



# Detailed Technical Design Review and Design Expertise Services for Rail Baltica

Eriks Dilevs – Roads and Utilities Team leader  
Kaupo Sirk – Head of Civil Works and Stations

28th of June, Riga 2019

Meeting with Suppliers



Co-financed by the European Union  
Connecting Europe Facility

## Meeting Agenda

- ⦿ Introduction to Rail Baltica project and project schedule.
- ⦿ Information on procurement in terms of general description and scope of work.
- ⦿ General information on timeline of required services.
- ⦿ Q&A session: Part 1: RB Rail AS questions; suppliers' answers;
- ⦿ Coffee break – 14:30, 15 min.
- ⦿ Q&A session: Part 2: suppliers' questions; RB Rail AS answers.

## Design Speed

249 km/h – passenger trains

120 km/h – freight trains

## Standard Gauge

1435 mm

## Double-track Electrified

2x25kV AC

## Axle Load

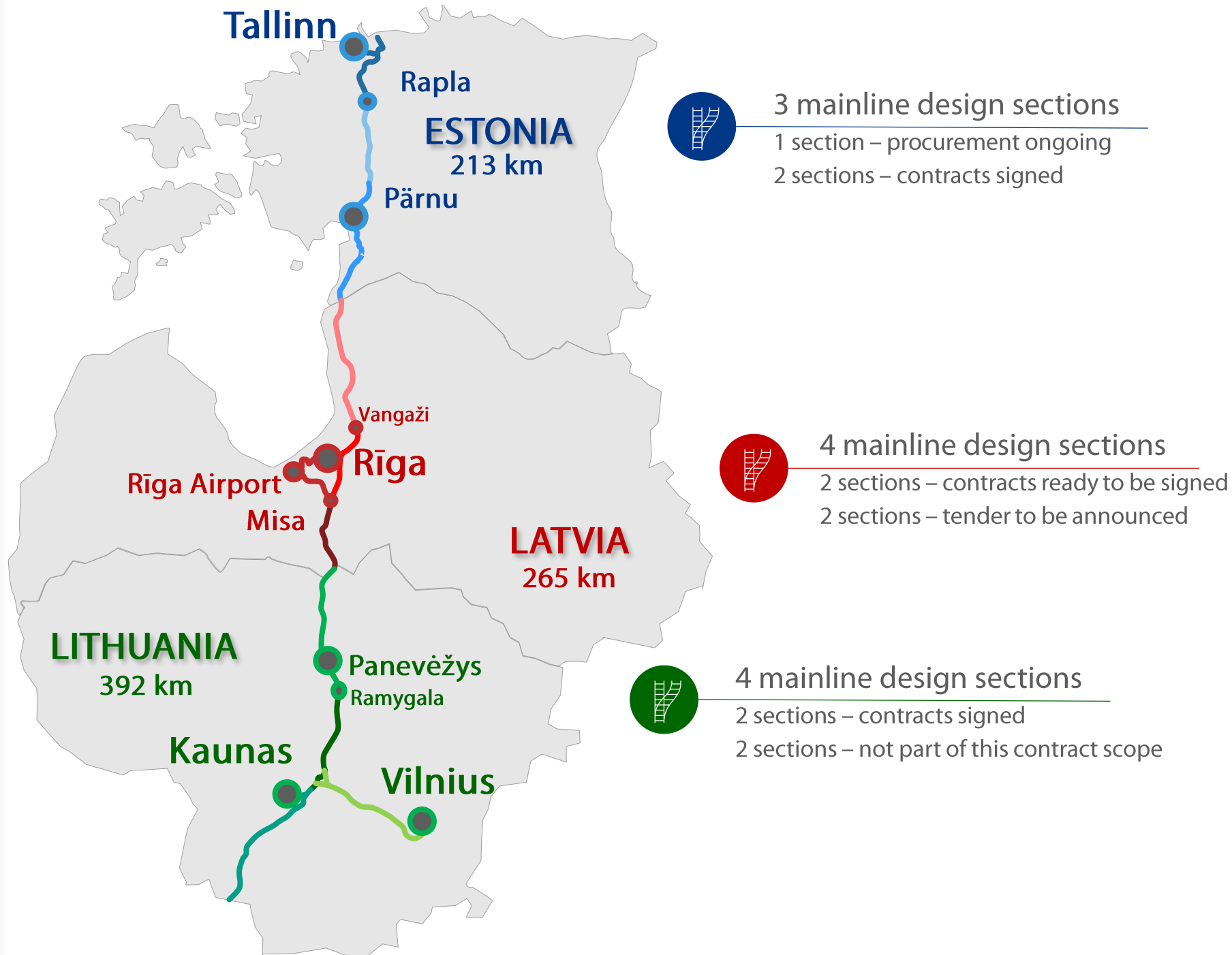
25 t

## Traffic Management

ERTMS 2

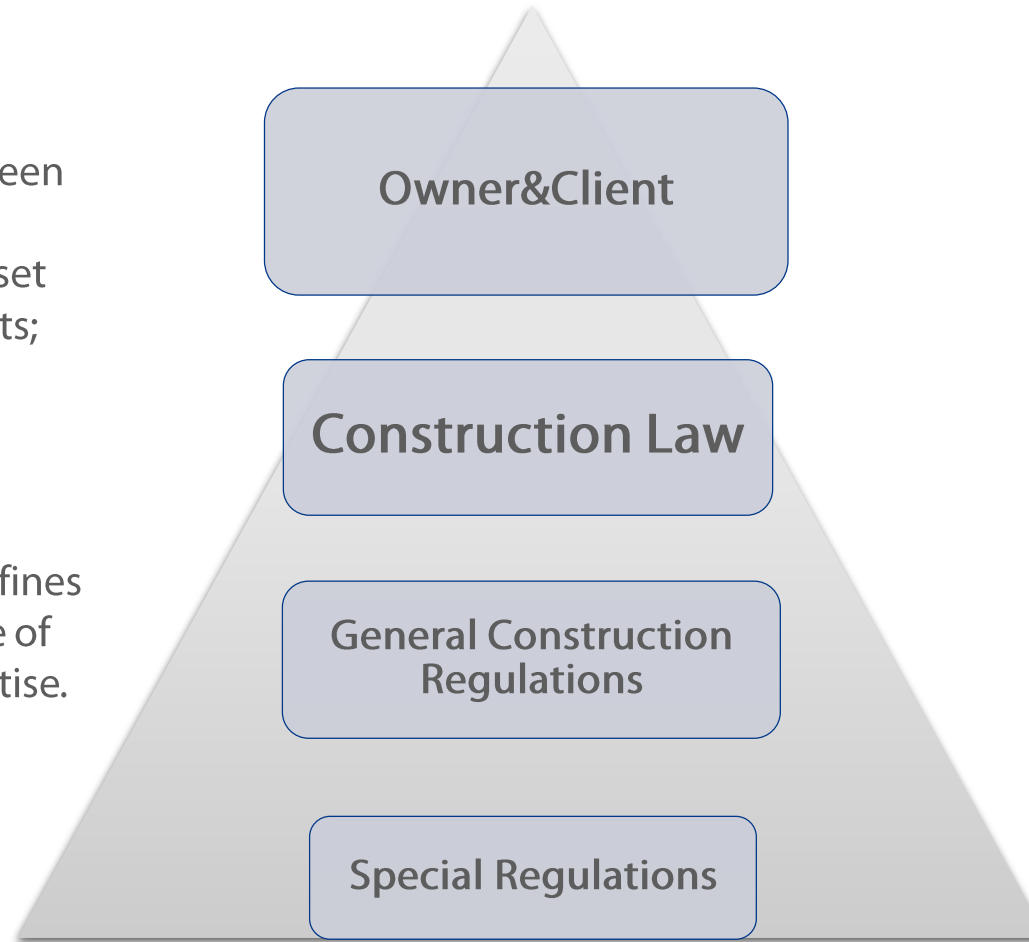
## Max. Freight Train Length

1050 m



# Laws and regulations for Construction process in Estonia, Latvia and Lithuania

- ✓ To ensure that works have been carried out in the highest possible quality Client shall set its own specific requirements;
- ✓ Construction Law describes general rules;
- ✓ Construction regulations defines general description of scope of work for Legal Design Expertise.



Owner and Client are fully responsible for the final deliverables and tender documents.

Defines responsibility of (The State Construction Control Bureau)

Defines structures that are mandatory for Design Expertise

Defines scope of Expertise – which part of Design must be expertised

# Special regulation approved by Cabinet of Ministers defining minimal scope for Design Expertise in Estonia, Latvia and Lithuania



## Estonia

- ✓ „Nõuded ehitusprojekti ekspertiisile“ Majandus- ja taristuministri 08.06.2015 määrus nr 62; Ehituseprojekti ekspertiisi tegemise kord RT I, 23.02.2012;

## Latvia

- ✓ Construction regulations for railways (Dzelzceļa būvnoteikumi), MK Nr.530
- ✓ Construction regulations for roads and streets (Autoceļu un ielu būvnoteikumi), MK Nr.633
- ✓ Construction regulations for Buildings (Ēku būvnoteikumi), MK Nr.529
- ✓ Construction regulations for individual engineering structure (Atsevišķu inženierbūvju būvnoteikumi), MK Nr.253
- ✓ Construction regulations for hydrotechnical and melioration structure (Hidrotehnisko un meliorācijas būvju būvnoteikumi), MK Nr.550
- ✓ Construction regulations for electricity generation, transmission and distribution structures (Elektroenerģijas ražošanas, pārvades un sadales būvju būvnoteikumi), MK Nr.573

## Lithuania

- ✓ Lietuvos Respublikos statybos įstatymas 1996-03-19 Nr. I-1240;
- ✓ Lietuvos Respublikos melioracijos įstatymas 1993-12-09 Nr. I-323; STR 1.04.04:2017
- ✓ „Statinio projektavimas, projekto ekspertizė“; MTR 1.05.01:2015 „Melioracijos statinių projekto ekspertizė ir melioracijos statinių ekspertizė“
- ✓ PTR 3.03.01:2005 „Nekilnojamojo kultūros paveldo statinio tvarkomųjų statybos darbų projekto ar tvarkomųjų paveldosaugos darbų projekto paveldosaugos (specialiosios) ekspertizės atlikimo taisyklės“

# Consequences to be decreased and risks mitigated

## ⦿ General Design Expertise according to local legislation without additional Design Review and Design Expertise services with detailed task description.

- Risks during design phase:
  - Incomplete design deliverable check;
  - Extension of time for the design works;
  - Mistakes in Bill of Quantities;
  - Mistakes in Calculations;
  - Increase of Design Supervision Service fees;
  - Possible claims and variations during design stage.
- Construction procurement and construction implementation phase:
  - Extension of time for Construction procurement due to incomplete design;
  - Increase of CAPEX for Construction;
  - Problems with project financing;
  - Extension of time during Construction phase.

## ⦿ Design Expertise with additional Design Review with specific scope of work defined in Terms of Reference for the Design Expertise procurement.

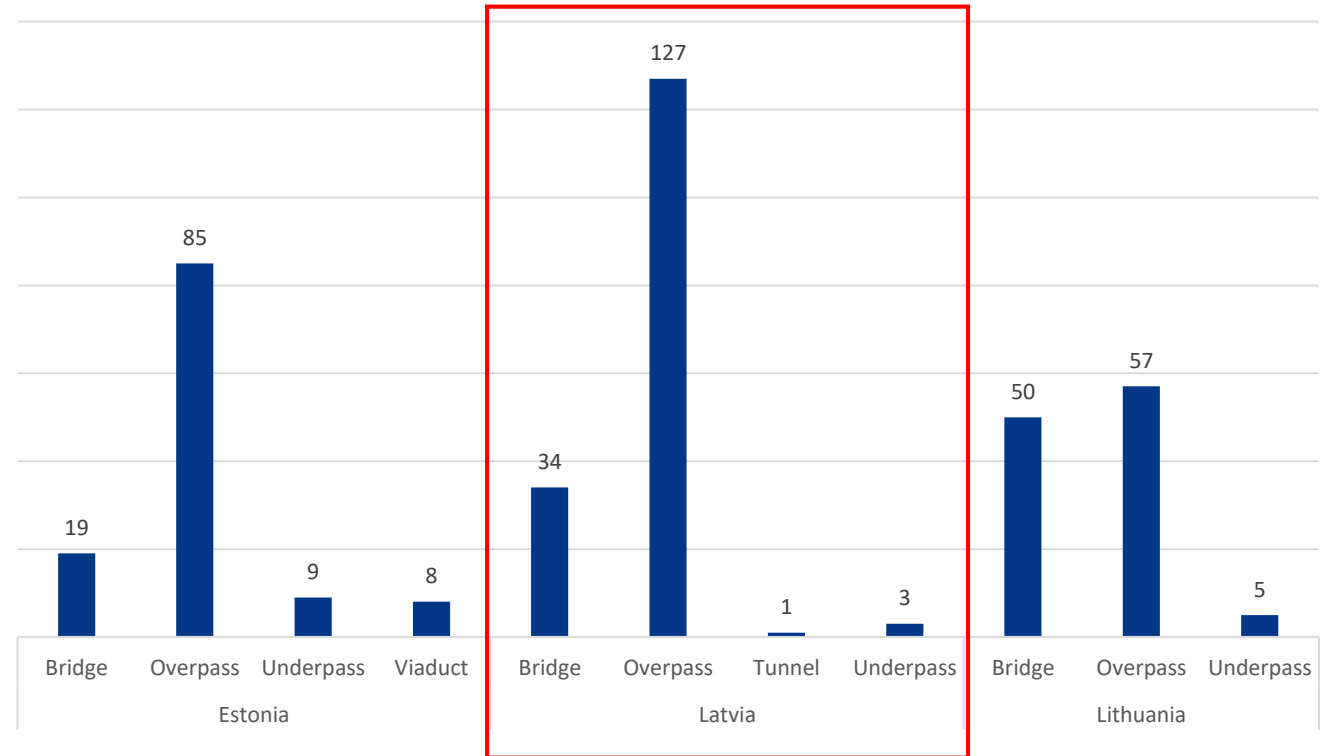
- Risks during design phase, construction procurement and construction implementation phase:
  - Design mistakes and errors shall be limited to minimum;
  - Design is completed in full compliance with contract agreements;
  - Contractor is not capable to prolong the procurement deadline relying on design errors and claim for variations during construction works relying on discrepancies in design;
  - Savings on CAPEX and OPEX.

## ⦿ Similar (depends on legal acts and budget) approach for all three Baltic state Detailed Technical Design shall be established to ensure that the best possible quality is achieved.

# Amount of work for Rail Baltica Design Sections

⦿ Total number of design sections, length and number of structures:

- Estonia:
  - ❑ 3 Design sections - total length 213 km
  - ❑ Structures – 121
    - Parnu bridge – total length 295 m
    - Keila river bridge – total length 206 m
    - Crossing with Tallin ringroad – total length 450 m
- Latvia:
  - ❑ 4 Design sections - total length 265 km
  - ❑ Structures – 165
    - Gauja bridge – total length 1750 m
    - Daugava bridge – total length 1150 m
    - Tunnel in Torņkalns - total length 2400 m
- Lithuania:
  - ❑ 2 Design sections - total length 168 km
  - ❑ Structures- 112
    - Neris bridge – total length 1700 m
    - Šešuva bridge – total length 300 m
    - Mūša/Mūsa bridge – total length 225 m



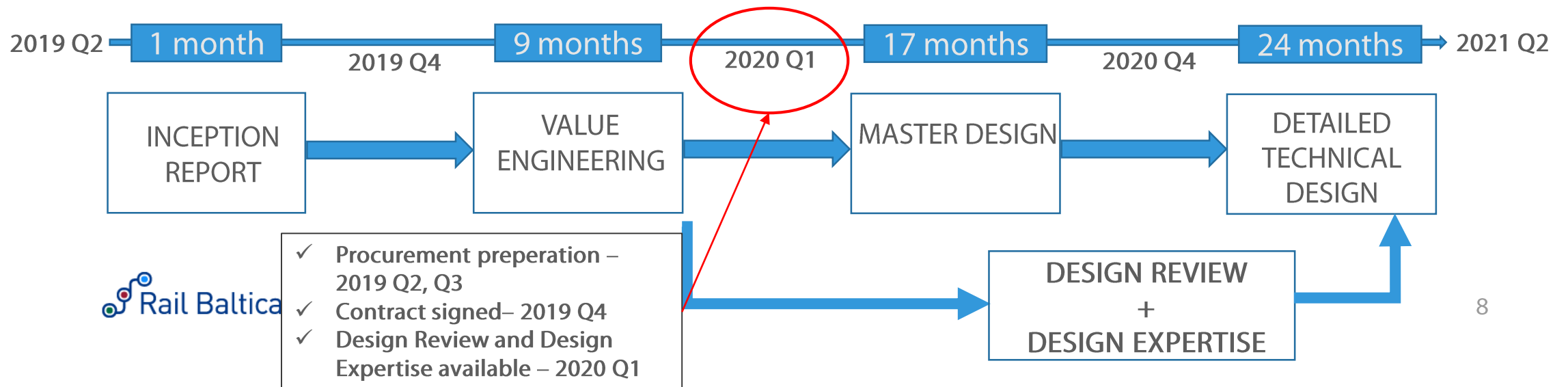
- ⦿ Culverts for waterway/ditch/melioration crossings >2,0 m
- ⦿ Road Interchanges with adjacent road infrastructure;
- ⦿ Underground and above ground utilities and adjacent infrastructure that is part of design scope of work.

Total length	Total count	EE	LV	LT
<20m	89	11	27	51
20m-40m	136	19	93	24
40m-60m	69	30	18	21
60m-100m	68	50	9	9
100m-300m	26	9	12	5
300m-500m	6	2	3	1
>500m	4		3	1

# When?

## Design Review and Design Expertise timeline

- Design Review and Design Expertise Services shall be available as follows:
  - Starting from the beginning of Master Design stage;
  - During Detailed Technical Design Stage.
  - Expected peak for Design review is expected in 2020-2021.
- Duration for Design Deliverable (according to DTD TS) reviewal is as follows:
  - Master Design – 30 to 40 days
  - Detailed Technical Design – 30 to 40 days
  - (Deliverables will be handed over to Experts as soon as received)
- Design Expertise final approval with the positive decision will be submitted to the respective Authorities that will issue Construction Permits.
- Timeline example for Detailed Technical Design Sections.
  - Except: Parnu-EE/LV border design section is with 27 months duration,
  - Except: Vangaži-LV/EE border design section is with 30months.





# Financing, procurement and contracting scheme

## ⦿ Financing:

- CEF 1 financing activity, according to Grant Agreement Amendments the planned possible budget could be EE-2.8 mill, LV-3.3 mill EUR, LT-1.0 mill EUR.

## ⦿ Planned procurement strategy (not yet aligned and confirmed):

- Open competition or restricted competition with 3 lots.
- One lot with three Design sections in Estonia:
  - Pärnu Rapla
  - Tallinn-Rapla
  - Pärnu-EE/LV border
- One lot with four Design sections in Latvia:
  - Vangaži-Salaspils Misa
  - Upeslejas-Riga, Misa
  - Vangaži-LV/EE border
  - Misa – LV/LT border
- One lot with two Design sections in Lithuania:
  - Kaunas-Ramygala
  - Kaunas – LT/LV border
- One contract for each lot;
- Planned procurement strategy is not yet finalized and will be aligned and confirmed after market analysis.

# Required field of Experts

## ⦿ All Experts shall fulfil local legal acts

- Project Manager of Design Expertise
- Building Design Expert
- Architectural Design Expert
- Structural Design Expert for Civil Structures and Tunnels
- Highspeed Structural Design Expert for Transport Structures
- Highspeed Railway track Design Expert 1435mm
- Railway track Design Expert 1520mm
- Road Design Expert
- Water, Stormwater, Drainage and sewage Design Expert
- Land melioration and Hydrotechnical Expert
- Electrical power supply design Expert for non-Traction power supply
- Railway catenary design expert
- Railway signaling design expert
- Low voltage (up to 1kV) power supply design Expert
- Mid voltage (1-35kV) power supply design Expert
- High voltage (110 and more kV) power supply design Expert
- Network and Telecommunications Design Expert
- Gas supply network (max pressure  $\leq 1,6$  MPa [16 bar]) design Expert
- Gas supply network (max pressure  $> 1,6$  MPa [16 bar]) design Expert
- Mechanical Design Expert
- BIM System Design Expert(not required according to local legislation)
- Environmental Expert

# Example template for Design deliverables

- Typical example, template

General Description of Deliverables
<b>1. General Part - Reports</b>
Site Investigation reports
Topographical, Geotechnical, Hydrogeological and Hydrological
Proposed solutions for High Risk Areas
Embankment, Transition Zones
Bridge Abutments, Earth Retaining Structures
Traffic Safety Audit
<b>2. Design Parts</b>
General Details
Design data, Horizontal, Vertical Curvature
General layout and utilities plan
Vertical and grading plan
Horizontal layout plan
Landscaping plans
Road Marking and Signage plan
Transport and Pedestrian Organization plan
Longitudinal profile
Railway Cross sections
Road Cross sections
Stakeout layout plan
Typical Details Drawings
Railway Track Design
Traffic Signaling plans
Traffic Signal Diagrams
Traffic Signal Power Supply
Traffic signal Cantilevers
Traffic Signal Gantry

<b>3. Storm Water and Drainage Design</b>
General layout plans
Storm Water and Drainage Layout plans
Storm Water and Drainage Longitudinal profiles
Storm Water and Drainage Cross sections
<b>4. Utilities part</b>
Mechanical Design
Water supply networks
Sewage networks
Power supply (Internal)
Electrical network(External)
Electrical LV
Electrical HV
Telecommunications
Gas supply
Longitudinal profiles for Utilities part
Typical Details for Utilities

<b>5. Structural Design for Road and Railway Embankments, Retaining Walls, Gabions, Reinforced soil walls, Culverts&lt;2.0m</b>
General Reports
Drawings
Calculation Reports
<b>6. Bill of Quantities</b>
Part for Railway track, Railway and Road Crossings, Embankments
Part for Maintenance and Access Roads
Part for underground and above ground utilities
Part for work organization project
<b>7. BIM</b>
BIM Model compliance with proposed design solutions
Rail, Road Interchange embankments and adjacent connected roads, layout plan compliance check with BIM model and required LOD.
Maintenance, Access roads design compliance according to information in BIM models and required LOD.
Above ground and underground utility compliance check from utility plans with the BIM models and required LOD.
Bill of Quantity general check from the BIM models
General check on clash detection analysis report to comply with the information in utility plans and BIM models.
Data Drops

# Example templates for Checklist and Financial proposal

## Checklist template example

No	Requirement	Reference	Item	Conformity
1	Twinning with high traffic routes	RBDG-MAN-012	7.1.1.	
2	Twinning with secondary roads	RBDG-MAN-012	7.1.2.	
3	The steel parts and structures shall be designed considering atmospheric corrosion class C4 according to EN ISO9223 or higher	RBDG-MAN-012	9.1	
4	The concrete parts/Structures shall be designed considering exposure classes XD1, XC4, XS1, XS2, XF2, XF3 or XA2 according to EN206	RBDG-MAN-012	9.2	
5	The recommended exposure class for surfaces protected by waterproofing is XC3	RBDG-MAN-012	9.2	
6	The recommended classes for surfaces directly affected by de-icing salts are XD3 and XF4	RBDG-MAN-012	9.2	
7	General conformity	EN 1997-1, EN 1997-2	Whole doc.	
8	General conformity	Affected Party Technical Conditions	Whole doc.	
9	Stormwater and Drainage for Roads	Affected Party Technical Conditions	Whole doc.	
10	Water supply networks	Affected Party Technical Conditions	Whole doc.	
11	Sewage networks	Affected Party Technical Conditions	Whole doc.	
12	Electrical networks low and mid voltage grid	Affected Party Technical Conditions	Whole doc.	
13	Electrical overhead crossings low and midvoltage	Affected Party Technical Conditions	Whole doc.	
14	Electrical power supply internal networks	Affected Party Technical Conditions	Whole doc.	
15	Highvoltage lines crossings	Affected Party Technical Conditions	Whole doc.	
16	Telecommunication and mobile cable networks	Affected Party Technical Conditions	Whole doc.	
17	Mechanical Engineering	Affected Party Technical Conditions	Whole doc.	
18	High pressure Gas networks	Affected Party Technical Conditions	Whole doc.	
19	Distric Heating networks	Affected Party Technical Conditions	Whole doc.	
20	Low and midpressure Gas networks	Affected Party Technical Conditions	Whole doc.	
21	Overall requirements	Agreement's Technical specification	Whole doc.	
22	Design Expertise report according to national legislation	National legislation acts	Legal act	

## Financial proposal template example

Design review and Design Expertise Services for the Rail Baltica Detailed Technical Design Section								
No	Item	Unit	Amount of units*	Unit cost (excl. VAT), EUR		Cost per design stage (excl. VAT), EUR		Total cost (excl. VAT), EUR
				MD	DTD	MD	DTD	
<b>1</b>	<b>Expertise for Rail Baltica railway line</b>							
<b>Scope of work</b>								
1,1	General conformity regarding contract and technical specifications (content of deliverable, formatting of documentation, etc.)	15,0 km of railway line						
1,2	Site investigations (geodetic, topographic, geological, hydrogeological, etc.)							
1,3	Design solutions (alignment, longitudinal profile, cross sections, embankments, earthworks, etc.)							
1,4	Water drainage solutions							
1,5	Railway culverts (diameter 2m or higher)							
1,6	Ecoducts							
1,7	Railway structures (viaducts, overpasses and bridges)							
1,8	Railway tunnels							
1,9	Pedestrian crossings							
1,1	Utilities							
1,11	Affected party technical conditions							
1,12	Bill of quantities and cost estimation							
1,13	Specifications							
1,14	BIM deliverables							
1,15	Design solutions (alignment, longitudinal profile, cross sections, pavement, embankments, earthworks, etc.)							
1,16	Water drainage solutions							
1,17	Road structures (overpasses and underpasses)							
<b>2</b>	<b>Expertise for national roads</b>							
<b>Scope of work</b>								
2,1	General conformity regarding contract and technical specifications (content of deliverable, formatting of documentation, etc.)	1,0 km of national road						
2,2	Site investigations (geodetic, topographic, geological, hydrogeological, etc.)							
2,3	Design solutions (alignment, longitudinal profile, cross sections, pavement, embankments, earthworks, etc.)							
2,4	Water drainage solutions							
2,5	Road structures (overpasses and underpasses)							
2,6	Utilities							
2,7	Affected party technical conditions							
2,8	Bill of quantities and cost estimation							
2,9	Specifications							
2,10	BIM deliverables							

# Questions

- ④ Does the current market is capable to provide necessary experts and cover required scope of work for all design sections for each country?
- ④ What is approximate percentage from the design fees for design expertise from similar projects in foreign countries?
- ④ If local companies does not have enough resources, how quickly can foreign experts get their certificates attested for required fields of expertise:
  - 1435mm highspeed railway track gauge;
  - Highspeed railway bridges, viaducts and other structures;
  - Tunnel experts;
  - BIM experts;
  - High pressure gas pipelines;
  - High voltage overhead line experts.



**PALDIES!  
THANK YOU!  
AITÄH!  
AČIŪ!  
KIITOS!  
DANKE!  
MERCII!  
DZIĘKUJĘ!**