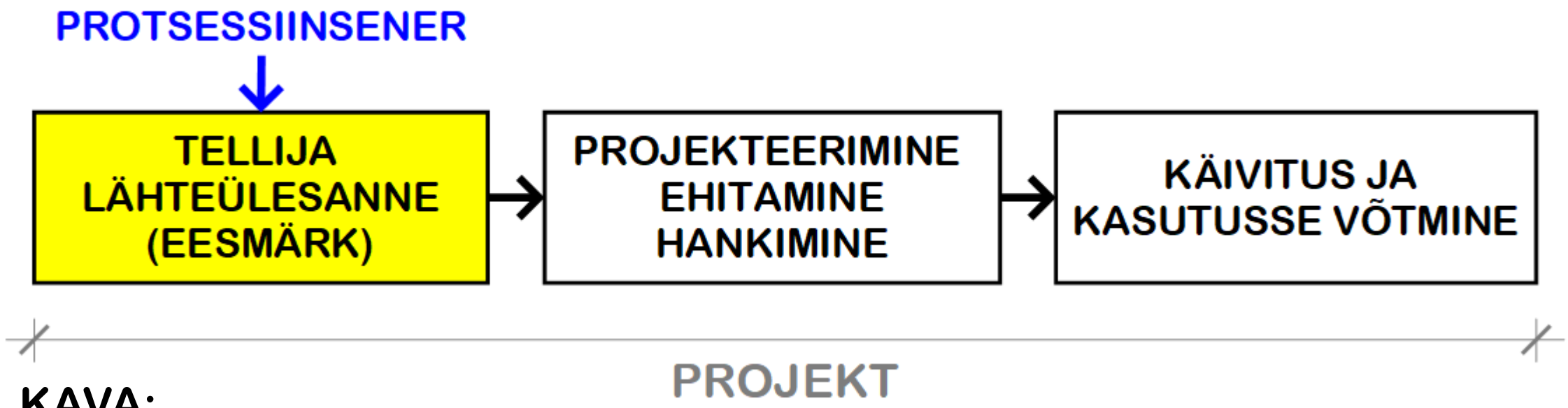
SKEEM

Protsessiinsener ja tellija lähteülesanne

Ergi Prommik, Skeem OÜ

SISSEJUHATUS



KAVA:

- Praktilised näited
- Protsessiinseneri ülesanded
- Näidis lähteülesanne
- Kruvikalapääsu protsessiskeem
- Narva jõe lähteandmeid

NÄIDE 1: tuletõrjevee reservuaar

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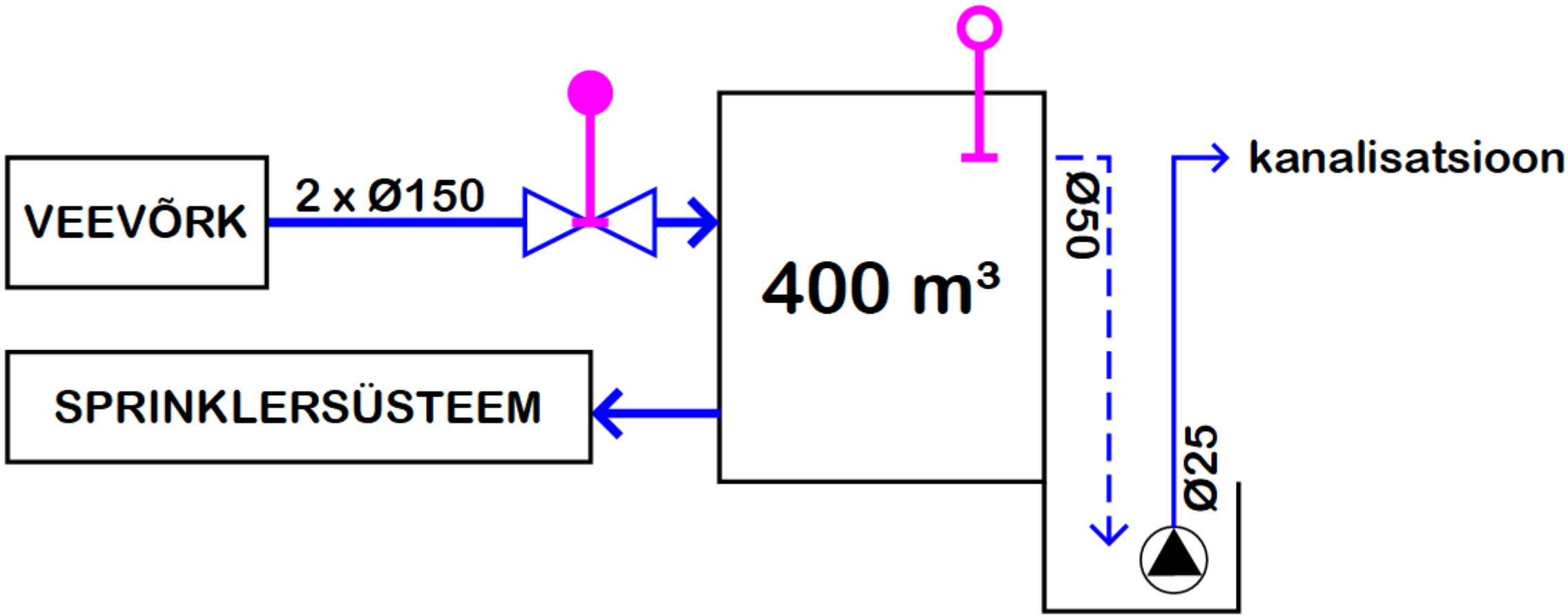

NÄIDE 2: liigne funktsionaalsus

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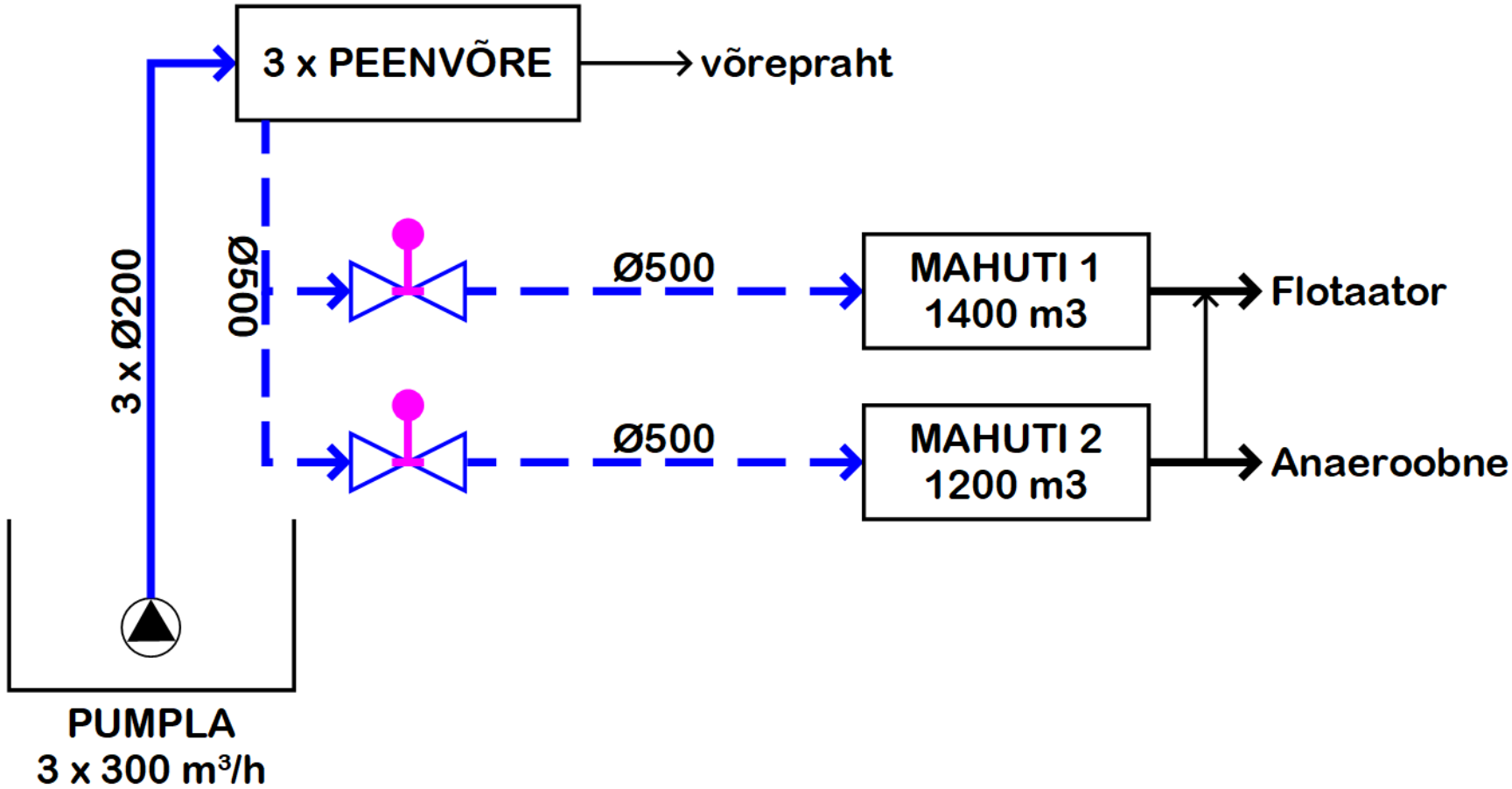

NÄIDE 3: väävelvesinik (H_2S)

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Väga ohtlik!

ÕHUS/GAASIS:

- söefilter (H_2S<300 ppm)
- skrabber (H_2S>300 ppm)

ANAEROOBSES KESKKONNAS:

- plast (vastavalt °C)
- roostevaba 316L
- keemiliselt (HCl)

AEROOBSES KESKKONNAS:

- plast (vastavalt °C)

NÄIDE 4: pumba valiku lähteandmed

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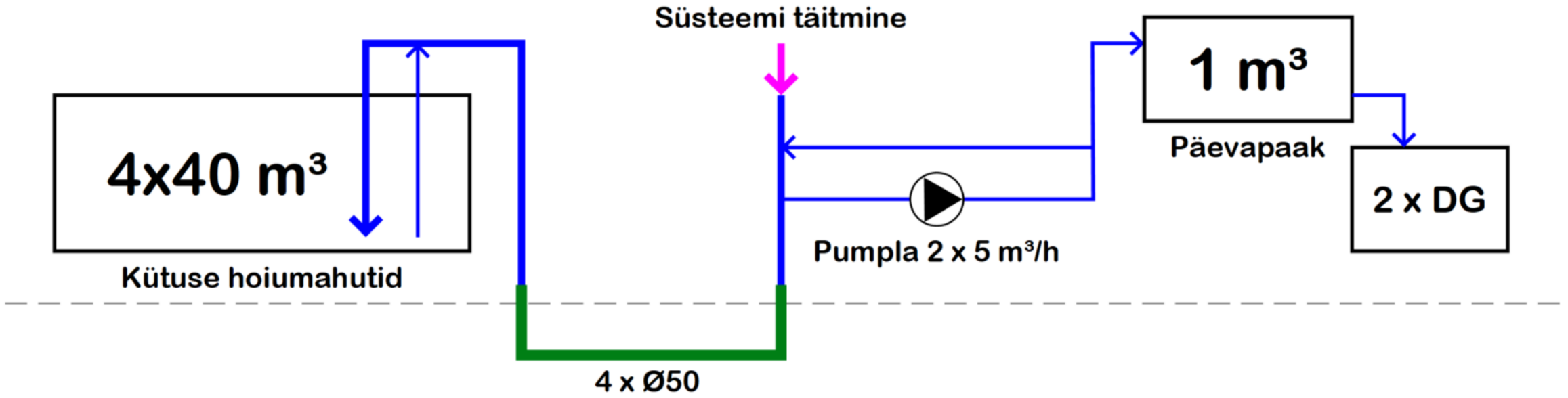
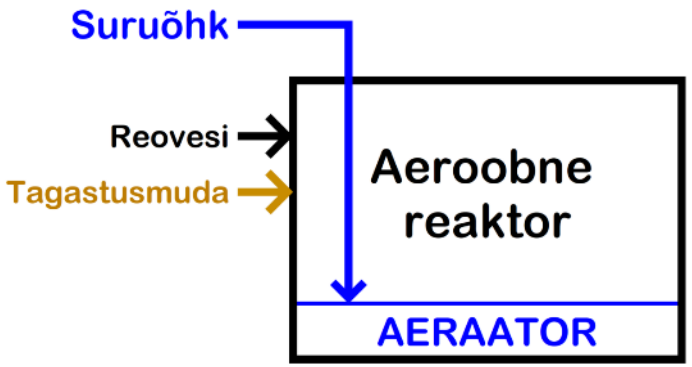
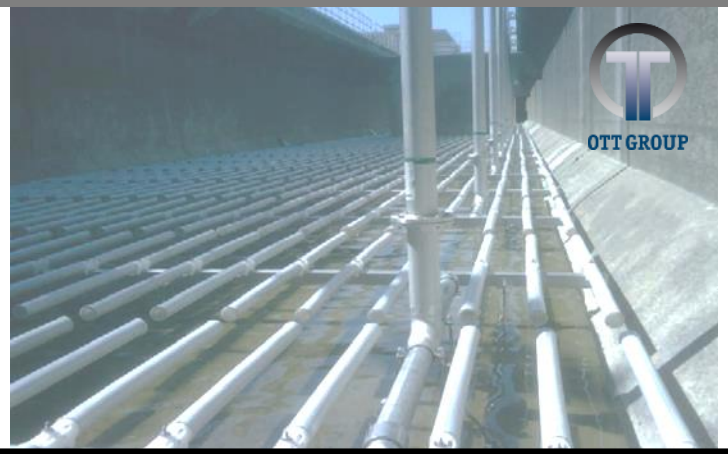


NÄIDE 5: bioloogiline reoveepuhastus





Parameeter	Enne	PROTSESSIINSENER	Pärast
Protsessimaht (m^3)	50 000		27 000
Mahuti sügavus (m)	6,5		13,5
Mulli tüüp	peenmull		keskmull
Suruõhu vajadus (Nm^3/h)	50 000		15 000
Kompressorid	4 x 550 kW		3 x 250 kW
Elektrikulu tunnis	1,25 MWh		0,625 MWh

PROTSESSIGARANTII

Protsessiinseneri ülesanded

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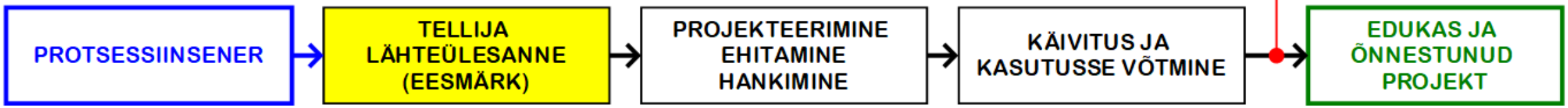
Kas saavutati projekti eesmärk?
Kas protsess toimib kõigil nõutud tingimustel?
Kas jäädi eelarvesse?
Kas projekt viidi ellu lubatud aja jooksul?
Kas kasutuskulud vastavad eeldatule?



- Protsessiinsener saab aru planeeritavast protsessist ning oskab seda kõigile osapooltele arusaadavalt selgitada.
- Protsessiinsener koostab lähteülesande ja selgitab välja projekti edukuse olulised toimivuskriteeriumid.
- Protsessiinsener vastutab koostatud lähteandmete eest!

Näidis lähteülesanne (jämevõre vahetus):

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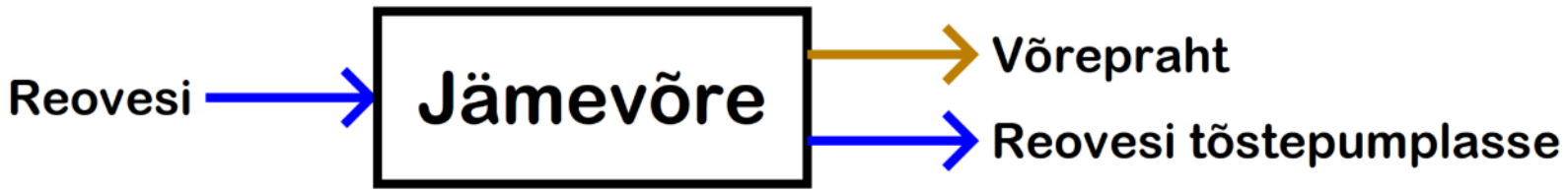
Lähteülesande osad:

1. **Eesmärk**
2. **Graafik**
3. **Vastutusmaatriks**
4. **Tehnilised tingimused**
5. **Maksetingimused ja garantiid**
6. **Protsessiskeem ja funktsionaalsuse kirjeldus**



Järgmised projekti etapid:

- Projekteerimine, ehitamine, hankimine
- Käivitus ja kasutusse võtmine
- Kas saavutati projekti eesmärk?

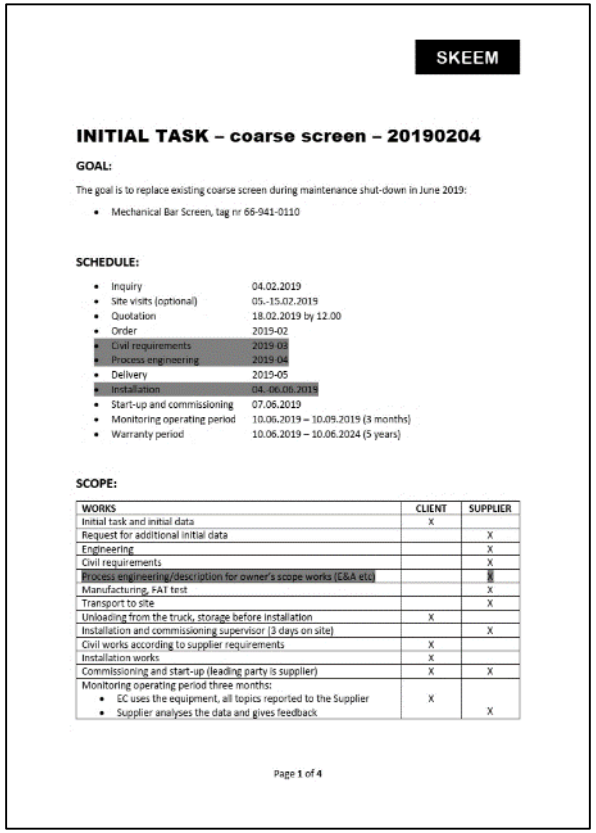
Näidis lähteülesanne (jämevõre vahetus): enne

Lähteülesanne (jämevõre vahetus):

SKEEM

Vt eraldi fail näidis lähteülesanne:

- *Lähteülesanne (jämevõre vahetus) – 20190204.pdf*



SKEEM

INITIAL TASK – coarse screen – 20190204

GOAL:

The goal is to replace existing coarse screen during maintenance shut-down in June 2019:

- Mechanical Bar Screen, tag nr 66-941-0110

SCHEDULE:

• Inquiry	04.02.2019
• Site visits (optional)	05.-15.02.2019
• Quotation	18.02.2019 by 12.00
• Order	2019-02
• Civil requirements	2019-03
• Process engineering	2019-04
• Delivery	2019-05
• Installation	04..06.06.2019
• Start-up and commissioning	07.06.2019
• Monitoring operating period	10.06.2019 – 10.09.2019 (3 months)
• Warranty period	10.06.2019 – 10.06.2024 (5 years)

SCOPE:

WORKS	CLIENT	SUPPLIER
Initial task and initial data	X	
Request for additional initial data		X
Engineering		X
Civil requirements		X
Process engineering (description for owner's scope works (E&A etc)		X
Manufacturing, FAT test		X
Transport to site		X
Unloading from the truck, storage before installation	X	
Installation and commissioning supervisor (3 days on site)		X
Civil works according to supplier requirements	X	
Installation works	X	
Commissioning and start-up (leading party is supplier)	X	X
Monitoring operating period three months: • EC uses the equipment, all topics reported to the Supplier • Supplier analyses the data and gives feedback	X	X

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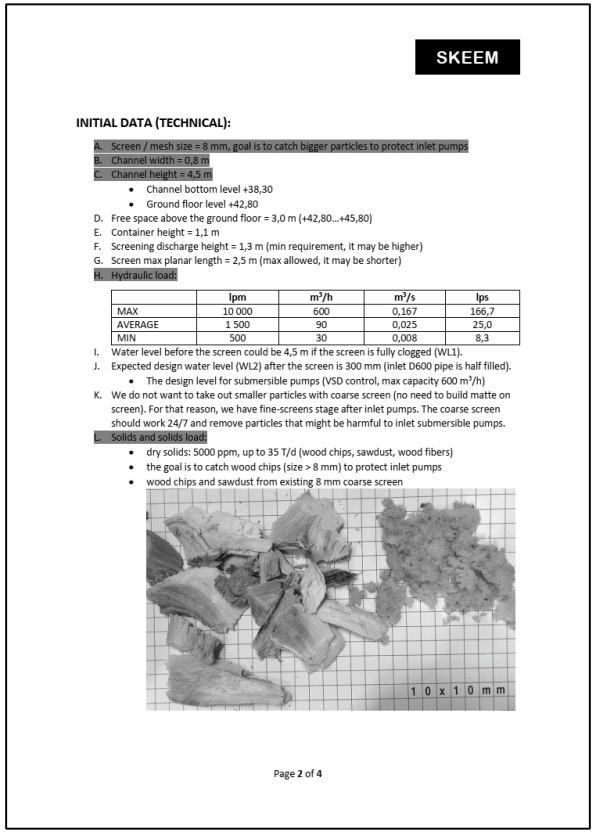

SKEEM

INITIAL DATA (TECHNICAL):

A. Screen / mesh size = 8 mm, goal is to catch bigger particles to protect inlet pumps
B. Channel width = 0,8 m
C. Channel height = 4,5 m
   - Channel bottom level +38,30
   - Ground floor level +42,80
D. Free space above the ground floor = 3,0 m (+42,80...+45,80)
E. Container height = 1,1 m
F. Screening discharge height = 1,3 m (min requirement, it may be higher)
G. Screen max planar length = 2,5 m (max allowed, it may be shorter)
H. Hydraulic load:

	lpm	m³/h	m³/s	lps
MAX	10 000	600	0,167	166,7
AVERAGE	1 500	90	0,025	25,0
MIN	500	30	0,008	8,3

I. Water level before the screen could be 4,5 m if the screen is fully clogged (WL1).
J. Expected design water level (WL2) after the screen is 300 mm (inlet D600 pipe is half filled).
   - The design level for submersible pumps (VSD control, max capacity 600 m³/h)
K. We do not want to take out smaller particles with coarse screen (no need to build matte on screen). For that reason, we have fine-screens stage after inlet pumps. The coarse screen should work 24/7 and remove particles that might be harmful to inlet submersible pumps.
L. Solids and solids load:
   - dry solids: 5000 ppm, up to 35 T/d (wood chips, sawdust, wood fibers)
   - the goal is to catch wood chips (size > 8 mm) to protect inlet pumps
   - wood chips and sawdust from existing 8 mm coarse screen

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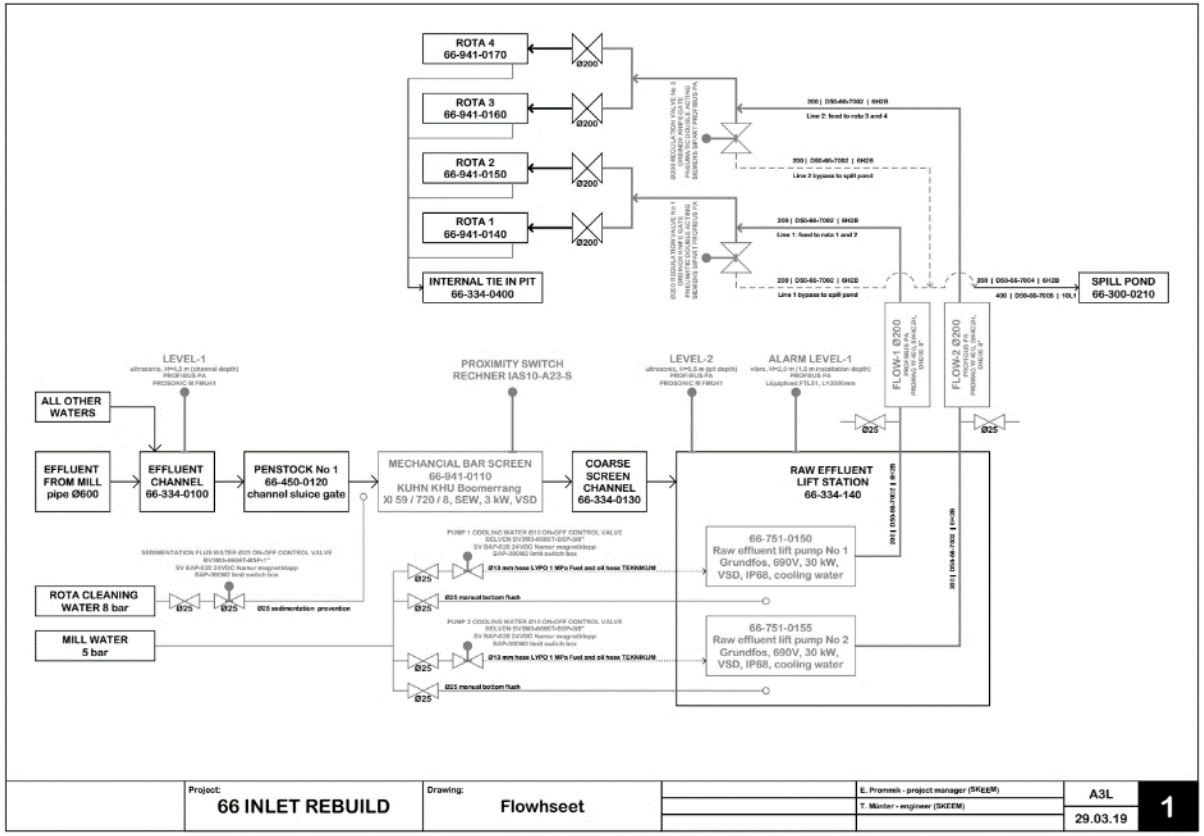
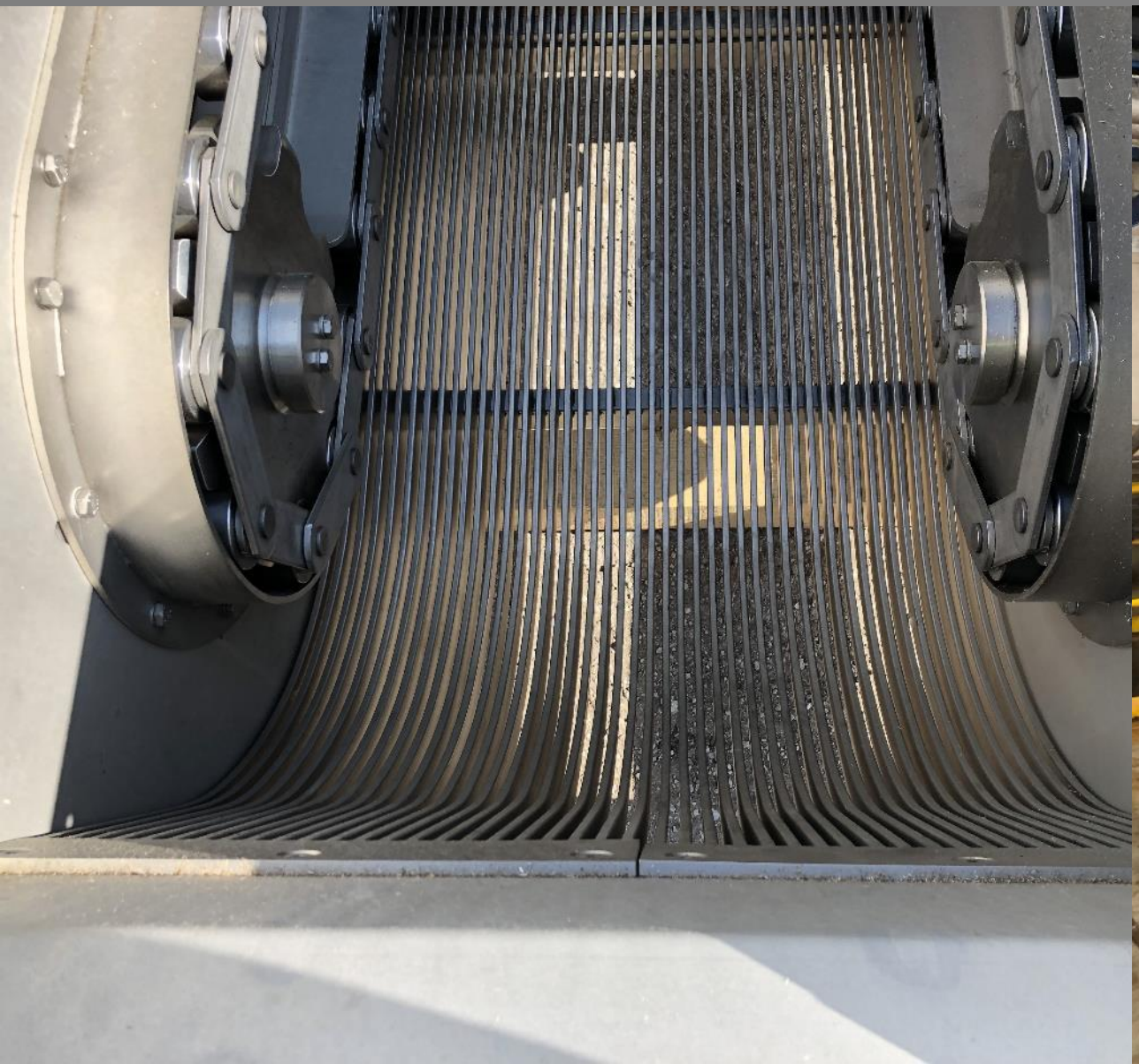
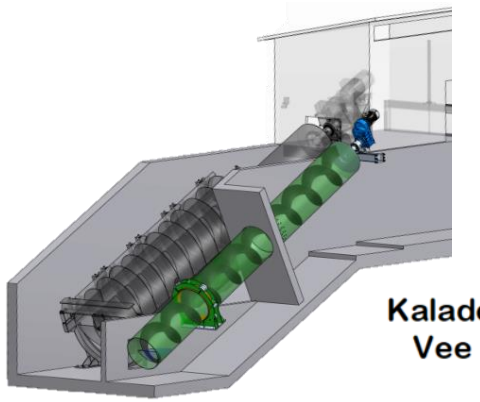


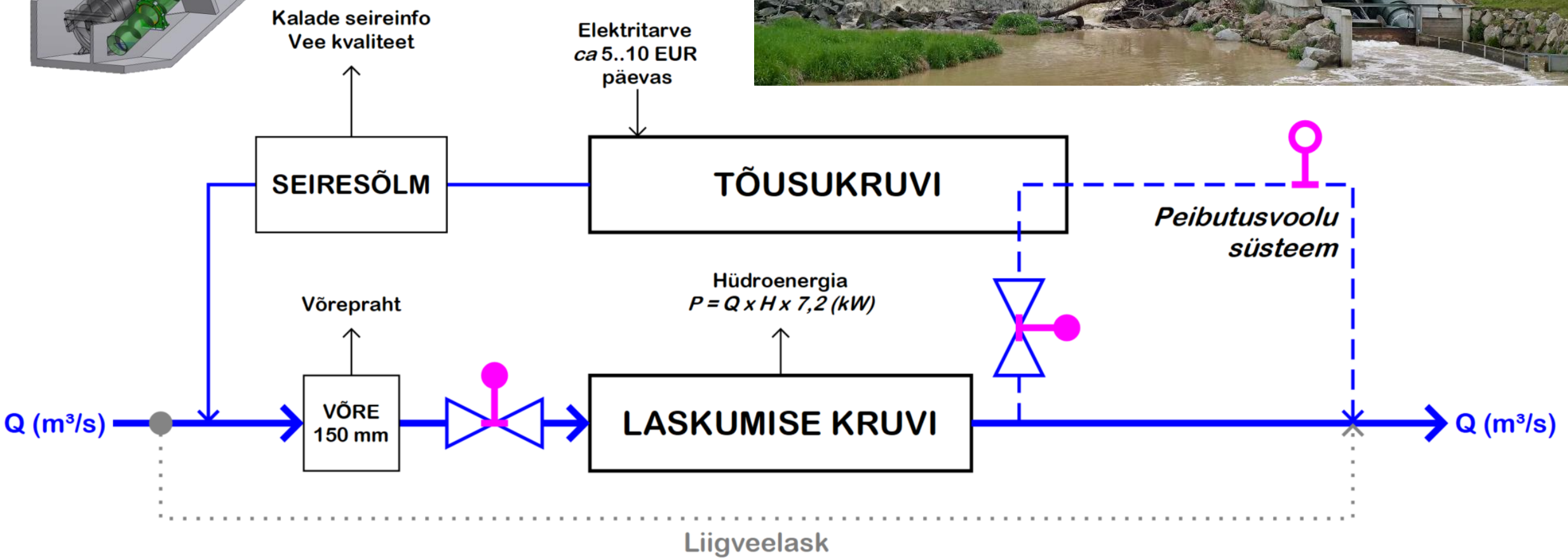
Lähteülesanne (jämevõre vahetus): pärast

SKEEM



Kruvikalapääsu protsessiskeem:





Narva projekti lähteandmed

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WATER & TRANSPORTATION

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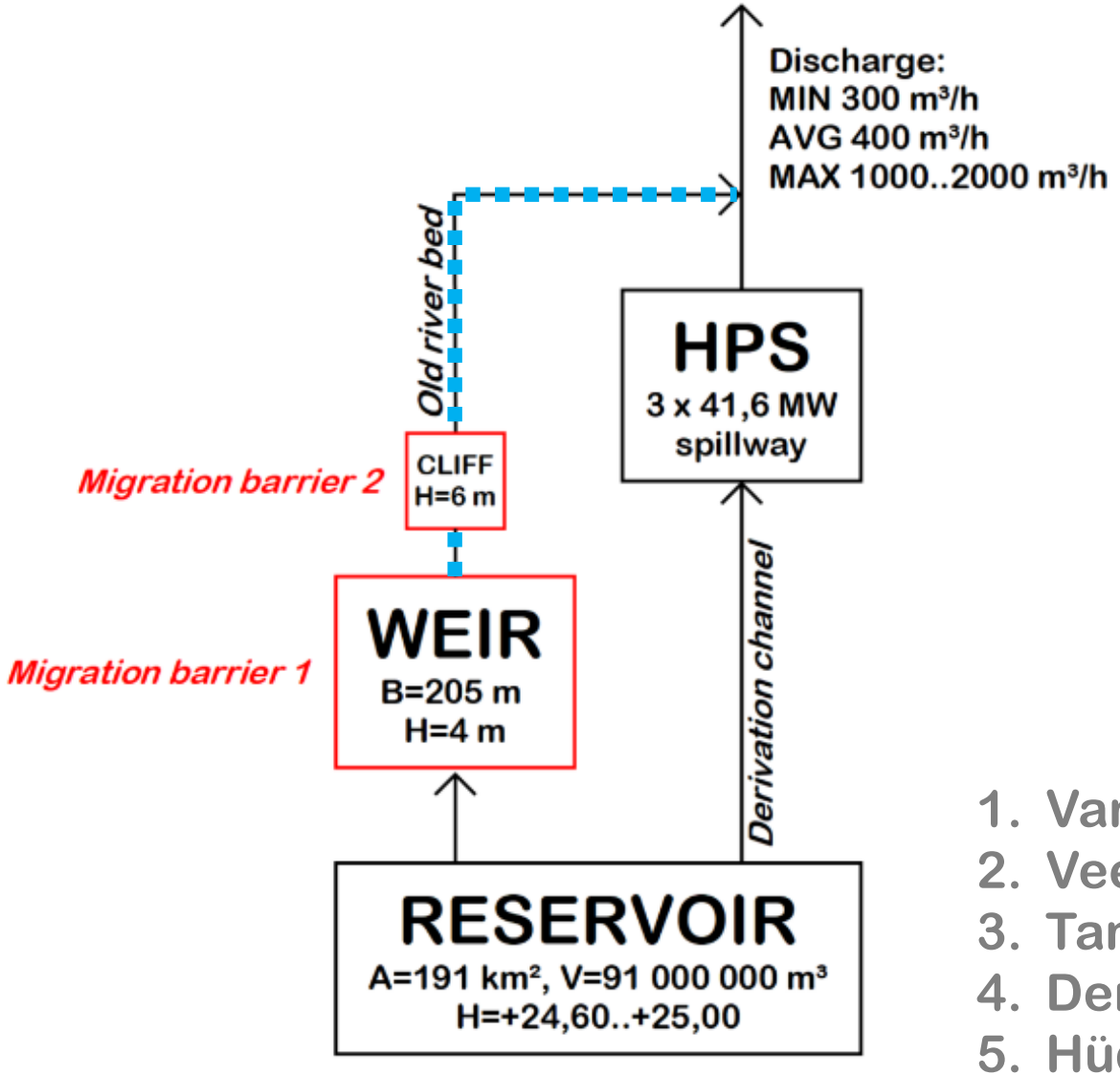

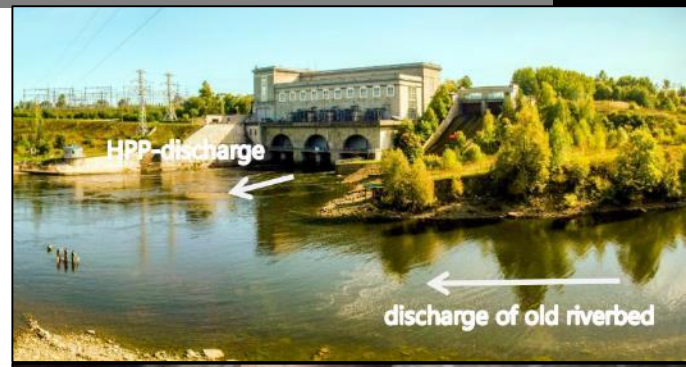

1. Vana jõesäng (~1,8 km)
2. Veehoidla
3. Tamm ja varjad liigvete jaoks
4. Derivatsioonikanal
5. Hüdroelektrijaam 125 MW

Narva projekt: Kust alustada?

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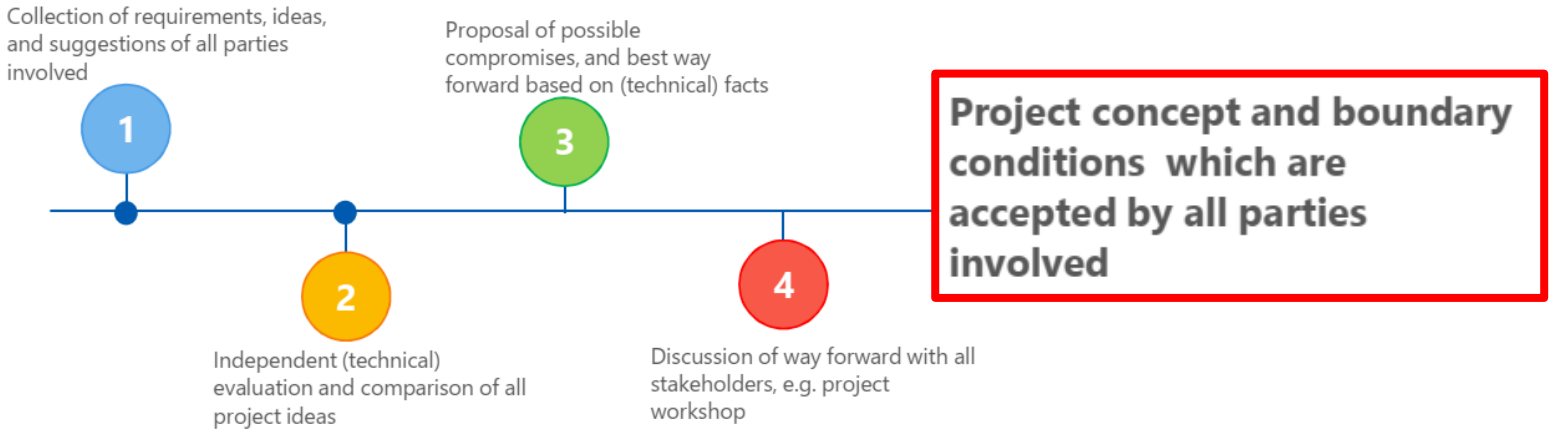
2. Initial ideas for Narva project

2.0 Technical initial task and parties conditions

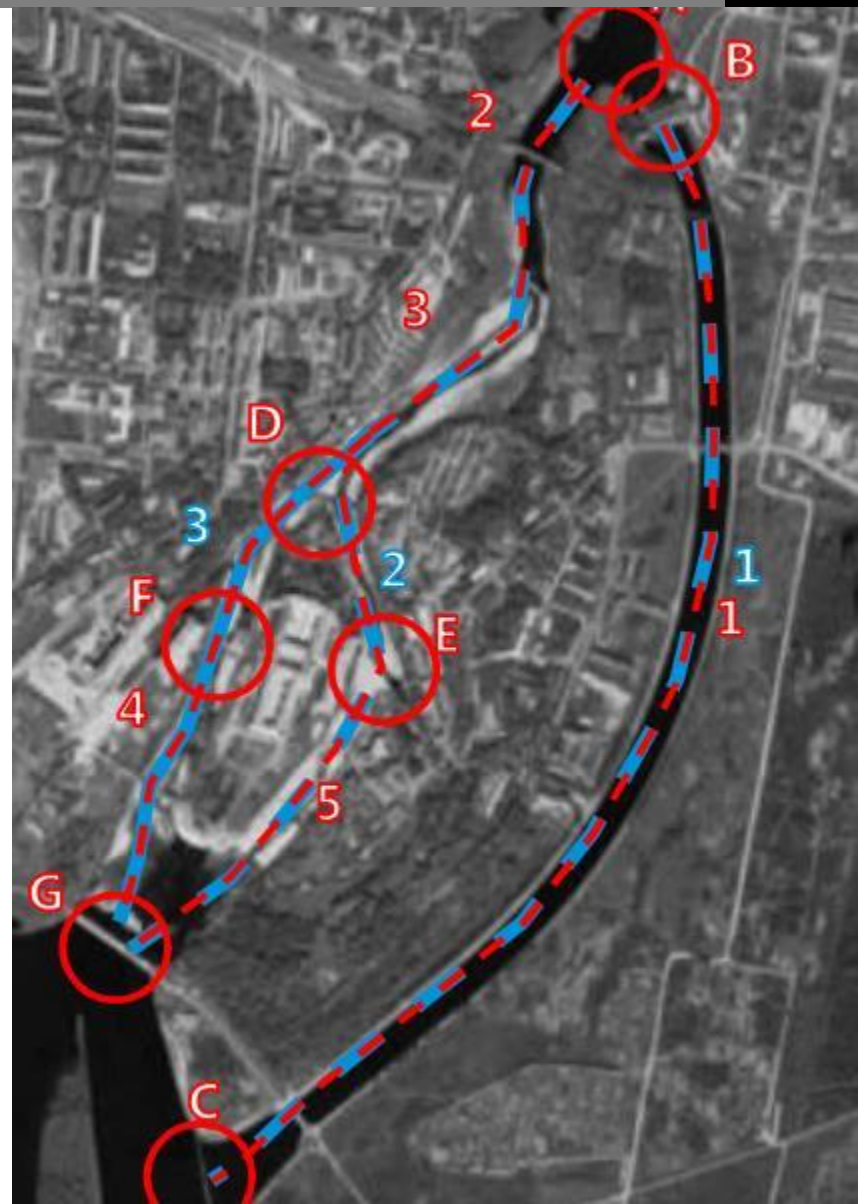
Project management

- Goal is to facilitate negotiations between Estonian and Russian parties involved in order to find a concensus on crucial project criteria, such as:
  - Flow available for ecological improvement (fish migration and habitate structures), depending on expected reduction hydropower potential
  - Surfaces (land plots) available for construction of fis migration facilities
  - Possible financing models for the envisaged project



Project concept and boundary conditions which are accepted by all parties involved

Fichtner will provide independent technical expertise and moderate talks, to support the decision-making process for all parties involved.



Narva projekt: võimalikud lahendused

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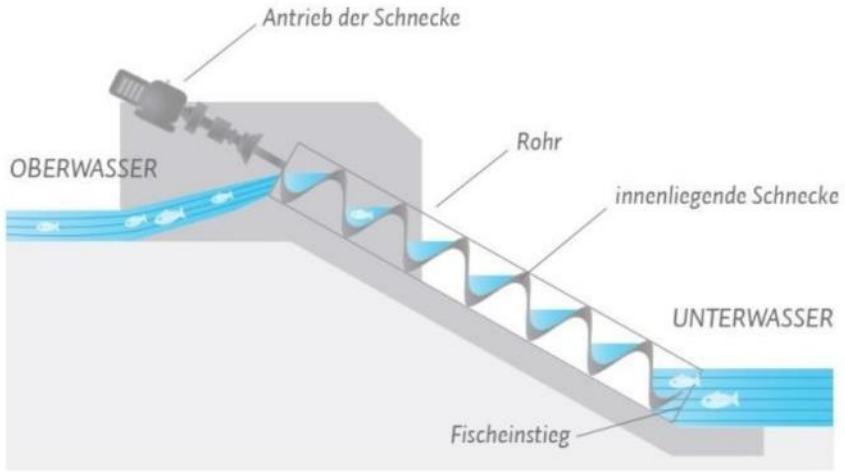

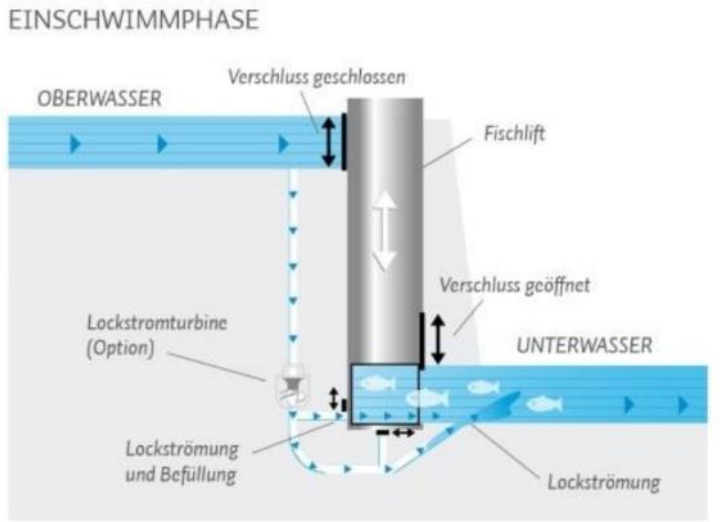

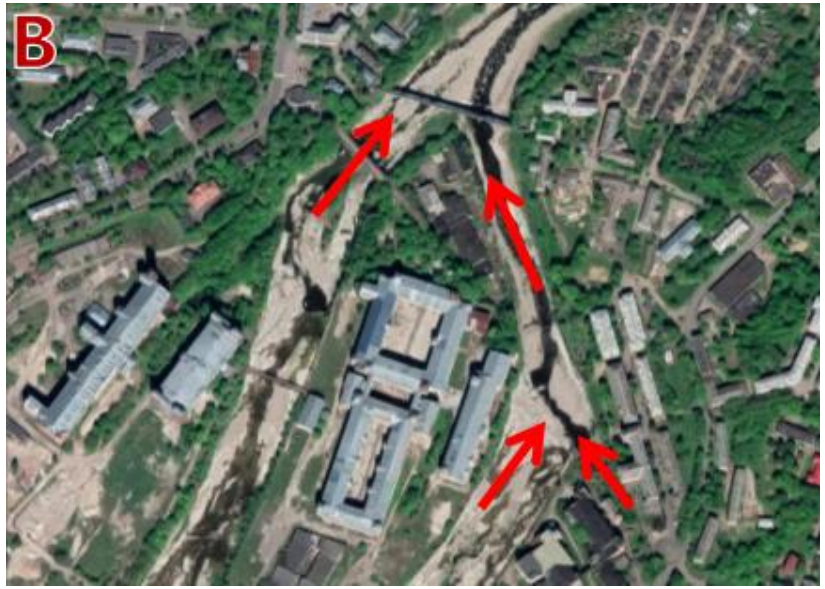

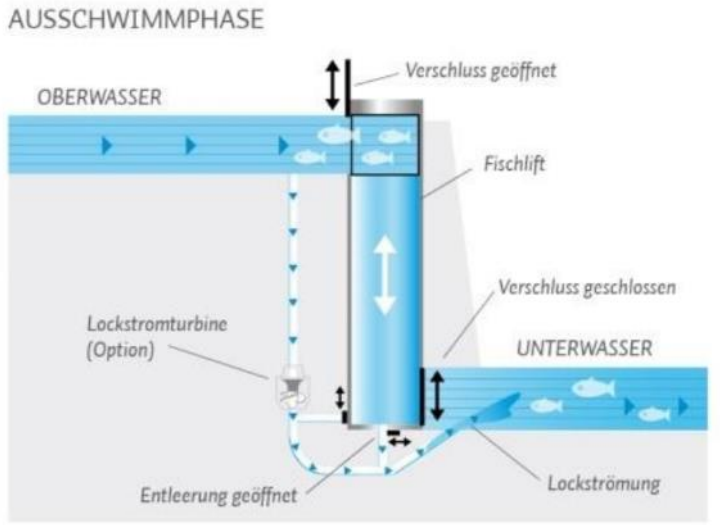

Kokkuvõte

- Protsessiinsener
- Tellija lähteülesanne
- Vastustundlik projekteerija ja ehitaja
- Asjatundlik kasutaja
- Edukas ja õnnestunud projekt

Tänan!