Winery Waste Management

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THE CHALLENGES

- Location
- Cost
- Solids
- Liquids
- Culture
- Simple Solutions

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Greenfield 10,000T Winery on 1.5 Ha

- Analyzed waste water quantities and BOD_5 for a New Zealand winery using:
  - Common practice for waste water treatment
  - Best practice for waste water treatment

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What is 'Best Practice' for Winery Waste Water Treatment?

- Minimise the waste stream
- Use a shovel, not a hose, when cleaning up solids
- Collect tartrates from tanks via screened overflow trolleys
- Use an interceptor for the RDV area liquid waste
- Conveyor designs for solid waste handling with liquid recovery
- Stainless screens in waste water sumps (3 - 5mm)
- Rotary screen to remove solids (0.5 – 1mm apertures)
- If possible secondary solids removal via settling tanks/ponds

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10,000T GreenFields Winery: Water / BOD_5 Spreadsheet: In harvest - Common Practice

BOD from concentrated 1L (kg/m^3)						Juice 244.5	Wine 264.4	Stillage 19.6	Citric 1% 7.5		
Cleaning Task, Daily Volume		Harvest	25	Days							
a) Harvest		Number of Units	Water Usage Lw/Unit/Use	Rinse Frequency per day	Clean Water Usage/Received Lw	Total BOD_5 per vintage(kg)	BOD_5 Juice (Kg/use)	BOD_5 Wine (Kg/use)	BOD_5 Stillage (Kg/use)	BOD_5 Citric 1% (Kg/use)	Assumption
Tank to tank transfer		1	221	20	110,447	1686.2	1.6	1.8			
Tanker to tank transfer		1	353	12	106,029	1011.7	1.6	1.8			
Tank to tanker transfer		1	353	12	106,029	1011.7	1.6	1.8			
Tank cleaning (kL)											
	200	12	2100	1	52,500	347.6	9	5		0.060	
	100	50	1800	4	180,000	757.3	5	3		0.039	
	50	44	1500	6	225,000	569.5	2	1		0.030	
	25	30	1200	6	180,000	358.1	2	1		0.015	
	10	30	990	6	148,500	187.5	1	0.3		0.007	
	5	16	900	6	135,000	93.7	0.5	0.1		0.004	
					-						
Barrels											
225		2000	250	130.00	812,500	1216.8	0.225		0.15		Diesel powered hot water used for barrel cleaning
Line cleaning											
0.00		20	215	80.00	430,000	142.4				0.071	1% caustic used for cleaning lines, caustic used every third rinse
Other - rinsing slabs, clearing sumps etc		1	3000	7.00	525,000	0.0					
Produced by bad practice											
- Using water as a hose for solids		1	250	55.00	343,750						
- Tartrates go directly into waste water stream		1			-	5460.0					Assume 30kg of tartrates per 50kL tank
- RDV solids entering waste stream		1	100	1.00	2,500	100.0					
- RDV solids washed into drain with hose		1	300	5.00	37,500	0.0					
- No rotary screen for waste water		2.5	0	50.00	-	3125.0					
- No screens in sumps		14	0	20.00	-	7000.0					
- Poor conveyor design from receival area		20	0	3.00	-	1500.0					
- Washing receival area with hoses to move solids into waste stream		1	300	4.00	30,000	0.0					
Stormwater: annual Blenheim average 655mm		655	Area (m^2) 15000	1.00	672,945	0.0					All stormwater goes into waste system
SUB-TOTAL PER VINTAGE DAY					164	m^3 of Waste Water / Vintage day	982.8	BOD_5 Kg / Vintage day			
SUB-TOTAL PER VINTAGE					4,098	m^3 of Waste Water / Vintage	24,570	BOD_5 Kg / Vintage			

TOTALS	BOD_5 average per day (g / m^3)
a) Harvest	5,996

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Site:	Greenfields 10,000T Winery		
Area:	1.5 Ha		
1	Best Practice Waste Water Estimate per Day (m^3 / day)	126	m^3 / day
	Common Practice Waste Water Estimate per Day (m^3 / day)	164	m^3 / day
	Percentage reduction	23%	%
2	Best Practice BOD_5 Average	2,348	g/m^3 in vintage
	Common Practice BOD_5 Average	6,582	g/m^3 in vintage
	Percentage reduction	64%	%
3	Best Practice BOD_5 Loading Average	295	Kg / vintage day
	Common Practice BOD_5 Loading Average	1,079	Kg / vintage day
	Percentage reduction	73%	%

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WINERY WASTE COMPOSITION

Base MDC Requirements
Trade Waste Bylaw

Year	Flow l/s	Suspended Solids g/m³	pH	BOD Ultimate mg/l	BOD Mass Limit mg/s
2001	2.0	< 1,000	5 - 10	< 1,000	< 2,000
2009		< 500	6 - 8	< 250	
Typical Winery					
Vintage		100 - 1,500	4 - 6	1,000 - 10,000	
Non-Vintage		100 - 1,000	4 - 7	1,000 - 5,000	

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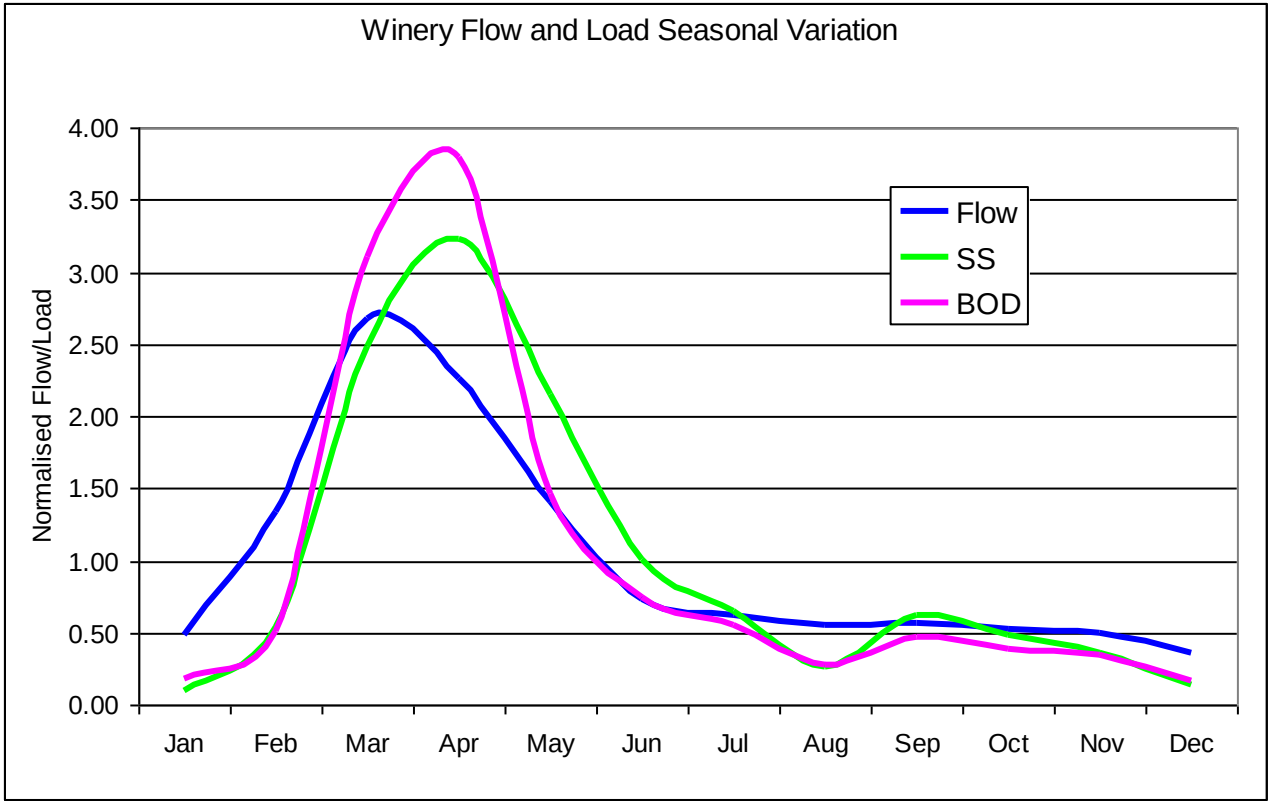
TYPICAL FLOW



WASTE WATER SOLUTIONS

- Liquid Minimisation
- Solids Removal

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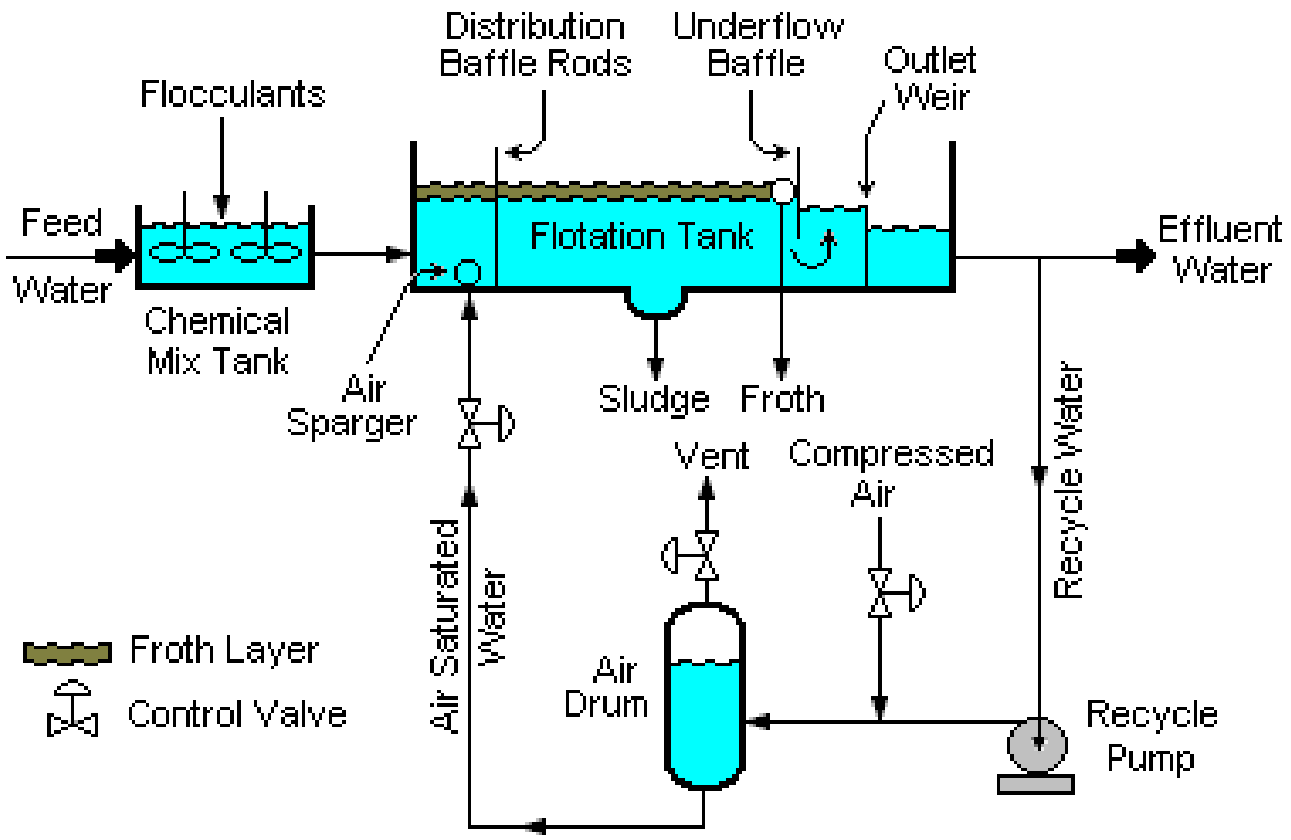
DAF Schematic



WASTE WATER SOLUTIONS

- Anaerobic Processes
- Aerobic Processes

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OPPORTUNITIES IN YOUR WASTE

- Marc
- The “French Paradox”
- Tarac – VinLife
- Polyphenols – Antioxidants
- Resveratrol
- Anthocyanins
- Proanthocyanidin (OPC)
- Quercetin

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SUMMARY

- Simple solutions
- Best practice
- Opportunities in your Marc

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