

# Landfill Gas Management Practices at Landfills – Potential for Odour



epa

Office of  
Environmental  
Enforcement

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Inspector  
Athlone, October 2009

Then.....(late 90'e early 2000's)



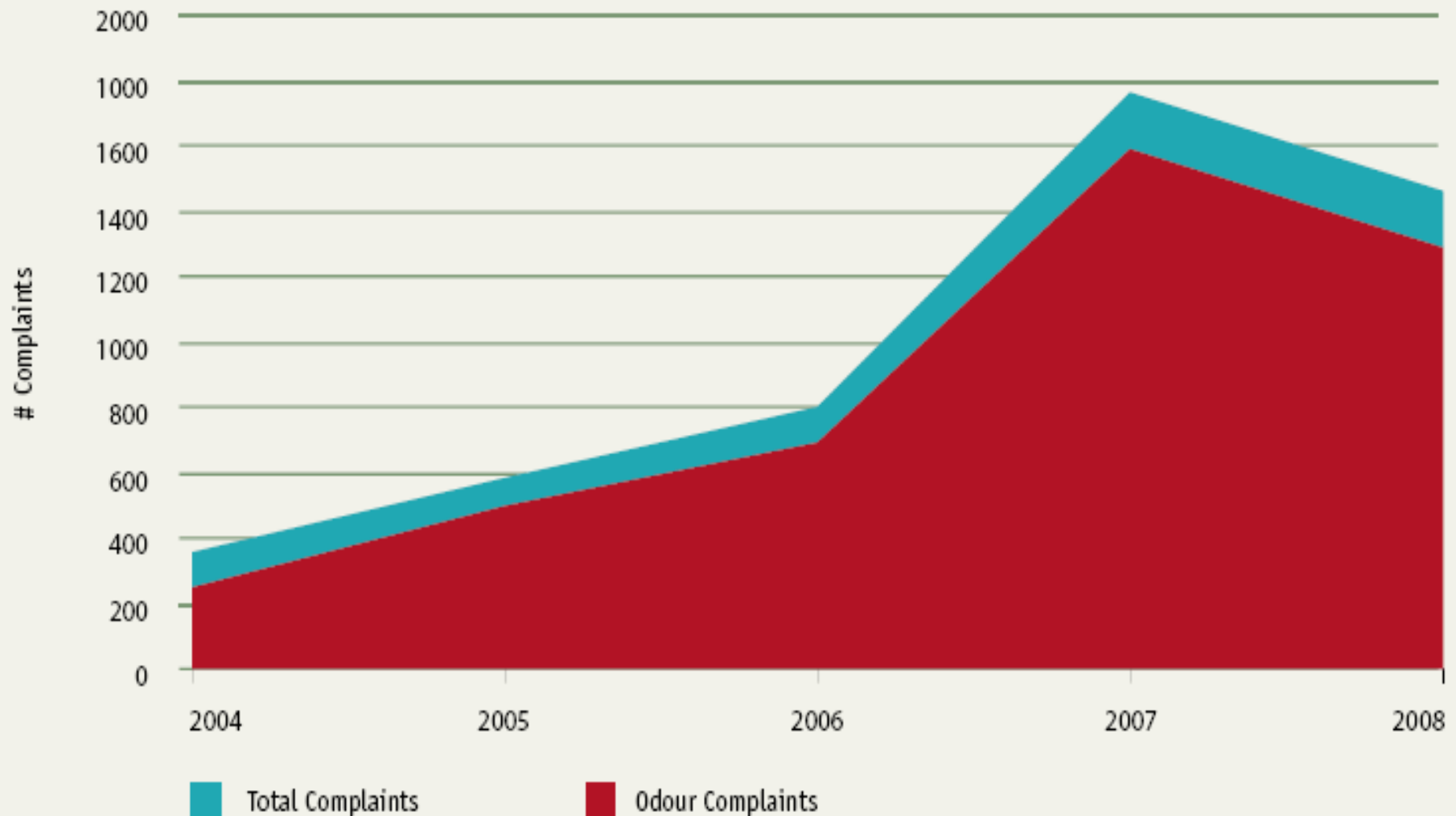
Now - 2009



Landfill operational & management practices have come a long way!



## Odour Related Complaints about EPA Licensed Landfills

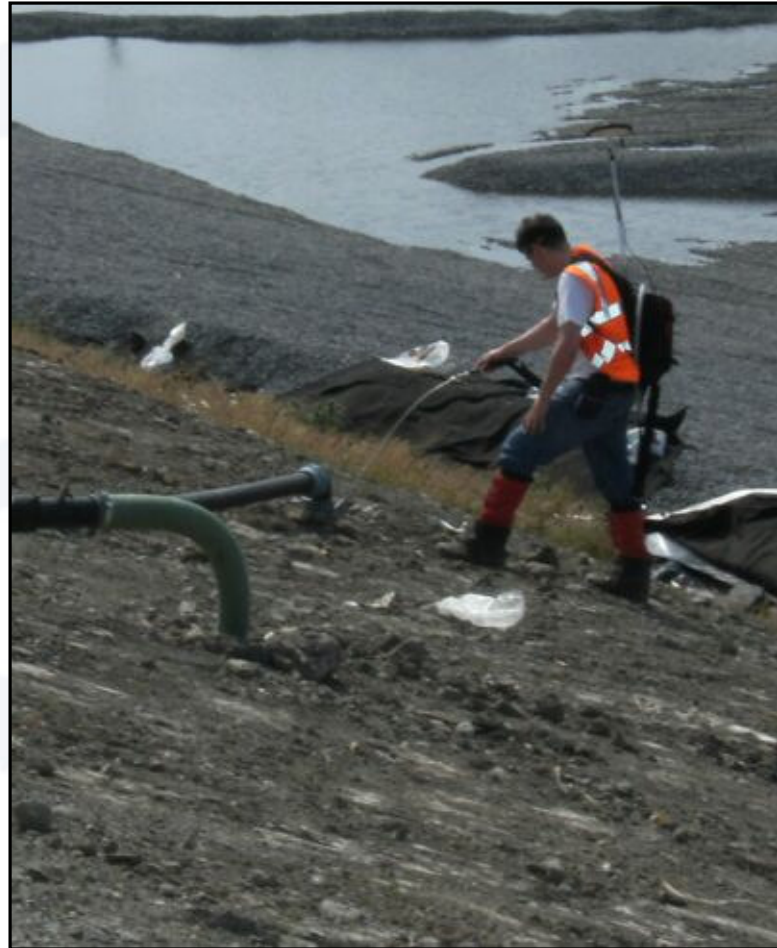




Separately, the council faces reduced income at the landfill this year after county manager Alec Fleming told councillors a major supplier of waste is now using an alternative landfill.

## OMI work on behalf of the EPA

- Surface level VOC assessment
- Overall view of standards across the country
- Comparison of surveys over time



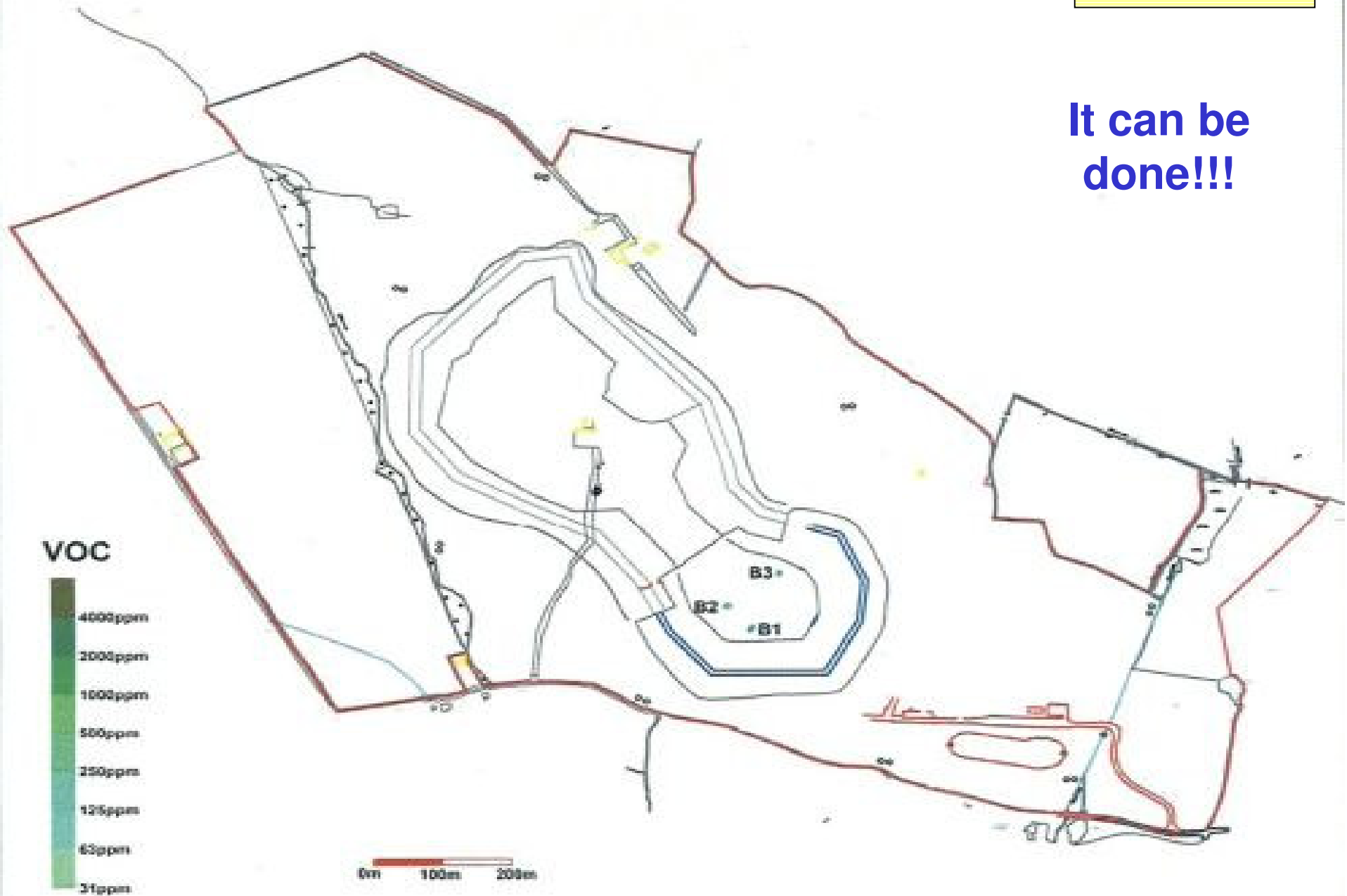
~ 90k tpa



0m 50m 100m

~ 100k tpa

**It can be  
done!!!**





## Basic Principals – Not as easy to implement

- Apply –ve pressure to waste body
  - Number & location of wells
  - Balancing available vacuum pressure
  - Oxygen ingress
- Extract gas via network of valves and pipes
- Flare gas at flare unit

**Not easy to implement!!!!**

## Landfill Gas Management – Potential odours

- Landfill Gas being generated after < 6 months
- There can be a very quick effect and off-site impact if extraction system is not adequately maintained
- Detailed knowledge of all aspects of the system is required (people “on the ground” need to know)
- Full time position at a facility for management and adjustment of landfill gas management system



# Successful landfill gas management

- Investment, design and installation does not guarantee effective system!!!
- Management of gas extraction system
  - It's a dynamic and variable system
  - Continuous management required
  - Requires significant “hands-on” resources
- Reaction to issues as they arise – compliant sites will react quickly and effectively
  - e.g. drop in  $-ve$  pressure at well head, oxygen ingress, condensate control.

# Sucessful landfill gas management system – whats required?

- Horizontal and vertical well installation within active areas
- Use of pin wells or shallow auger wells
  - Will require installation of final permanent system at later date
- Planning for waste filling & cessation of waste filling
- Management of the system
  - Odour management plan
  - Condensate management plan
  - Daily inspections and adjustments
  - Records of system monitoring
  - On-site knowledge



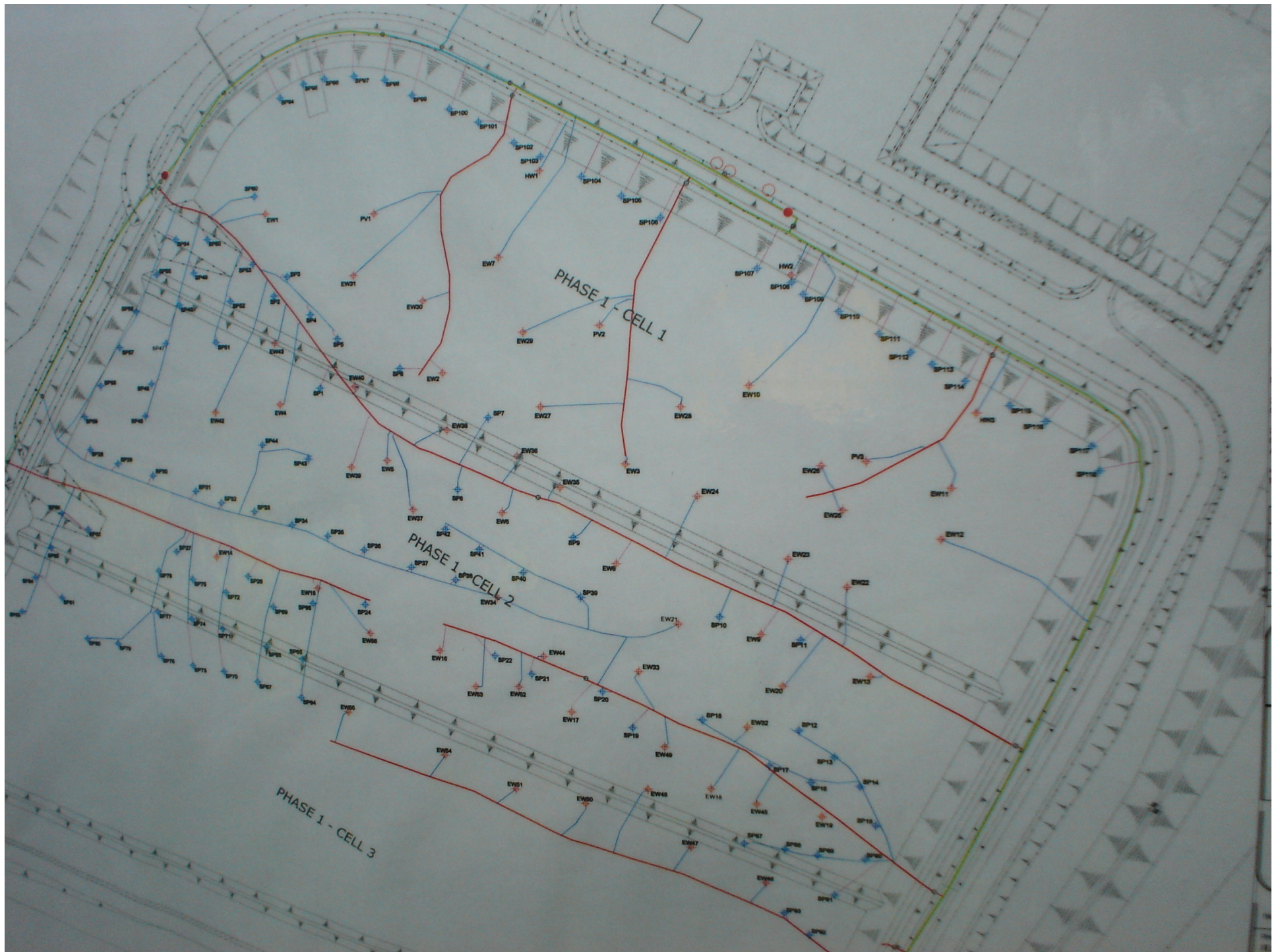
## Trench for horizontal well



## Pipework for horizontal well









## Pin Well installation



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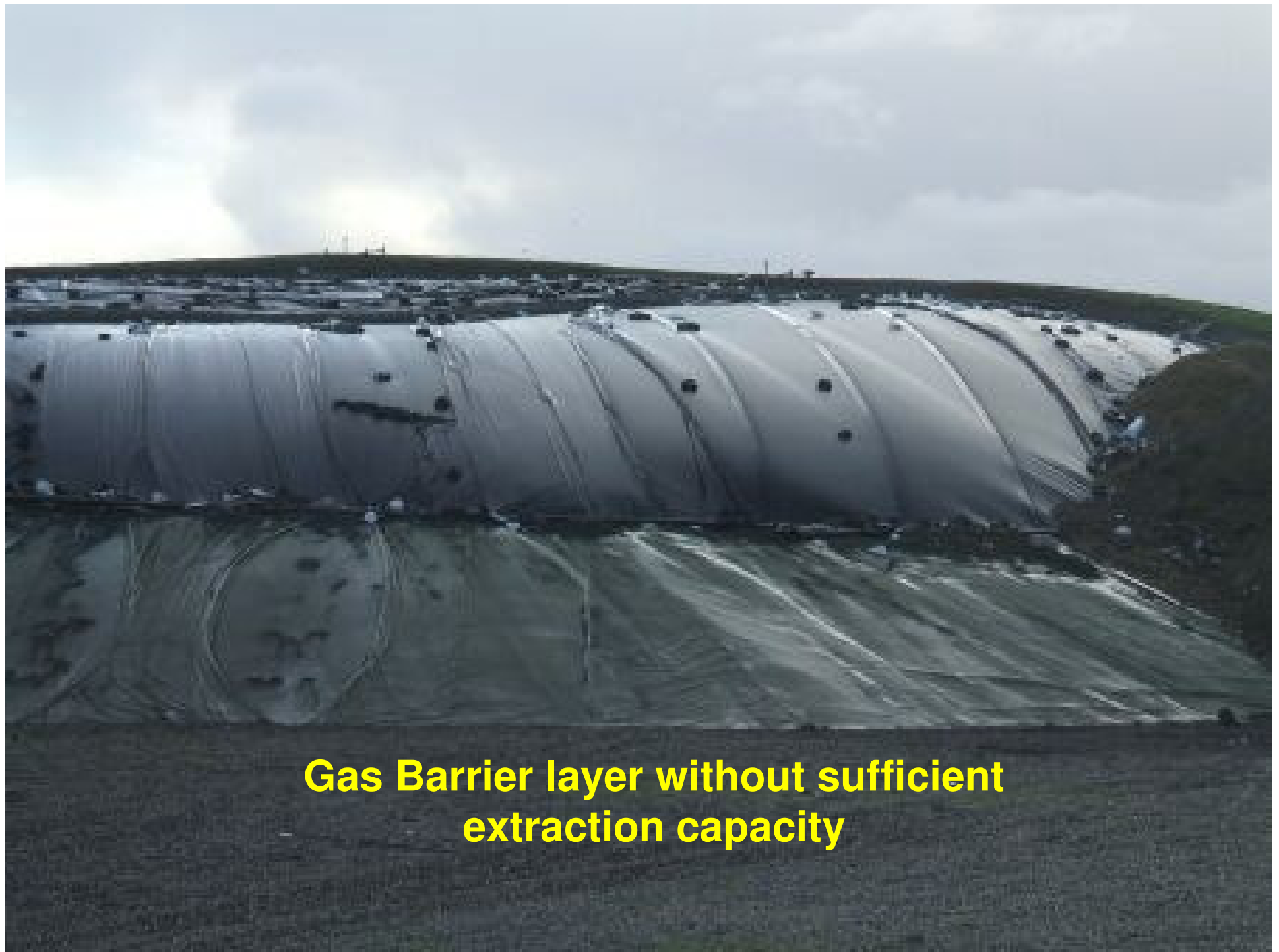
## Drilled vertical well



# Landfill gas infrastructure/management

- Provision of temporary capping systems
  - Gas Barrier Layer
  - Sealing at base and top
  - Connection with vertical wells
- Gas abstraction capacity
  - Adequate sizing of blower
  - Balancing of landfill gas field
- Integrity of extraction system
- Timing of Infrastructure!!!! – No longer a retrospective process





**Gas Barrier layer without sufficient  
extraction capacity**

# Landfil Gas – Monitoring the system

- Well head
  - Sealed cap
  - Valve control (valve type!)
  - Quality, flow & pressure monitoring points
  - Monitoring points both sides of valve
- Pipework
  - Sealed
  - Gradient
  - Condensate
- Flare
  - Combustion
  - Gas Quality



## Key Issue at Licensed Landfills

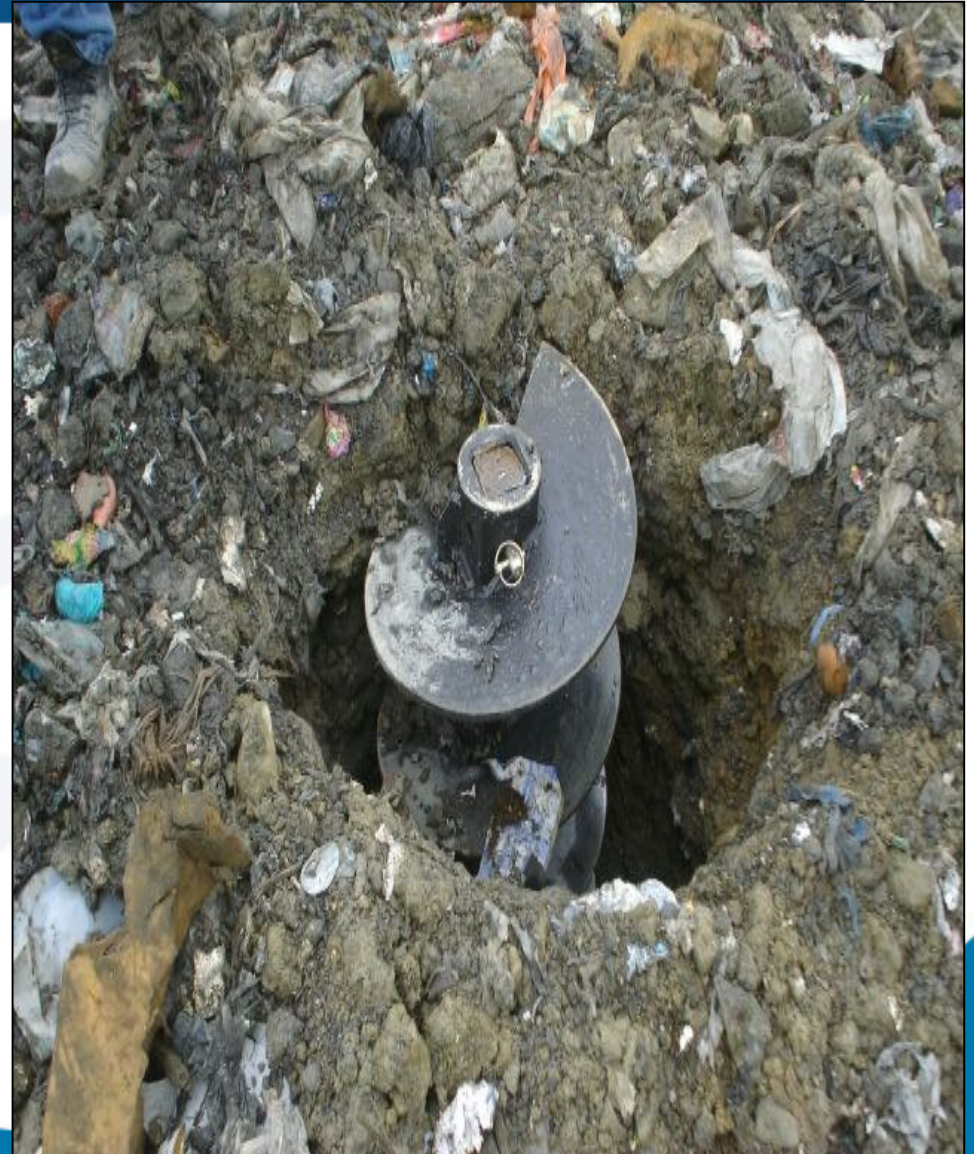
- Management of landfill gas well / pipework installation/maintenance
- Excavations in the waste body should be minimised and capped by end of the working day
  - Planning of works
  - Have required materials on-site
  - Finish well once it has been started



## Day to Day Management – Installation & operational



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# Key Issue at Licensed Landfills

- Minimise pathways for landfill gas emissions
- Routine removal of condensate
  - Maybe twice a day
- Minimise the use of narrow diameter pipework (63mm )
  - Blocks very easily
- Positioning and gradient of collection pipework
  - Reduces manual work required
  - Requires daily adjustment

## Minimise pathways for landfill gas emissions





Minimise the use of narrow diameter pipework (63mm )



# Management of Landfill Gas Systems - Condensate management



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## Situation is improving

- On-site knowledge is improving
- Use of temporary capping systems on the increase
- Pro-active approach being adopted by operators
- Use of surface level monitoring of VOC's
- Investment in “hands-on” resources as well as investment in extraction systems, flares, etc



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- Good use of tyres for well stability
- Good fall on pipework into main pipe (use of props)





**High Density of vertical wells,  
minimal use of 63mm pipework, well  
fitted barrier layer**

## Key Message - Management of the system

- Planning for development and expansion of gas management system
- Site specific design essential
- Appropriate materials
- On-site knowledge
- Routine internal assessments / auditing (VOC's, Condensate)
- Hands-on resources
- Ability to react & change / improve the system





# Thank You!

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