

NPEC  
Winery Wastewater  
Treatment And Reuse

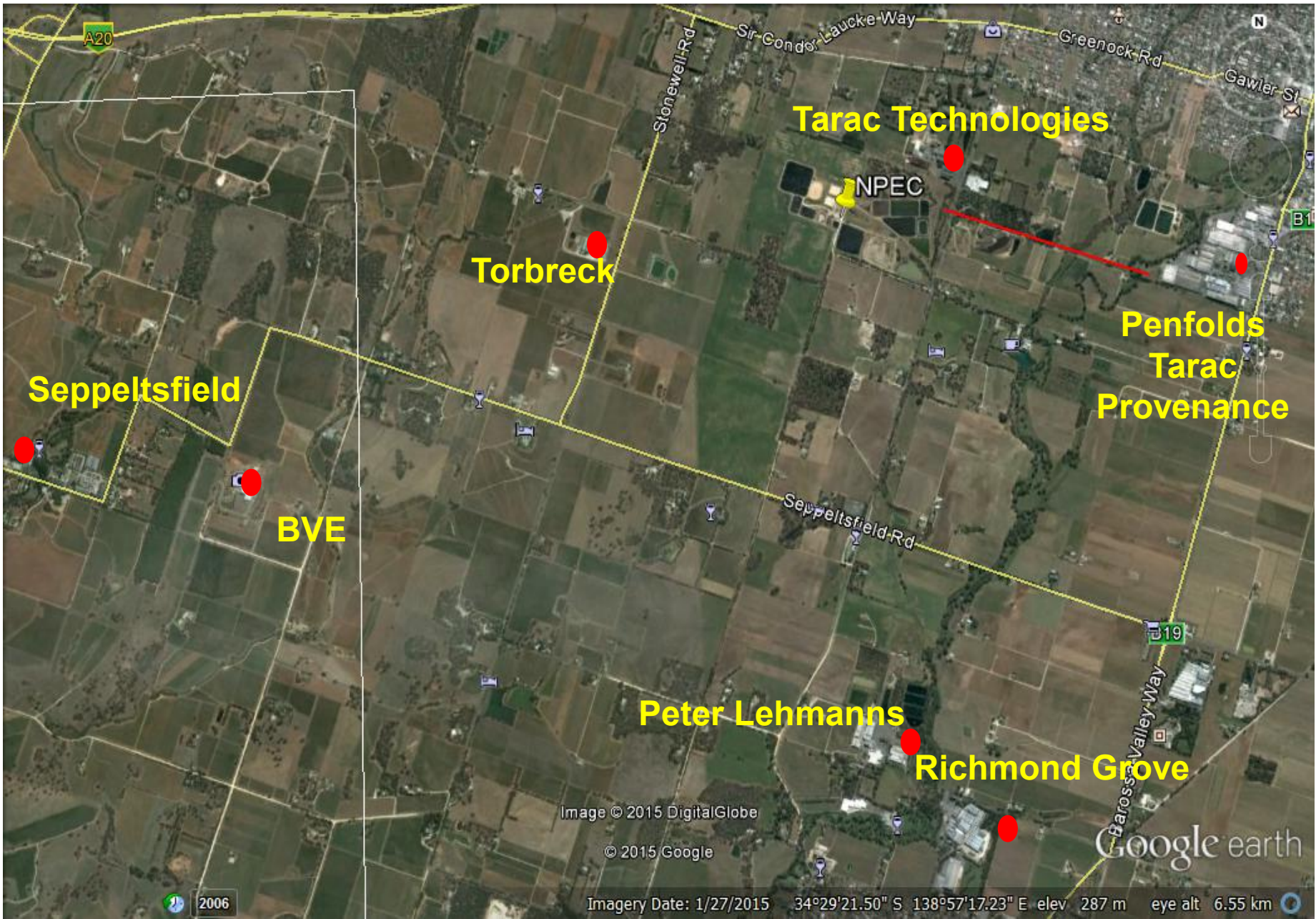
By  
John Constable  
JJC Group

# NPEC Project

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- North Para Environment Control Pty Ltd
  - Since 1975.
  - Owned today by Treasury Wine Estates & Tarac.
  - Water Recycling plant started 2003.
    - BOOT by Cleanaway for Southcorp & Tarac
    - Designer & Project Manager – JJC Engineering
    - Operator Since 2004 – JJC Operations
  - Beneficial Reuse – Reduces take from Murray River.

# NPEC Pipelines



# NPEC Treatment Plant



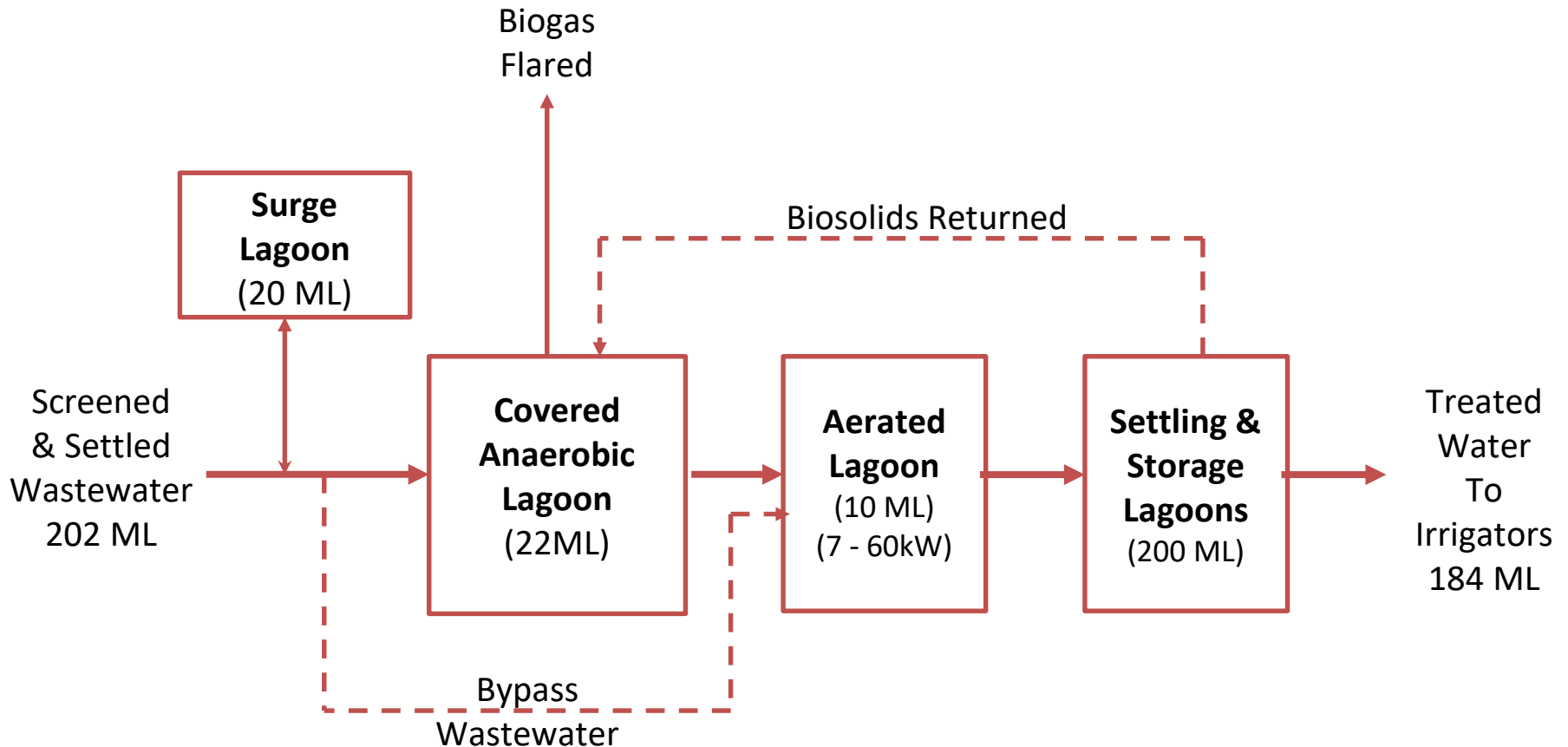
# NPEC Project

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- In 2018/19:
  - Received 200 ML wastewater from 8 wineries & distilleries
  - Sold 184 ML of treated water to 12 vineyards.
  - Substitute for Murray River water.
  - Treated water quality (Average 12 mths to Apr 19)
    - BOD 7 mg/L
    - SS 9 mg/L
    - Salt (EC) 1265 us/cm
    - Total N 4 mg/L
    - P 8 mg/L
  - Power Used 50kW (2018, 365/24 basis)
  - Biogas Energy Value 260 kW (2018, 365/24 basis)

# NPEC Wastewater Process

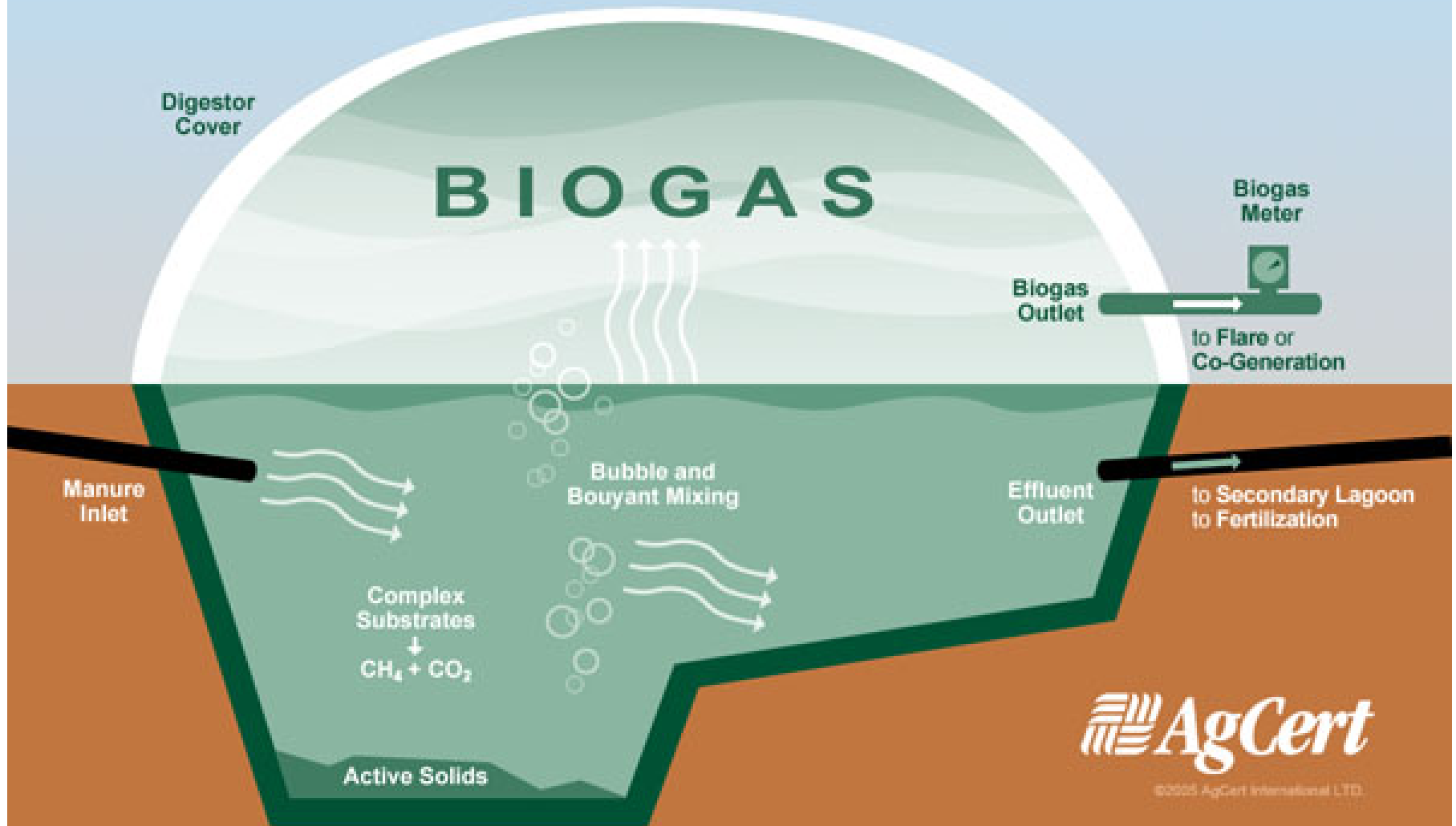
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Microbiology Provides "pH Correction".  
"No Added Salt"

No Biosolids Removed From Process (SINCE 2003)

# Anaerobic Digestion



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Digesters are designed by optimizing the retention time (typically between 22-28 days) to maximize  $\text{CH}_4$  capture.

# Anaerobic Process

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- Three reactions occur:
  - Hydrolysis – Conversion of solids, complex organics to simple monomers,
  - Acid Forming – Production of Volatile Fatty Acids (VFA)
  - Methanogenesis – Conversion to Acids to Methane



- Issue Is Methanogens are inhibited by low pH.
  - Need to keep pH above 6.5.
  - Winery wastewater is pH 4 to 5.
  - And VFA production drives pH down.
- Challenge Is To Correct pH using Microbiology.

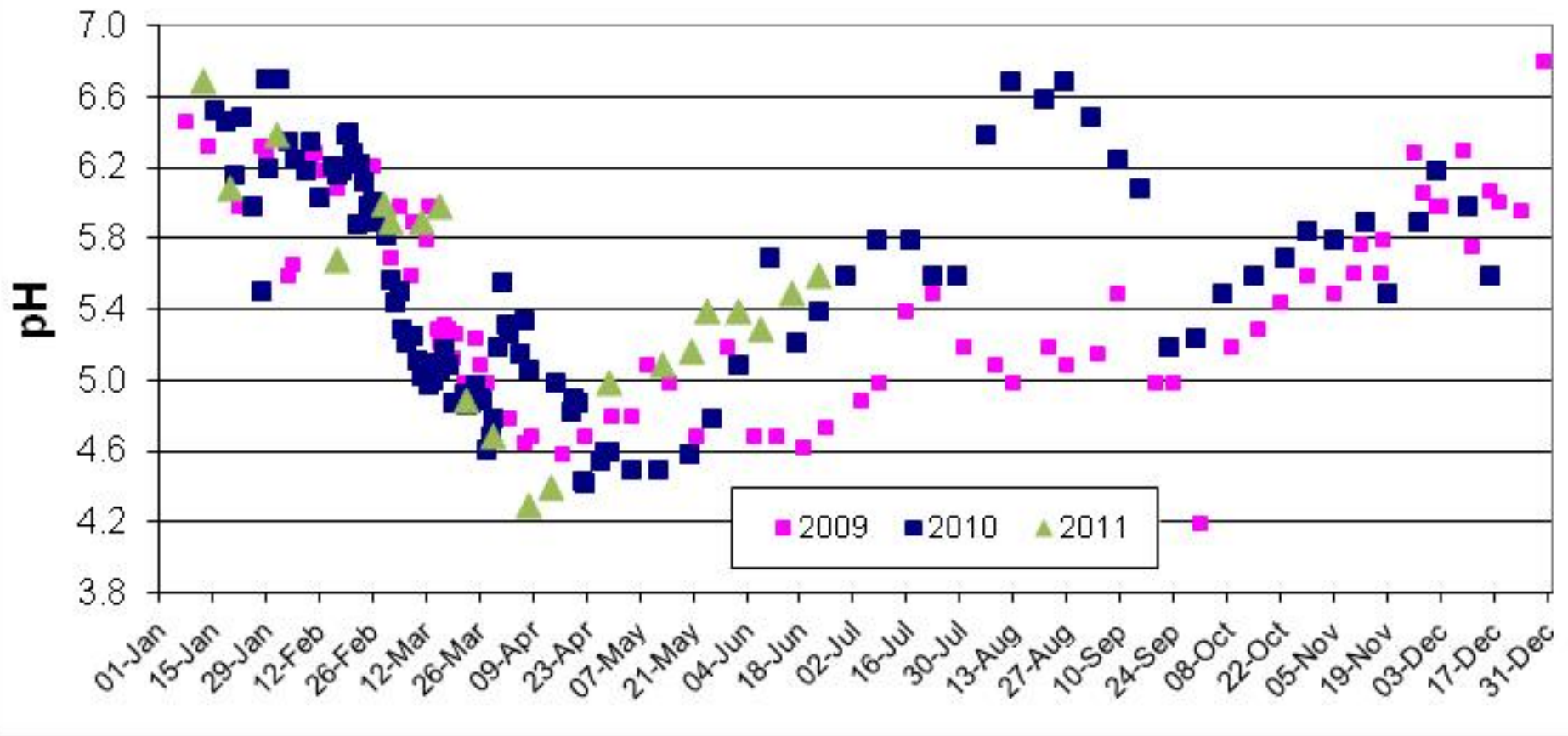
# Winery CAL – Jan to June 2019

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<u>Into CAL</u>		
Volume Feed	95	ML
Average Feed	523	kL/day
March Feed	995	kL/day
Average COD	4778	mg/L
COD Loading Rate (Ave)	0.11	kgCOD/m <sup>3</sup> /day
<u>Out of CAL</u>		
Average COD <sub>f</sub>	102	mg/L
Average SS	214	mg/L
<u>Biogas Produced</u>		
Total Volume	147,457	m <sup>3</sup>
Calorific Value	22	MJ/m <sup>3</sup>
Average Energy Value	206	kW

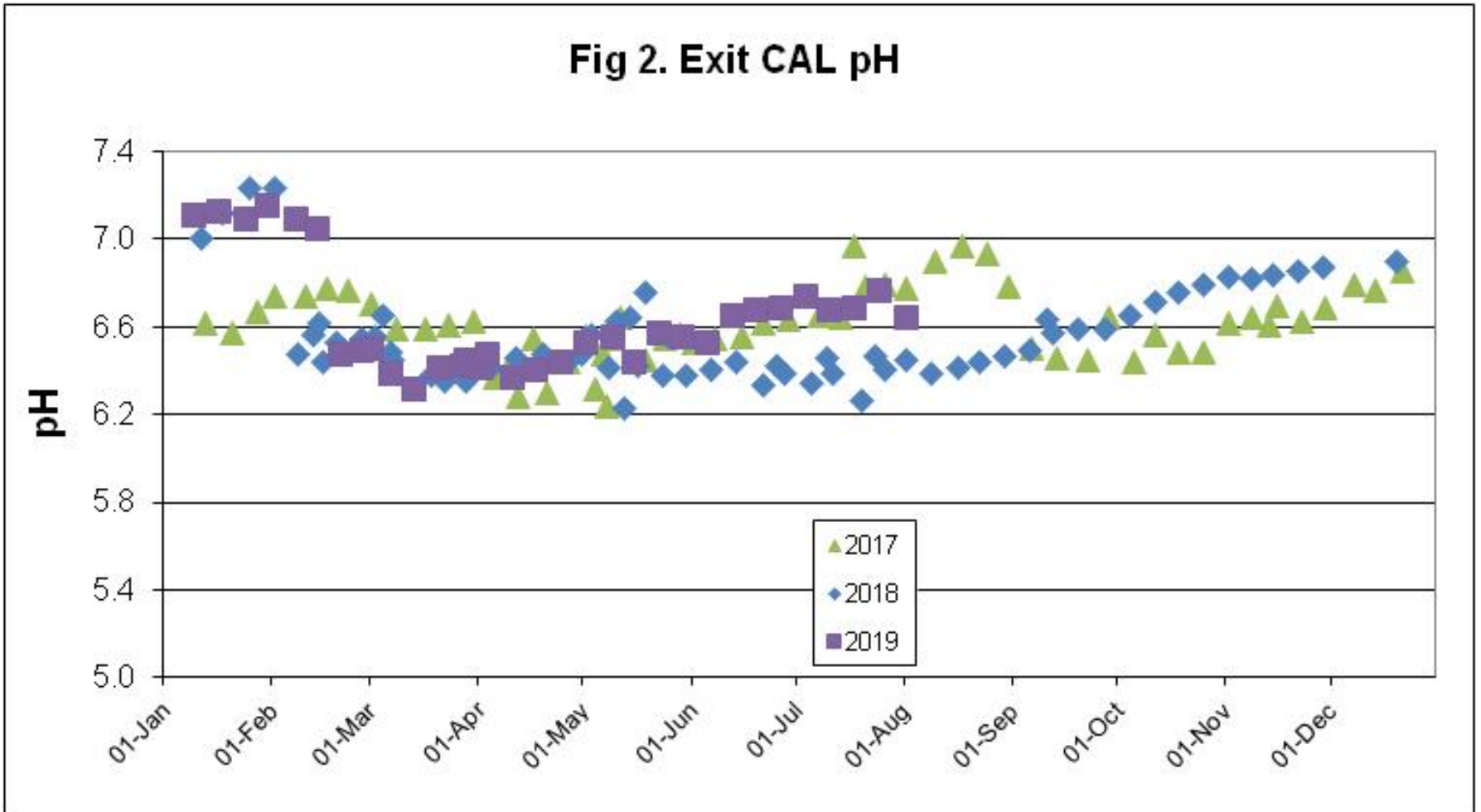
# CAL pH - Then

Fig 3. Exit CAL pH



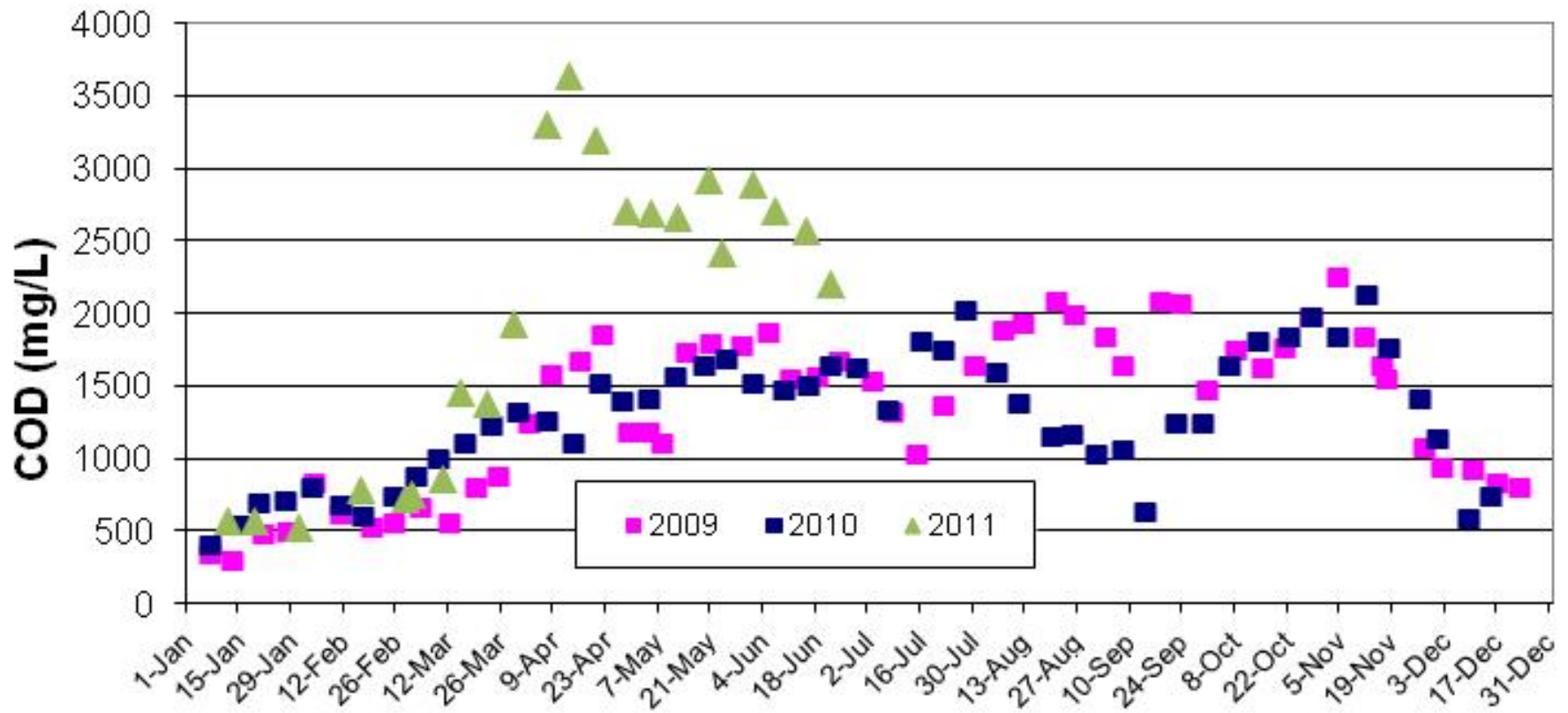
# CAL pH - Now

Fig 2. Exit CAL pH



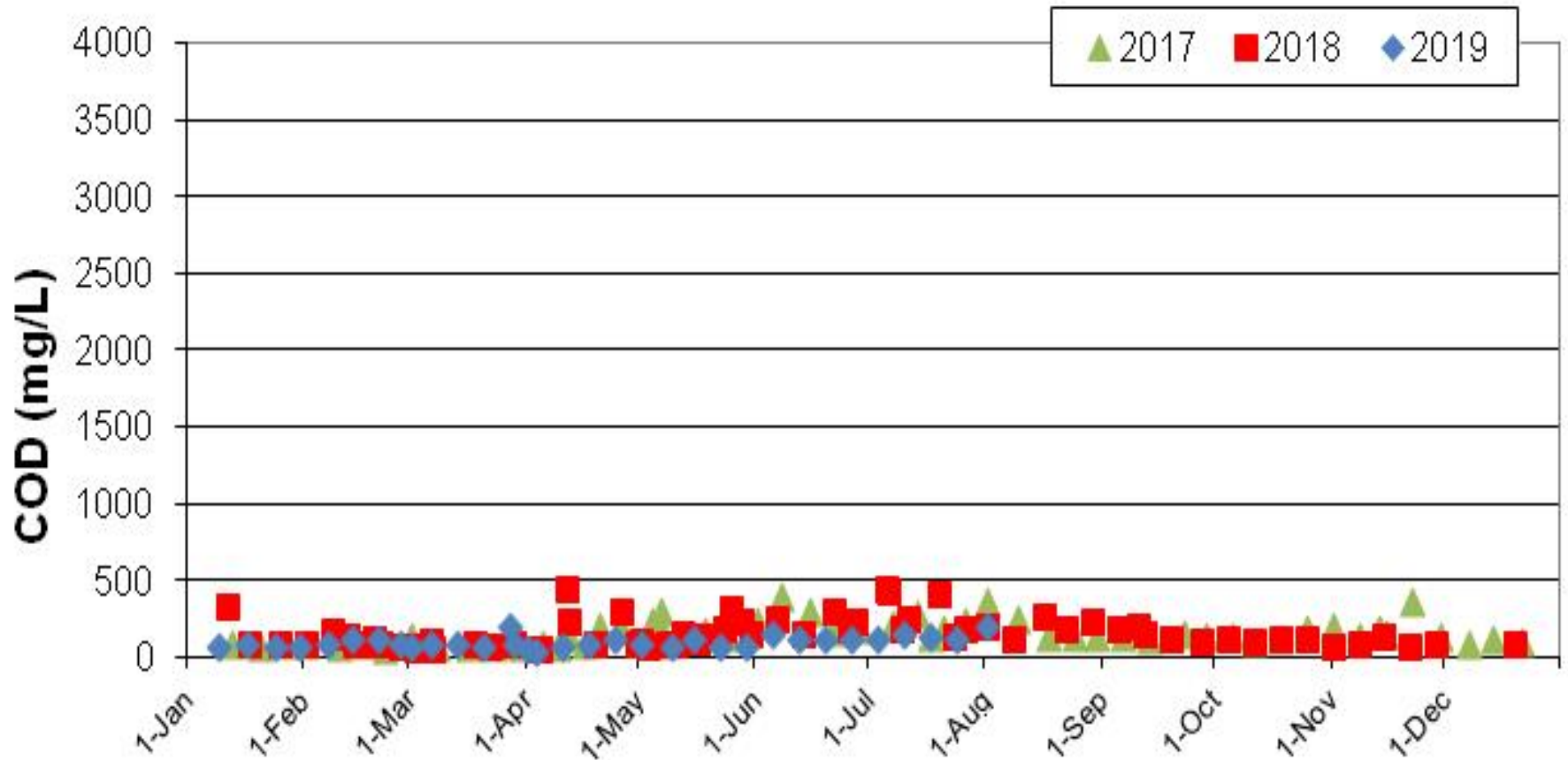
# CAL CODf - Then

Fig 2. Exit CAL COD(f)



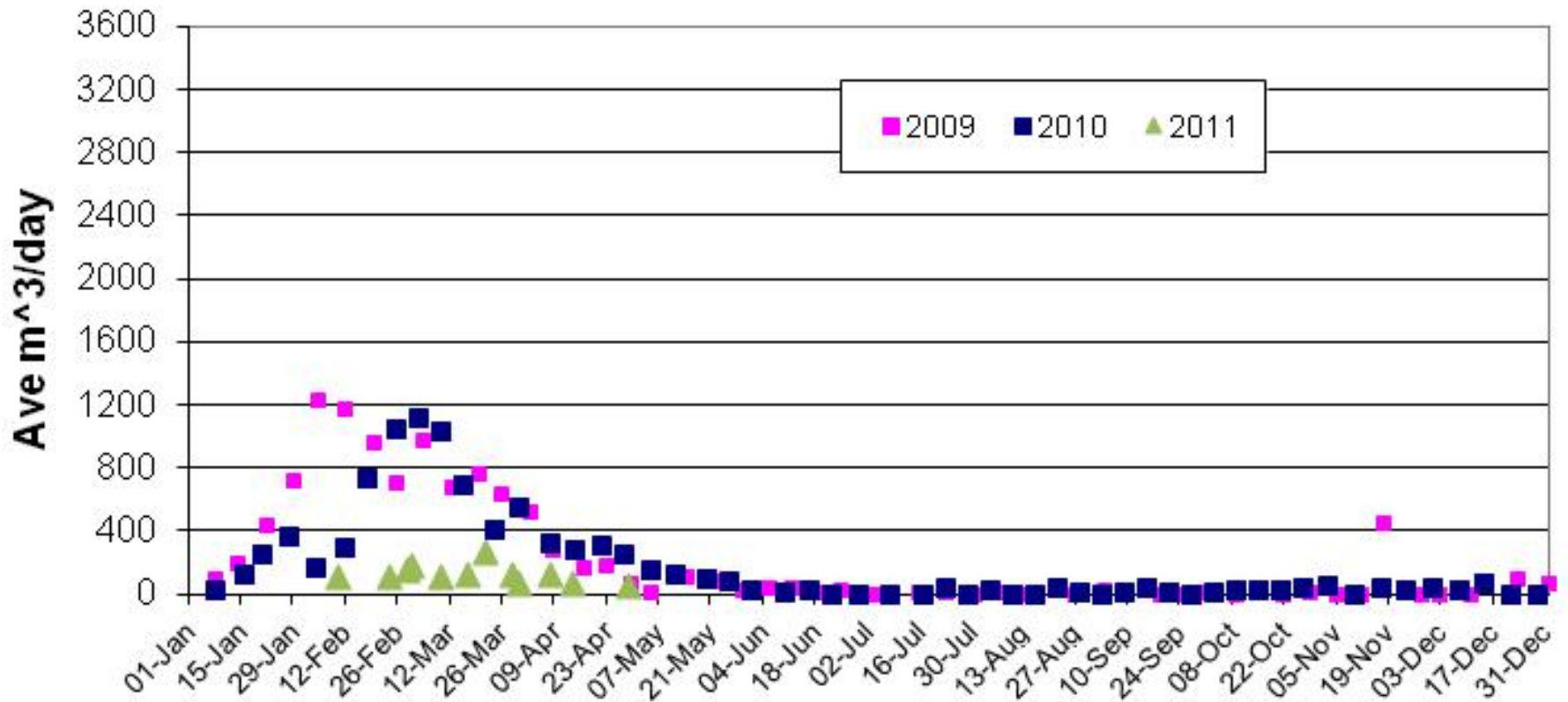
# CAL CODf - Now

Fig 3. Exit CAL COD(f)



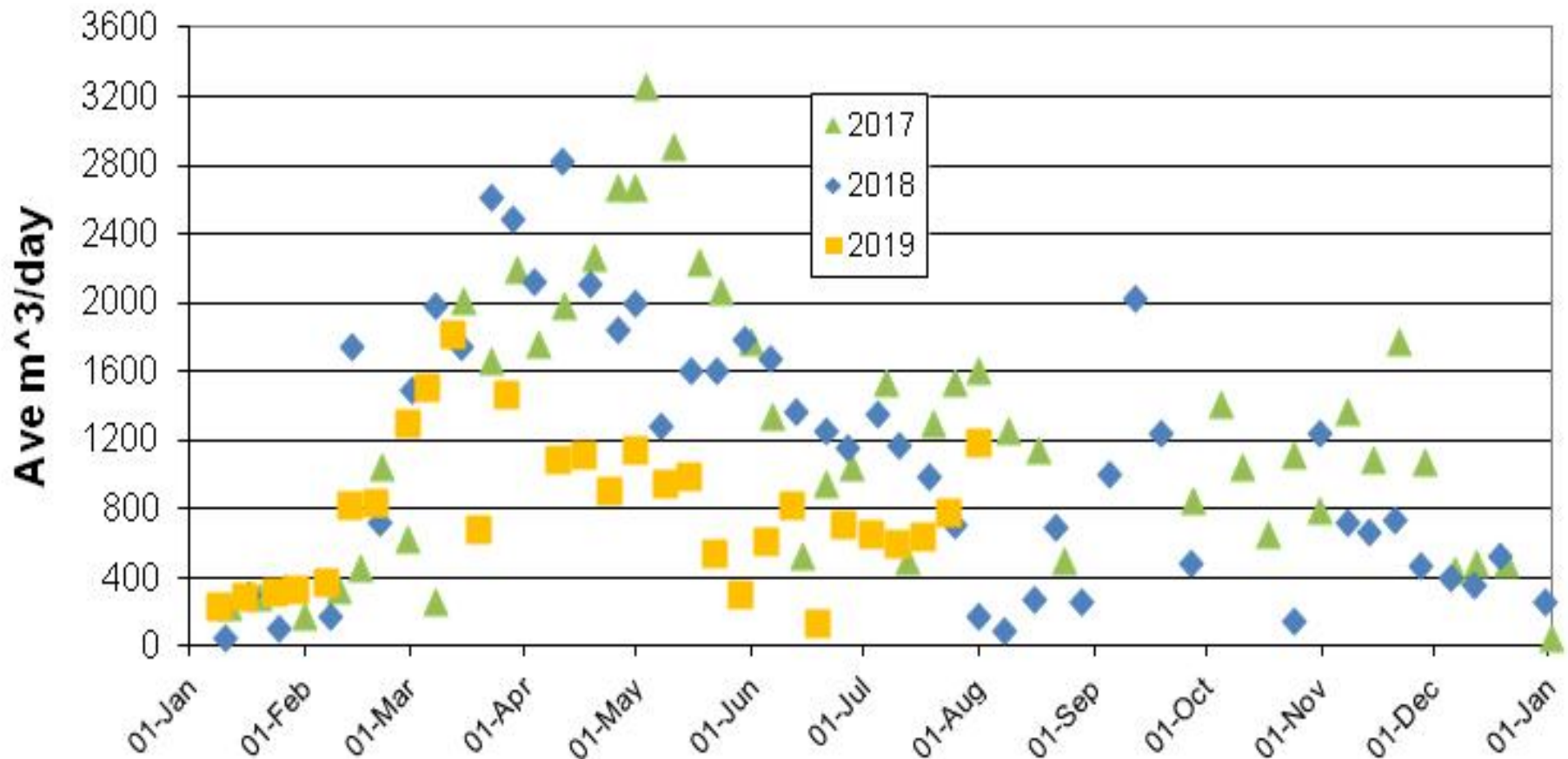
# CAL Biogas - Then

Fig 4. CAL Biogas

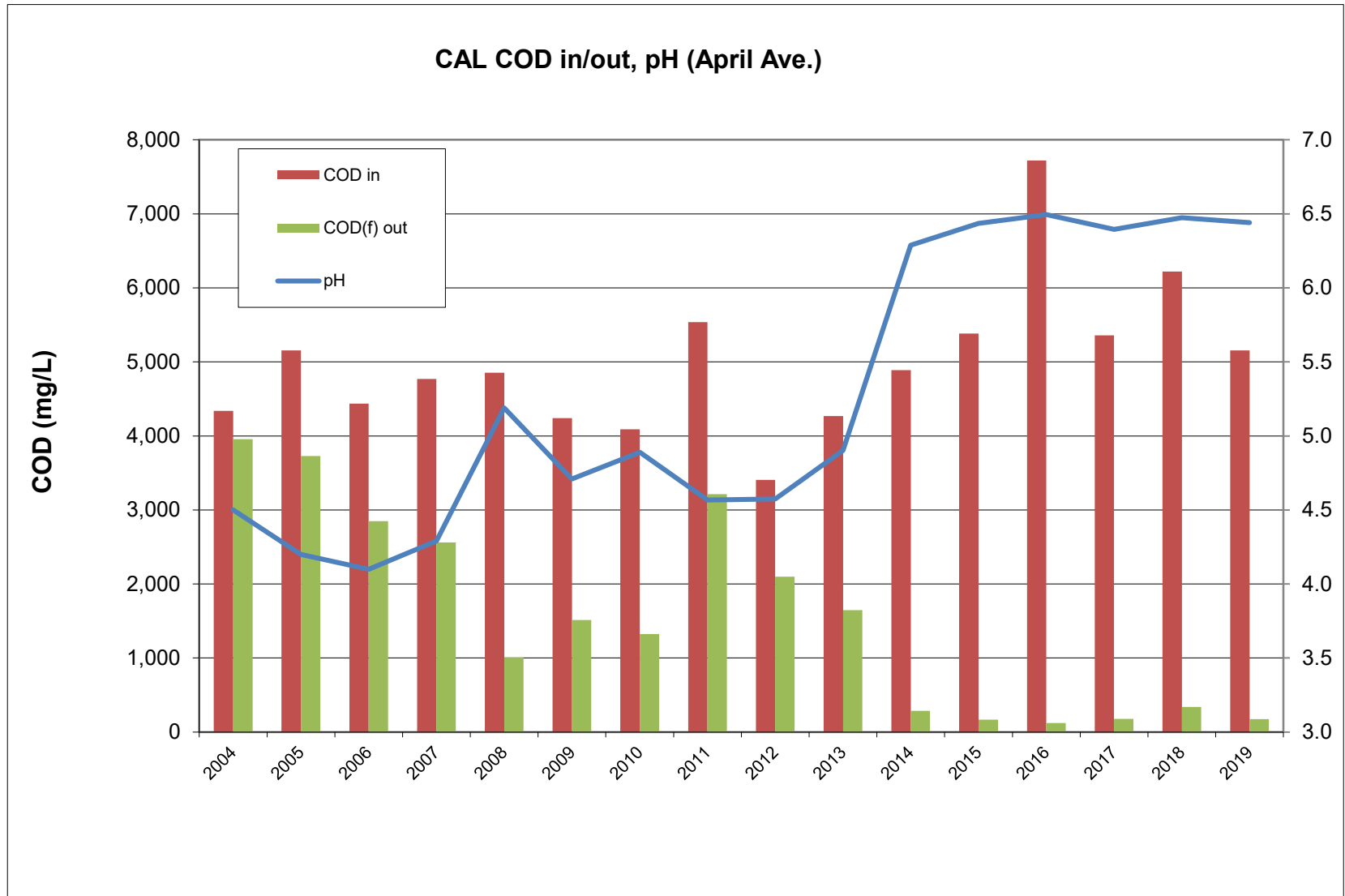


# CAL Biogas - Now

Fig 4. CAL Gas



# CAL Over 15 Years



# Lessons 1

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- Recycling Water Is A Journey
- Management Commitment – Initial & Continuing.
- Design
  - Treatment capacity,
  - Water balance,
  - Winter storage.
- Process evaluation and continuous improvement
- Good operators are Gold

# Lessons 2

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- Reuse of Winery Wastewater

- Reduces water taken from Murray Darling.
- In winery:
  - Eliminate & Reduce waste
  - Minimise salt emitted (cleaners, Lees)
  - Harvest stormwater

- Anaerobic Treatment Of Winery Wastewater

- Can use microbiology (not chemicals) to correct pH.
- Need to protect the CAL – Surge & Bypass.
- Maintaining a healthy sludge layer is essential.

# Thanks

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NPEC Board      Greg Pearce Tony Robinson at TWE  
Rob Pelton, Nigel Logos & Lin Lin Low at Tarac

JJC Operations Mike Carson  
Darren Dugmore  
Michael Raven  
Julie Constable

WEA for providing this opportunity

And you.

More Information

Chat during “Networking & Stress Relief”

&

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