

Utilising virtual design and BIM in greenfield projects

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Agenda

About Rail Baltica

The Digital challenge

Managing Digital data in Rail Baltica

Bridging design and construction
digitally

Suggestions for future megaprojects



About Rail Baltica



870 km greenfield railway infrastructure

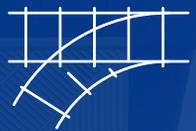


ERTMS Level 2 + FRMCS*



Maximum length of freight trains: 1050m

Design speed:
249 km/h for passenger trains ,120 km/h for freight trains



1435 mm gauge railway



Electrified 2x25kV AC



Axle load 25t



SE-C (Swedish) loading gauge

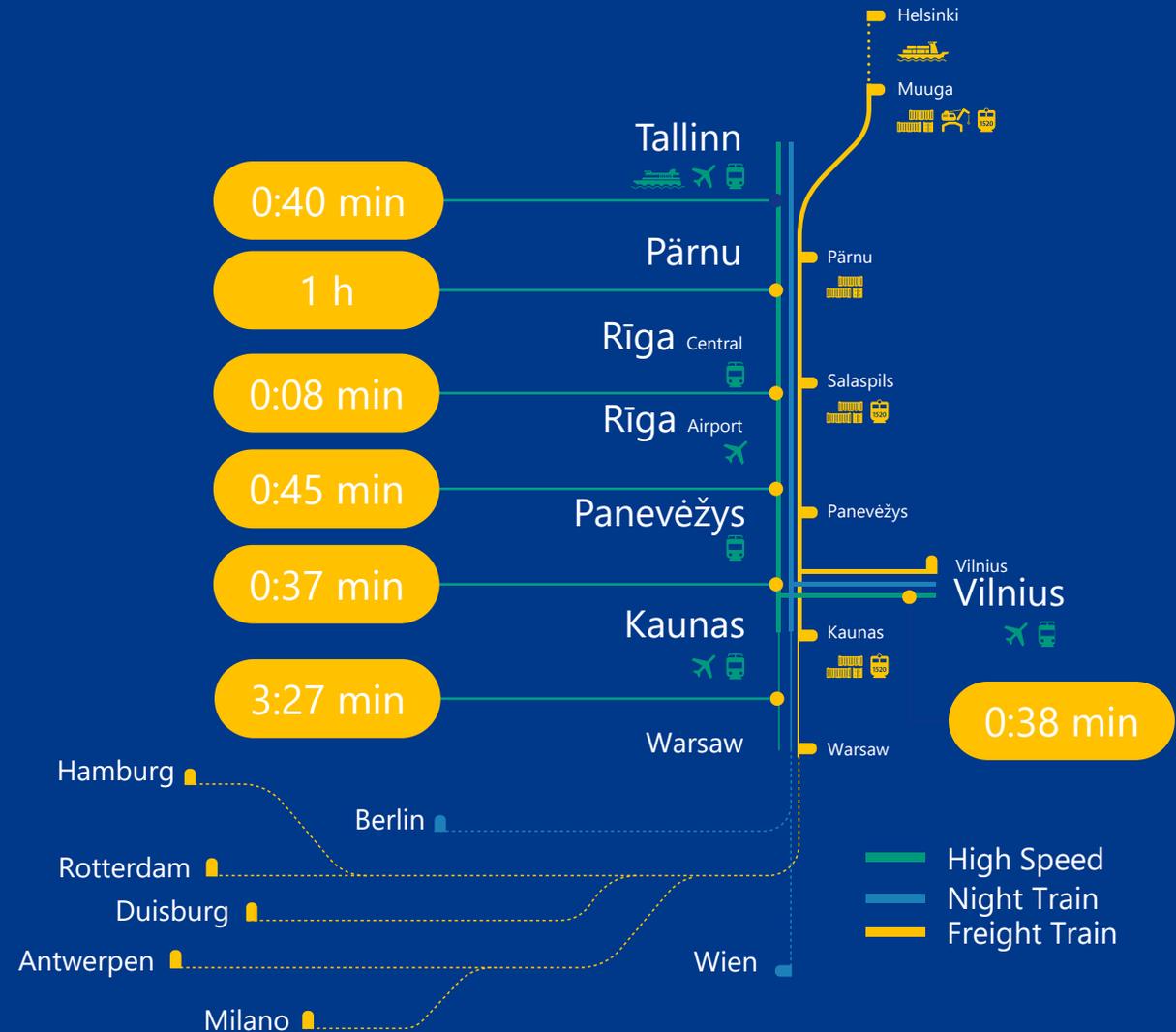
About Rail Baltica

50% less travel
time compared to
current journeys

5 countries involved

3 new cross-
border

connections
Fully electrified



Construction progress

Estonia



- 105 km substructure and related infrastructure in construction
- Construction contracts signed for 200km

Latvia



- Riga central station and Riga airport under construction
- Contract for mainline of 230km signed, first priority construction works started

Lithuania



- Mainline embankment and structure of 46 km is under construction
- 9 km of railway installed

The Digital challenge

Why do we need BIM?

I don't understand YOUR BIM

It taking too long, it worked fine without BIM before

Anyway, no one is going to use this digital information



The Digital challenge

Three countries, three languages, different laws and traditions – **but one mega-project!**



Rail Baltica BIM roadmap

BIM Strategy

- Rules
- Design Guidelines
- Trainings



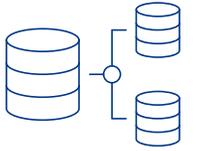
Software

- CDE
- GIS
- Asset register creation



Operations and maintenance

- Handover
- Asset management



BIM Framework

EU directive 2014/24

- BIM strategy framework
- Market engagement

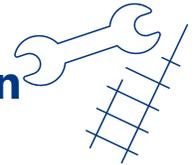
Workflows and design

- Design review workflow
- Procedures
- Data collection



Construction

- BIM usage
- BIM As-built
- Progress



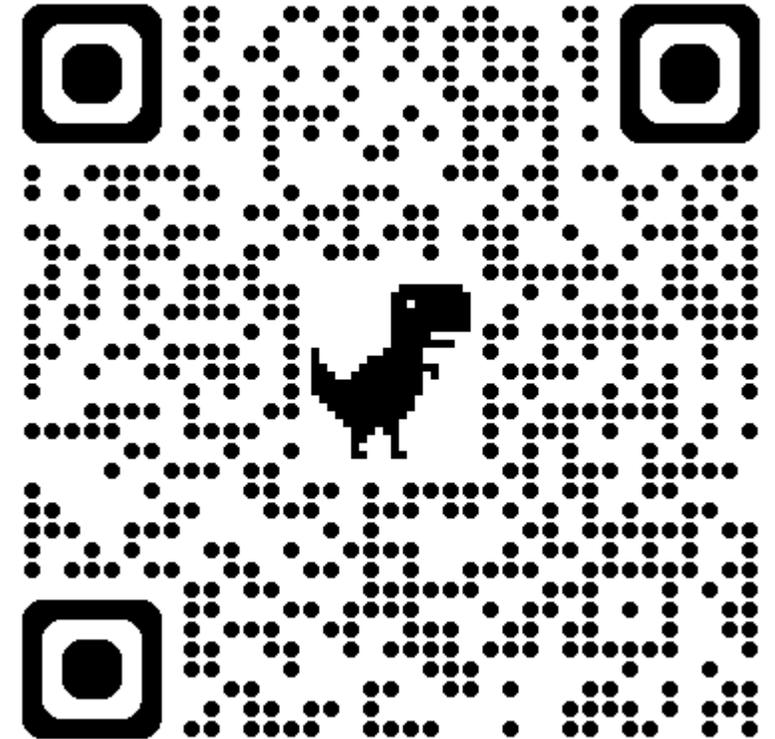
Design Guidelines and public map

The screenshot shows the Rail Baltica website interface. At the top left is the Rail Baltica logo. To the right are links for 'Careers', 'Contacts', a search bar, and a language selector 'EN'. Below this is a dark blue navigation menu with the following categories and sub-items:

- About the project
 - About Rail Baltica
 - Finances
- Map
 - Map
- Building Rail Baltica
 - Progress today
 - Infrastructure
 - Virtual design and construction
 - Sustainability
- Governance
 - Project governance
 - Company governance
 - Documentation
- For partners
 - Rail Baltica partners
 - Procurements
 - Procurement Plan
 - About procurement
- News
 - News
 - Newsletter

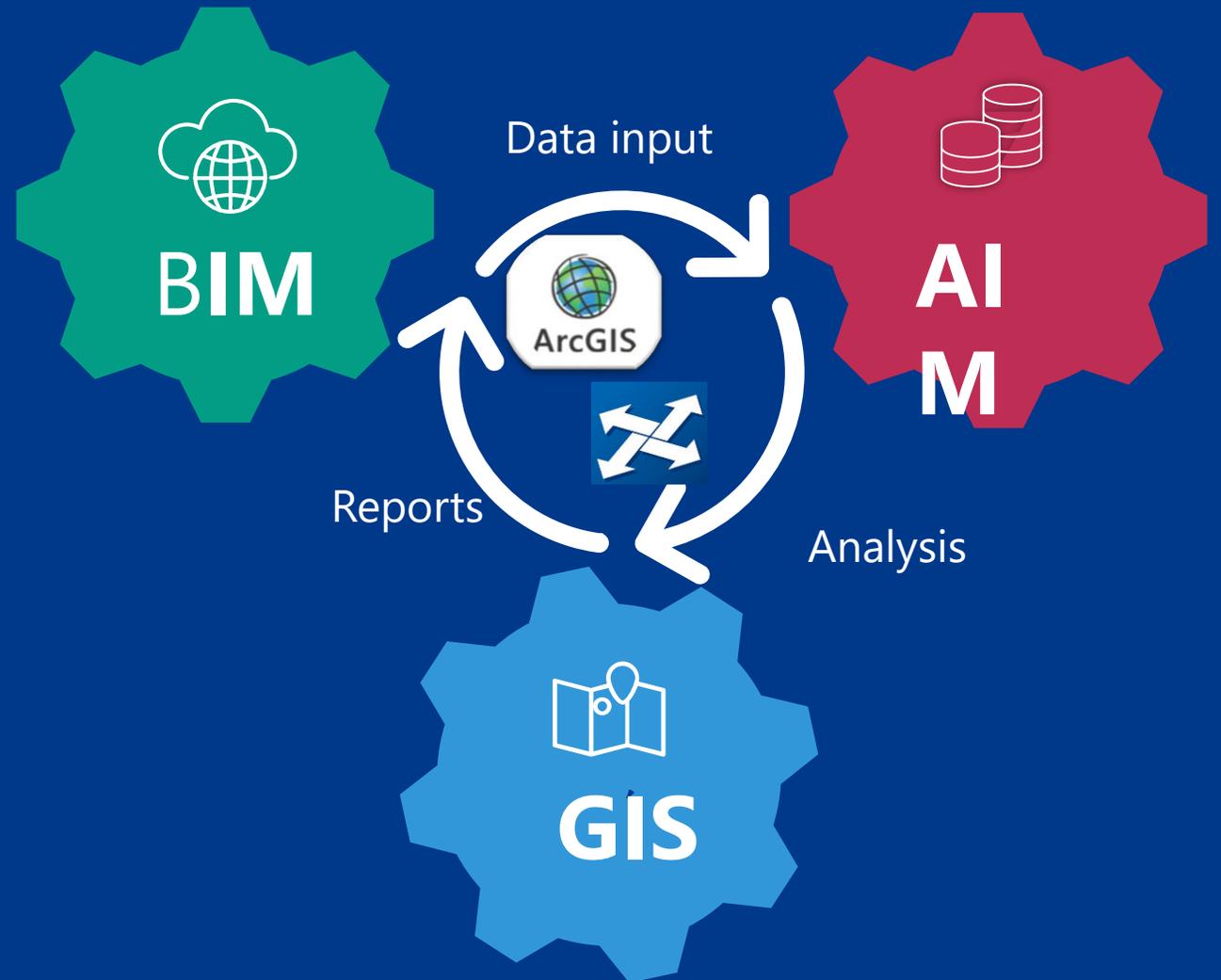
The main content area features a map of the Baltic region showing the planned railway route from Stockholm to Vilnius. A legend on the left side of the map defines the track types and construction status:

- Planned railway track**
 - Planned 1435 mm gauge railway track (solid orange line)
 - Planned 1435 mm gauge railway track (Spatial planning procedures in progress) (dashed orange line)
- Existing railway track**
 - Existing 1435 mm gauge railway track (solid yellow line)
 - Reconstruction of 1520 mm gauge railway tracks (dashed yellow line)
- Construction**
 - Construction status of point type objects
 - Construction works completed (green circle icon)

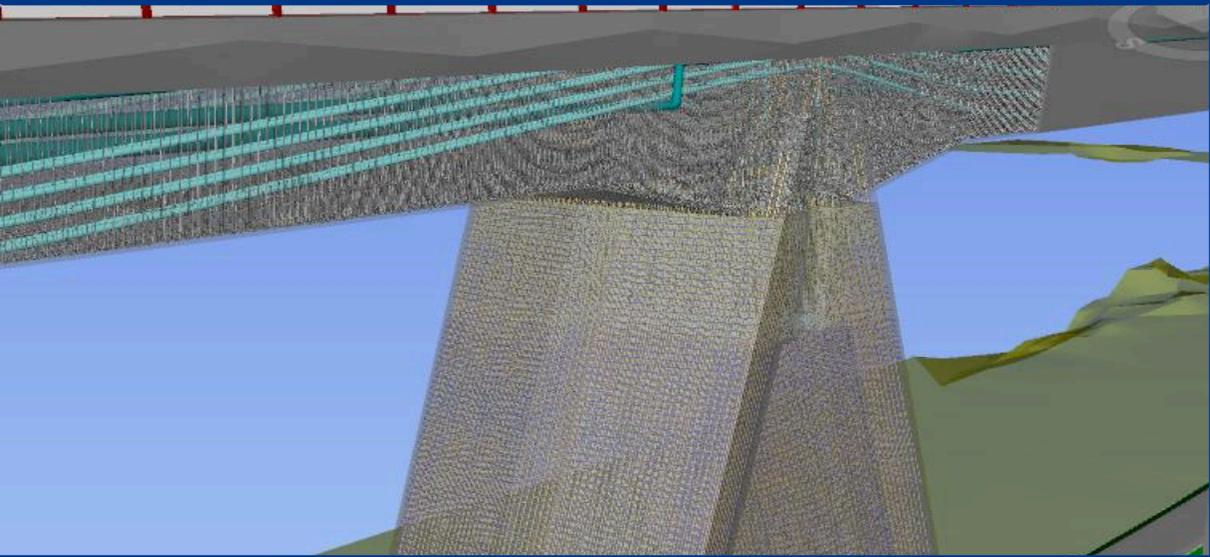


<https://www.railbaltica.org>

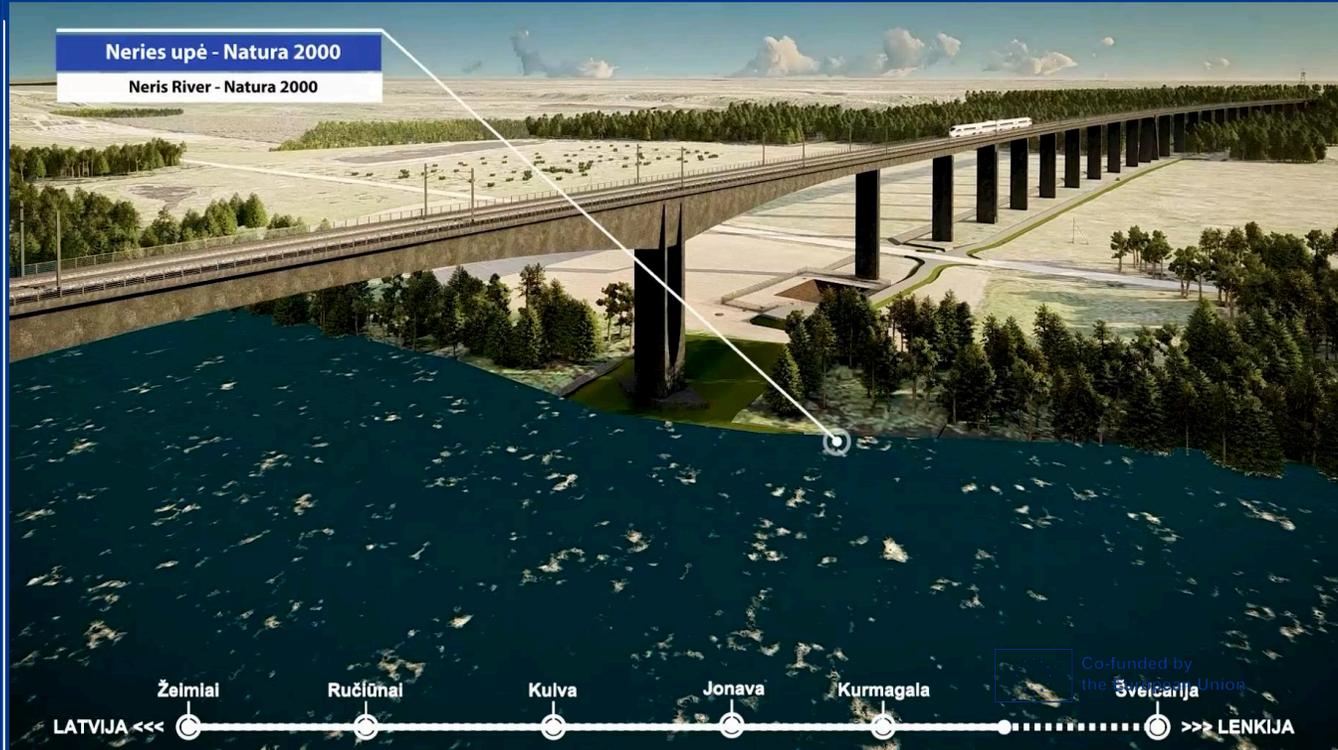
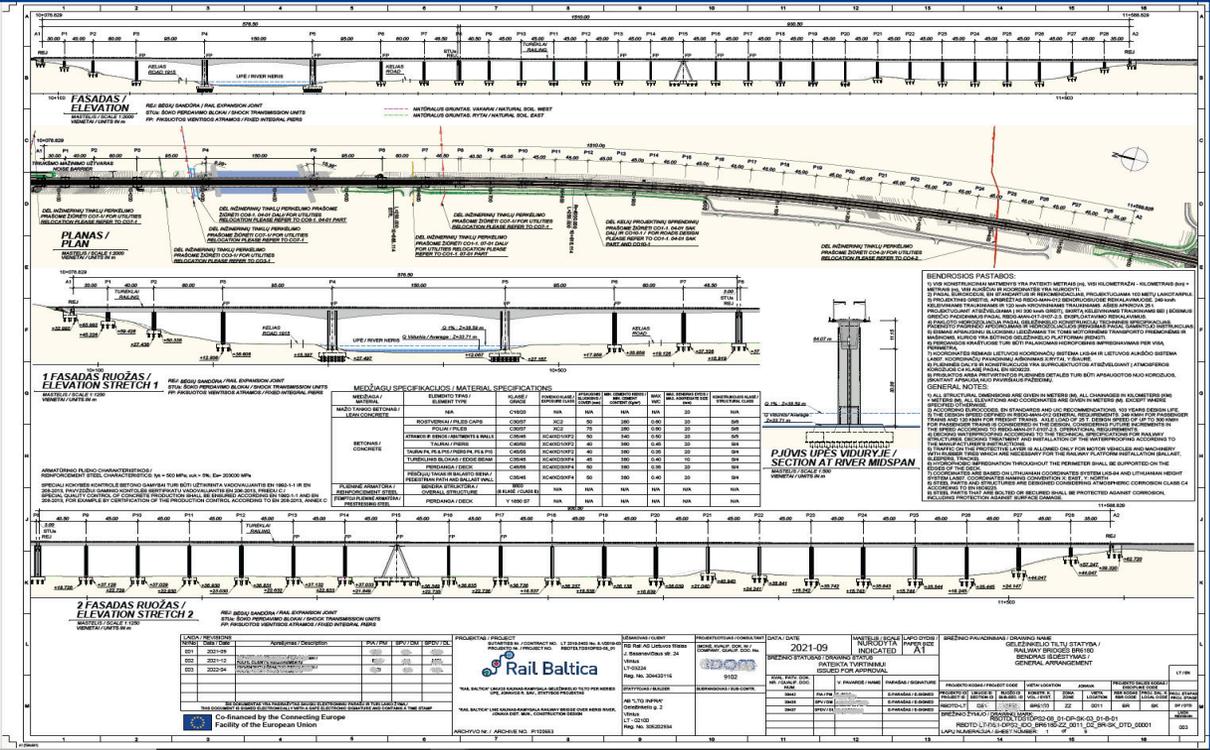
Managing Digital data in Rail Baltica



Rail Baltica design

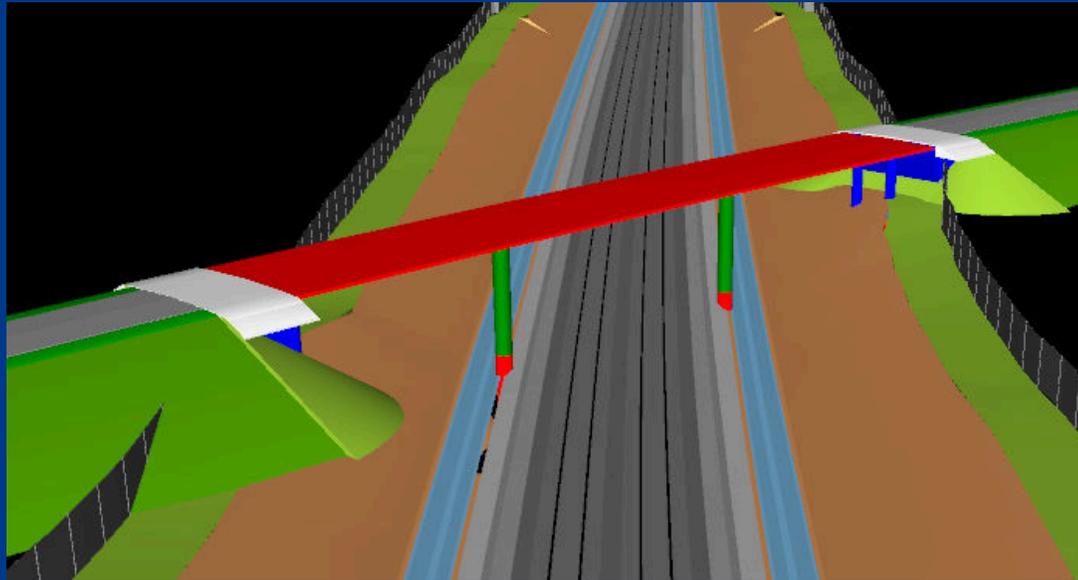


Item	IFC	AllplanAttributes	RBR-Data	TimeLiner	Material
Property					Value
GLOBALID					1Ww2Jhk2D09RuHEVpsXY7y
RBR-OCC					303
RBR-Project_ID					11111111
RBR-Section_ID					11111111
RBR-SubSection_ID					11111111
RBR-Originator					11111111
RBR-Discipline_Code					BR
RBR-VolSysZone					BR618977
RBR-Location					0011
RBR-Functional_classification					CV-BR-RWBG-00
RBR-Object_ID					STR-PIR-022
RBR-Start_Kilometre					10078.000
RBR-End_Kilometre					11358.125
RBR-LoG					400
RBR-LoI					400
RBR-Design_life					100
RBR-Material_Designation					C45/55
RBR-Material_Description					Reinforced concrete
RBR-Product_Name					Bridge_Pier_C45/55_XC4/XD3/XF4
RBR-Product_Description					Reinforced concrete bridge piers
RBR-Pr_Code					Ss_20_50_20_70
RBR-Type_number					STR-000005
RBR-Units					m³
RBR-Local_Code					SK
RBR-Project_Stage					DTD
RBR-Revision					4
RBR-Type					Integral
RBR-Position					P-15
RBR-Length					28.80 m
RBR-Concrete_Volume					859.820
RBR-Steel_Mass					132154.340
RBR-Reinforcement_Ratio					155
RBR-Exposure					XC4/XD1/XF2



Design Deliveries and reviews

Value Engineering



Master design



Value Engineering data

RBR-Project_ID
RBR-Section_ID
RBR-SubSection_ID
RBR-Originator
RBR-Revision

RBDT-DLT
DS1
DPS2
IDO
en

1. BIM specific checklist

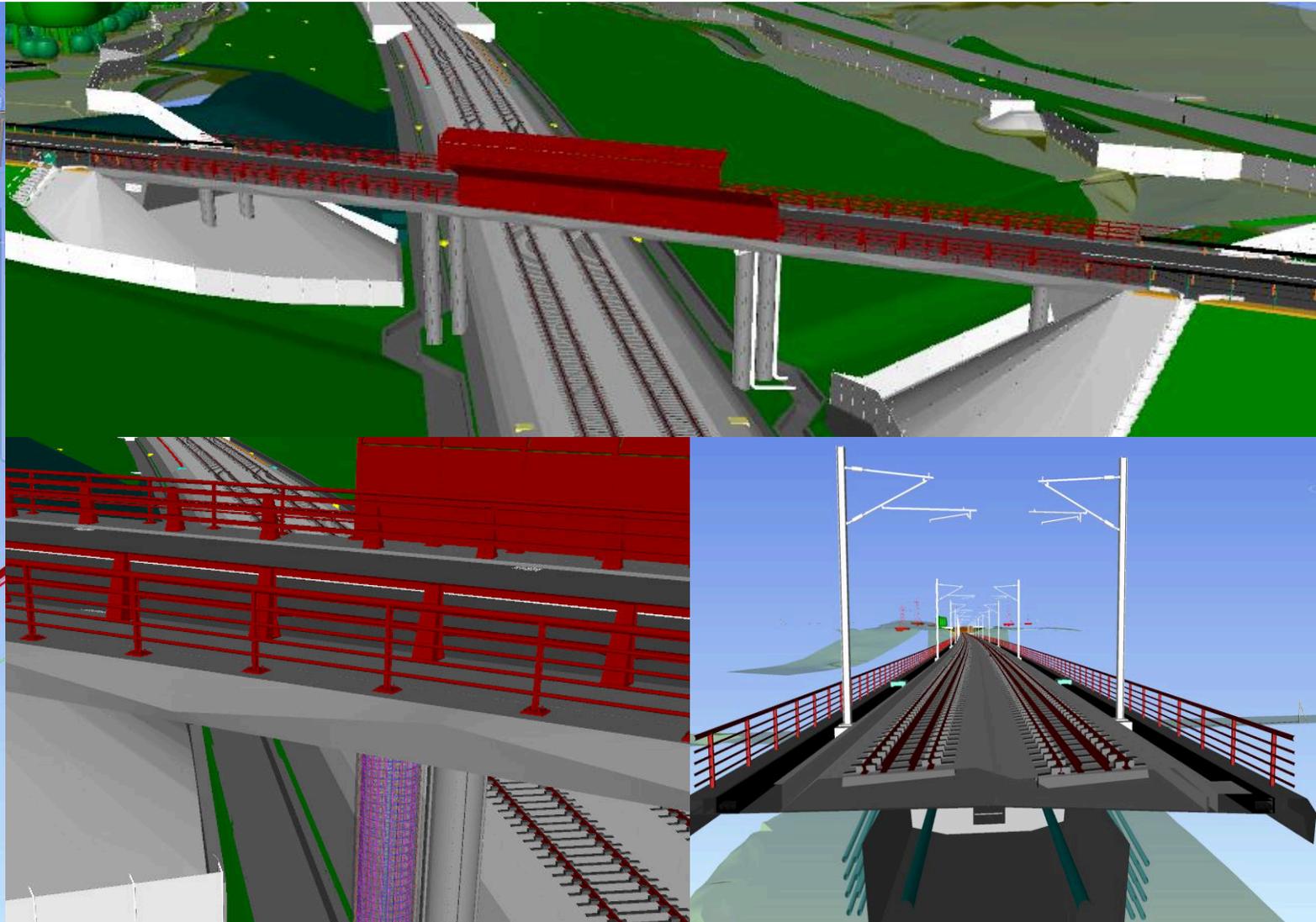
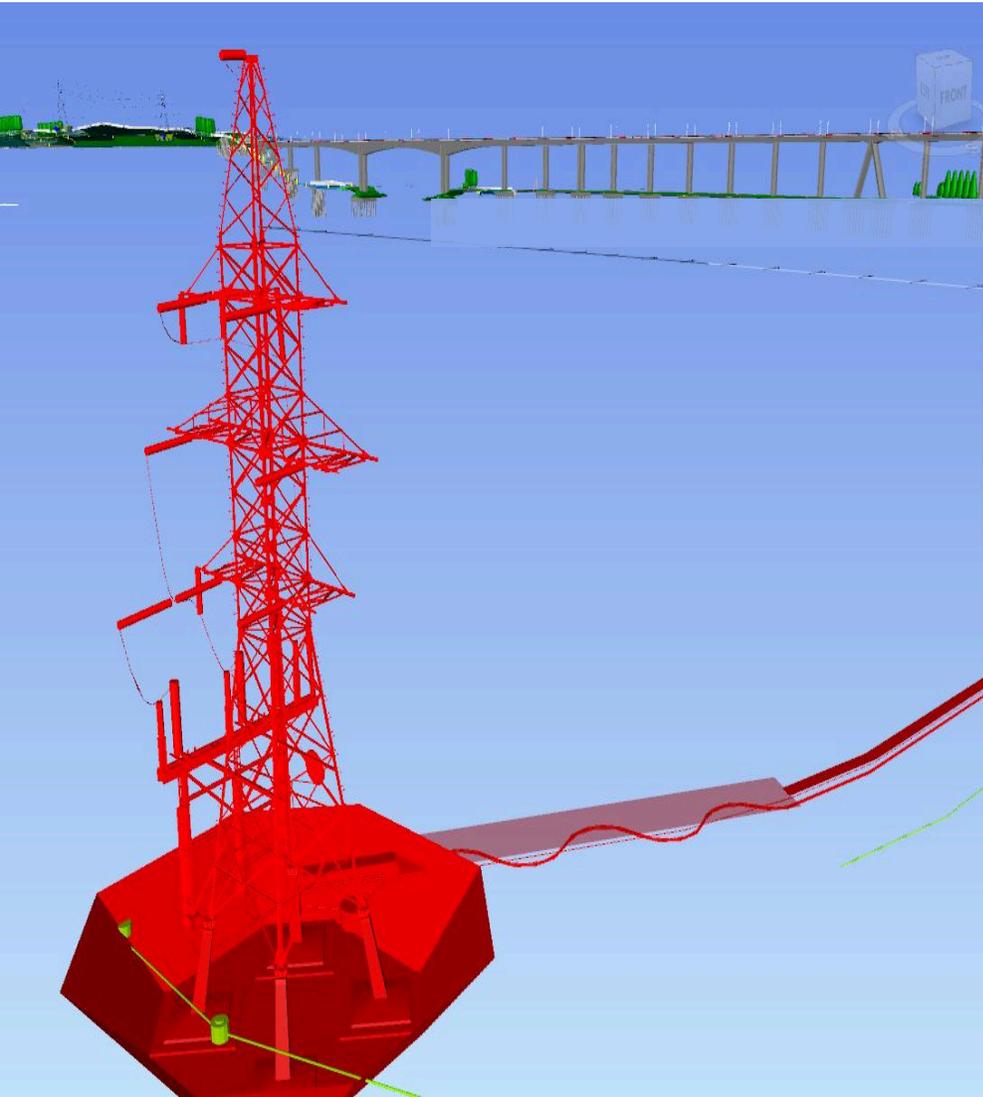
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1.3	0.10	m	Structure
1.4	0.10	m	Structure
1.5	0.10	m	Structure
1.6	0.10	m	Structure
1.7	0.10	m	Structure
1.8	0.10	m	Structure
1.9	0.10	m	Structure
1.10	0.10	m	Structure
1.11	0.10	m	Structure
1.12	0.10	m	Structure
1.13	0.10	m	Structure
1.14	0.10	m	Structure
1.15	0.10	m	Structure
1.16	0.10	m	Structure
1.17	0.10	m	Structure
1.18	0.10	m	Structure
1.19	0.10	m	Structure
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1.21	0.10	m	Structure
1.22	0.10	m	Structure
1.23	0.10	m	Structure
1.24	0.10	m	Structure
1.25	0.10	m	Structure
1.26	0.10	m	Structure
1.27	0.10	m	Structure
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1.31	0.10	m	Structure
1.32	0.10	m	Structure
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1.34	0.10	m	Structure
1.35	0.10	m	Structure
1.36	0.10	m	Structure
1.37	0.10	m	Structure
1.38	0.10	m	Structure
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1.91	0.10	m	Structure
1.92	0.10	m	Structure
1.93	0.10	m	Structure
1.94	0.10	m	Structure
1.95	0.10	m	Structure
1.96	0.10	m	Structure
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1.98	0.10	m	Structure
1.99	0.10	m	Structure
1.100	0.10	m	Structure

Master design data

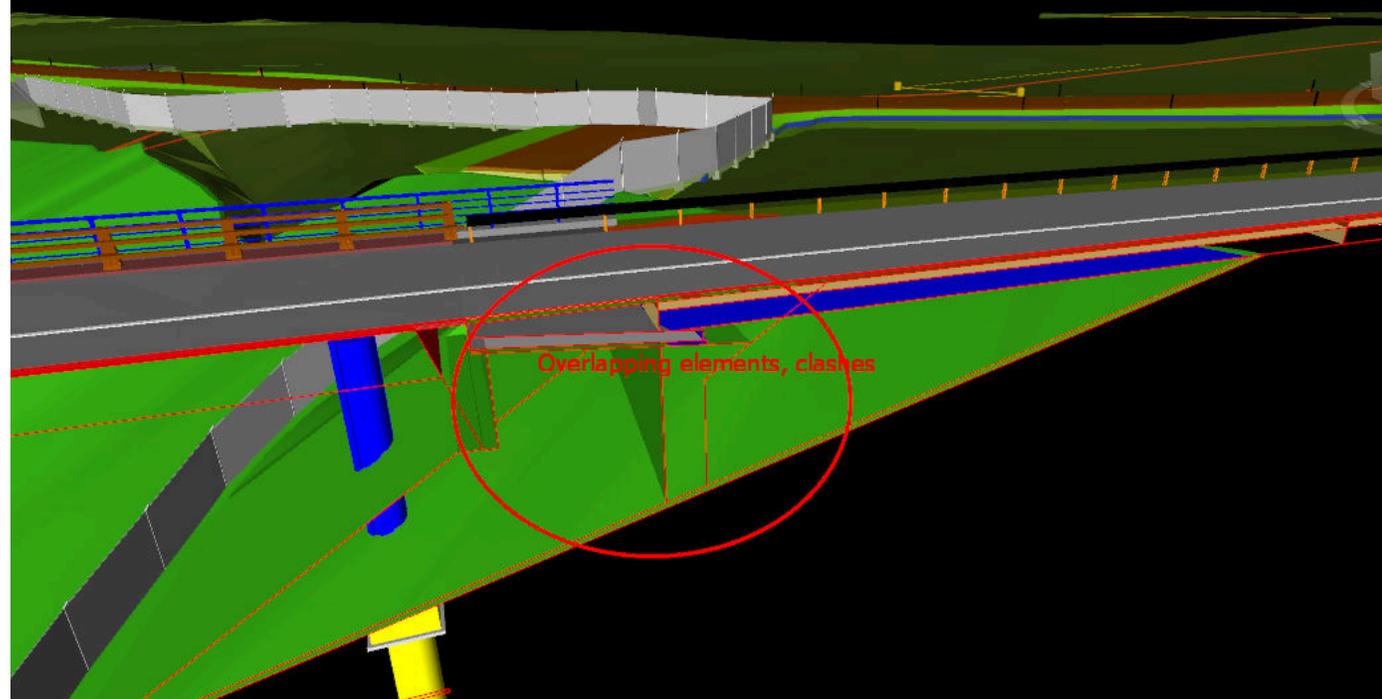
ID	Name	Material	Color	Texture
1	Concrete	Concrete	Grey	Concrete
2	Steel	Steel	Blue	Steel
3	Wood	Wood	Brown	Wood
4	Soil	Soil	Green	Soil
5	Grass	Grass	Light Green	Grass
6	Water	Water	Blue	Water
7	Rock	Rock	Dark Grey	Rock
8	Asphalt	Asphalt	Dark Grey	Asphalt
9	Concrete	Concrete	Grey	Concrete
10	Steel	Steel	Blue	Steel

Design Deliveries and reviews

Detail Technical Design

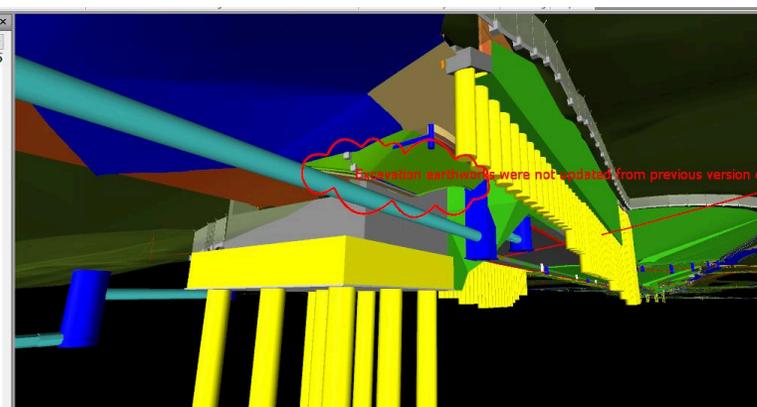


Design Deliveries and reviews



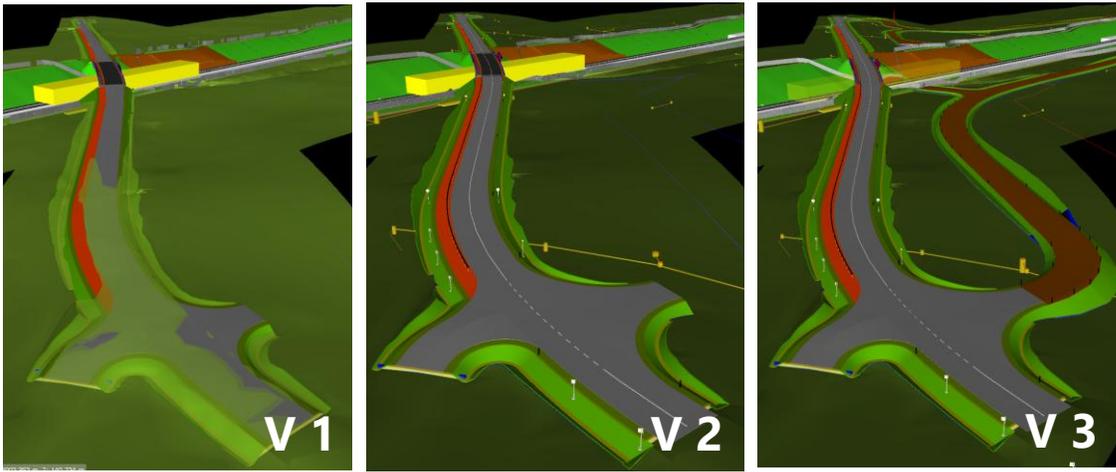
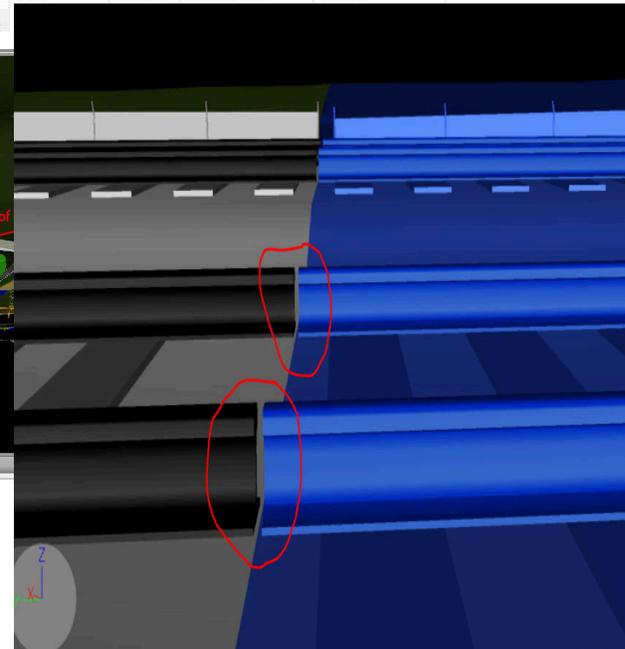
Comments

Comment	Date	Author	Comment ID	Status
Road model must be adjusted according to technical block solution, as this road is part of RBDTDLTDS1DPS2-02...				

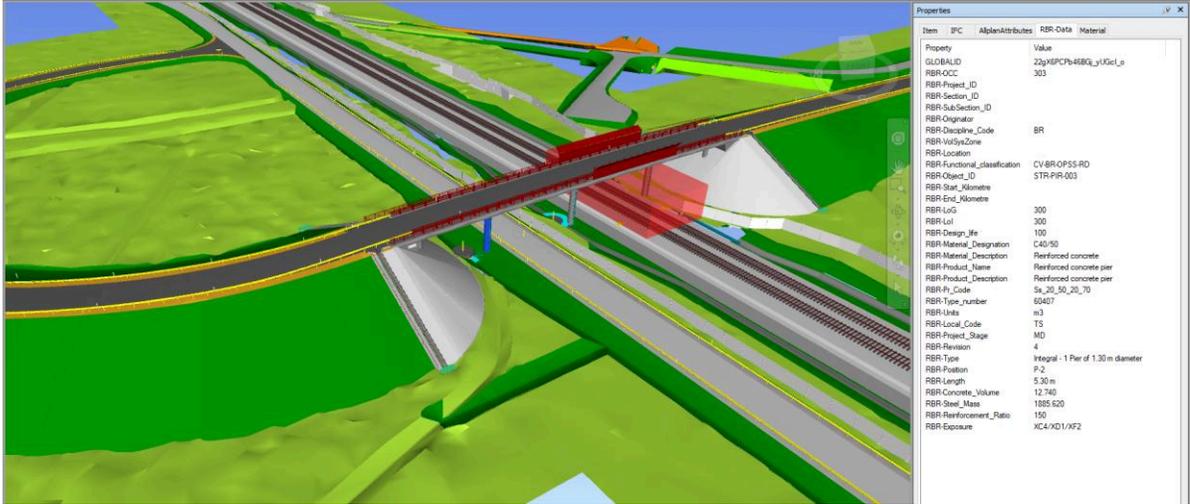


Comments

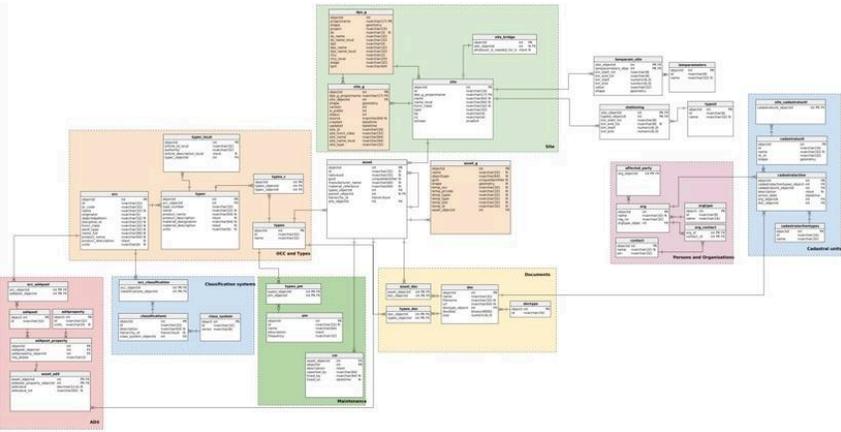
Comment	Date	Author	Comment ID	Status
Consultant has updated the excavation model according to RBR comments. To view these model please unhide ...	13:32:33 ...	marta...	269	New



BIM to GIS = Asset Register

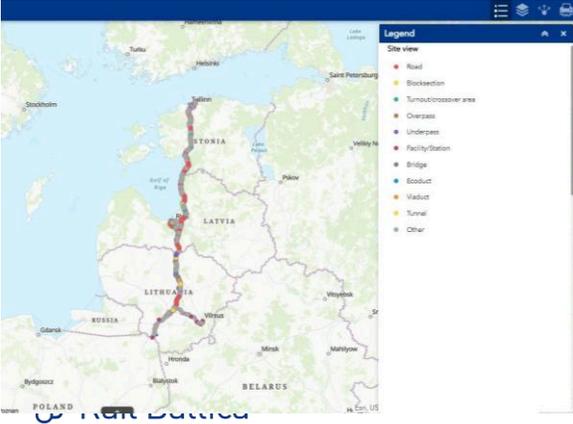


GIS Enterprise Geodatabase (SQL)

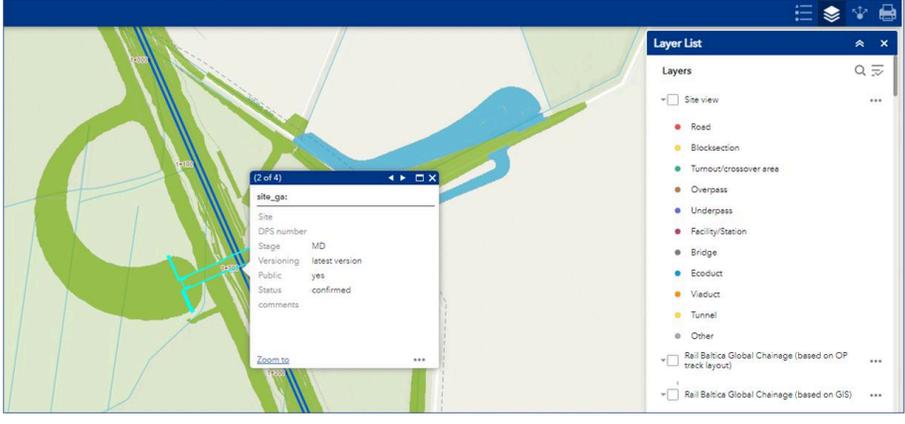


Web Interface

Sites



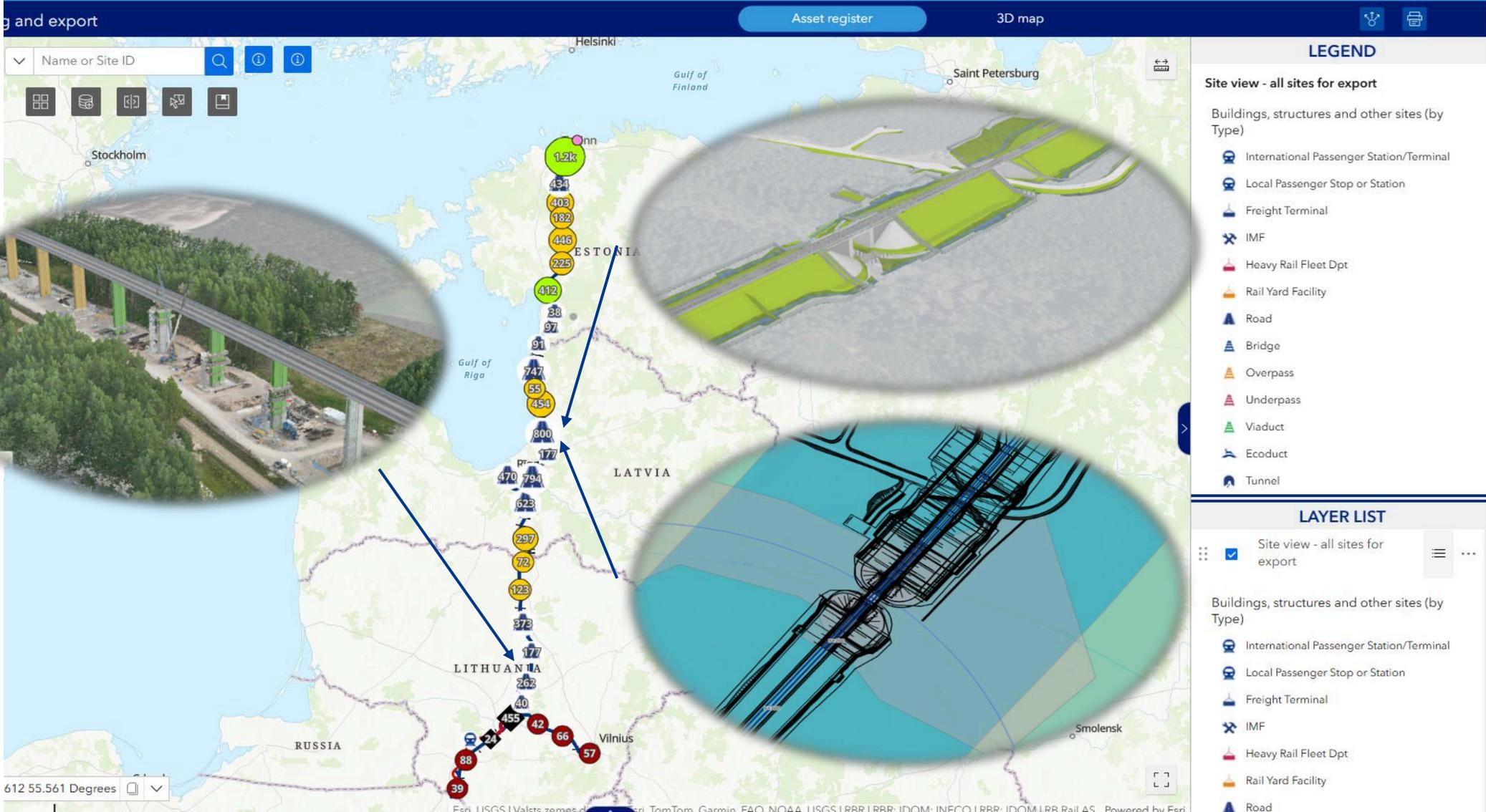
2D Footprint



3D Representation



Bridging design and construction digitally

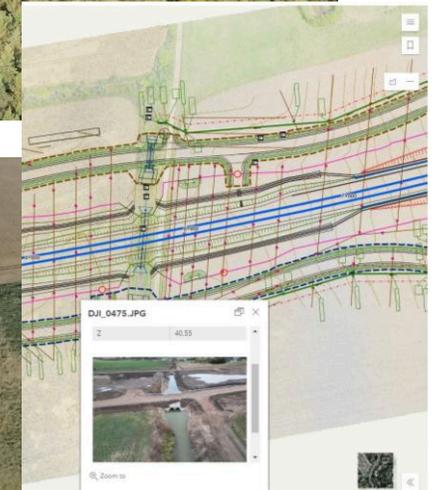


870 km of railway infrastructure in GIS database

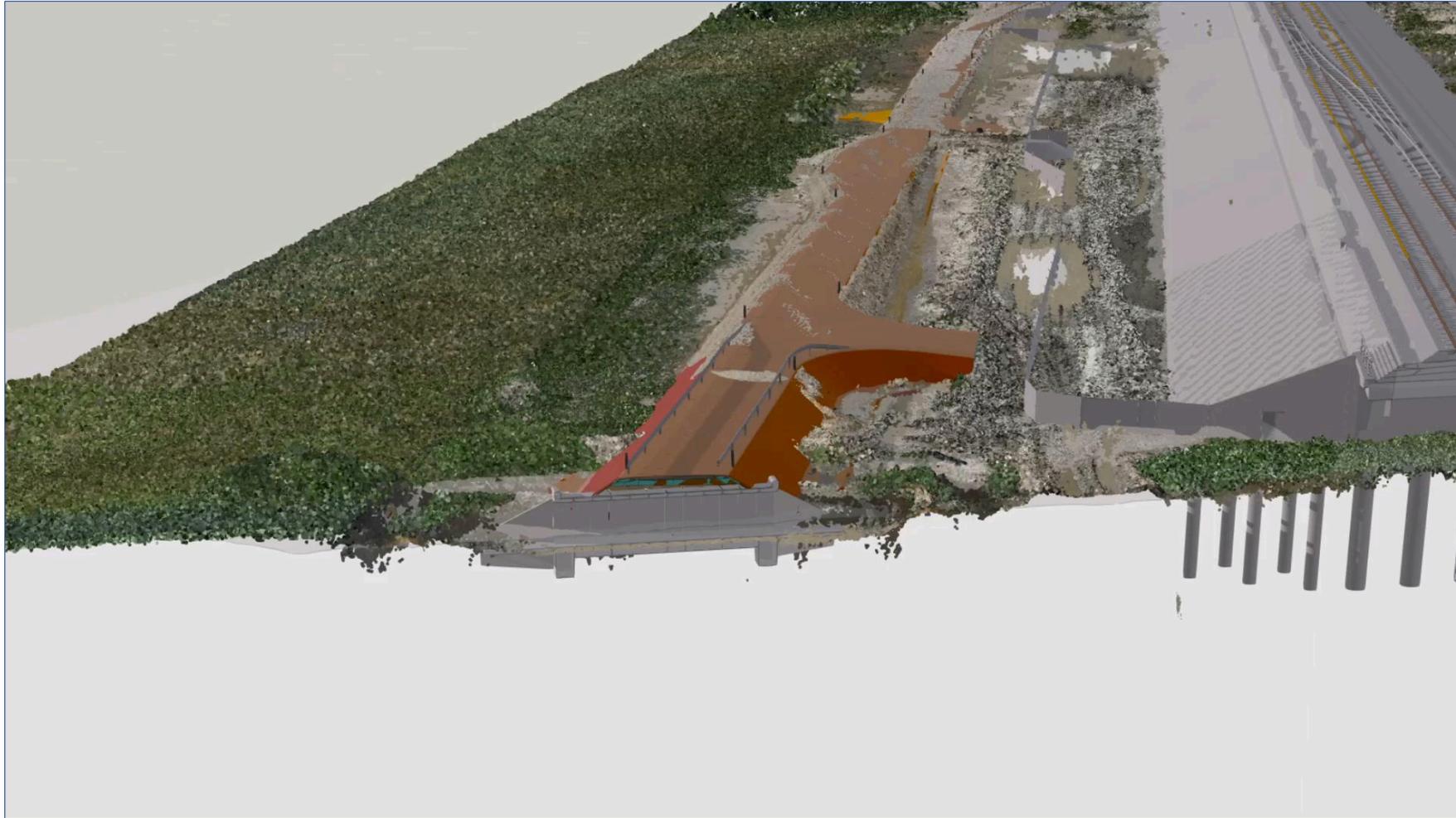
Collection and evaluation of factual data from construction sites

Drones. Quick and Efficient Assessment of the Situation and Data Collection

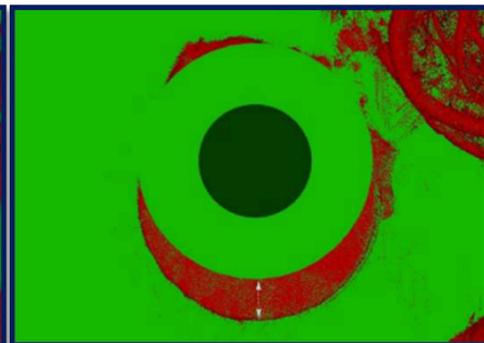
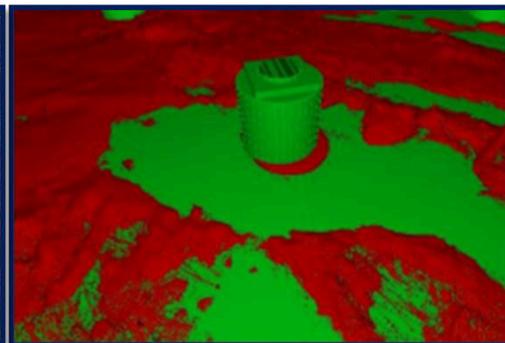
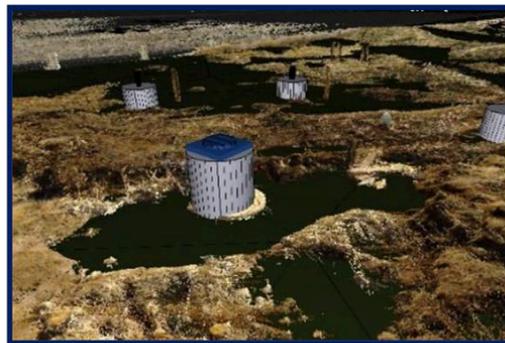
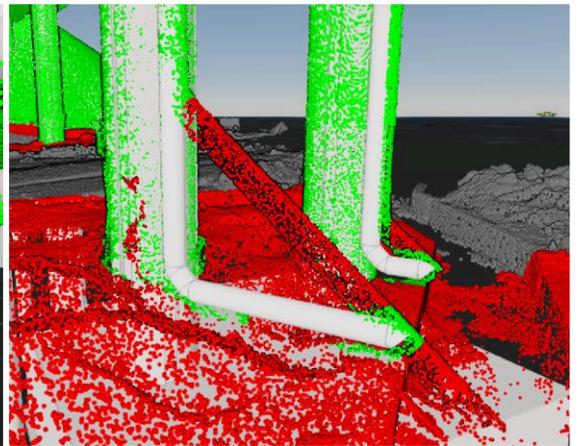
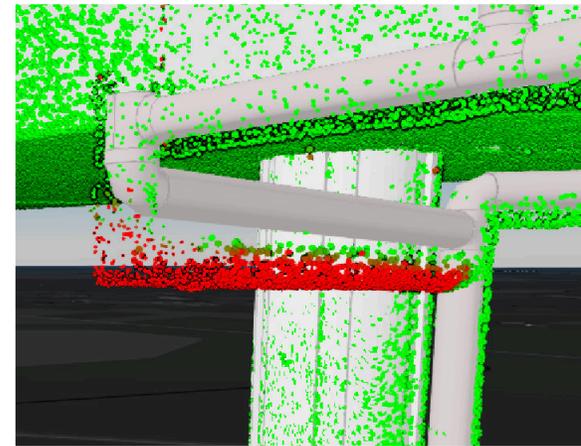
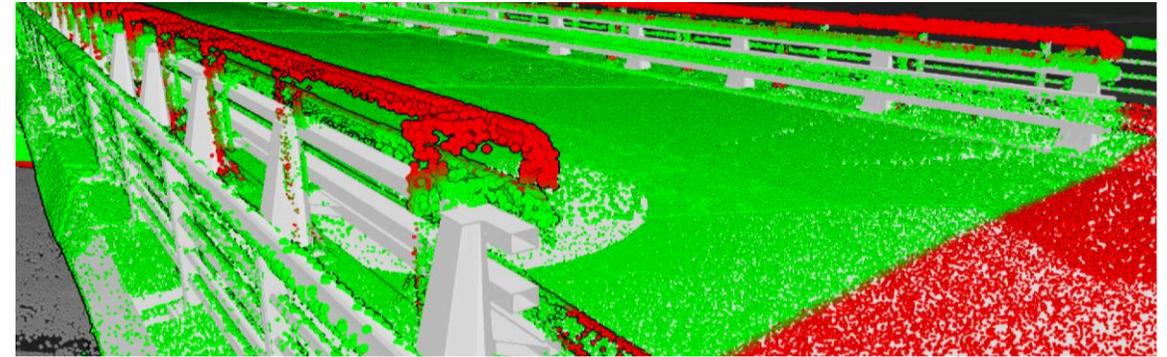
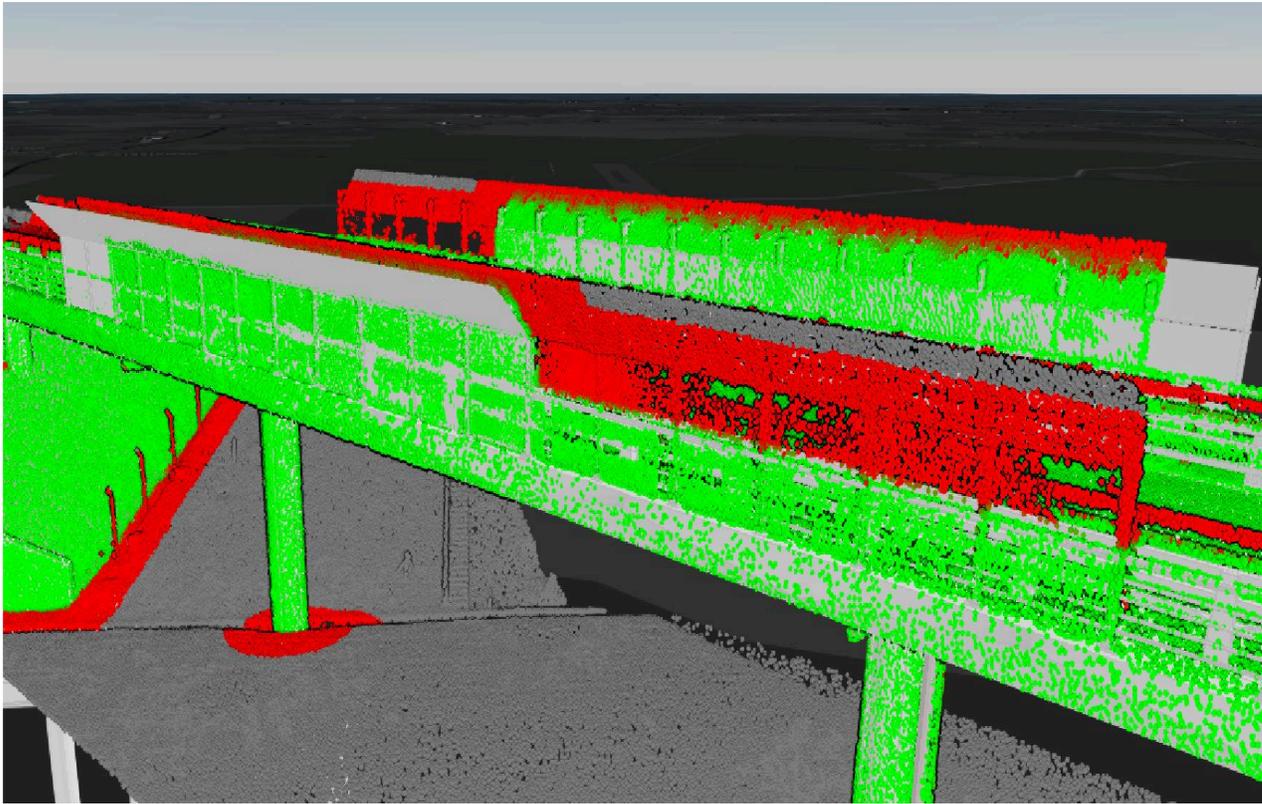
Field Applications. On-site Data Collection



Monitoring and Reporting in GIS



Why it is important to monitor?



Digital possibilities

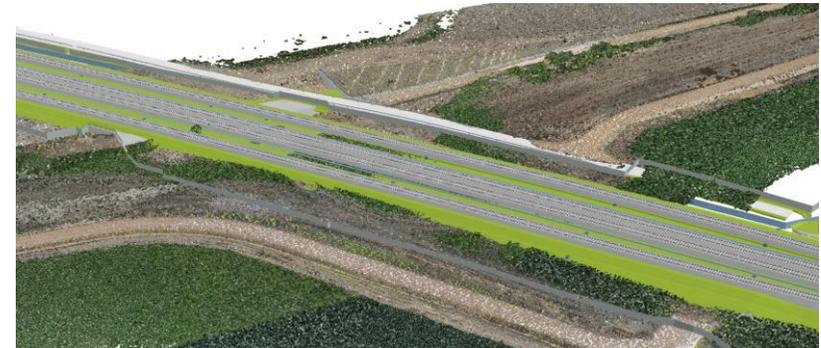
Data analysis

Visual supervision

Monitoring progress from the office

Possibilities for automated control

Future digital twin for operation and maintenance



Suggestions for future megaprojects

Suggestions for future megaprojects

01 →

Planning

Client Requirements

The Client, as the end user, defines what digital data will be managed and how it should be handled. Once agreed upon, these requirements are expected to remain stable to ensure consistent implementation and project alignment.

02 →

CDE

One Environment

It is crucial that all project participants work within a single, shared environment. A strong commitment from all stakeholders is essential to ensure consistency, transparency, and effective collaboration.

03 →

Process

Quality

While the designer or contractor should understand how to deliver the required data, it is essential for the Client to remain actively involved in the process. Strong collaboration between all parties plays a critical role in ensuring high-quality outcomes.

04 →

Integration

BIM – GIS – AIM

Many different systems may be used within the scope of a project. It is essential to align them within a single, coherent information flow to prevent data loss and reduce interface-related issues.

05 →

Maintenanc

BIM Benefit

The true value of digital data collected throughout the project phases lies in the structured, systemized information it provides, enabling more efficient and automated maintenance processes.

Thank you!



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