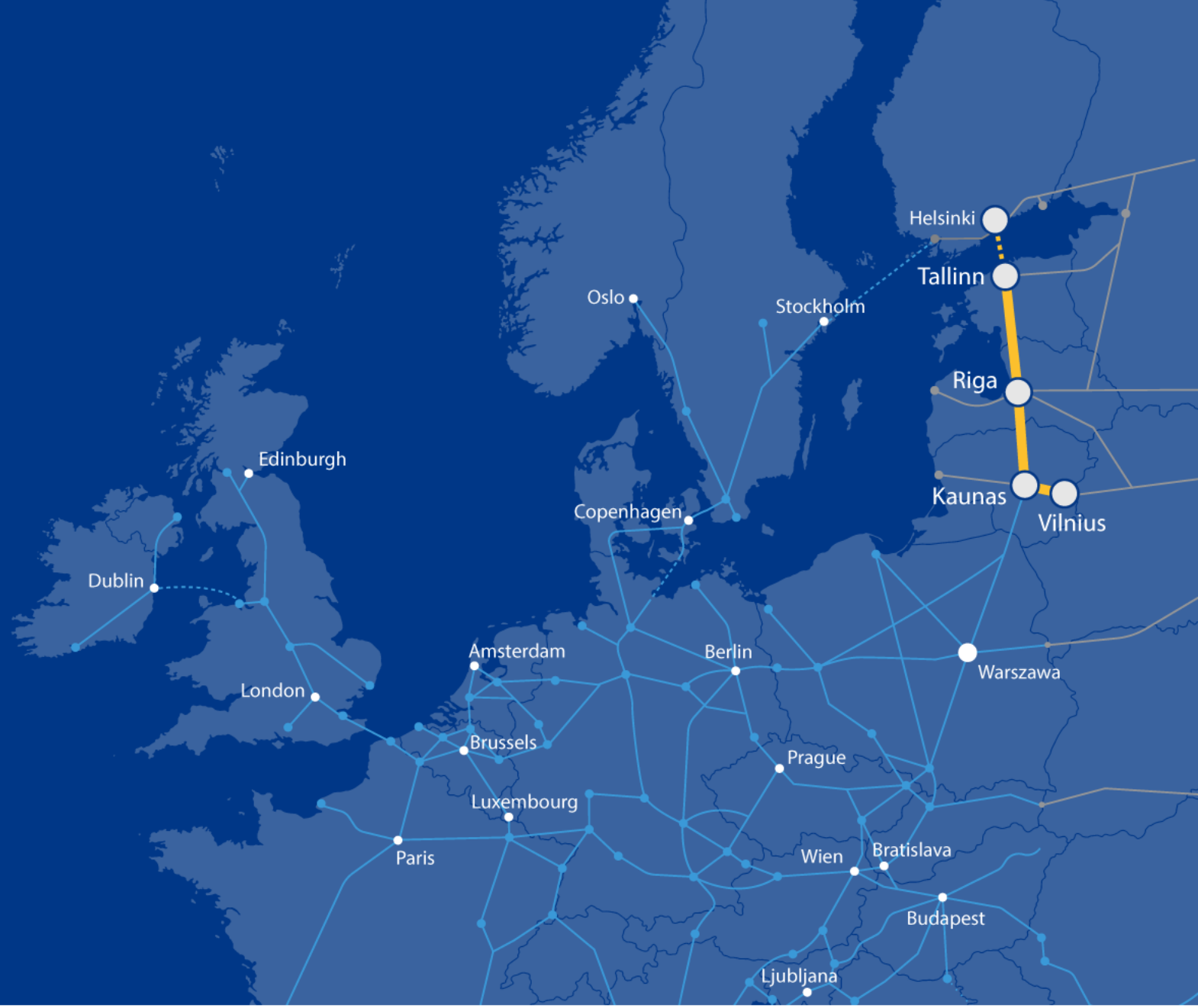
Rail Baltica

Designing Rail Baltica and BIM



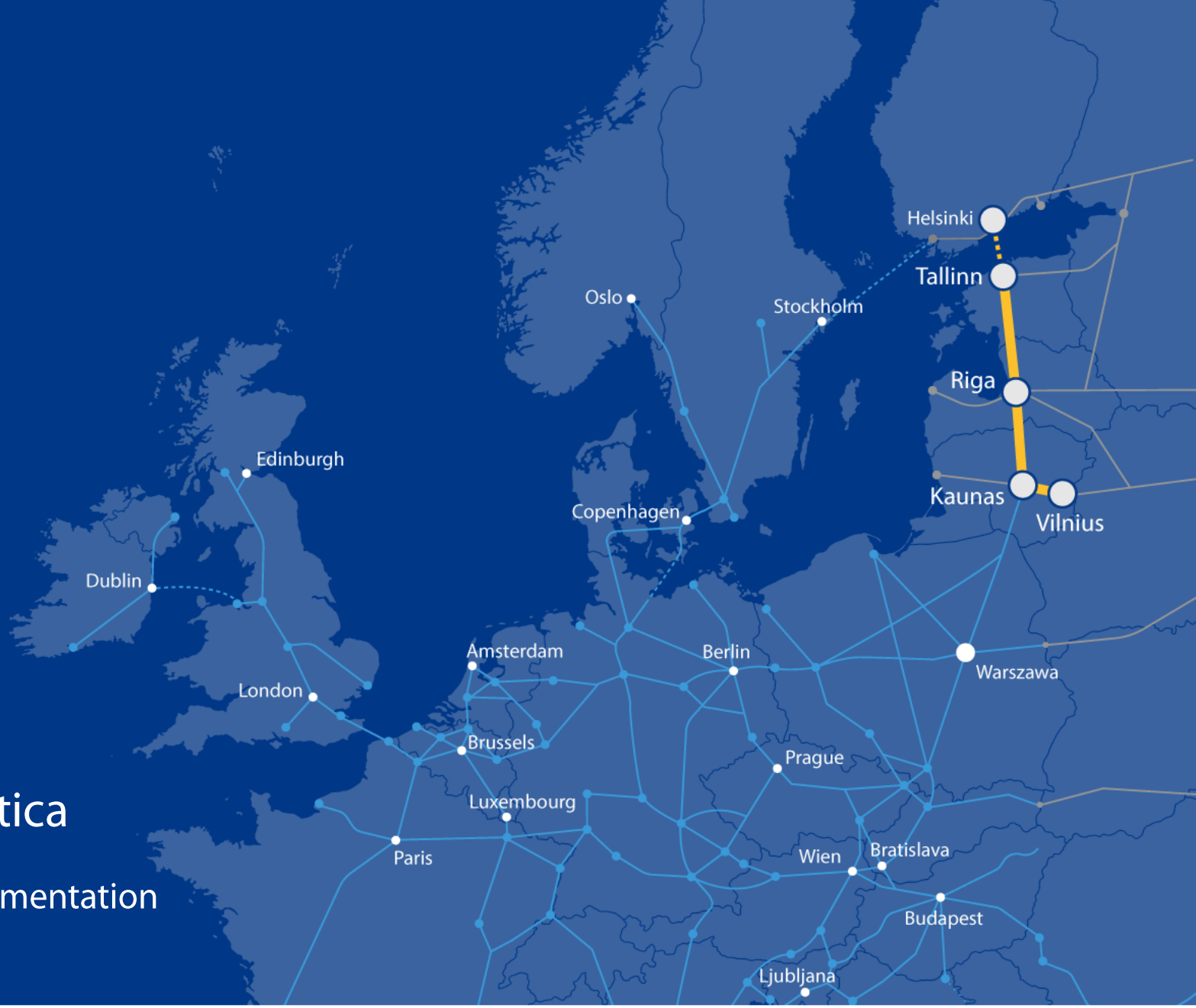
Co-financed by the Connecting Europe Facility of the European Union

Martins Millers 22-10-2020

Martins Millers

BIM and AIM coordinator at Rail Baltica

-constructing architect, BIM coordinator
-main fields architectural design and BIM implementation
-first interaction with BIM in 2011
-in Rail Baltica since 2020



Co-financed by the Connecting Europe Facility of the European Union

Rail Baltica

EU flagship greenfield rail infrastructure project, European standard gauge 1435 mm

First **high-speed rail link** connecting the Baltic States to Central Europe

Total **line length**: 870 km

Design speed 249 km/h for passenger trains, 120 km/h for freight trains; **fully electrified double-track**; ERTMS L2; 25t axle load

6 international stations, **3 intermodal freight terminals**

CAPEX 5.8bn as per 2017 EY Cost-Benefit Analysis

Detailed Technical Design in Estonia

Sections:

- Tallinn to Rapla
- Rapla to Pärnu
- Pärnu to Estonian/Latvian border

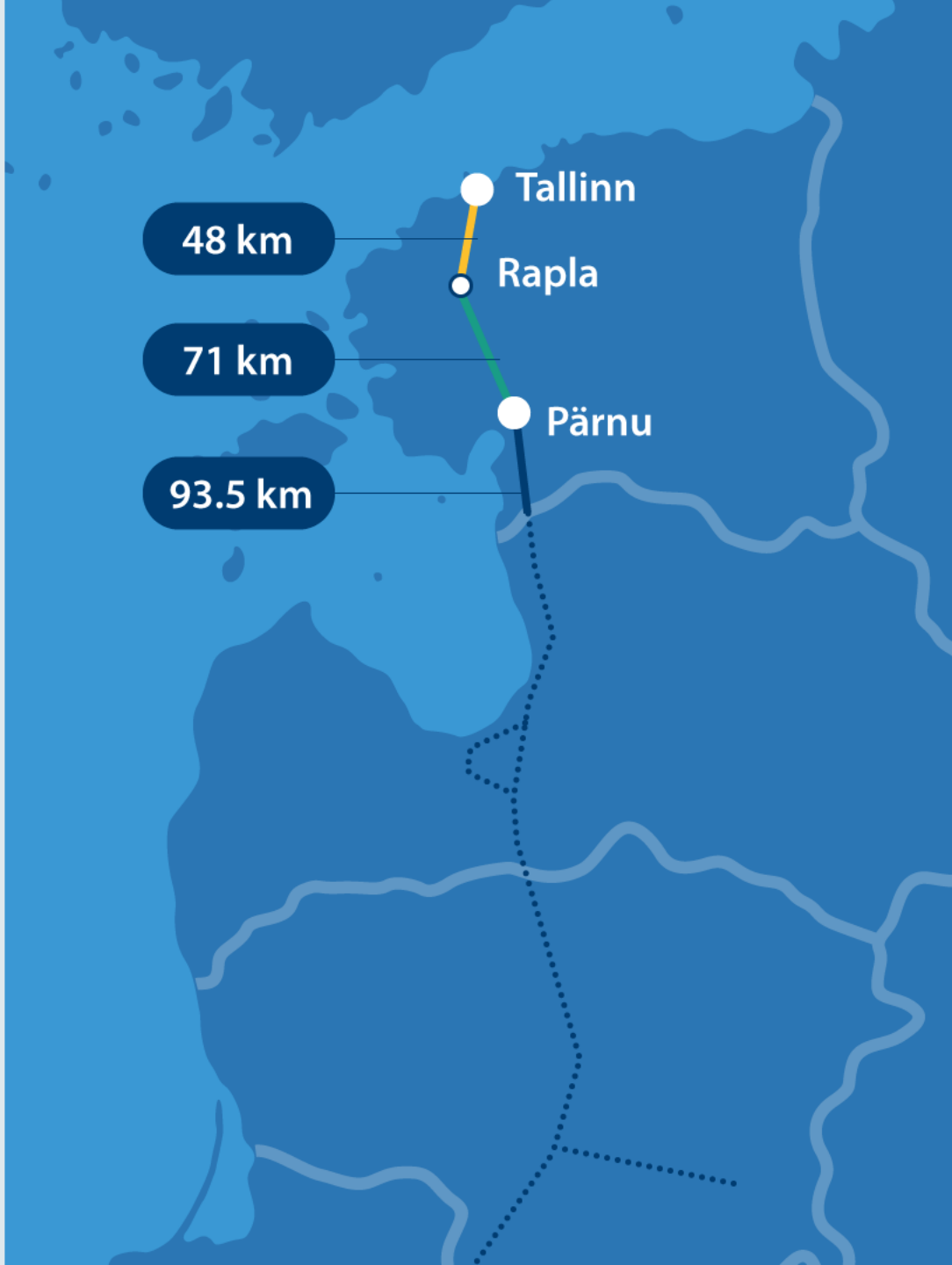
Indicative scope of works:

15 bridges

24 railway viaducts

40 road viaducts

24 ecoducts



Detailed Technical Design in Latvia

Sections:

- Riga Central Section
- Vangaži to Misa
- Estonian/Latvian boarder – Vangaži
- Misa – Latvian/Lithuanian border

Indicative scope of works:

32 bridges

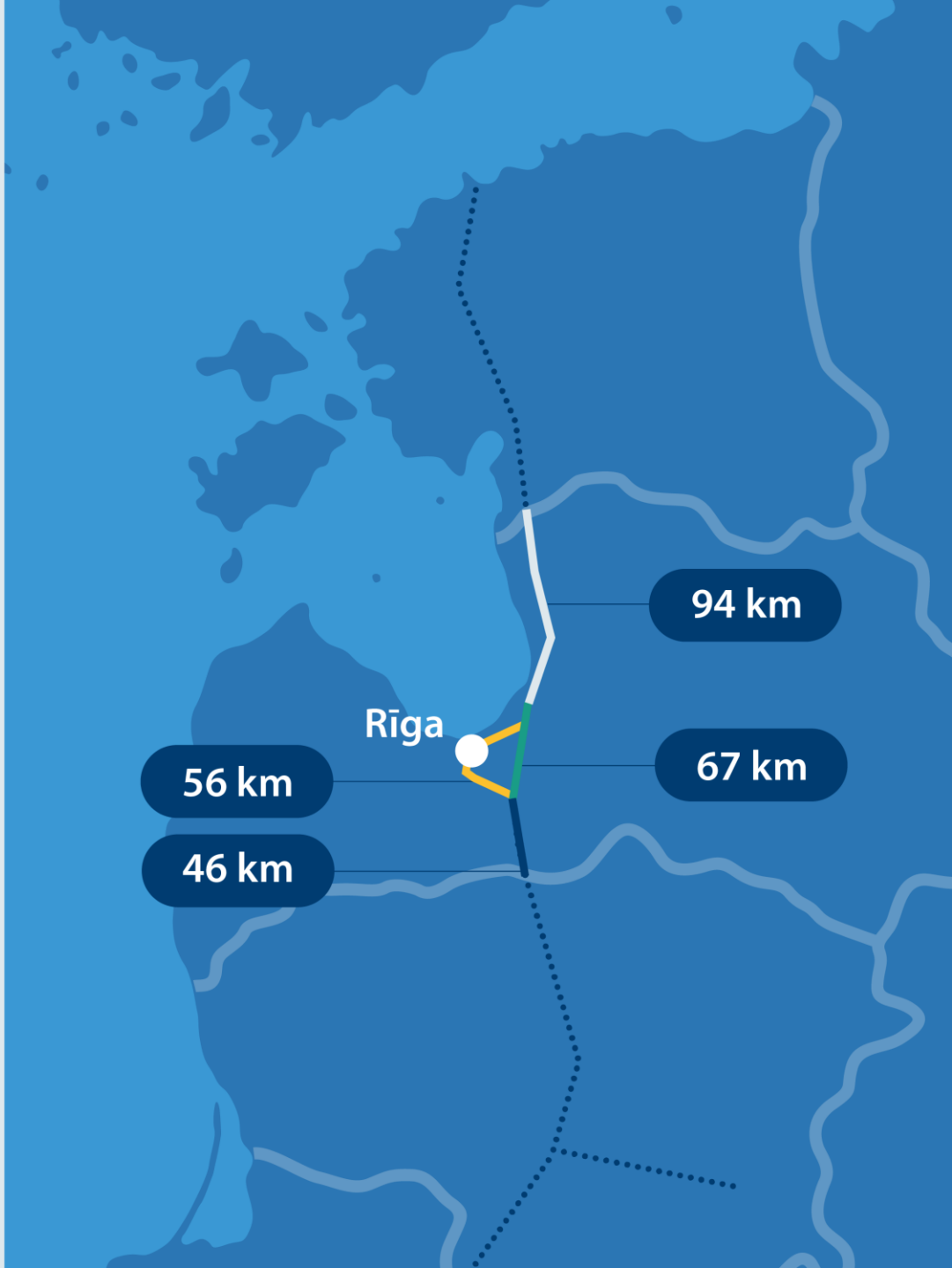
43 railway viaducts

82 road viaducts

10 ecoducts

13 segregated pedestrian crossings

1 tunnel



Detailed Technical Design in Lithuania

Sections:

- Ramygala to Lithuanian/Latvian state border
- Ramygala to Kaunas

Indicative scope of works:

7 bridges

31 railway viaducts

21 road viaducts

7 ecoducts

870

km
track

98

railway
viaducts

13

seggregated
pedestrian
crossings

3

multimodal
terminals

1

tunnels

4

airport
connections

54

bridges

41

ecoducts

6

international
stations

143

road
viaducts

Ülemiste Terminal in Tallinn

Rail Baltica

Rail Baltica BIM roadmap

Rail Baltica project at the moment

BIM Framework

Developed BIM Strategy framework;

Sent a "BIM message" to the market;

BIM Strategy

Detailed set of rules, including BIM Manual;

Developing training material;

Communication with industry's professionals;

Software

CDE and supporting technology implementation;

GIS integration;

AIM and scheduling solution integration;

Workflows and design

Developing and defining workflows;

BEP, MIDP, TIDP;

Work with designers to check and verify their work;

Construction

Collecting and updating asset data;

Using BIM models and data in construction;

Educating construction sector;

Operations and maintenance

Handover of Project BIM data;

Utilizing Project BIM data to manage assets;

«Building Information Modelling is nothing more and nothing less than a systems approach to the design, construction, commissioning, ownership, management, operation, maintenance use, demolition and reuse of built assets»

BIM goals

- Lifecycle centric approach for information delivery and use
- The Pre-Construction Design by means of BIM models
- The mitigation of the loss of information
- Extend the use of BIM beyond 3D
- Developing a set of common shared asset object types
- To capture operational and asset management information
- escalation of the value of information through projects
- Encourage and support the design and construction Supply Chain to use BIM tools and technology
- To encourage the Supply Chain to freely use the best
- technology
- To implement the technologies, the methodology and the BIM culture

BIM Strategy principles

- Gathering and Organisation the information
- Coordination and Standardisation
- Drawing / Model - based Management of the documentation
- File based federated coordinating delivery of information
- An ‘Open BIM’ approach structure
- Definition of a Strategy evolvable

Goal? **B**etter **I**nformation **M**anagement

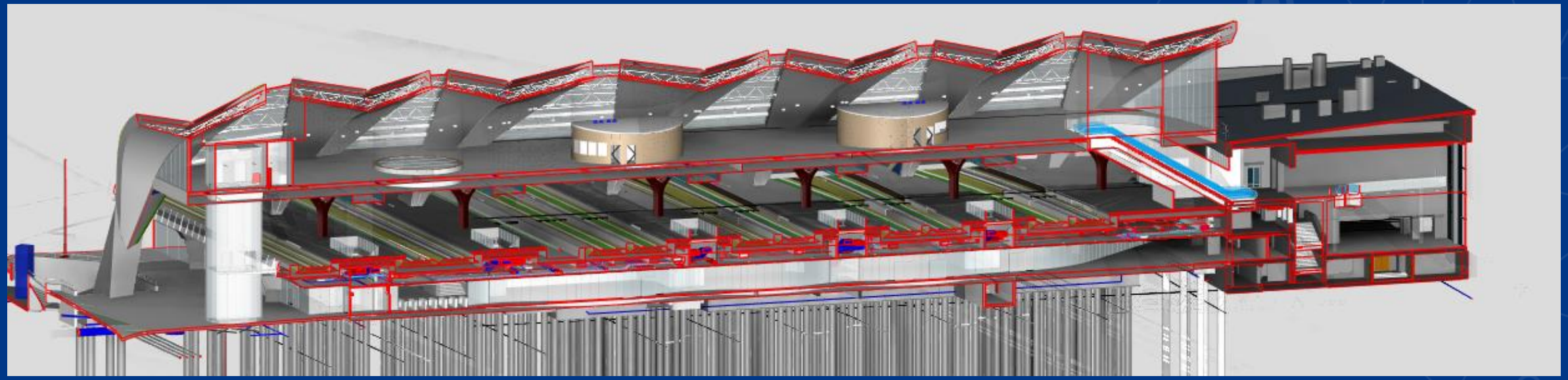

Rīga Central
Station

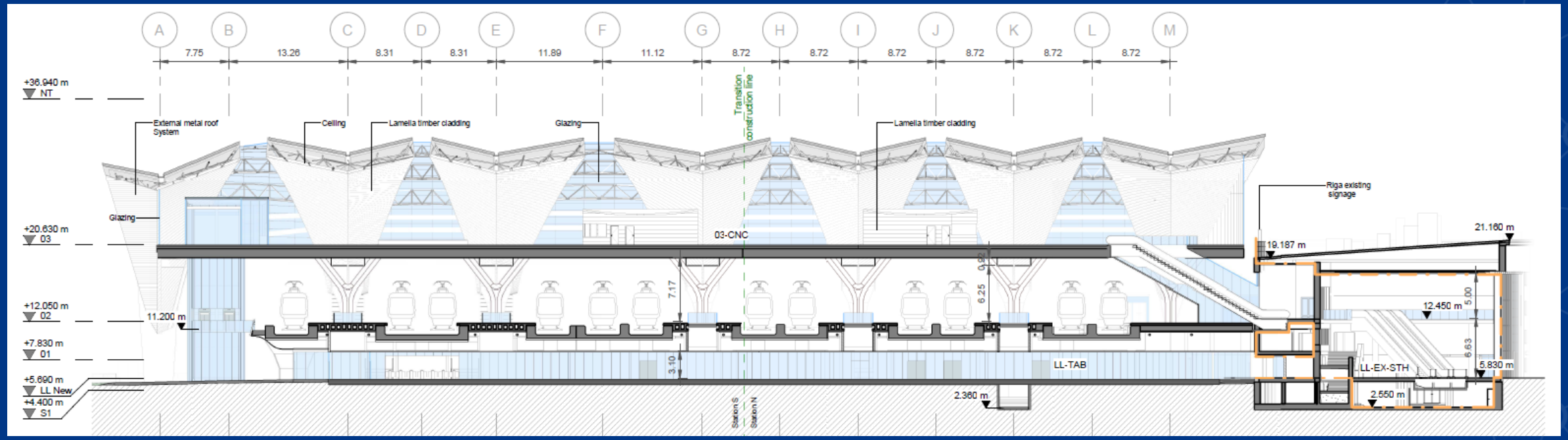
Rail Baltica

PROJECT PHASES and LOG / LOI

Majority of the sections currently are here

Site investigation	Value engineering	Master design	Detailed technical design	Construction	Operations and maintenance
*/200	200	300	400	400/500	500
Geotechnical investigations; Topographical surveys; Laser scanning, hydrologic studies, etc.	Conceptual design to choose the most economically advantageous option for horizontal and vertical alignment; types of structures, etc. MCA, CAPEX, OPEX	Main design solutions with a target to start construction tender processes; More precise CAPEX calculations, QEX etc.	Detailed design solutions; Detailed geometry and attribute information; Specifications, QEX	Collecting and updating asset data; Using BIM models and data in construction;	Handover of Project BIM data; Utilizing Project BIM data to manage assets;




A
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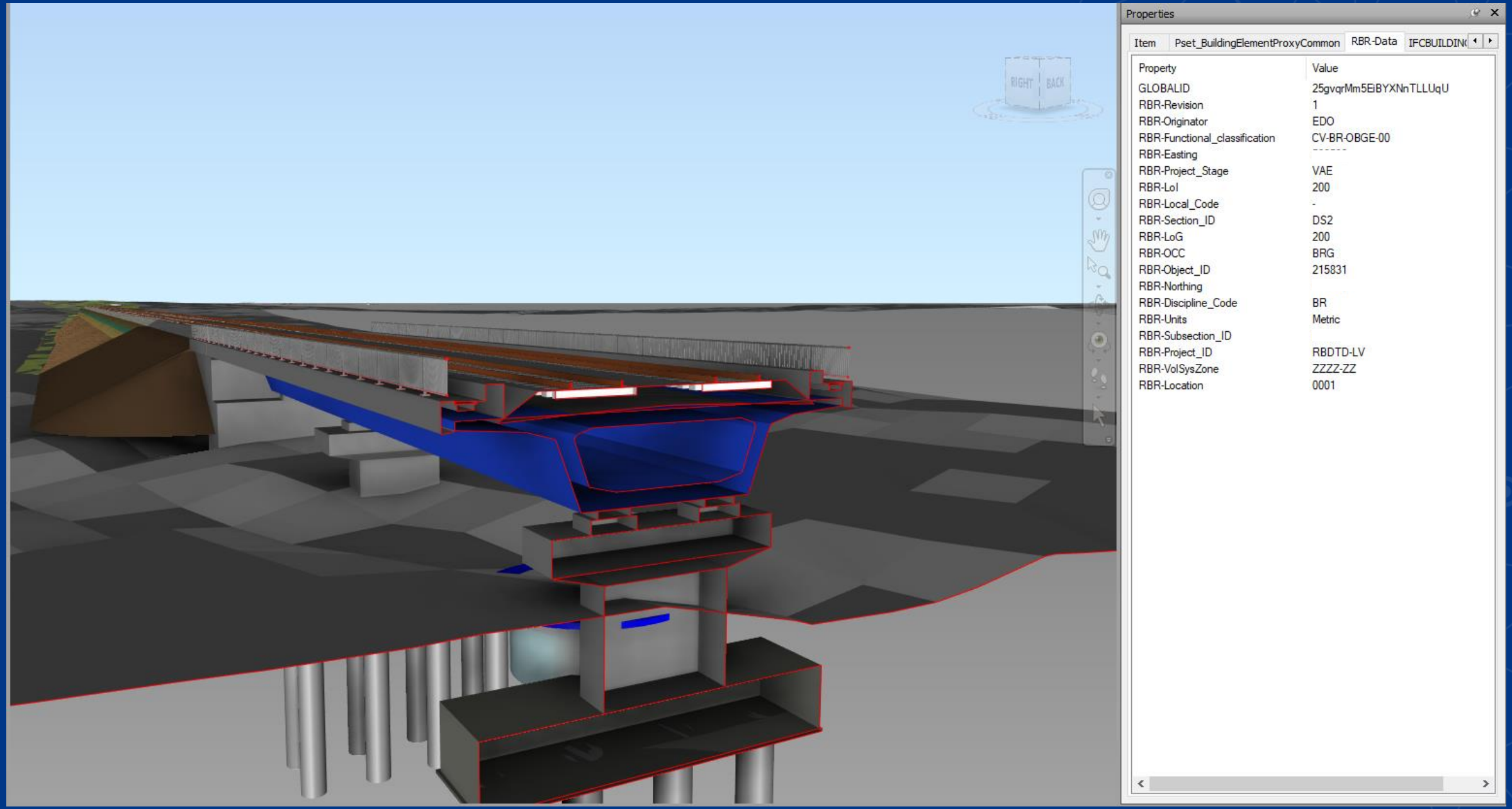
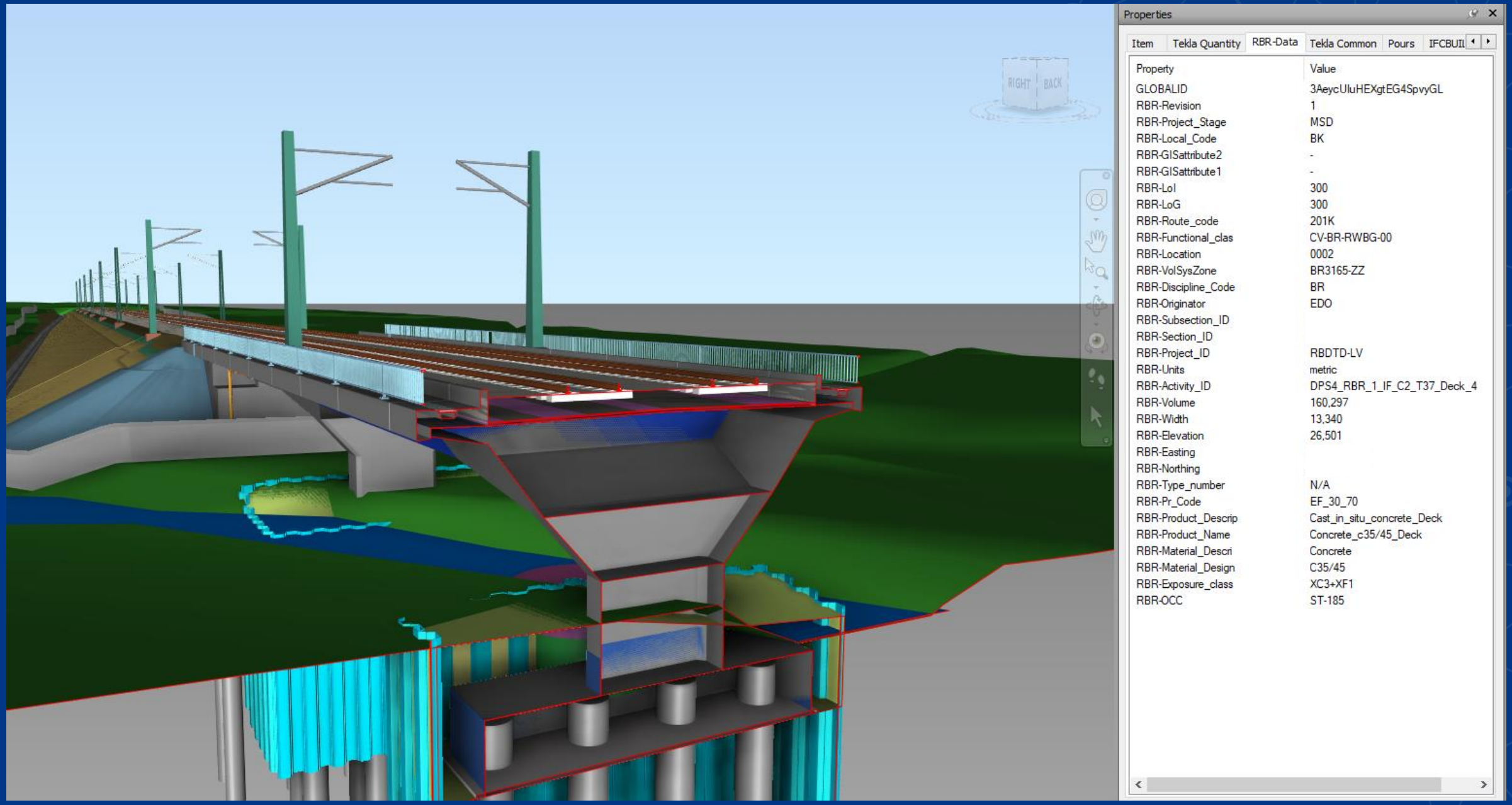
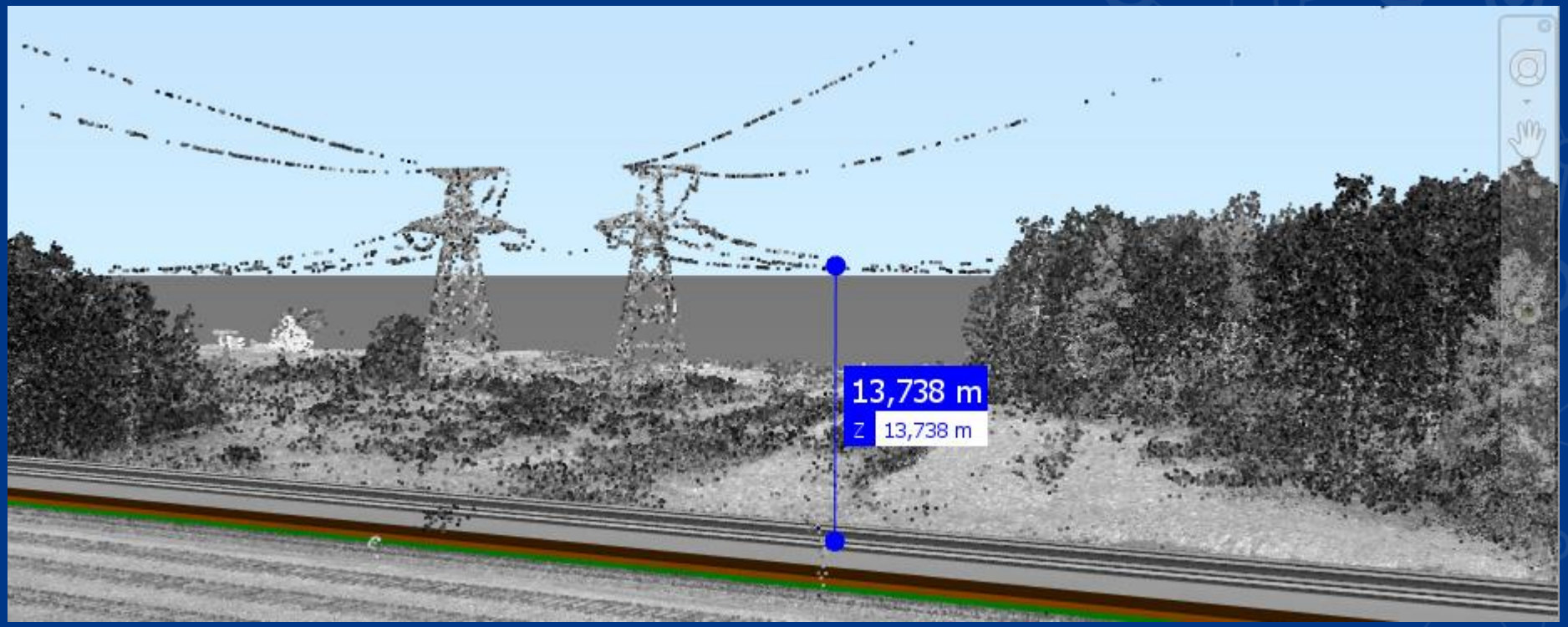
7.75
13.26
8.31
8.31
11.89
11.12
8.72
8.72
8.72
8.72
8.72
8.72
+36.940 m
NT
+20.630 m
03
+12.050 m
02
+7.830 m
01
+5.690 m
LL New
+4.400 m
S1
11.200 m
External metal roof System
Ceiling
Lamella timber cladding
Glazing
Transition construction line
Lamella timber cladding
Glazing
Riga existing signage
03-CNC
21.160 m
19.187 m
12.450 m
5.00
6.63
5.830 m
LL-EX-STH
2.550 m
7.17
6.25
0.92
3.10
LL-TAB
2.360 m
Station S
Station N

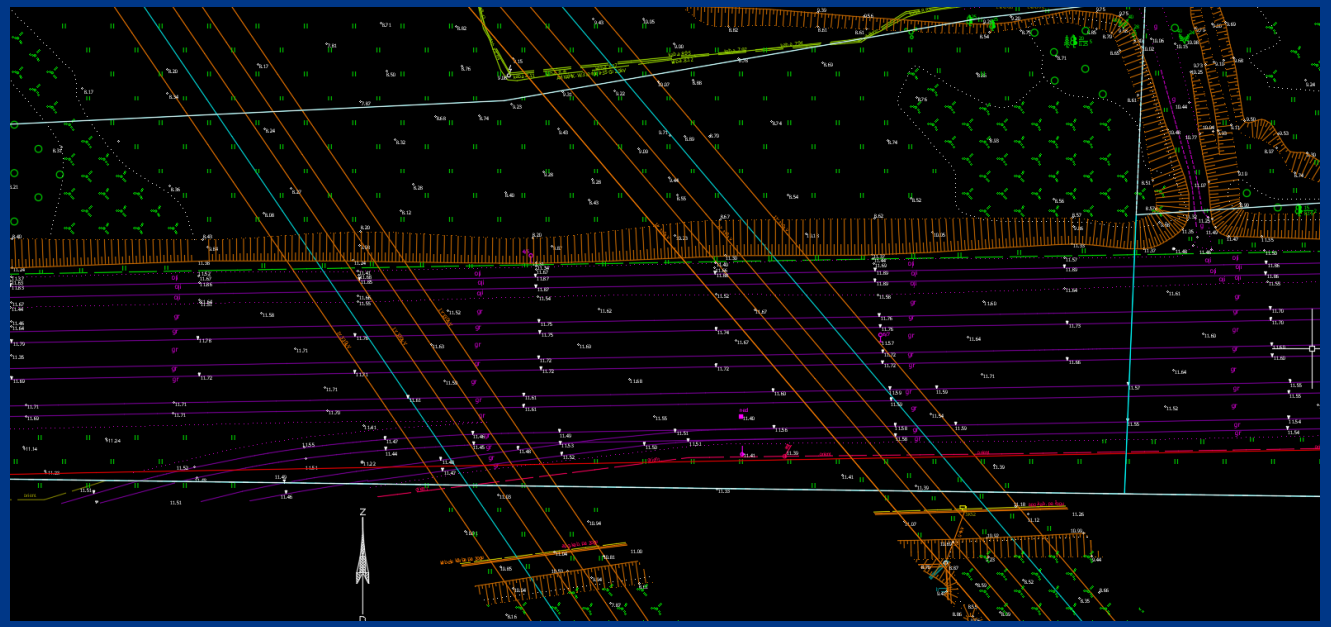
Production model VE



Production model MD





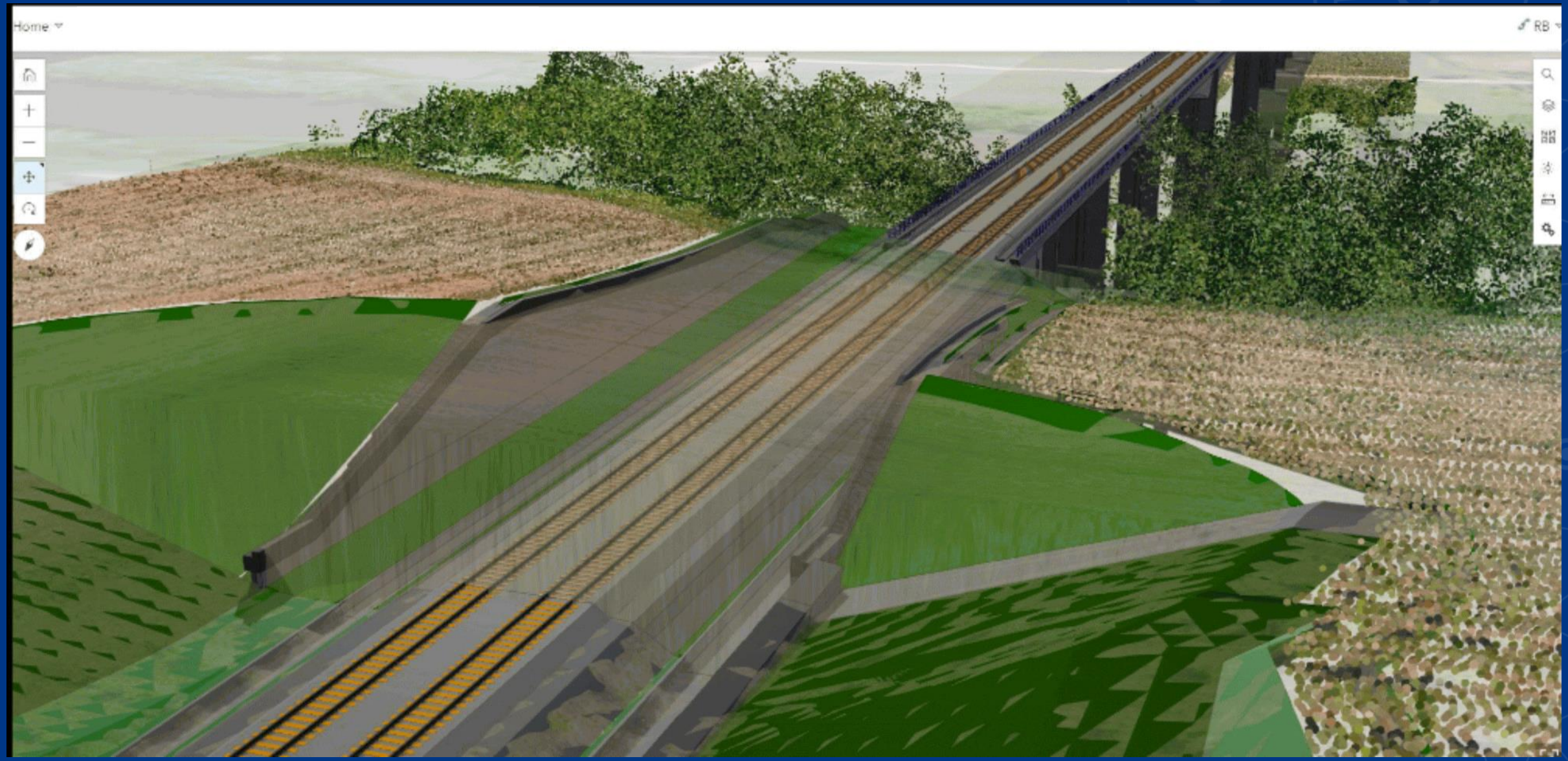


Rail Baltica

GIS implementation aim – Create a Geographic Information System that covers all stages of the Rail Baltica GP Life Cycle.

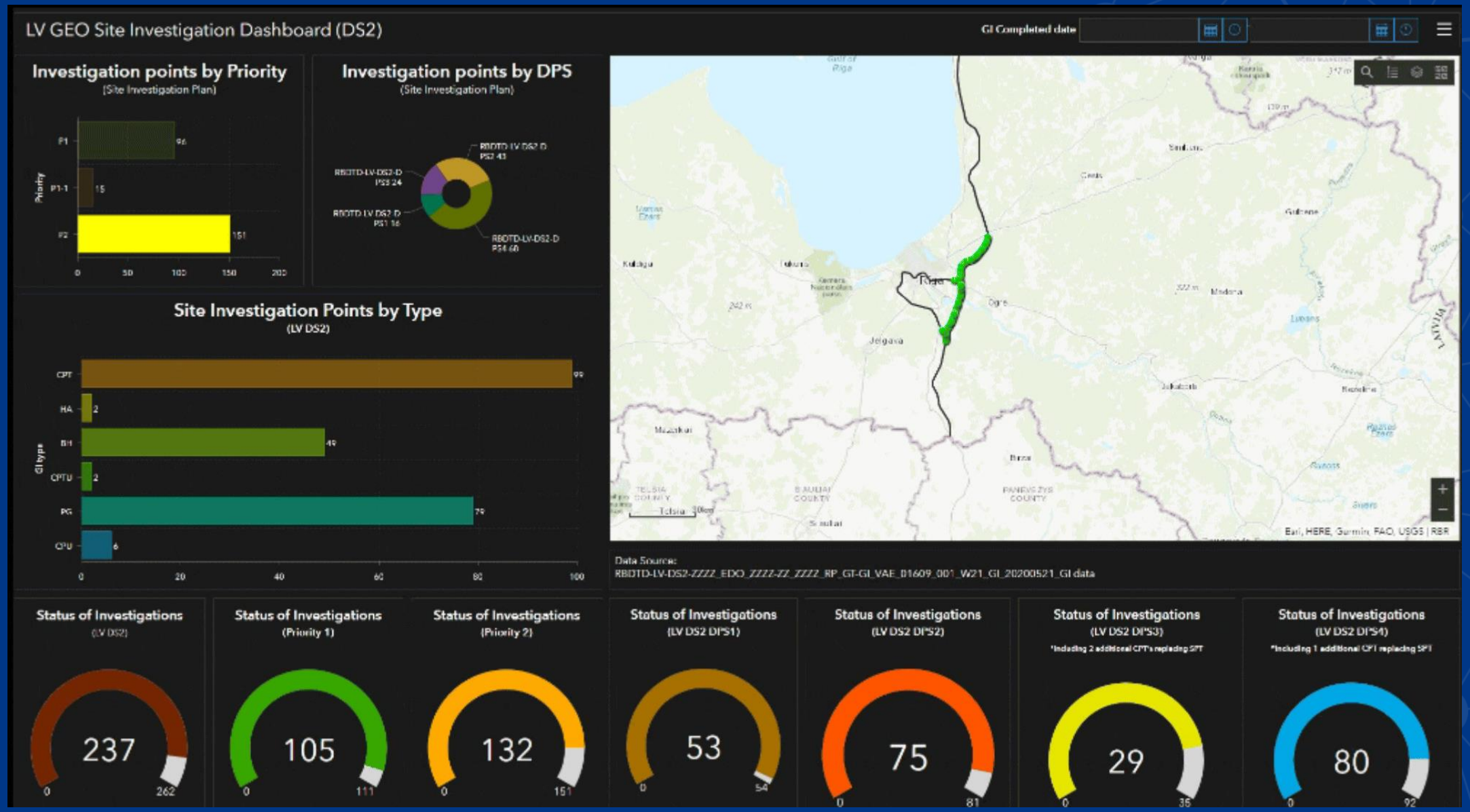
GIS Use Cases

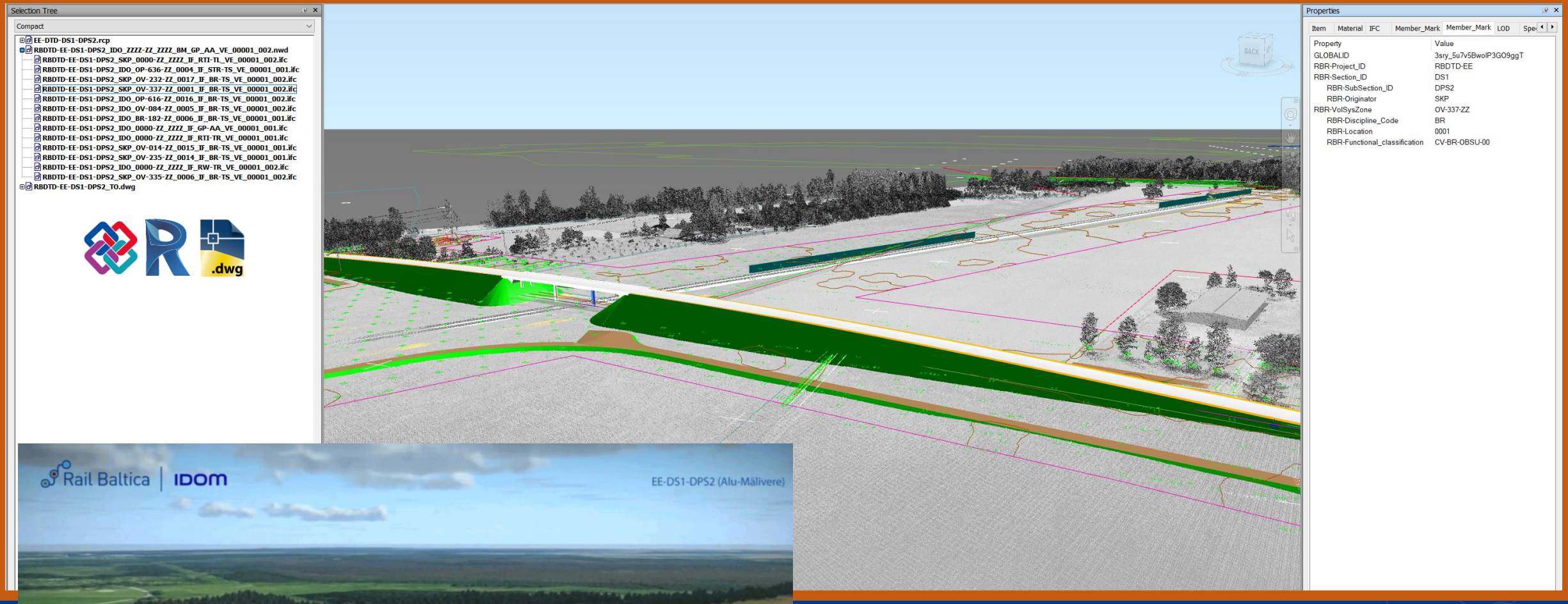
Project Information Model in GIS

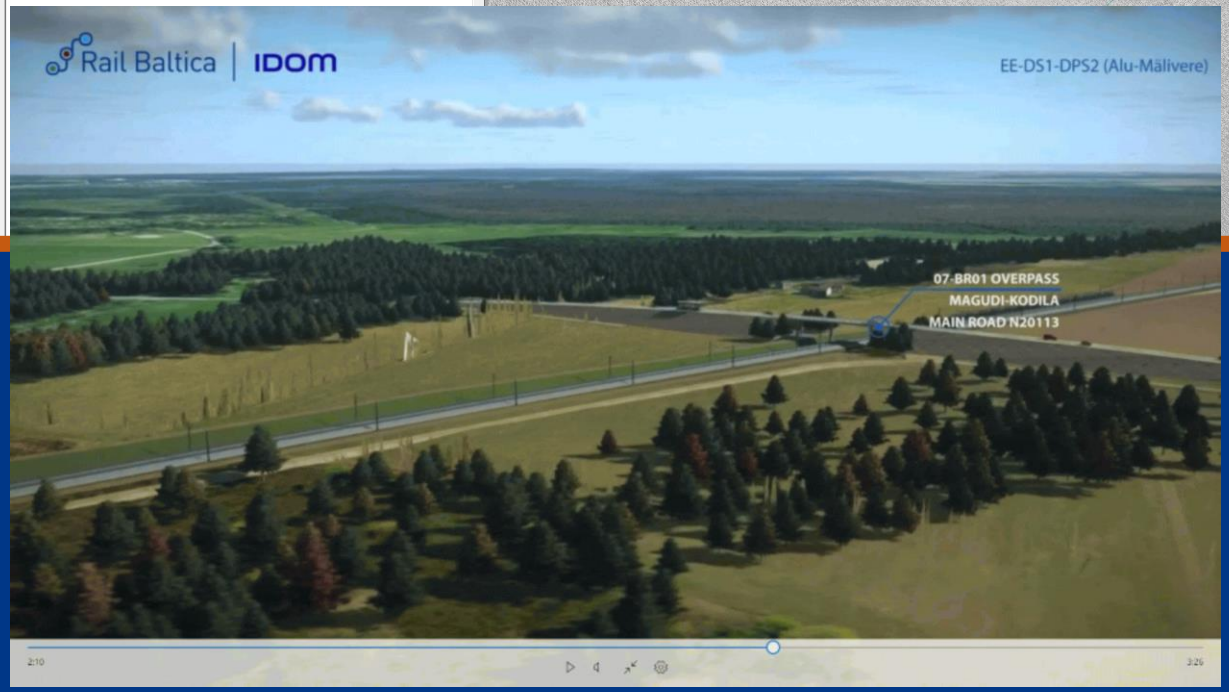


Project Information Model in GIS

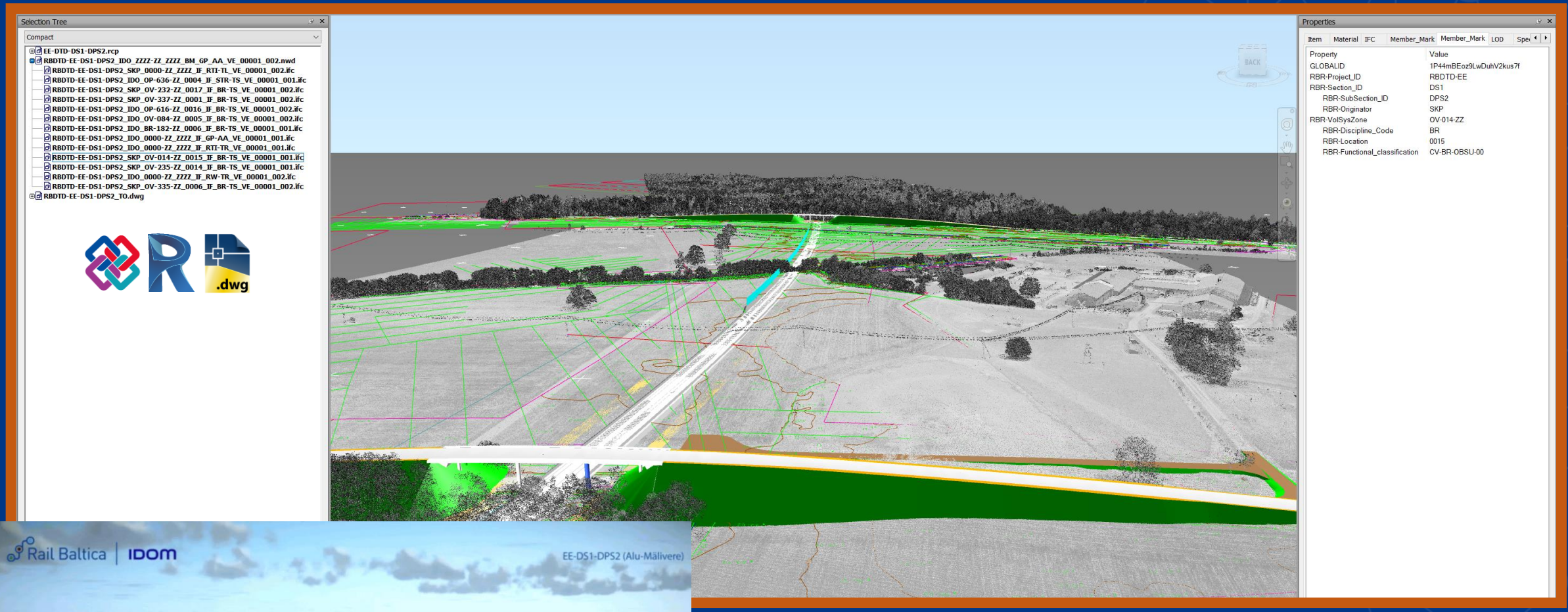
Site investigation dashboard in GIS







Federated model used for visualizations



Federated model used for visualizations


RIX Airport
Station

Conclusions so far

01

Set clear requirements

BEP and TIDP

It must correspond to BIM EIR and it shall be agreed during the Inception phase, but must be updated frequently.

VE, MD and DTD stages – must be renewed and followed.

02

Follow the progress

Client's task

Client must follow the progress. Client must be involved and must have/develop the knowledge. Client must understand what is being delivered. Dedicated team must be assigned (for now).

03

Everybody must learn

Client and Consultant

Teams on both sides must learn. Early stages of the project (VE) serves as «test ground» for Master and Detailed Technical Design stages.

04

Demand the results

Contract must be fulfilled

«…we usually don't do it this way…» is not acceptable.

If the rules are agreed, they must be follwed – on both sides.

Contract obligations are for both parties.

Conclusions so far

05

Flexibility

To a certain degree it's good

Too much flexibility gives room for misinterpretation = no rules.

Communication is key.

06

Big picture

Work with it in mind

Consultants come, do their work and go. Client must think about the goals to be achieved with Digitalization. Just to have BIM is not a goal.

07

BIM is not alone

AIM, GIS, etc.

Digitalization should be the priority. Modern asset management, digital tools and IT minded engineers.

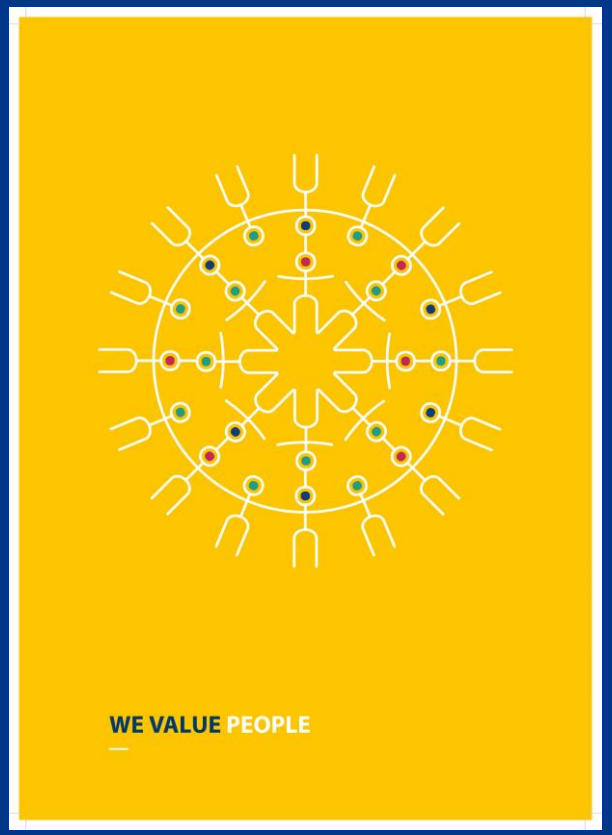
08

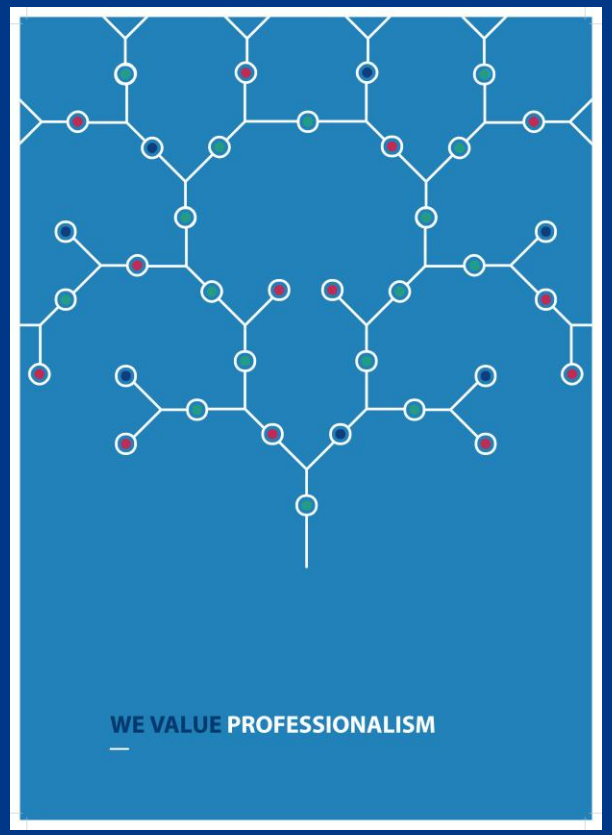
It's not easy

New things are hard

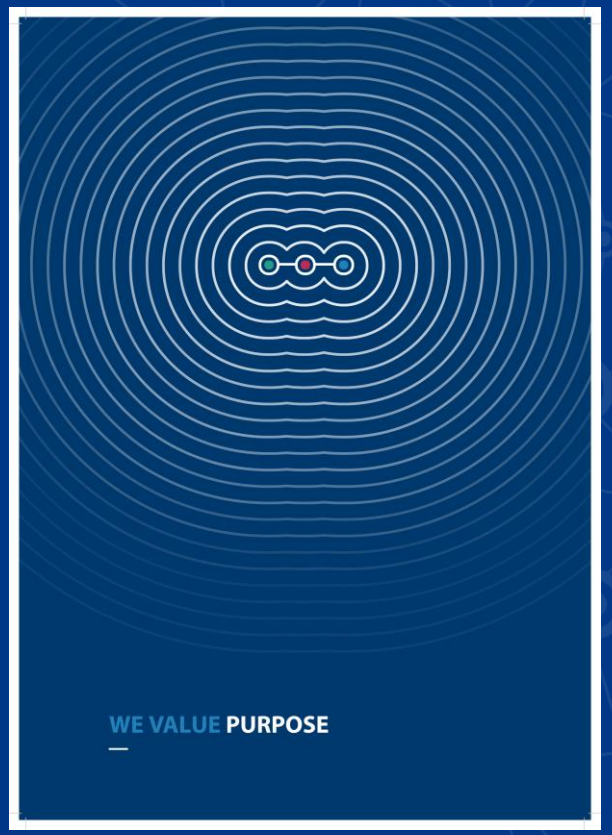
It takes time and effort. It's easy to loose the target and give up. Right people help. Right people are hard to find.

Rail Baltica





Thank you!
Aitäh!
Paldies!
Ačiū!



Questions, comments? martins.millers@railbaltica.org