1 SUPPLEMENTARY MATERIAL—QMRA

The gained health effects from the implemented UF membranes were estimated using three reference pathogens; *Campylobacter* (bacteria), Norovirus (virus) and *Cryptosporidium* (protozoa). Detailed information about the used input variables data can be seen in Table 1, below, and the estimated probability of occurrence for each event is illustrated in Figure B & Figure C.

1.1 RAW WATER SOURCE CHARACTERISATION

1.1.1 Stora Neden

The intake concentrations of pathogens at the DWTP from a release of pathogens to the lake, Stora Neden was calculated as:

$$C_{In_{SN}} = \frac{w_{Source}}{V * 10^{OWTS}} \times (1 - r_{GW})$$

where $C_{In_{SN}}$ was the DWTP's intake concentration of pathogens (# L^{-1}) during the duration of a pathogen release to the lake Stora Neden, w_{Source} was the average daily pathogen load per day (# day^{-1}) from the released source, V was the volume of Stora Neden in which the load is mixed, *OWTS* was the OWTSs Log-removal, and R_{GW} was the groundwater ratio at the DWTP. Note that *OWTS* was only included for the calculations for the intake concentration of pathogens released from the lake's surrounding OWTSs, i.e. the baseline risk.

The run time from the north part of the lake to the DWTP's raw water intake has been calculated to approximately six hours by VIVAB, which indicates that the probability of a contaminant being completely mixed in the lake is low. Given that no hydrodynamic model was used to calculate the spread of a pathogen release, as there were no known models of the lake at the time of writing this paper, the expected dilution volume in the lake is unknown. The dilution volume has instead been estimated using lake's measured thermocline depth and likely area of spread.

The lakes dilution volume (V) was estimated as a beta PERT-distribution with a maximum value of 61 100 000 m^3 (the volume of Stora Neden), a P95-value of the area of the lake multiplied with the thermocline depth, a P50-value of the area of the anticipated contaminant path (marked in Figure A) multiplied with the thermocline depth and a minimum value of zero m^3.

A sensitivity analysis, calculating the impact of the dilution volume on the result for each volume above, showed that the dilution volume in the lake has a relatively small impact on the results, compared to other uncertainties in models input variables why the above assumption has been considered sufficient even though no hydrodynamic modelling was conducted.

Similarly the decay of pathogens has not been included in this model because of the short runtime in the lake mentioned above (giving very little time for any deterioration to occur [1]) and that the retention time of a contaminant in the lake is currently unknown, it may be years or it may flush out very fast.

The **expected load** of the OWTSs was estimated to last for the duration of an infected person's pathogenic excretion, for each respective pathogen and was calculated via Equation 1 and Equation 2:

$$w_{OWTS} = \frac{C_{Faecal} \times m_{Faeces} \times t \times I}{365} \quad \text{Eq. 1}$$

$$I = i \times U \times P \quad \text{Eq. 2}$$

where w_{OWTS} was the average daily load of pathogens (# d^{-1}) released from the OWTSs per year, C_{Faecal} was the faecal concentration of pathogens (# g^{-1}) given an infection, m_{Faeces} was a person's daily production of faeces (g p^{-1} d^{-1}), t was the expected number of days a person would excrete pathogens, I was the expected number of infected people per year living within the catchment area of Stora Neden, i was the pathogens' geometric mean of incidence per person per year in the district of Halland, U was the underreporting factor for each respective pathogen's incident data, as only a small portion of the actual infections are likely to be reported in the medical databases [2] and P was the number of people connected to the OWTSs in connection to the raw water source[1].

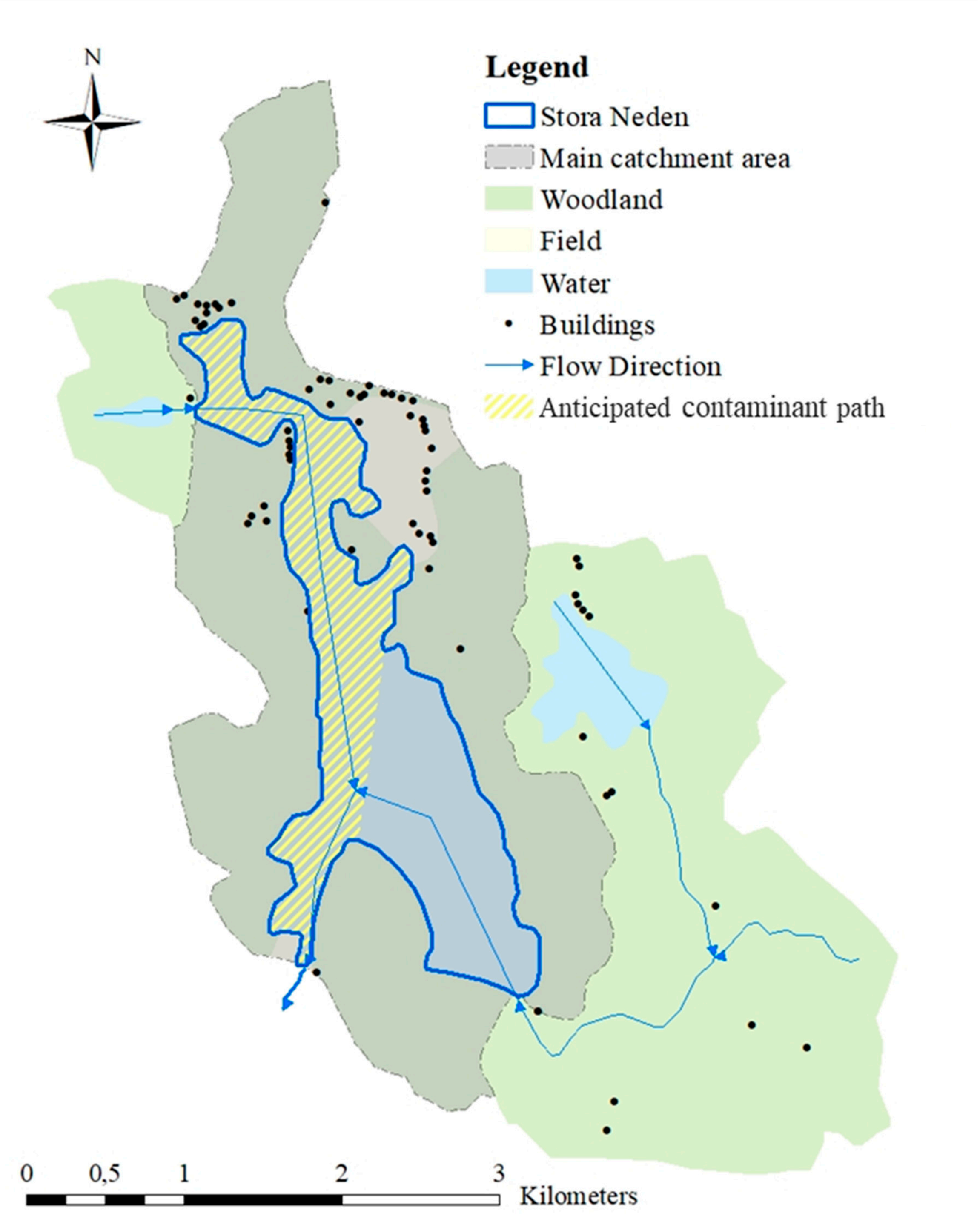

Figure A *Map over the lake Stora Neden. Note that only the houses within the grey catchment area was assumed to have OWTSs discharging wastewater to the lake*

[1] Based on the expected number of houses with OWTSs in connection to the raw water source area and the expected number of people per household in the municipality of Varberg.

The pathogen load from a **manure transport**, driving into the lake, was calculated via Equation 3 & 4:

$$w_{Manure\,Transport} = C_{manure} \times V_{manure} \qquad \text{Eq. 3}$$

$$C_{manure} = \sum_{n=i}^{N} C_{cattle_i} \times p_i \times r_{cattle_i} \qquad \text{Eq. 4}$$

where $w_{Manure\,Transport}$ was the load of pathogens (# d^{-1}) released from an accidental crash of manure transport, C_{manure} was the released manure's concentration of pathogens (# L^{-1}), V_{manure} was the released volume of manure (L d^{-1}), i was the type of cattle, N is the total number of manure types, C_{cattle_i} was the concentration of pathogens in the cattle type's manure given an infection, p_i was the pathogen's (i.e. cryptosporidium's) prevalence among the said type of cattle and r_{cattle_i} was the ratio of the cattle type in the mixed manure, i.e. juvenile or adult cows

The resulting concentration in the drinking water from a large manure spill has been assumed to last for a full year, all though it's just a single event. This is due to the unknown retention time of pathogen in the lake and cryptosporidium's low decay rate.

1.1.2 Ragnhilds Källa

The resulting intake concentration of pathogens at the DWTP, given a release of pathogens to the aquifer's area was estimated via Equation 5:

$$C_{In_{RK}} = \frac{C_{Source}}{10^{-(U+S)}} \times r_{GW} \qquad \text{Eq. 5}$$

where $C_{In_{RK}}$ was the DWTP's intake concentration of pathogens (# L^{-1}) from the aquifer Ragnhilds Källa during the duration of the contaminant release, C_{Source} is the source's released concentration of pathogens (# L^{-1}), *U* is the Log-removal of the aquifer's unsaturated zone and *S* is the Log-removal of the aquifer's saturated zone. Note that $C_{In_{RK}}$ is calculated based on concentration rather than load of pathogens, as the estimations of the aquifer's saturated Log-removal includes the contaminant dilution in the groundwater flow. Furthermore, to illustrate that the sewage pipe is likely in near, or in direct, contact with the aquifer's saturated zone; the unsaturated zone is excluded for the events associated with a sewage pipe-burst.

The expected concentration of pathogens in the **manure tank** is assumed to be same as for the manure spillage.

The concentration of pathogens in the wastewater from a **pipe-burst**, given an infectious load, was assessed via Equation 6:

$$C_{Pipe-burst_{Inf.}} = \frac{w_{pipe-burst}}{Q_{OWTS}} \qquad \text{Eq. 6}$$

where $C_{Pipe-burst_{Inf.}}$ is the daily sewage concentration of pathogens given an infectious load, $w_{pipe-burst}$ is the load from the number of infected households (h_i) connected to the leaking sewage pipe, calculated as w_{OWTS} (Eq. 1), and Q_{OWTS} is the OWTSs sewage flow (l d^{-1}), based on the connected peoples' combined wastewater production; assumed to be equal the to the drinking water consumption.

1.2 TREATMENT CHAIN

The expected concentration of pathogens being distributed, before ($C_{DW_{Prior}}$) and after ($C_{DW_{After}}$) the installation of the UF membranes, given one of the mentioned events, was calculated via Equation 7 and Equation 8:

$$C_{DW_{Prior}} = \frac{C_{In}}{10^{(B_{RS} + B_{UV250})}} \quad \text{Eq. 7}$$

$$C_{DW_{After}} = \frac{C_{In}}{10^{(B_{RS} + B_{UV400} + B_{UF})}} \quad \text{Eq. 8}$$

where C_{In} is the DWTP's intake raw water concentration of pathogens, i.e. any of the above source characterised concentrations, *B* is the log-removal of the different treatment barriers, *RS* is the rapid sand filter, *UV* is the UV radiation and *UF* is the UF membranes. Note that the UV strength was increased from 250 Jm^{-2} to 400 Jm^{-2} for the current treatment and that chloramine was excluded from the treatment chain, as its main purpose is to hinder the regrowth of pathogens rather than inactivating them [3].

The log-removal of the rapid sand filters were based on the findings of Smeets*, et al.* [4], albeit somewhat modified to better fit with the standards of SWWA [5]; stating that the removal efficiency of the rapid sand filter should be considered as poor. Hence the minimum log-removal was set to zero for all pathogens and the maximal removal efficiency was limited to the mean elimination capacity of the sand filters in the study.

The UV-inactivation capacity is based on the results of Hijnen*, et al.* [6], where the log-removal was assumed to the maximum removal efficiency for the assessed UV strength. Furthermore, an additional hazardous event, or rather an internal vulnerability was also assessed looking into the impact of a possibly **dysfunctional UV** barrier during similar circumstances of a baseline event. The probability of failure for the UV light was assumed to be equal to that of the UF membranes, i.e. 0.5 % [7].

The UF membranes' log-removal was assigned with respect to a conservative approach to not overestimate their benefits. It was based on data from the manufacturer, X-Flow [8], the operational routines at Kvarnagården DWTP and the QMRA-model by Åström*, et al.* [9], where the minimum separation efficiency was assigned for all pathogens as a sharp cut-off value. Uncertainties were disregarded, as the log-removal of the UF is solely based on its pore-size. Hence, events linked to a barrier's availability, which could affect other treatment steps, e.g. power failure, would not decrease the UF's removal efficiency but rather the water flow. The only viable inclusion of a UF failure would be a membrane breakdown. Yet this was considered too unlikely, given the operational routines at Kvarnagården DWTP, to be included from a practical sense.

1.3 RISK CHARACTERISATION

The expected number of infections *(I_i)* from each respective pathogen, for each event, was calculated by multiplying the total number of drinking water consumers with the annual probability of infection ($P_{inf\ Annual}$), calculated via Equations 9-12.

By using an Exact Beta-Poisson function, applied using Monte Carlo simulations and an exponential function with a beta distribution in the exponent, the P_{inf} for each respective event was calculated via Equations 9-11 [10]:

$$P_{inf} = 1 - e^{-r \times D} \quad \text{Eq. 9}$$

$$D = C_{DW} \times V_{DW} \quad \text{Eq. 10}$$

$$V = e^{Normal\ (\mu,\sigma)} \qquad \text{Eq. 11}$$

where *r* represents a pathogen's infectivity, described as a sample from a beta distribution with statistical parameters set for each pathogen's dose response, *D* is the simulated daily pathogen dose, where C_{DW} is the pathogen concentration in the distributed drinking water, and V_{DW} is the estimated exposure volume; based on a Log-normal distribution with a mean value μ and a standard deviation σ. From these equations, one can then estimate a pathogen's annual probability of infection, $P_{inf\ Annual}$, via Equation 12:

$$P_{inf\ Annual} = 1 - (1 - P_{inf})^d \qquad \text{Eq. 12}$$

where *d* is the expected number of days per year that the set dose, *D,* will be present in the drinking water. In addition, the $P_{inf\ Annual}$ for each pathogen, *n*, can also be combined for all investigated pathogens to give a total annual probability of infection, $P_{Total\ inf}$, as shown in Equation 13:

$$P_{Total\ inf} = 1 - \prod_{n}^{N} \left(1 - P_{inf\ Annual}\right)_n \qquad \text{Eq. 13}$$

Table S1 Detailed information regarding the input variables data for the quantitative microbial risk assessment.

Section	Input Variable	Symbol	Pathogen Type	Distribution Type [a]	A	B	C	Source
Raw Water Source Char. Endemic Risk	Households connected to OWTS at Stora Neten	-	-	-	50	-	-	Lantmäteriet [11]
	People per household	-	-	Triangular	1.0	2.0	7.0	SCB [12]
	Incidence per person per year	i	Camp.	Ext Value	$9.9\ 10^{-4}$	$1.3\ 10^{-4}$	-	Folkhälsomyndigheten [13] [b]
			Noro.	Ext Value	$3.3\ 10^{-4}$	$1.5\ 10^{-4}$	-	
			Cryp.	Uniform	0	$3.8\ 10^{-4}$	-	
	Underreporting factor	U	Camp.	-	17	-	-	Haagsma, *et al.* [14]
			Noro.		67			Lindqvist, *et al.* [15]
			Cryp.		67			Lindqvist, *et al.* [15]
	Faecal pathogen concentration (# g^{-1})	C_{Faecal}	Camp.	Triangular (Log_{10})	4	6	10	Petterson, *et al.* [16] [c]
			Noro.		5	8	11	Based on various authors [d]
			Cryp.		6	7	9	
	Faecal production (g p^{-1} d^{-1})	m_{Faecal}	-	Triangular	200	800	1000	Fine and Fordtran [17]
	Duration of pathogen excretion (days)	t	Camp.	Triangular	15	34	42	Petterson, *et al.* [16] [c]
			Noro.		14	29	45	Petterson, *et al.* [18]
			Cryp.		5	10	30	Petterson, *et al.* [16] [c]
	Volume Stora Neden (m^3)	V	-	-	$61.1\ 10^{6}$	-	-	SMHI [19]
	Area Stora Neden (m^2)		-		$2.9\ 10^{6}$	-	-	SMHI [19]
	Area of anticipated contaminant path (m^2)		-		$1.3\ 10^{6}$	-	-	Assumed

Section	Input Variable	Symbol	Pathogen Type	Distribution Type [a]	A	B	C	Source
Raw Water Source Char. Endemic Risk	Stratification depth Stora Neden (m)		-	Uniform	7	9	-	County Administative Board of Halland [20]
	Log removal OWTS	O	All	Triangular	1.0	2.0	3.0	USEPA [21]
	Groundwater ratio	r_{GW}	-	Triangular	15%	20%	25%	VIVAB [22]
Raw Water Source Char. Risk Events	Manure pathogen concentration of juvenile cattle (# g^{-1})	$C_{cattle_{Juv}}$	Cryp.	Log-normal	38155	22500		Ferguson and Kay [23]
	Manure pathogen concentration of adult cattle (# g^{-1})	$C_{cattle_{Adu}}$	Cryp.	Log-normal	3830	46		Ferguson and Kay [23]
	Mean pathogen prevalence in juvenile cattle	p_{Juv}	-	-	20%	-	-	Ferguson and Kay [23]
	Mean pathogen prevalence in juvenile cattle	p_{Adul}	-	-	15%	-	-	Ferguson and Kay [23]
	Cattle ratio (Juvenile:Adult)	r	-	Beta (Alt)	10	20%	0;1	Assumed
	Volume of manure transport (L)	V_{manure}	-	Triangular	$1.0\ 10^4$	$2.0\ 10^4$	$3.0\ 10^4$	Harrigan [24]
	Household connected to broken OWTS at Ragnhilds Källa	h_i	-	-	1	-	-	Assumed
	Wastewater production (L p^{-1} d^{-1})	-	-	Uniform	160	200	-	SWWA [25]
	Log-removal unsaturated zone	U	Camp. Noro. Cryp.	Triangular	0.9 0.6 0.9	4.4 3.1 4.4	8.4 5.9 8.4	Ho, *et al.* [26] Åström, Pettersson and Pott [9]
	Log-removal saturated zone	S	Camp. Noro. Cryp.	Triangular	1 2.9 1	2.2 3.2 2.2	3.3 4 3.3	Sinton [27] Åström, Pettersson and Pott [9] [e]

Section	Input Variable	Symbol	Pathogen Type	Distribution Type [a]	A	B	C	Source
Treatment Chain Log-Removal	Rapid sand filter	*RS*	Camp.	Triangular	0	0.1	0.6	Smeets, Rietveld, Hijnen, Medema and Stenström [4]
			Noro.		0	0.1	0.8	
			Cryp.		0	0	1.8	
	UV (250 m^{-2})	*UV250*	Camp.	-	5,3	-	-	Hijnen, Beerendonk and Medema [6]
			Noro.	-	2,6	-	-	
			Cryp.	-	3	-	-	
	UV (400 m^{-2})	*UV400*	Camp.	-	5,3	-	-	Hijnen, Beerendonk and Medema [6]
			Noro.	-	4,2	-	-	
			Cryp.	-	3	-	-	
	UF (20 nm)	UF	All	-	4	-	-	X-Flow [8]
Risk Character.	Infectivity	*r*	Camp.	Beta	0.024	0.011	-	Teunis, *et al.* [28]
			Noro.		0.04	0.055	-	Teunis, *et al.* [29]
			Cryp.		0.115	0.176	-	Teunis, *et al.* [30]
	Unboiled drinking water consumption	*V*	-	Log-normal	-0.299	0.570	-	Westrell, *et al.* [31]
	Drinking Water Consumers	-	-	-	62755	-	-	SCB [12]
	Duration until detection of event [e] (d)	*d*	All	Triangular	1	7	14	Assumed
	Lost QALY per infection	$\Delta QALY$	Camp.	-	$1{,}65\ 10^{-2}$	-	-	Batz, *et al.* [32]
			Noro.	-	$9\ 10^{-4}$	-	-	
			Cryp.	-	$3{,}5\ 10^{-3}$	-	-	

a) - = single value (A), Triangular (A = min; B = mode ; C = max), Ext Value (A = α; B = β), Uniform (A = min; B = max), , Log-normal (A = mean; B = StDev), Beta (A = α; B = β), Beta (Alt) (A = α; B = P50; C = min; max)
b) @Risk fitted distribution, using Akaike Information Criterion (AIC)
c) Various authors = Chan, *et al.* [33]; Atmar, *et al.* [34]; Petterson, Stenström and Ottoson [18]; Newman, *et al.* [35]; and Teunis, *et al.* [36]
d) Using the virus transport model, where ground water flows were based on information from SGU [37] and the outtake flow recorded by Sweco [38]
e) Events which may not be detected straight away were the pipe-burst of an OWTS nearby Ragnhilds Källa and the leakage from the manure tank at Ragnhilds Källa

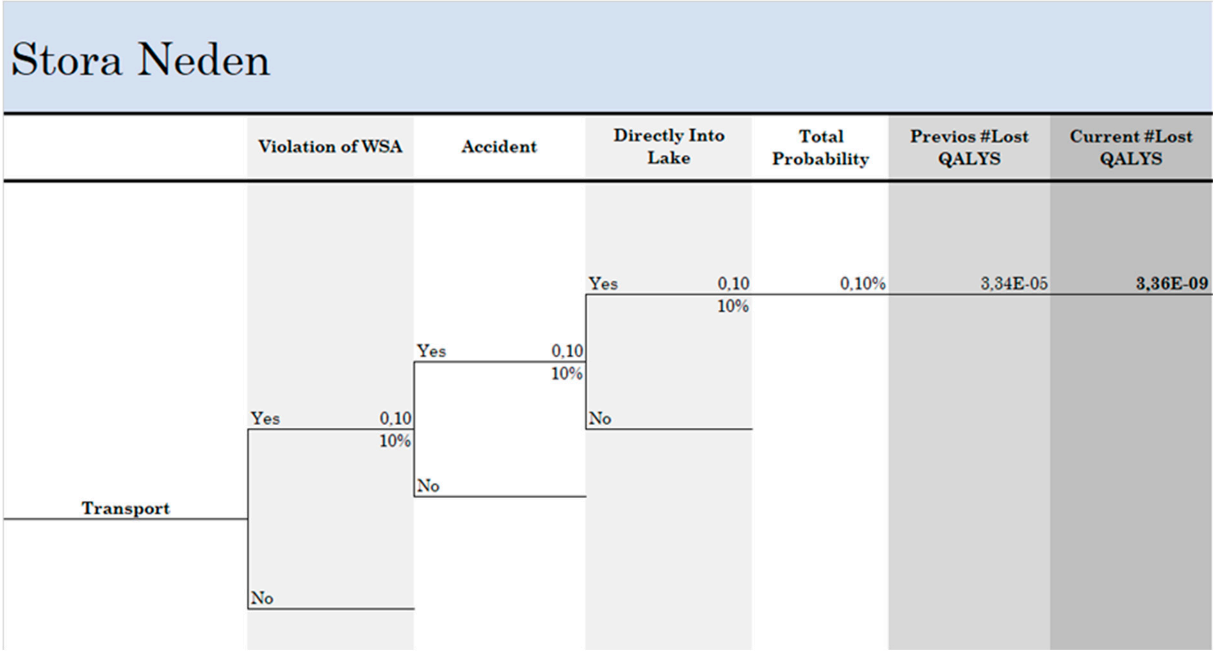

Figure B Event tree analysis for the hazardous event of a manure transport driving into the lake Stora Neden.

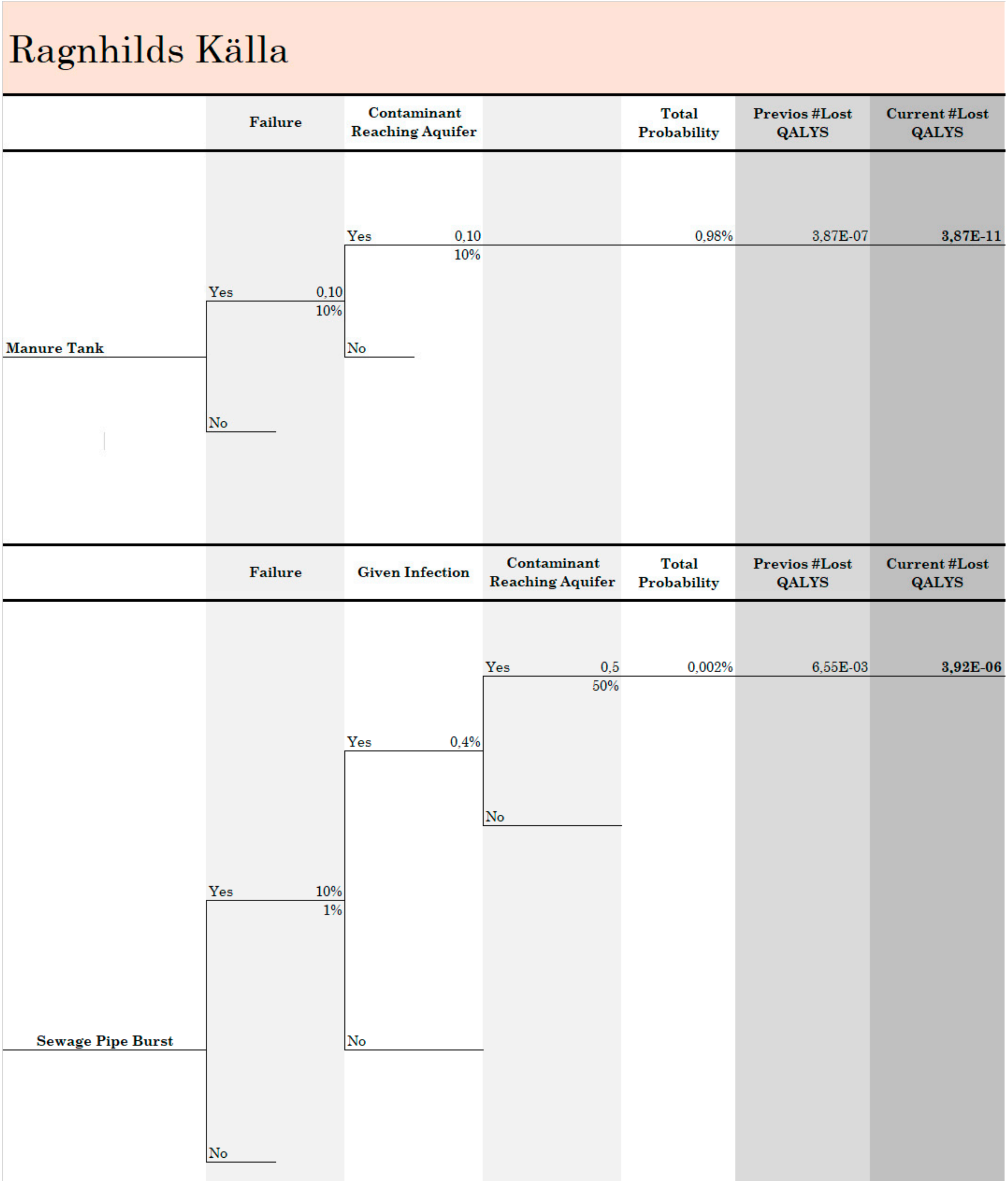

Figure C Event tree analysis for the different hazardous events connected to microbial pollution of Kvarnagården DWTP from Ragnhilds Källa

1.4 REFERENCES

1. Bertrand, I.; Schijven, J.F.; Sánchez, G.; Wyn-Jones, P.; Ottoson, J.; Morin, T.; Muscillo, M.; Verani, M.; Nasser, A.; Husman, A.M.d.R.; et al. The impact of temperature on the inactivation of enteric viruses in food and water: a review. *J. Appl. Microbiol*. **2012**, *112*, 1059–1074. https://doi.org/10.1111/j.1365-2672.2012.05267.x.
2. Gibbons, C.L.; Mangen, M.-J.J.; Plass, D.; Havelaar, A.H.; Brooke, R.J.; Kramarz, P.; Peterson, K.L.; Stuurman, A.L.; Cassini, A.; Fèvre, E.M.; et al. Measuring underreporting and under-ascertainment in infectious disease datasets: a comparison of methods. *BMC Public Health*. **2014**, *14*, 147–165. https://doi.org/10.1186/1471-2458-14-147.
3. Norton, C.D.; LeChevallier, M.W. Chloramination: Its Effect on Distribution System Water Quality. *American Water Works Association*. **1997**, *89*, 66–77.
4. Smeets, P.; Rietveld, L.; Hijnen, W.; Medema, G.; Stenström, T.-A. *Efficacy of water treatment processes*; University of Delft,: Delft, Netherlands, 2006.
5. SWWA. *Introduktion till Mikrobiologisk BarriärAnalys, MBA*; The Swedish Water & Wastewater Association: Stockholm, Sweden, 2015.
6. Hijnen, W.A.M.; Beerendonk, E.F.; Medema, G.J. Inactivation credit of UV radiation for viruses, bacteria and protozoan (oo)cysts in water: A review. *Water Res.* **2006**, *40*, 3–22. https://doi.org/10.1016/j.watres.2005.10.030.
7. VIVAB. *Utbyggnad av Kvarnagårdens vattenverk*; Vatten och Miljö i Väst AB (VIVAB): Varberg, Sweden, **2017**.
8. X-Flow. *ULTRAFILTRATION MEMBRANE: X FLOW AQUAFLEX 55*; PENTAIR: Twente, the Netherlands **2018**.
9. Åström, J.; Pettersson, T.J.R.; Pott, B.-M. *Analytica: QMRA-verktyg för beräkning av hälsorisk för grundvattenverk och ytvattenverk*; Technical Report for Svenskt Vatten Utveckling: Bromma, Sweden, 10 February 2017.
10. Bergion, V. *Developement of a Risk-Based Decision Model for Prioritizing Microbial Risk Mitigation Measures in Drinking Water Systems*; Chalmers University of Technology: Gothenburg, Sweden 2017.
11. Lantmäteriet. GSD-Terrängkartan_vektor. Available online: ftp://download-opendata.lantmateriet.se/GSD-Terrangkartan_vektor/ (accessed on 23 January 2022).
12. SCB. KOMMUNER I SIFFROR: VARBERG. Available online: http://www.scb.se/hitta-statistik/sverige-i-siffror/kommuner-i-siffror/#?region1=1383&region2= (accessed on 1 January 2022).
13. Folkhälsomyndigheten. Smittsamma sjukdomar A-Ö: Campylobacterinfektion, Cryptosporidiuminfektion, Calicivirus (noro och sapovirus). Available online: https://www.folkhalsomyndigheten.se/smittskydd-beredskap/smittsamma-sjukdomar/ (accessed on 23 January 2018).
14. Haagsma, J.A.; Geenen, P.L.; Ethelberg, S.; Fetsch, A.; Hansdotter, F.; Jansen, A.; Korsgaard, H.; O'Brien, S.J.; Scavia, G.; Spitznagel, H.; et al. Community incidence of pathogen-specific gastroenteritis: reconstructing the surveillance pyramid for seven pathogens in seven European Union member states. *Epidemiol. Infect*. **2013**, *141*, 1625–1639.
15. Lindqvist, R.; Andersson, Y.; Lindbäck, J.; Wegscheider, M.; Eriksson, Y.; Tideström, L.; Lagerqvist-Widh, A.; Hedlund, K.-O.; Löfdahl, S.; Svensson, L.; et al. A One-Year Study of Foodborne Illnesses in the Municipality of Uppsala, Sweden. *BMC Infect Dis*. **2001**, *7*, 588–592.
16. Petterson, S.R.; Mitchell, V.G.; Davies, C.M.; O'Connor, J.; Kaucner, C.; Roser, D.; Ashbolt, N. Evaluation of three full-scale stormwater treatment systems with respect to water yield, pathogen removal efficacy and human health risk from faecal pathogens. *Sci Total Environ*. **2016**, *543*, 691–702. https://doi.org/10.1016/j.scitotenv.2015.11.056.
17. Fine, K.; Fordtran, J. The effect of diarrhea on fecal fat excretion. *Gastroenterology*. **1992**, *102*, 1936–1939.
18. Petterson, S.R.; Stenström, T.A.; Ottoson, J. A theoretical approach to using faecal indicator data to model norovirus concentration in surface water for QMRA: Glomma River, Norway. *Water Res*. **2016**, *91*, 31–37. https://doi.org/10.1016/j.watres.2015.12.037.
19. SMHI. *Svenskt Vatten Arkiv [Online]*; Swedish Meteorological and Hydrological Institute: Norrköping, Sweden, 2016.
20. USEPA. *Onsite Wastewater Treatment Systems Manual*; United States Environmental Protection Agency: Pennsylvania, USA, 2002.
21. VIVAB. *Mikrobiologiska barriärer vid Kvarnagårdens vattenverk*; Vatten och Miljö i Väst AB (VIVAB): Varberg, Sweden **2011**.
22. Ferguson, C.; Kay, D. Transport of microbial pollution in catchment systems. In *Animal Waste, Water Quality and Human Health*, Dufour, A., Bartram, J., and, R.B., Gannon, V., Eds.; World Health Organization: Geneva, Switzerland, 2012.
23. Harrigan, T. *Efficient Liquid Manure Transport and Land Application*; Michigan State University: Michigan, US, 2011.
24. SWWA. *FACTS ON WATER SUPPLY AND SANITATION IN SWEDEN*; The Swedish Water & Wastewater Association: Bromma, Sweden, 2009.

25. Ho, G.E.; Gibbs, R.A.; Mathew, K.; Parker, W.F. Groundwater recharge of sewage effluent through amended sand. *Water Res.* **1992**, *26*, 285–293. https://doi.org/10.1016/0043-1354(92)90025-Y.
26. Sinton, L.W. *Investigations into the use of the bacterial species Bacillus stearothermophilus and Escherichia coli (H2S positive) as tracers of groundwater movement*. Water & soil technical publication: Christchurch, New Zealand, **1980**.
27. Teunis, P.; Van den Brandhof, W.; Nauta, M.; Wagenaar, J.; Van den Kerkhof, H.; Van Pelt, W. A reconsideration of the Campylobacter dose-response relation. *Epidemiology and Infection.* **2005**, *133*, 583–592.
28. Teunis, P.F.; Moe, C.L.; Liu, P.; Miller, S.E.; Lindesmith, L.; Baric, R.S.; Le Pendu, J.; Calderon, R.L. Norwalk virus: how infectious is it? *Journal of Medical Virology.* **2008**, *80*, 1468–1476.
29. Teunis, P.F.M.; Chappell, C.L.; Okhuysen, P.C. Cryptosporidium dose response studies: Variation between isolates. *Risk Analysis.* **2002**, *22*, 175–183.
30. Westrell, T.; Andersson, Y.; Stenström, T.A. Drinking water consumption patterns in Sweden. *Journal of Water and Health.* **2006**, *4*, 511–522, doi:doi: 10.2166/wh.2006.030.
31. Chan, M.C.W.; Sung, J.J.Y.; Lam, R.K.Y.; Chan, P.K.S.; Lee, N.L.S.; Lai, R.W.M.; Leung, W.K. Fecal Viral Load and Norovirus-associated Gastroenteritis. *Emerging Infectious Diseases* **2006**, *12*, 1278–1280.
32. Atmar, R.L.; Opekun, A.R.; Gilger, M.A.; Estes, M.K.; Crawford, S.E.; Neill, F.H.; Graham, D.Y. Norwalk Virus Shedding after Experimental Human Infection. *Emerging Infectious Diseases.* **2008**, *14*, 1553–1557. https://doi.org/10.3201/eid1410.080117.
33. Newman, K.L.; Moe, C.L.; Kirby, A.E.; Flanders, W.D.; Parkos, C.A.; Leon, J.S. Norovirus in symptomatic and asymptomatic individuals: cytokines and viral shedding. *Clinical & Experimental Immunology.* **2016**, *184*, 347–357, doi:doi:10.1111/cei.12772.
34. Teunis, P.F.M.; Sukhrie, F.H.A.; Vennema, H.; Bogerman, J.; Beersma, M.F.C.; Koopmans, M.P.G. Shedding of norovirus in symptomatic and asymptomatic infections. *Epidemiol. Infect.* **2015**, *143*, 1710–1717. https://doi.org/10.1017/S095026881400274X.
35. SGU. Geokartan. Available online: https://apps.sgu.se/geokartan/ (accessed on 22 February 2022).
36. Sweco. *Ragnhilds källa, revideringen av vattenskyddsområde*; Sweco: Gothenburg, Sweden, 2017.