Aquatic Control Engineering
Efficient fish friendly flood defence pumping systems

Presented by

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PENTAIR
FAIRBANKS NIJHUIS®

ACE
Aquatic Control Engineering

FishFlow
INNOVATIONS

- Established 1995 – 28 years
- Carried out and project managed water flow control projects up to £2.5million
- In house project management and installation facilities and capabilities
- ACE act as both principle contractor as well as sub-contractors to many well known Tier 1 contractors.
- ACE partners with Pentair Fairbanks Nijhuis and Fish Flow Innovations on pump projects

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“Our vision is to protect people, property and biodiversity with innovative and sustainable solutions”

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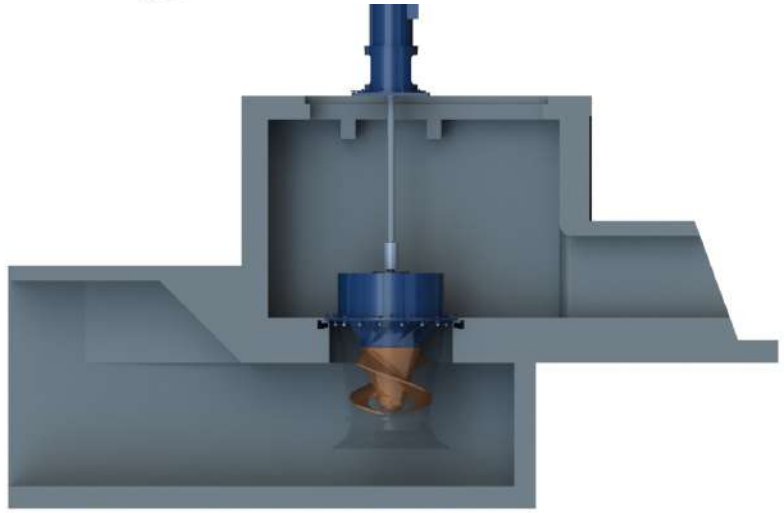

Broadest range of fish friendly flood defence pumps in the market

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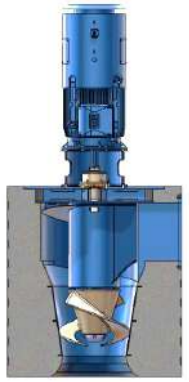

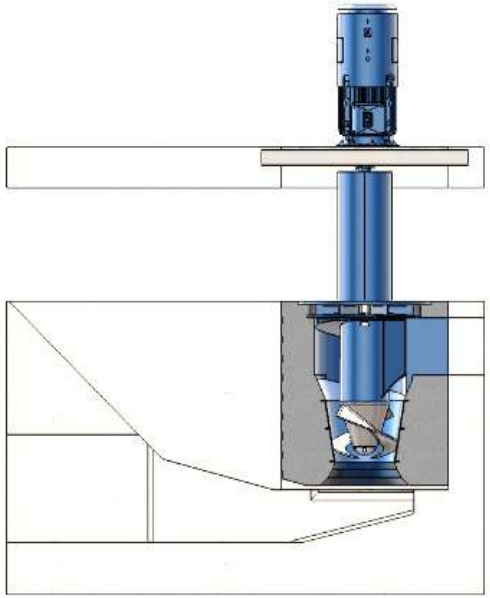

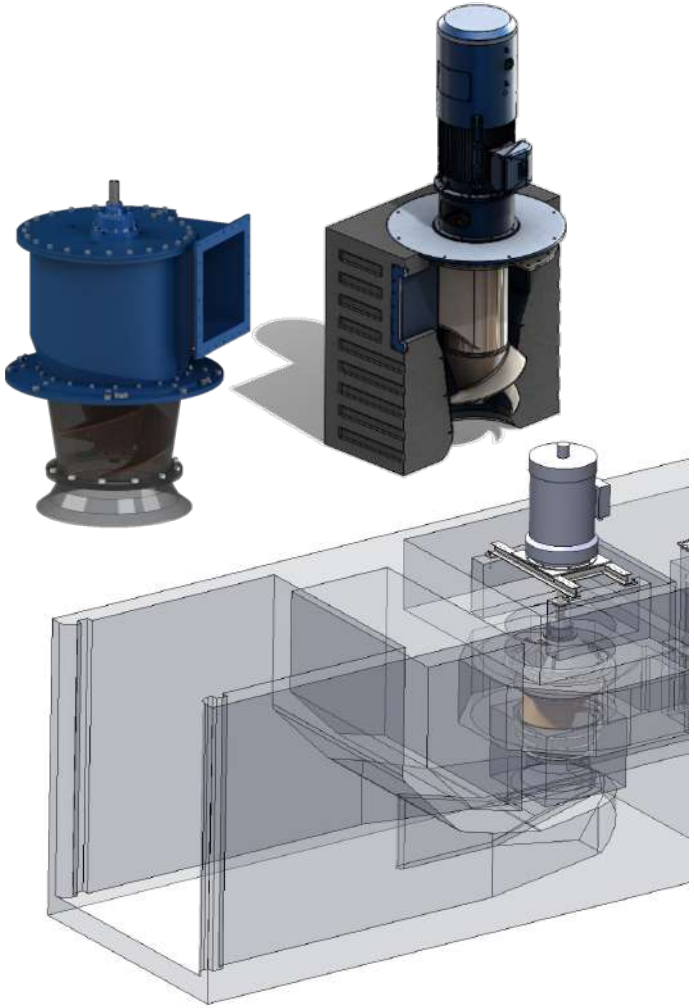

Broadest range of fish friendly flood defence pumps in the market

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Broadest range of fish friendly flood defence pumps in the market

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Keadby PS – 24m^3/s capacity (6No 4m^3/sec 330kW pumps)

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Bells PS – 3.5m^3/s capacity (2No 1.75m^3/sec 2m diameter screw pumps)

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dial flow

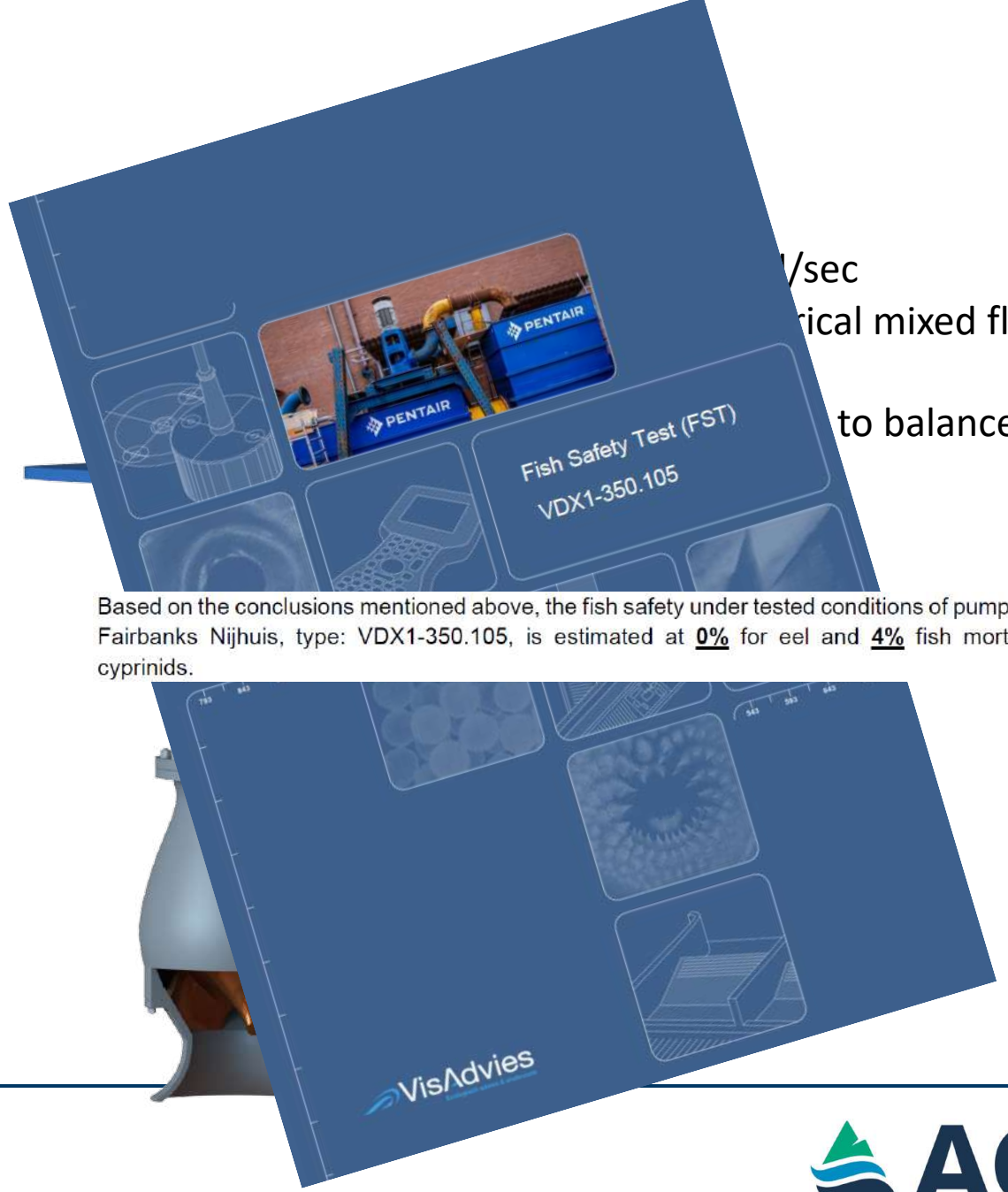
anced

/sec

rical mixed flow

to balanced

Based on the conclusions mentioned above, the fish safety under tested conditions of pump Pentair Fairbanks Nijhuis, type: XRW1-250.65, estimated at **1.0%** for eels and **4.8%** for cyprinids.



Based on the conclusions mentioned above, the fish safety under tested conditions of pump Pentair Fairbanks Nijhuis, type: VDX1-350.105, is estimated at **0%** for eel and **4%** fish mortality for cyprinids.

Pump efficiency & fish passage

Keadby has 6 x 330kW pumps

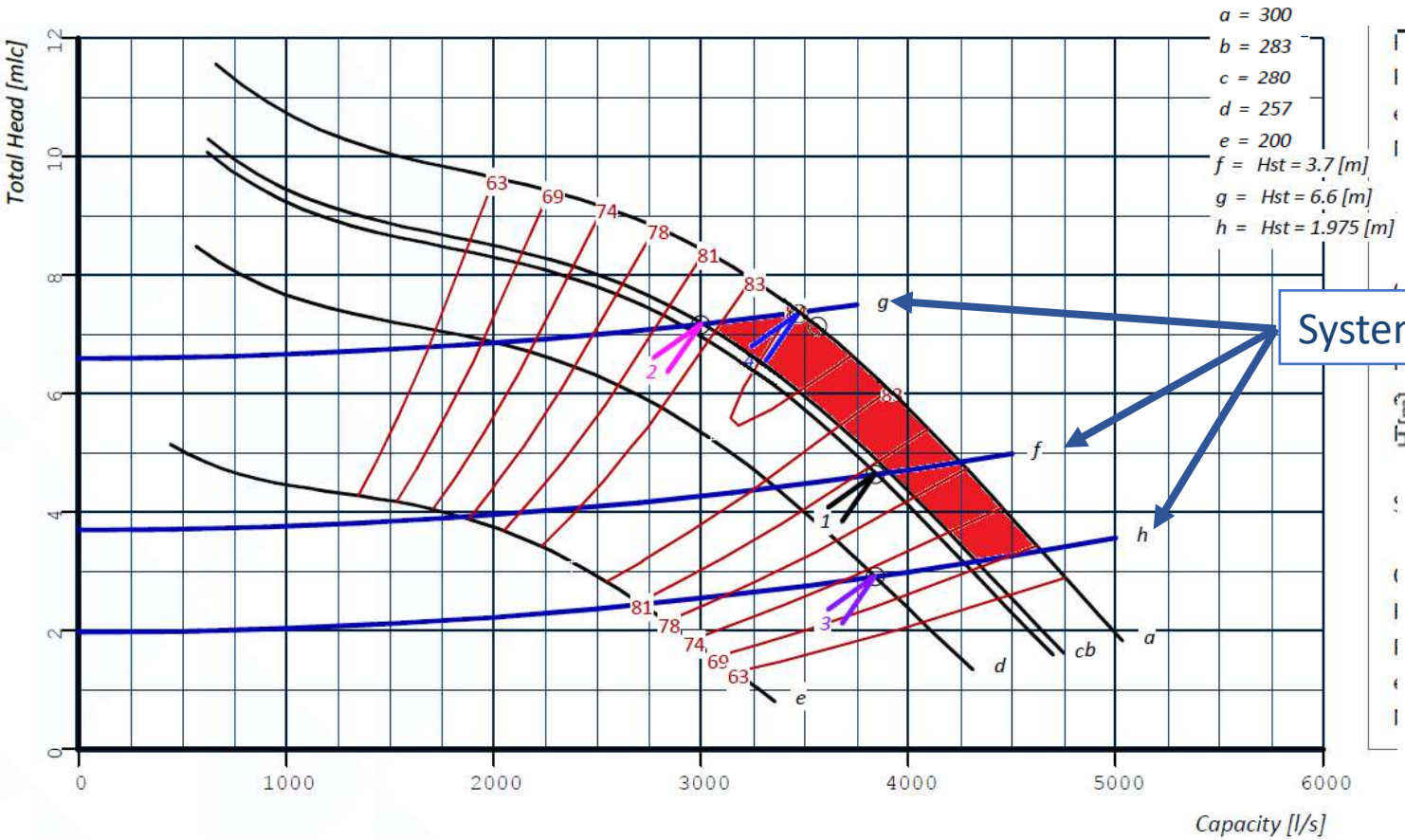
330kW operating for 1h = 330kWh

330kWh = 1,645 miles in a Tesla 3

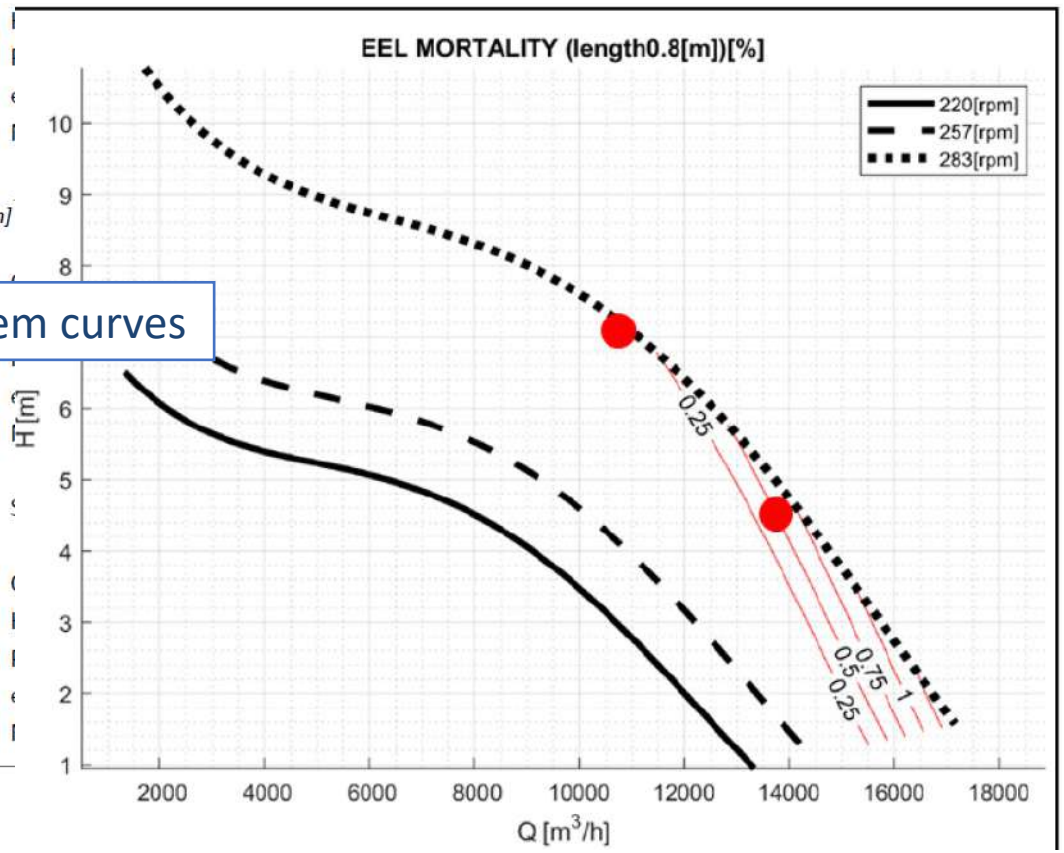
Or boil enough water for 14,500 250ml mugs of tea

The carbon intensity of electricity (CIE) of the UK in 2021 (the most recent figure) was 265 grams of CO2 per kWh, running one pump for one hour = 87.45kg CO2

Every percentage of improved efficiency on pumps this large saves a lot of energy and a lot of CO2 – It also improves fish passage



System curves



Key points when looking at efficiency in Rotodynamic pumps

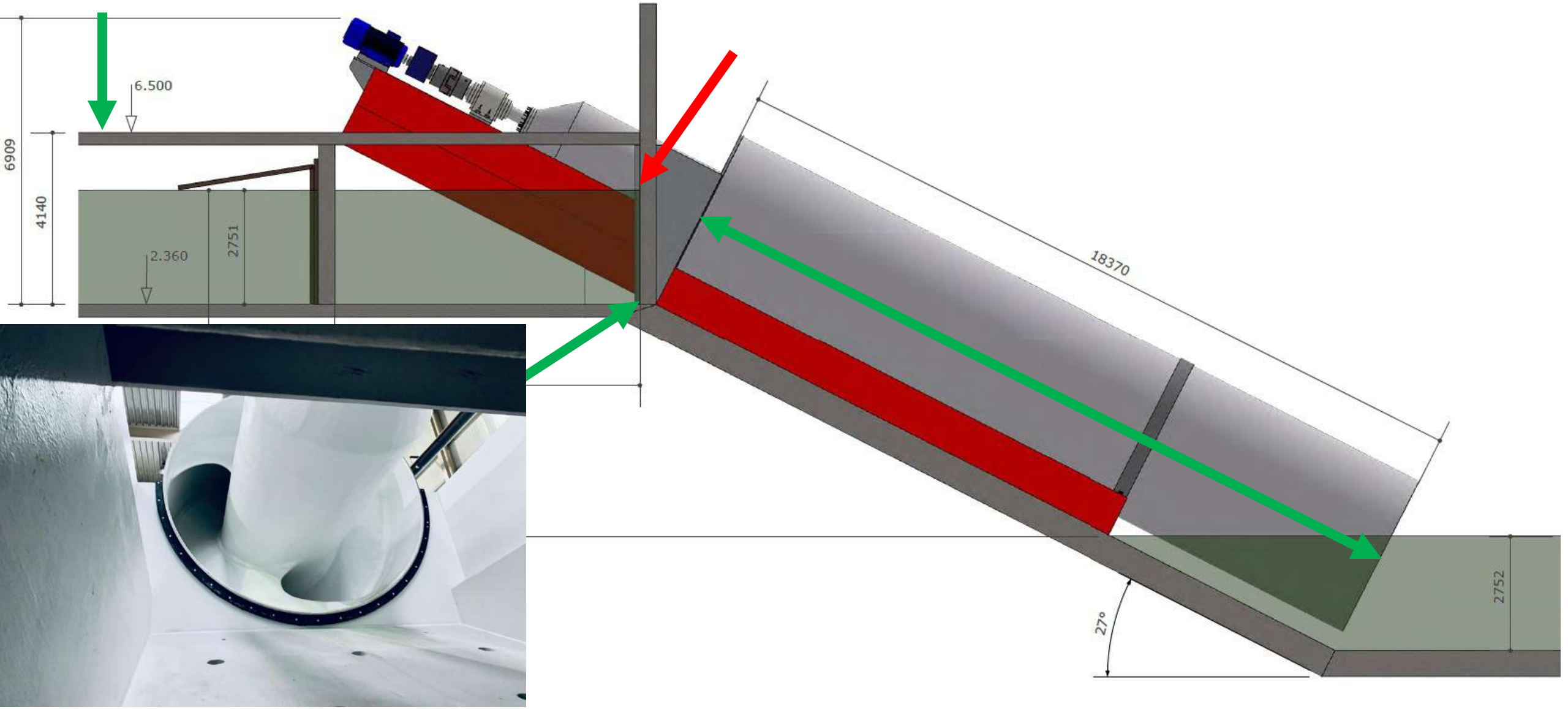
- Check system curves have been included on your pump curves and consider valves, state of pipework etc

- Ensure pump curves are in accordance with ISO 9906 and choose a suitable grade (usually 2b)

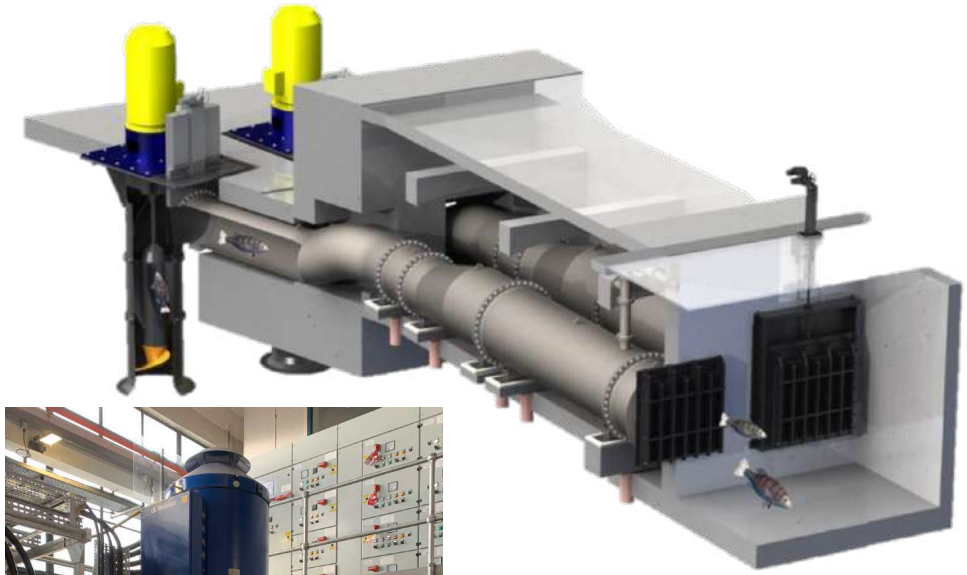
- Ensure the pump will also be FAT checked in accordance with ISO 9906 (this is not always possible for very large pumps)

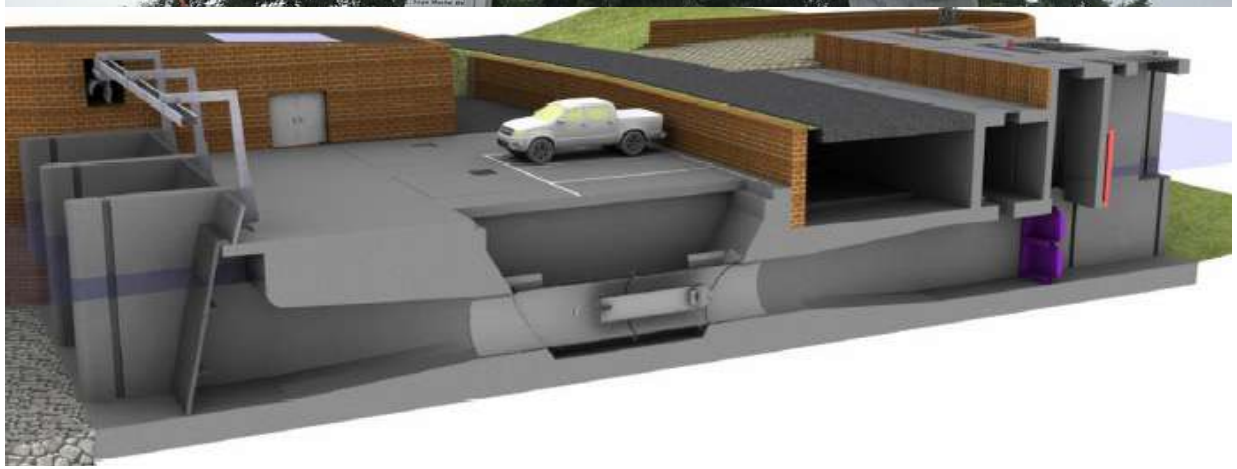
- A balanced symmetrical hydraulic (impellor) will provide the highest efficiency and least vibration

	Referention	Name	Cap (m^3/h)	Head (m)	Fish specie	Length (cm)	N	N-n alive	n dead	% dead
	Screw pumps									
1	Denayer & Belpaire, 1992	De Seine	35	3.6	Div. cyprinids	6-15	138	103	35	25
					Eels	27-45	52	33	19	37
2	Germonpré et al., 1994	Sint Karelsmolen	30	2.9	Div. cyprinids	6-32	517	300	217	42
					Eels	15-37	57	49	8	14
3	Lange & Merkx, 2005	Snelrewaard	100	2	Div. coarse fish	3-29	1009	868	141	14


6.500
6909
4140
2751
2.360
18370
2752
27°

Beyond excellent pump selection what more can we do to aid fish migration and further improve efficiency?





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Intake screen bar spacing

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Landustrie
WORLDWIDE WATER TECHNOLOGY

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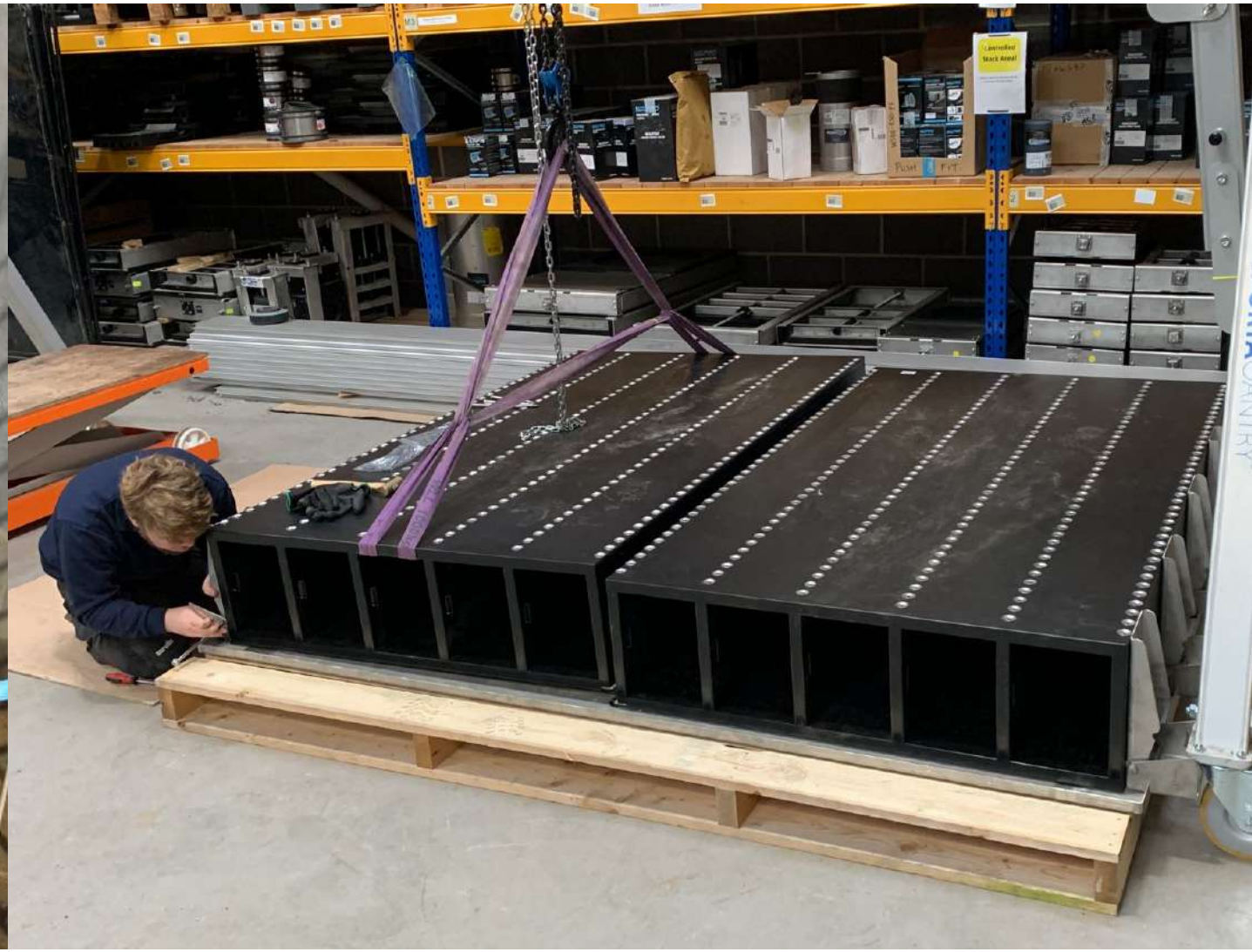
Gravity outfall/sluicing



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Talk to us today

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