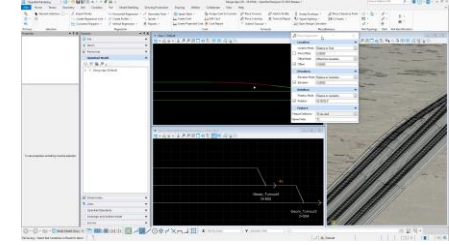
# Schematic model – Drawing production

- Schematic model Edge is enabled for Drawing Production
  - Recognized by Named Boundaries

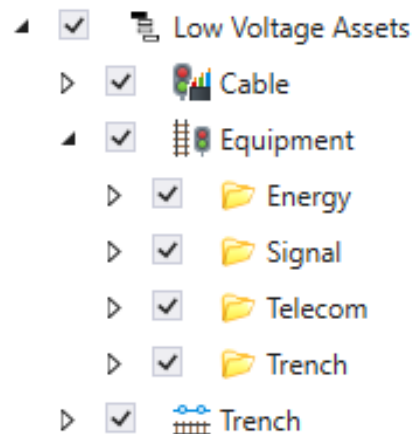




# LVA - Equipment, Trenches and Cables



- Equipment
  - Point object
- Trenches
  - Linear object
- Cables
  - Connectivity object



- Placement options,
  - Location
    - Along centerline
    - Relative a point
    - Absolute
  - Offset
    - Centerline
    - Closest rail
  - Elevation,
    - Centerline
    - Closest rail
    - Terrain
    - Absolute
  - Rotation
    - Centerline
    - Absolute

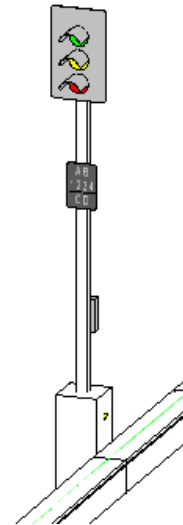
A screenshot of the 'Place Equipment' dialog box. The dialog is divided into several sections:

- Location**
  - Location Mode: Along Centerline
  - Centerline Distance: 914.49281m
  - Offset Mode: Offset from Centerline
  - Offset: -3.20000
- Elevation**
  - Elevation Mode: Relative to Centerline
  - Elevation: 0.00000
- Rotation**
  - Rotation Mode: Relative to Centerline
  - Rotation: 00°00'00.0"
- Feature**
  - Feature Definition: 3A Non Passable
  - Name Prefix: CB

# LVA – Equipment Assembly

- Two Elevations,
  - Base- and Top have separate Elevation
- Better accuracy when modeling the Equipment

Top  
*Template*  
Base



Properties (OpenRail Standards)

Selection (1)

3A

Selection

Feature Definition

Items

Equipment Attributes

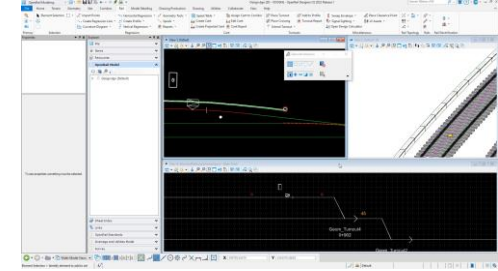
Feature Details

**Assembly**

Is Equipment Assembly	Yes
Base Connection Offset	-0.2500
Top Connection Offset	-0.1800
Equipment Connection Tem	Templates\Rail\LV Assets\Mast\Signal

**Feature Symbology**

Equipment Geometry Aspec	3A
Equipment Connection Geor	Signaling Mast d152
Top Equipment Geometry A	3A-RYG-HEAD
Connection Region Geomet	Connection Point

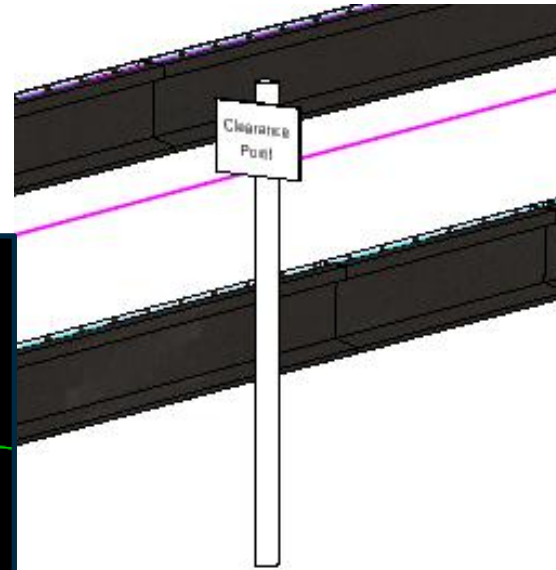
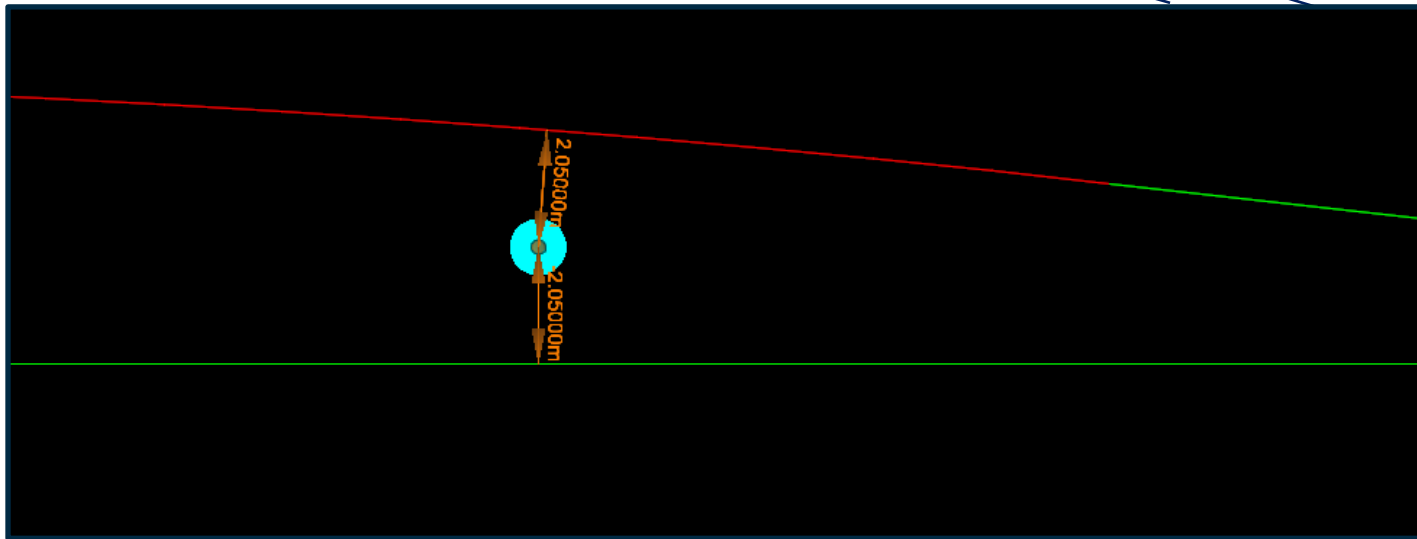
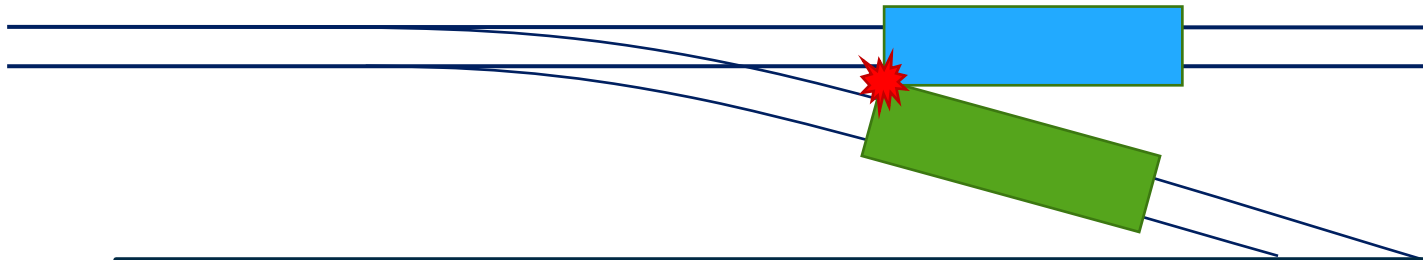
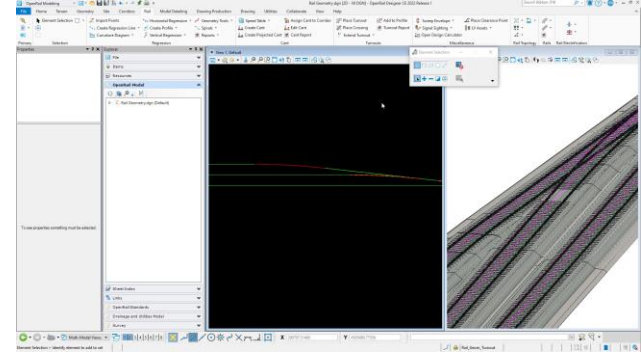


# LVA – Populate existing objects/survey points (import)

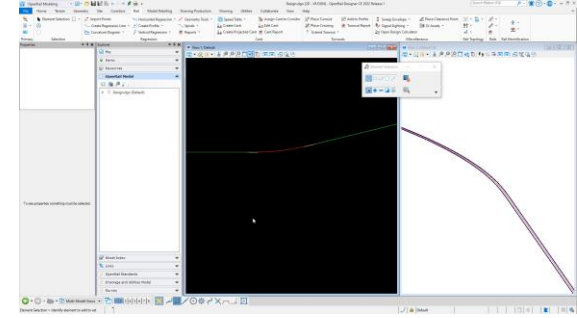
- LVA Equipment key-in command accepts arguments
  - This can be utilized with MicroStation Batch Process
- Arguments,
  - Feature Definition
  - Name/ID
  - Location data,
    - Linear referencing
    - XYZ coordinates

# New tool - Clearance Point

- Offset – offset ruled to two geometries



# Ruled objects will update if geometry is changed



- User alert!
  - Geometry has changed and following Equipment are moved..

