Xm Services Ltd

Industrial Wastewater Treatment

Roddy MacDonald

Environmental Services Manager

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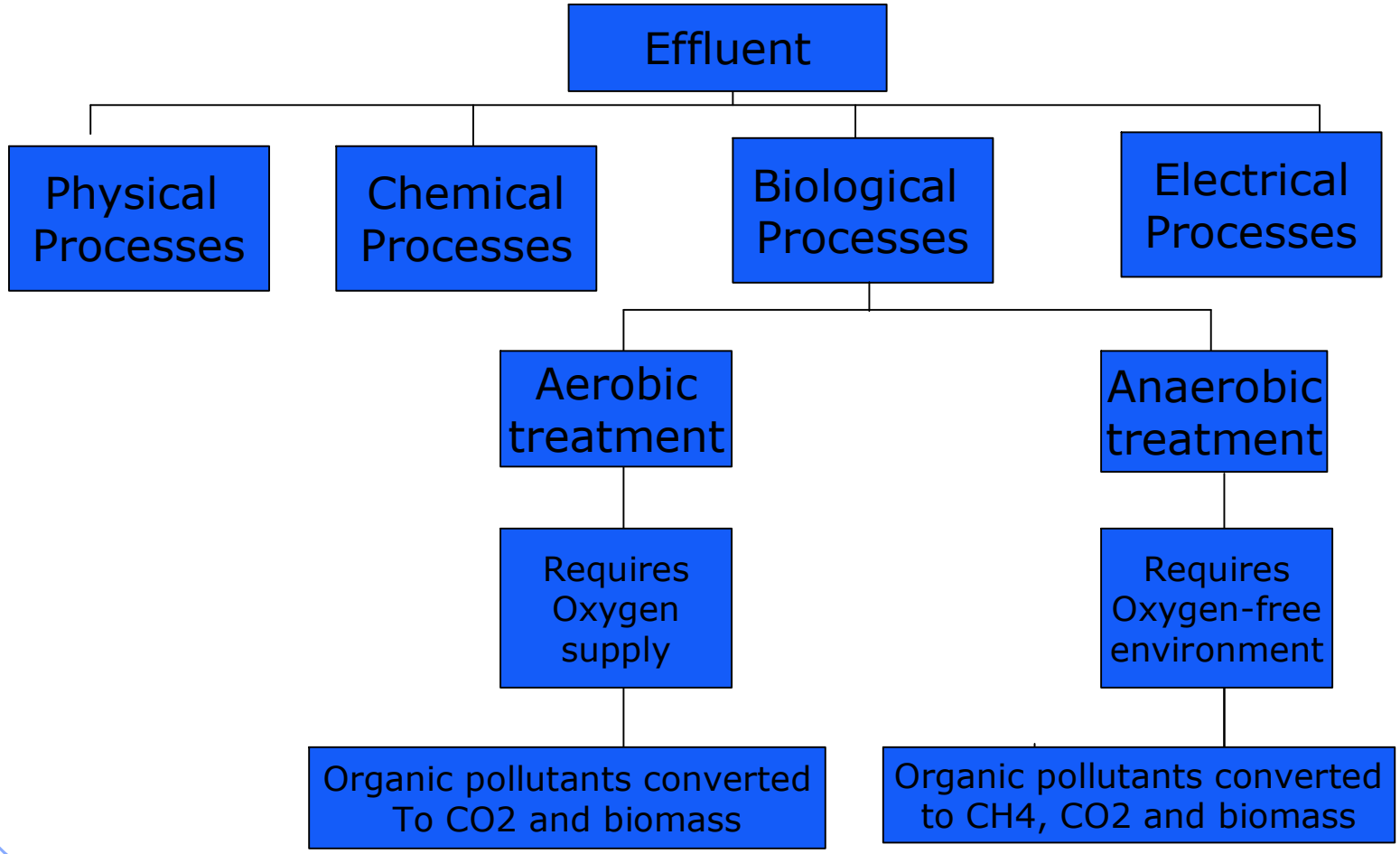
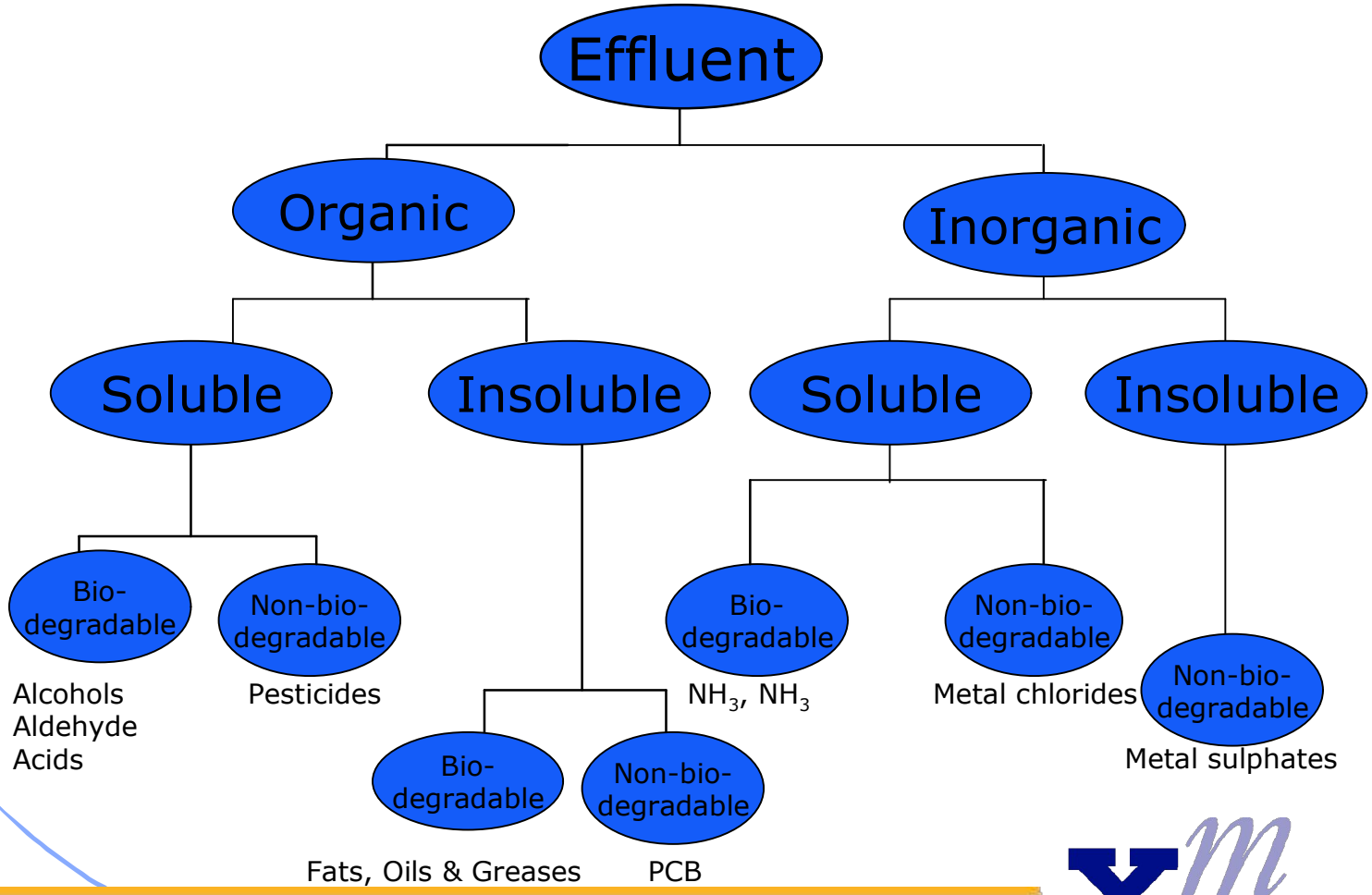
Why treat wastewater?

- To meet regulatory requirements
- To reduce wastewater disposal costs.
- To reduce water purchase costs
- To recover energy
- Stakeholder pressure

Routes to Effluent Treatment



When is Biological Treatment Appropriate?



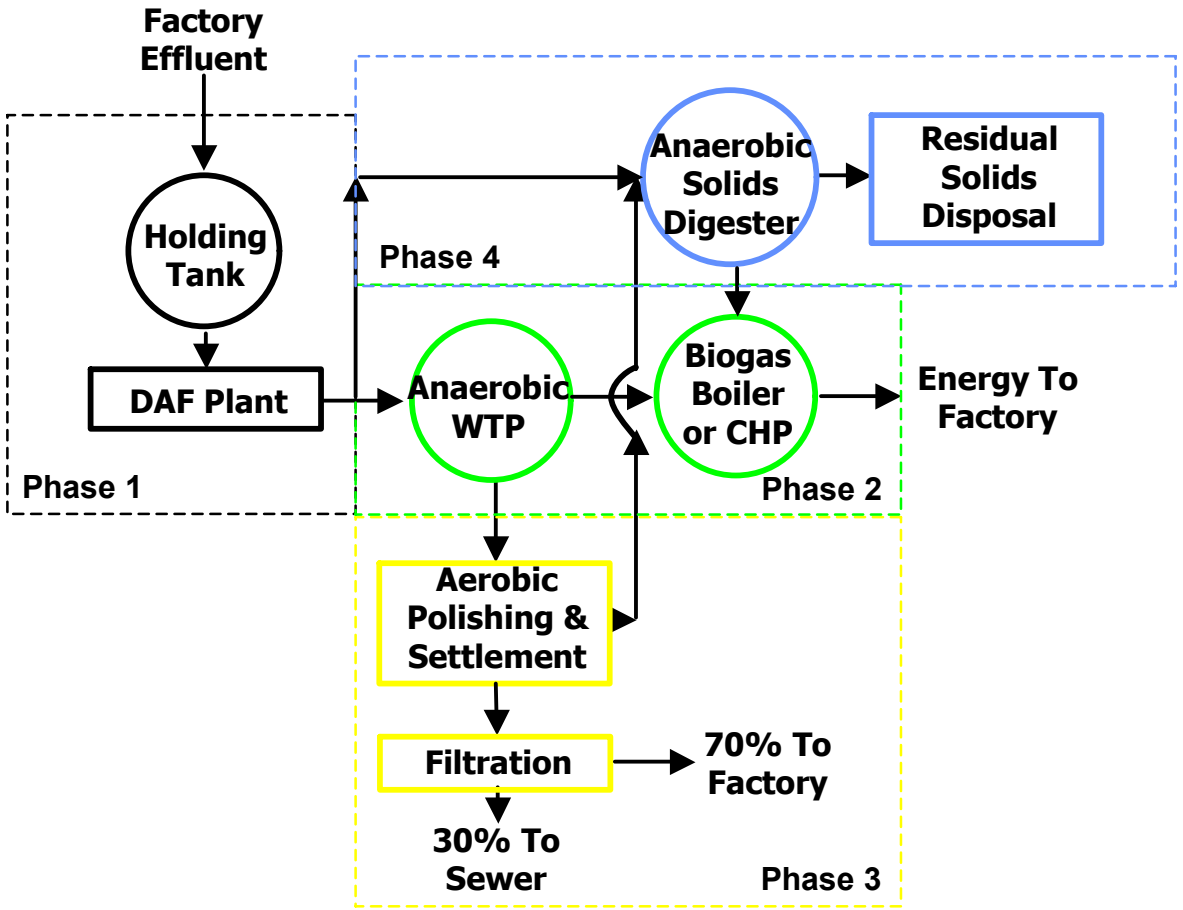
Case Study 'Potato Processor'

- Objectives
- Process Road Map
- Process Options
- Total Annual Benefits
- Summary

Objectives

- Comply with discharge consents
- Reduce effluent discharge costs
- Reduce energy costs
- Reduce water purchase costs
- Reduce environmental impact
- Improve the bottom line

Process Road Map



Process Options – Phase 2

Aerobic Treatment:

Energy Requirement = 120kW

Sludge Volumes = 18T/day @ 4% solids

Nutrient Requirement = £18,500/yr

Energy Gain = Nil

COD Removal = 95%

Process Options – Phase 2

Anaerobic Treatment:

Energy Requirement = 6kW

Sludge Volumes = 5T/day @ 4% solids (nil for up to 3 years)

Nutrient Requirement = £5,500/yr

Energy Gain = up to 150kW

COD Removal = 75 – 80%

Annual Benefits - Phase 2

Compliance with discharge consents	
Mogden savings:	£195k
CHP energy savings:	£50k
Renewable Obligation Certificates:	£37k
Climate Change Levy:	£5k
Operating costs:	(£17k)
Total savings:	£270k
Total capital cost:	£577k
Internal Rate of Return:	2.1 years

Process Options – Phase 3

Phase 3 - Aerobic Polishing & Filtration:

- Recycle up to 70% (420m³/day) of the effluent back to the factory mains supply
- Heat gain through using 70% recycled water at 30°C
- The settled solids may be processed using an Anaerobic Solids Digester in phase 4

Annual Benefits - Phase 3

Mogden savings:	£120k
Water purchase savings:	£76k
Water heat energy savings:	£10k
Operating costs:	(£50k)
Total savings:	£156k
Total capital cost:	£320k
IRR:	2 years

Process Options – Phase 4

Phase 4 – Anaerobic Solids Digester:

Process the 2,280kg/day of dry organic solids from the DAF plant (phase 1), aerobic polishing processes (phase 3) and solid potato waste to provide an additional 1,140m³/day of biogas for the CHP and organic solid waste disposal savings.

Annual Benefits - Phase 4

CHP energy savings:	£36k
ROC savings:	£22k
Climate Change Levy:	£3k
Solid waste disposal savings:	£15k
Operating costs:	(£17k)
Total savings:	£59k
Total capital cost:	£300k
IRR:	5.1 years

Total Annual Benefits

Mogden savings:	£315k
CHP Energy savings:	£86k
ROC Savings:	£59k
Climate Change Levy Savings:	£8k
Water purchase savings:	£76k
Water heat energy savings:	£10k
Organic solids disposal savings:	£15k

Total Annual Benefits

Operating costs:	(£83k)
Total savings:	**£486k**
Total capital cost:	£1197k
IRR:	**2.5 years**

Summary

Compliance with discharge consents

Reduced effluent discharge costs:	£315k
Reduced energy costs:	£163k
Reduced water purchase costs:	£76k
Reduced environmental impact:	£15k
Improved bottom line:	**£486k**

Paper Mill

- Treat effluent on site biologically
- Discharge to river
- Energy value of effluent discharged in excess of £500,000
- Water Recycle Process being discussed giving attractive pay back based solely on energy savings

Chicken Processor

- Abstract groundwater
- Unable to extract any further water so limiting site expansion
- Process water plant to recycle 40% of wastewater to clean vehicles and baskets

Conclusion

- Wastewater treatment can often yield attractive savings, if approached correctly. Not only can it give environmental gain but can also give financial and marketing gain also.