



An overview of SLC considerations wrt Groundwater Monitoring

SAFESPUR Groundwater Event 10th July 2013

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Introduction

- Going to cover “at high level” a number of aspects facing SLCs and the Supply Chain
- NOT going to provide answers
- NOT going to, I hope, step on the ground to be covered by others this afternoon



It is not just about Groundwater

Other parameters

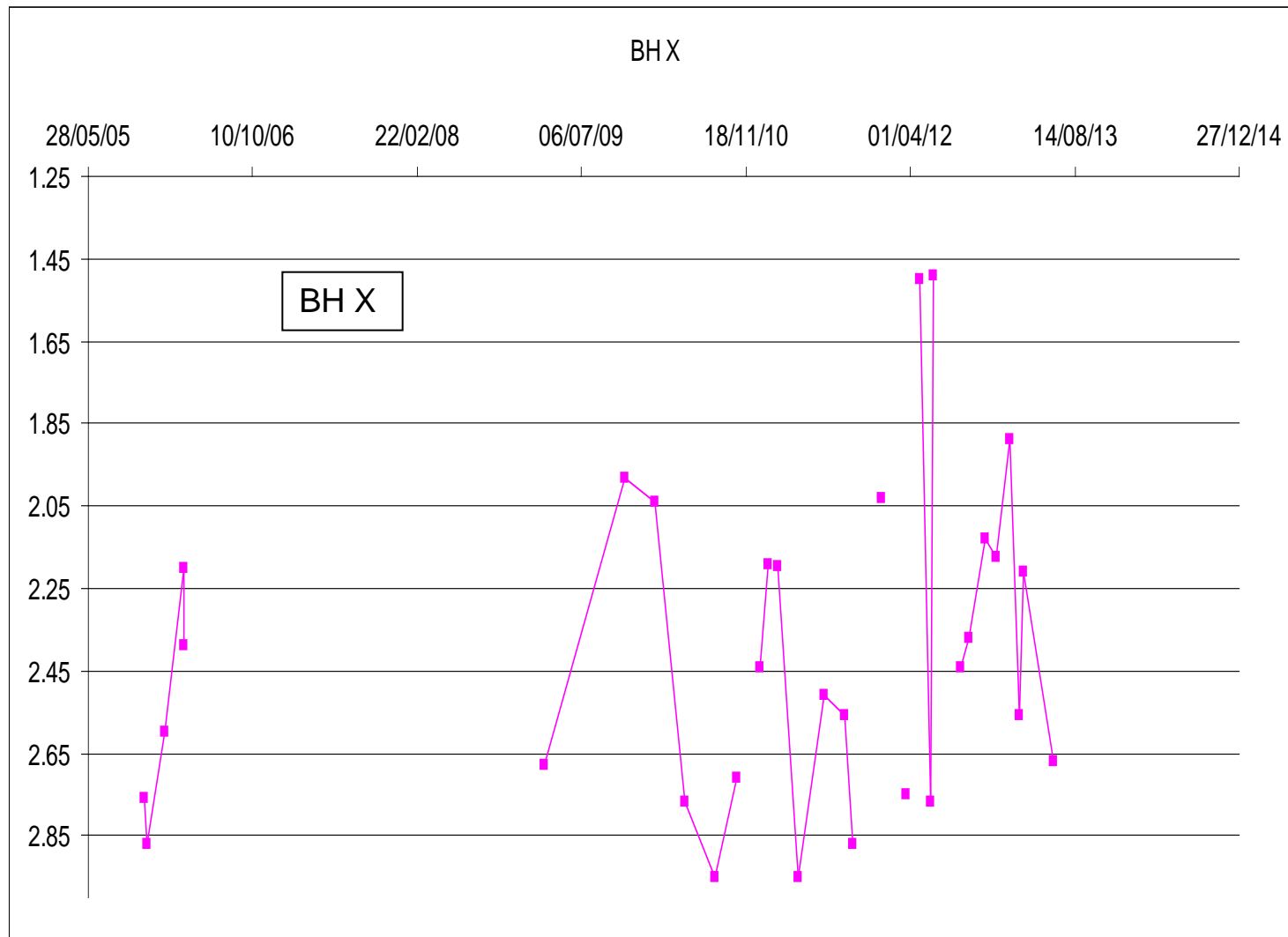
- Meteorological data
 - Rainfall
 - Temperature
 - Wind-speed/ direction
 - Barometric pressure
- Surface water / drainage flux (balance)
- Sampling Technique(s)
- Analytical Technique(s)

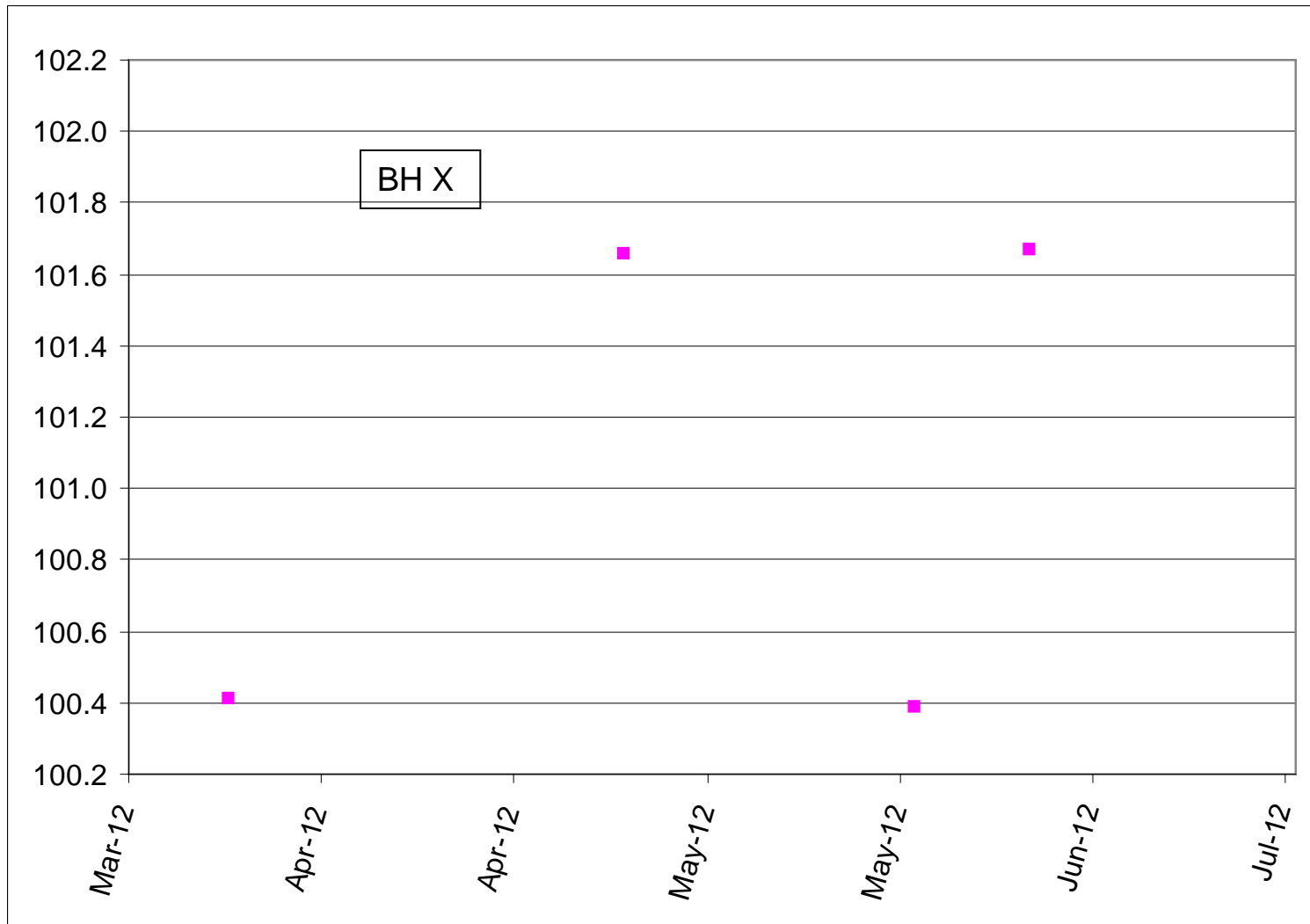
Drivers

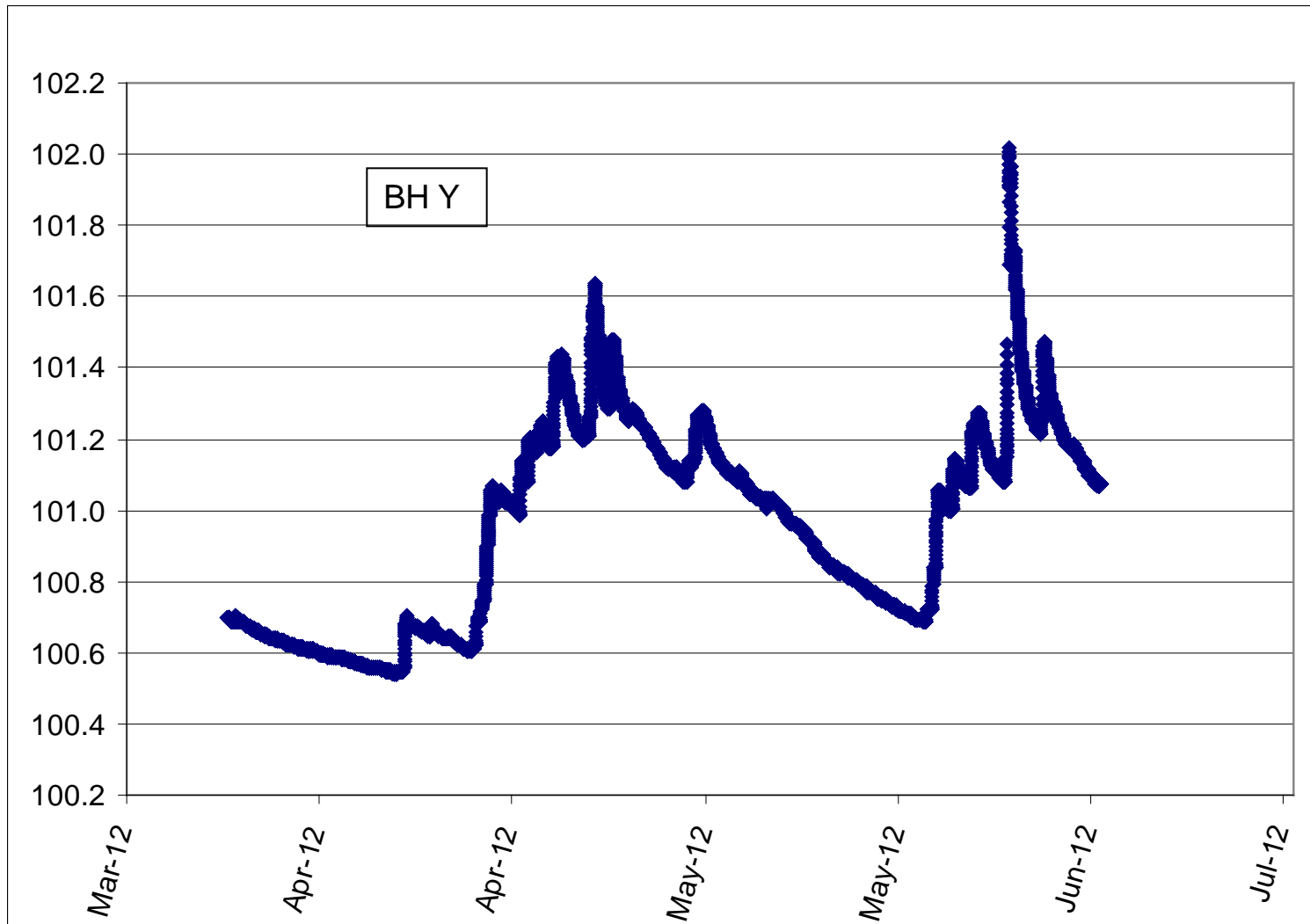
- Characterisation
 - What is the problem?
- Process Monitoring
 - Is something going wrong?
- Reassurance
 - Everything is fine
- Compliance
 - A legal or commercial requirement

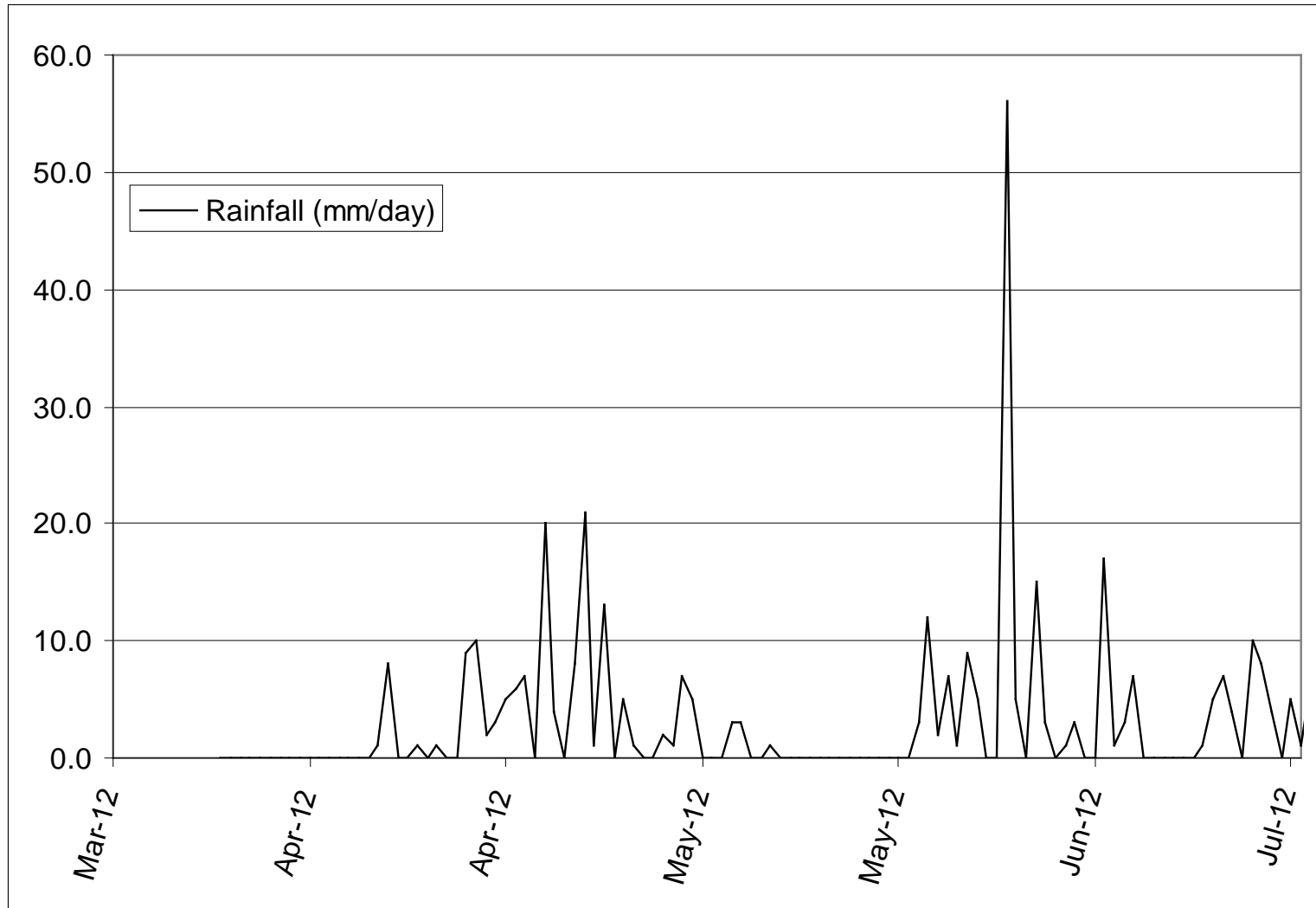
Data

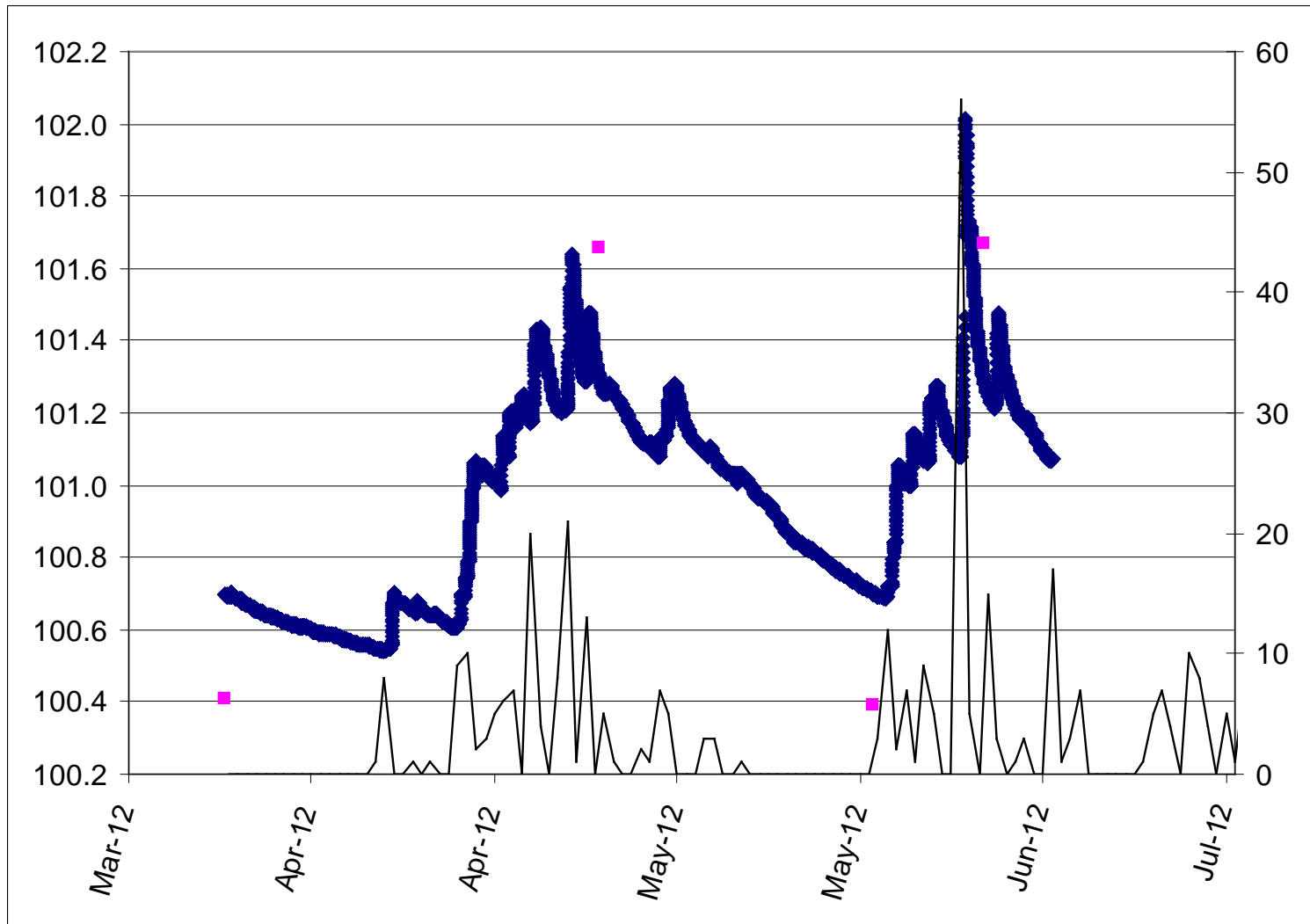
- Not all data is equal
- Follow best practice of the day – QA/QC – TRACK CHANGES
- Data may be old and not to current standard but if it was “correct” at time it was recorded it still has value
- Provides the long term view that stakeholders want to see
- If you are spending a fortune on generating the data DO NOT skimp on your IMS
- OR the resource to manage it
- Learn to trust the data











Review

- Before we can look forward we need to look back.....
- 1980's
- 1990's
- 2000's
- 2010's and now we look ahead



Progress - AWE

- Started from a position of huge uncertainty.
 - How deep?
 - What direction?
 - What velocity?
- Undertook a number of phases of ground investigation
 - 20% High density
 - 50% Medium density
 - Rest Low density
- Looking at RA and non RA issues
 - Driven by desk study
- Ramping down activities



Process - AWE

Each phase undertook:

- Desk study of what went before
- Site investigation – installation of BHs
 - Soil analysis
 - Risk assessment
- Groundwater monitoring
 - Water analysis
 - Risk assessment
 - Recommendations for next phase

We did not always agree with our contractors



Outcome(s) - AWE

- Reduced uncertainties on a phase by phase basis.
- Much happier Regulators
- Much happier Customer
- Much happier Site Management
- Defence of the programme was an on-going challenge.....
 - Not considered “core business”
 - Considered ill-planned even though each phase was fully justified
 - “why are you not finished yet?”
 - “How much !?”



Outcome(s) - AWE

- Incorporated land quality requirements into new build characterisation studies
 - Supported Site CSM
 - Supported adjacent facility CSM
 - Supported planning applications

- Challenged some project requirements
- Challenged supply chain into economies of scale
- Challenged historic perception of sites
- Challenged some regulatory expectations

Improvements

- Improved industry/ regulatory experience has resulted in evolution of BH design
- Started as long screened BH that provided little depth differentiation
- Now BHs are appropriately screened and where multilevel installations are emplaced that appropriate packering is installed to prevent cross contamination.

Improvements

- Sampling has evolved in support of improved analytical techniques
- L v sub 1L
- Low flow systems investigated
- Analytical techniques improving:
 - Throughput
 - LoD
 - Precision
- More screening techniques being investigated
- Application of statistics to large datasets
 - Background
 - Natural variations at local levels



Benefits - AWE

- Developed a major groundwater monitoring network.
- Phased out BHs as justified by risk assessment
- Retained core groundwater monitoring to provide assurance to stakeholders



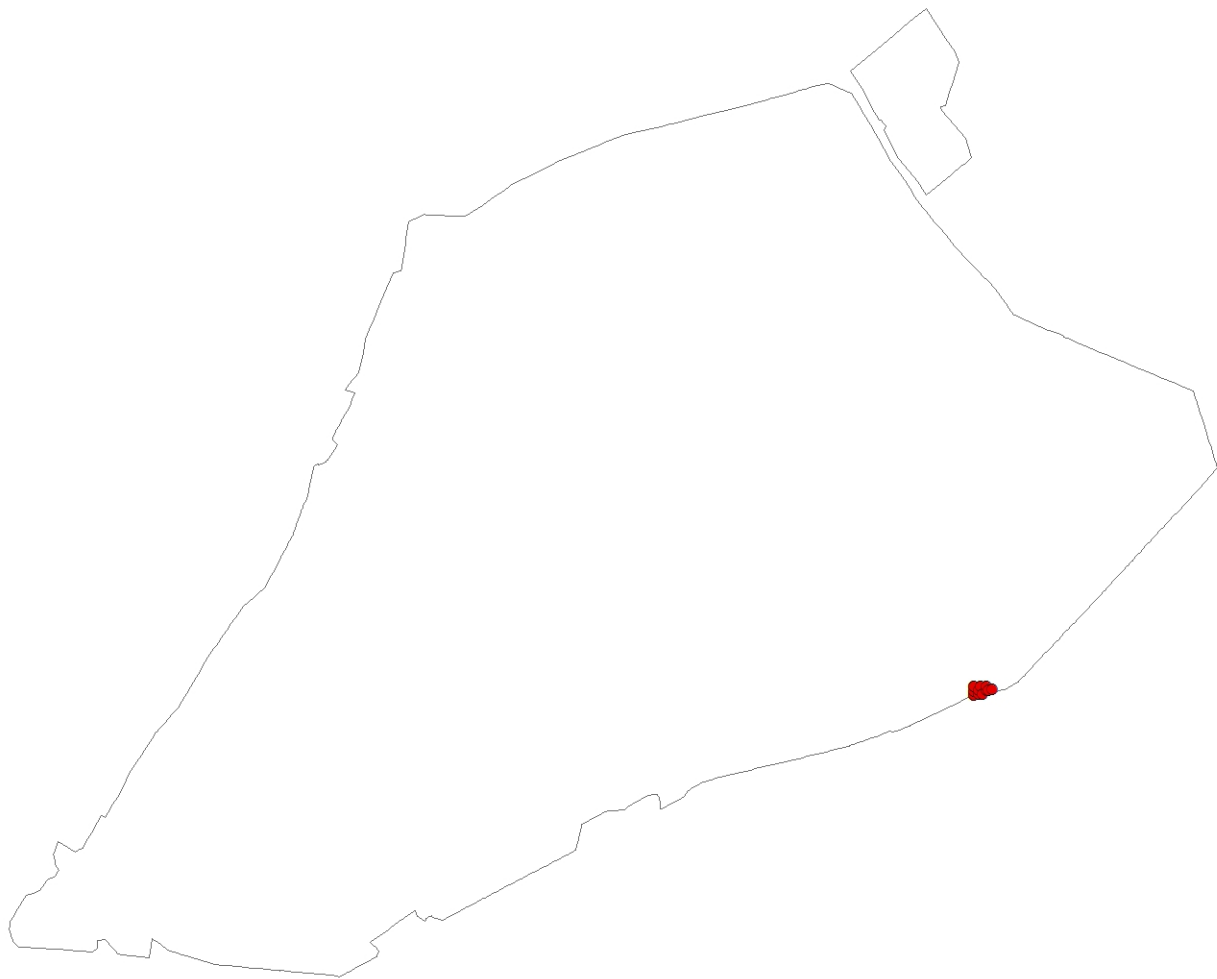
Past, Present and Future

- Site End State – a reason to optimise sampling
- Appropriate for Stakeholder assurance
 - ONR/ EA/ Local Authority/ Local Population
- Period of monitoring
- Started [1980s]
- Present
- Future – de-licensing ?????
 - “Period of responsibility” “verification”

AWE v SRS v DSRL v

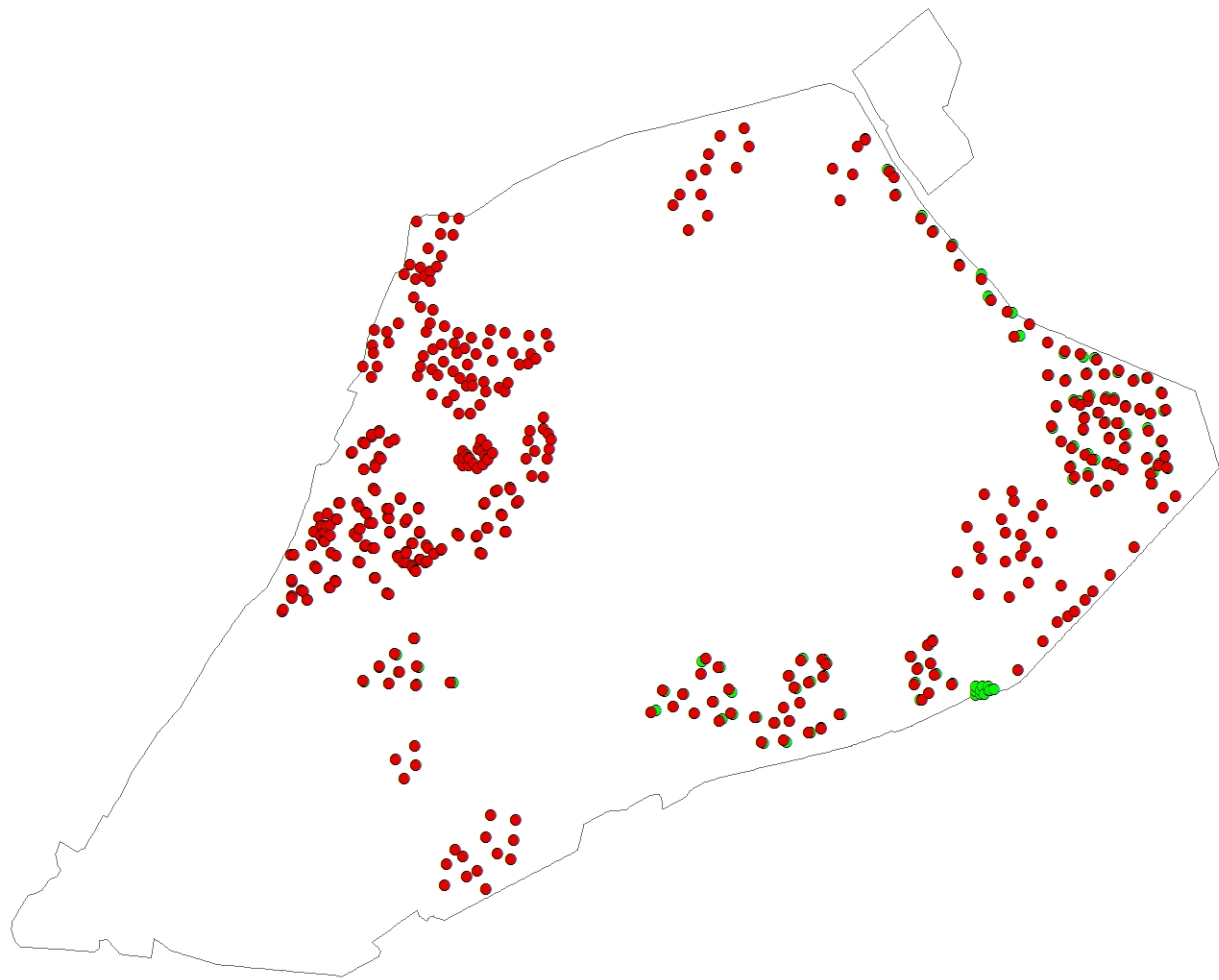
My wish list

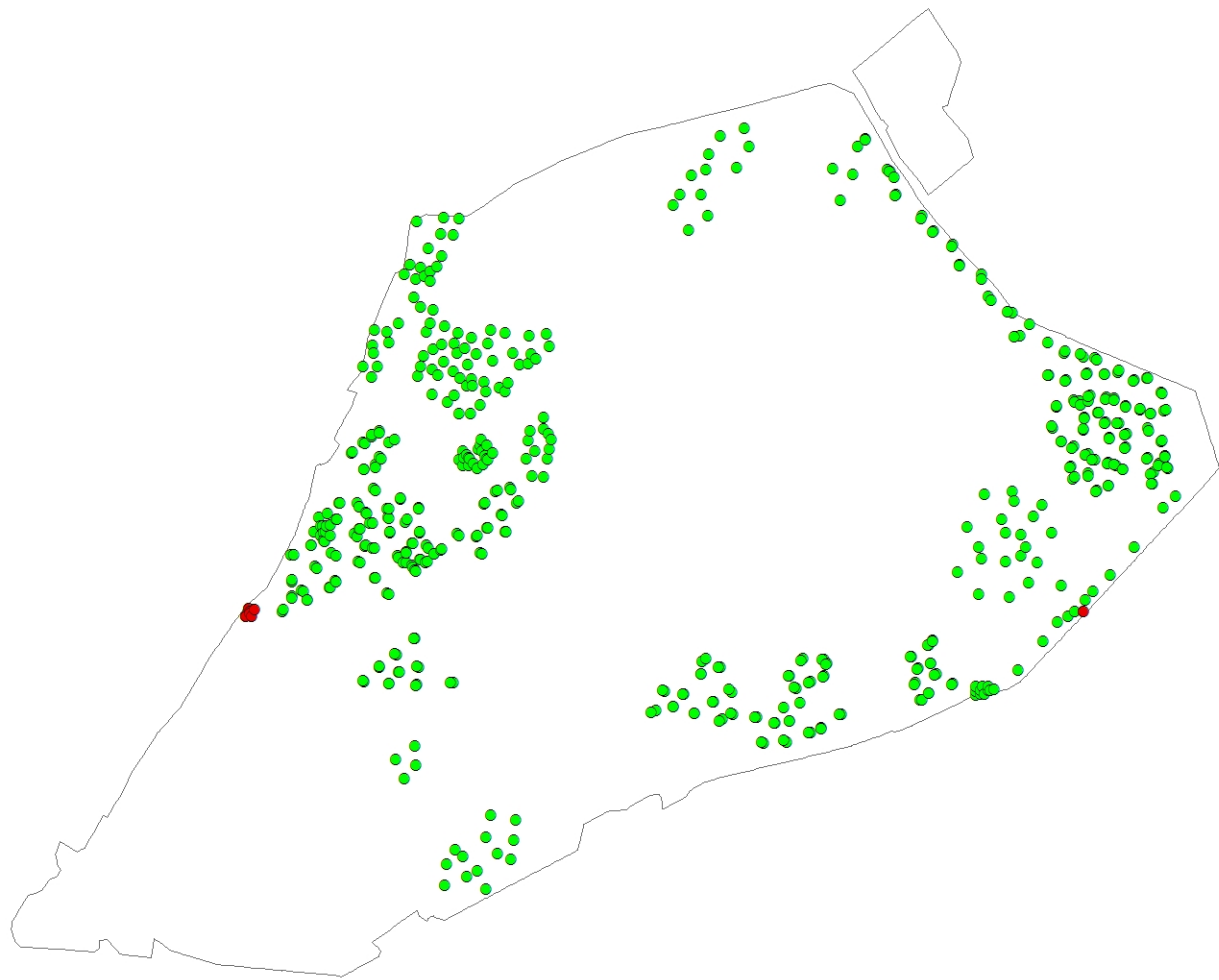
- Field screening that can be MCERT accredited
- Down hole sensors that alert me when parameters are breached
- Tuneable spectrum bio-sensors that can be deployed as per expected conditions



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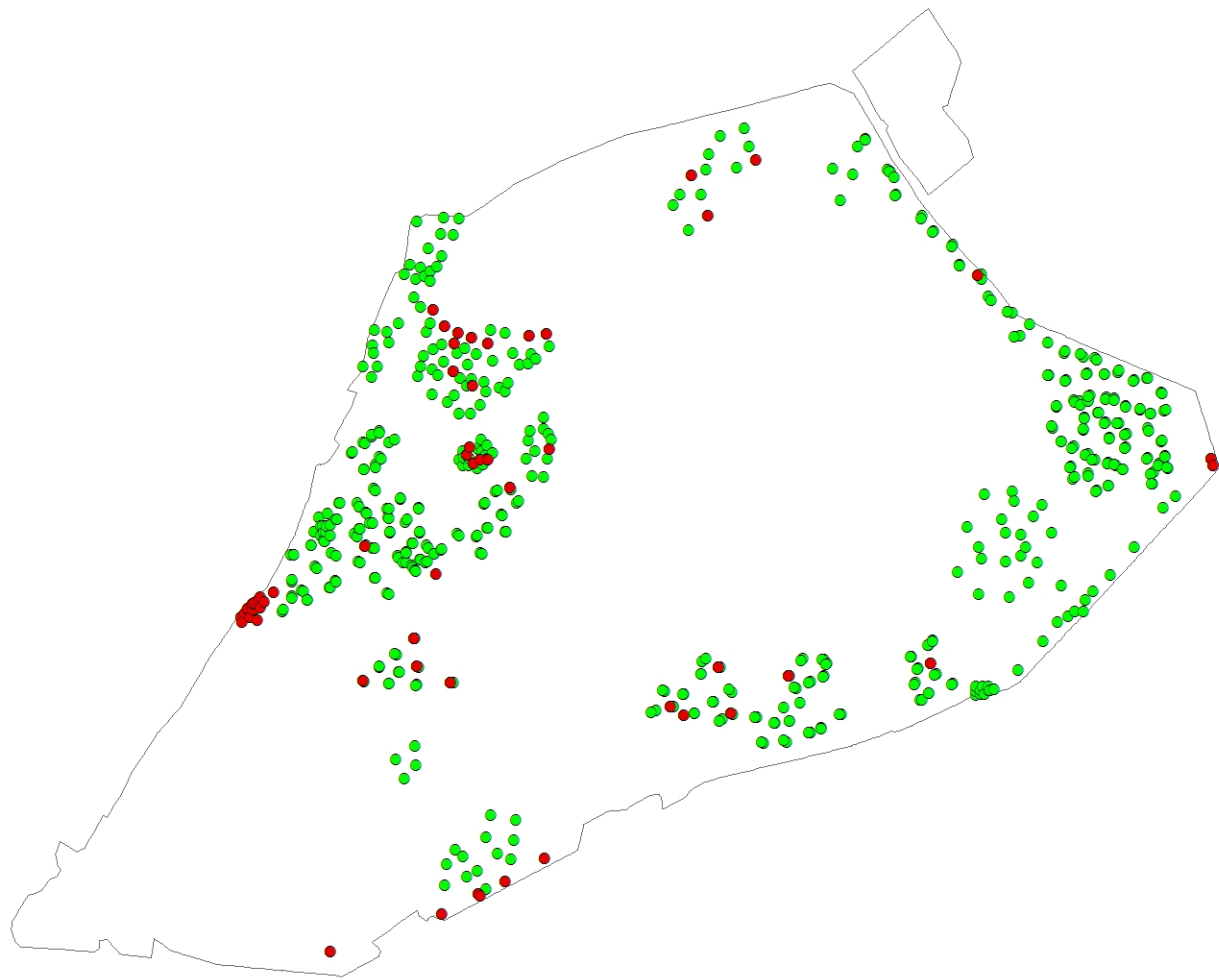






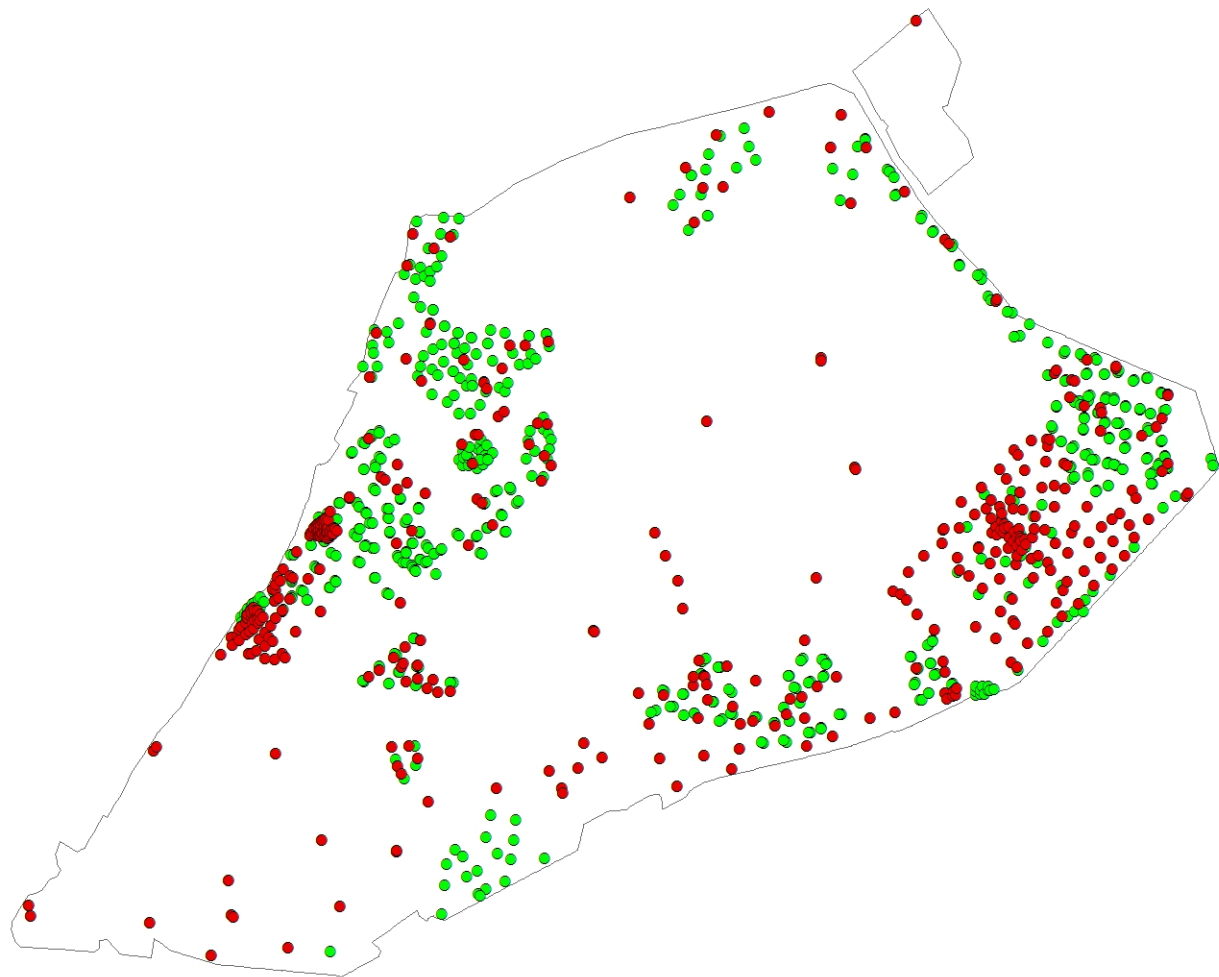
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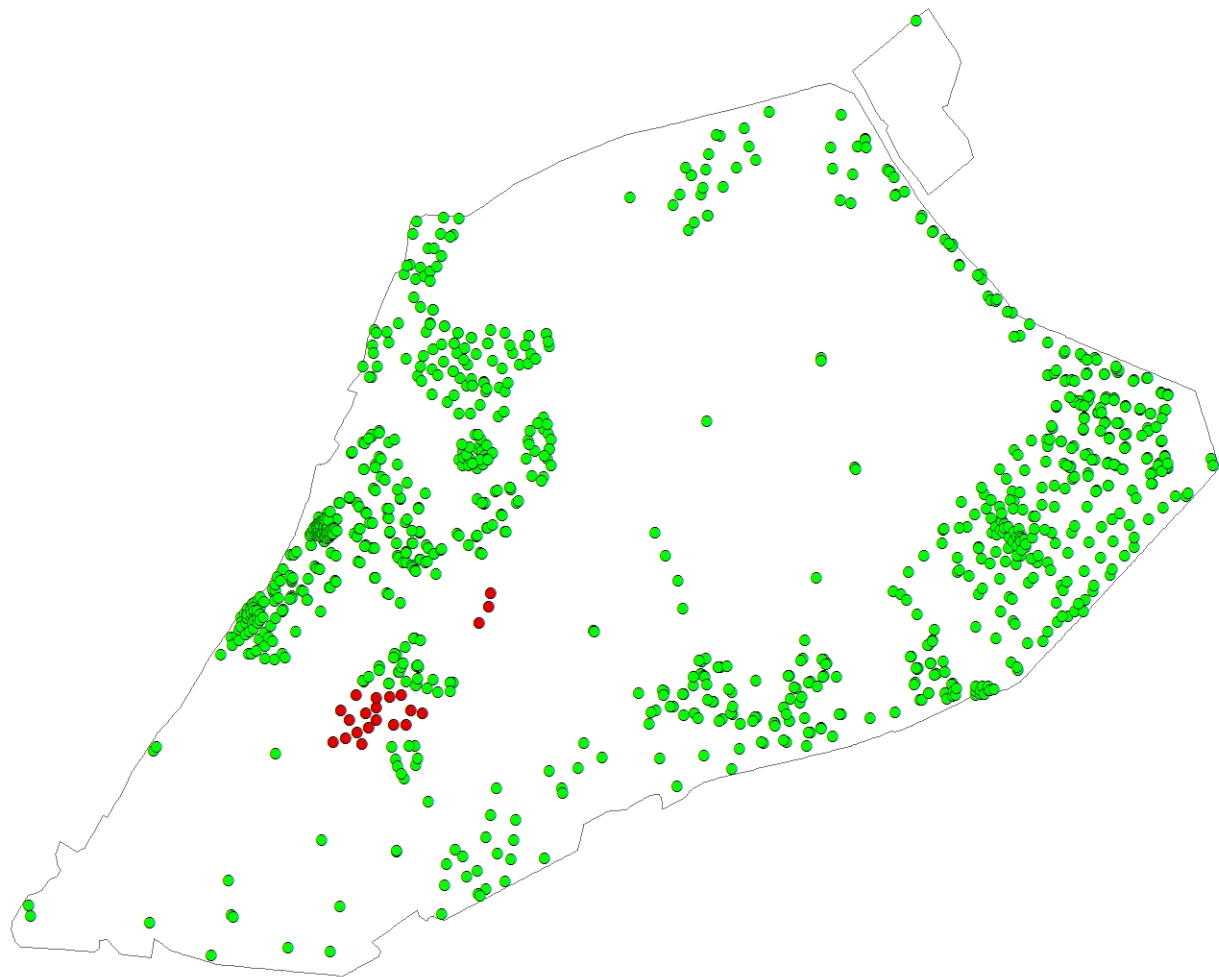




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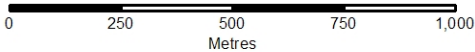
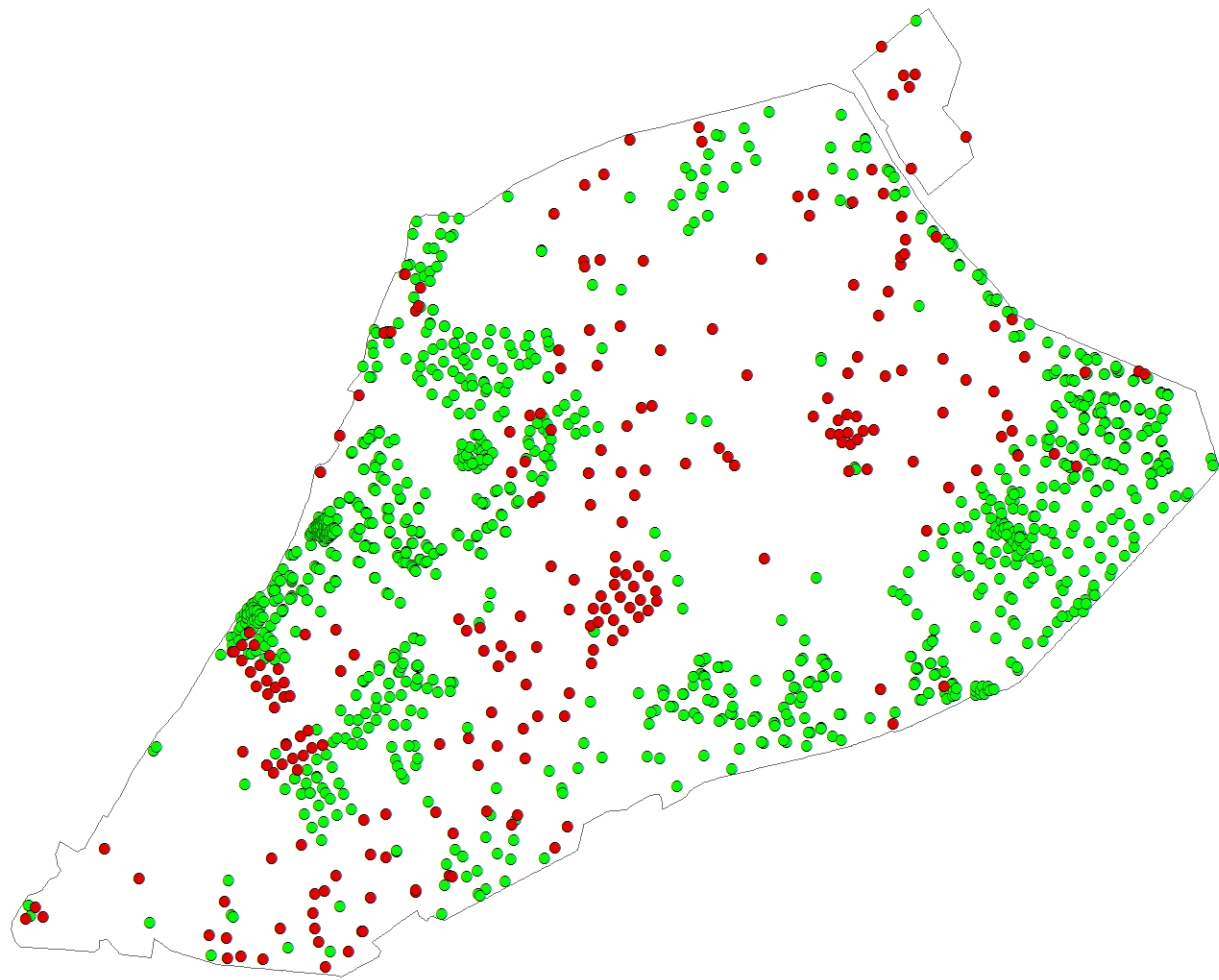




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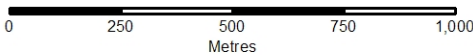
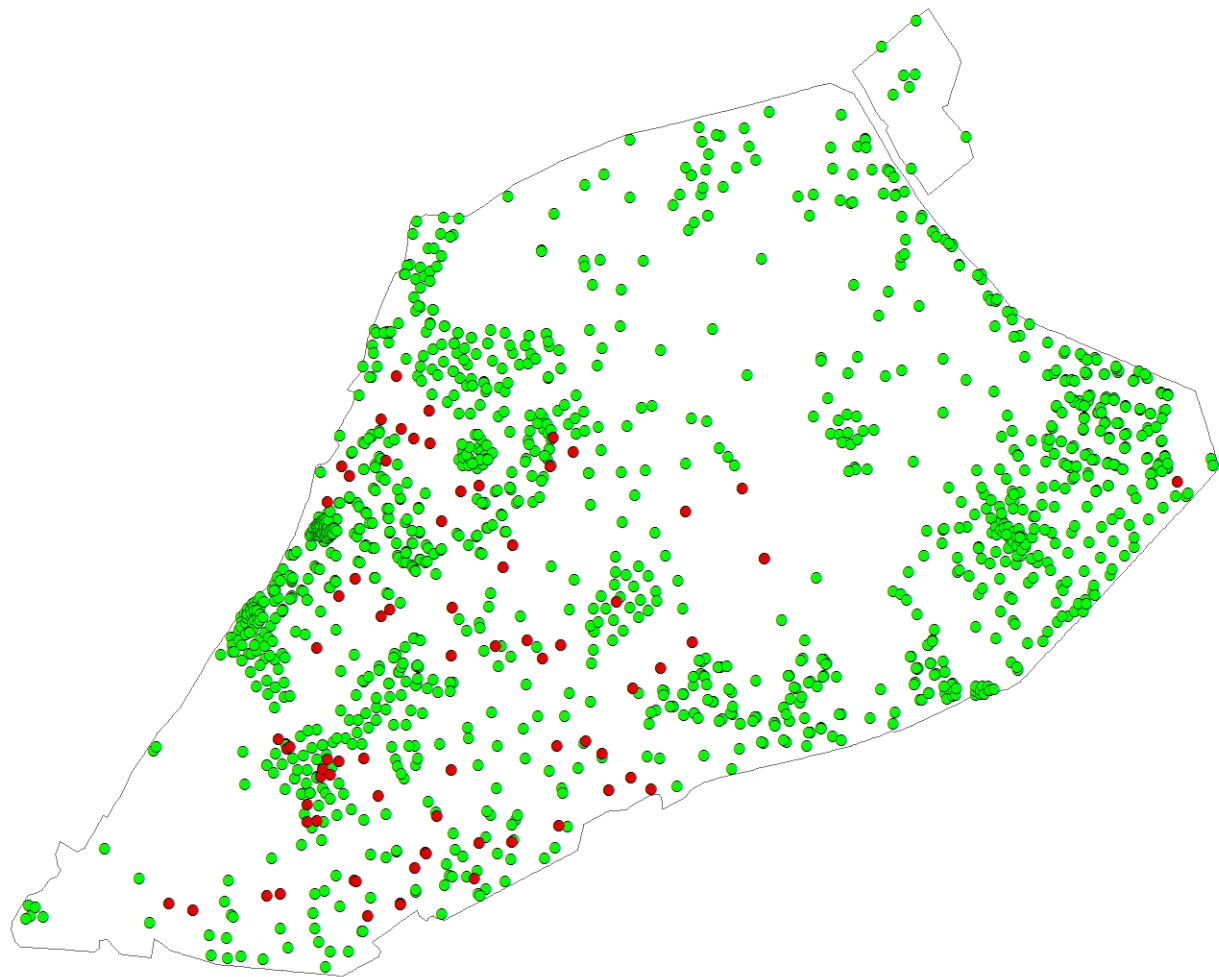




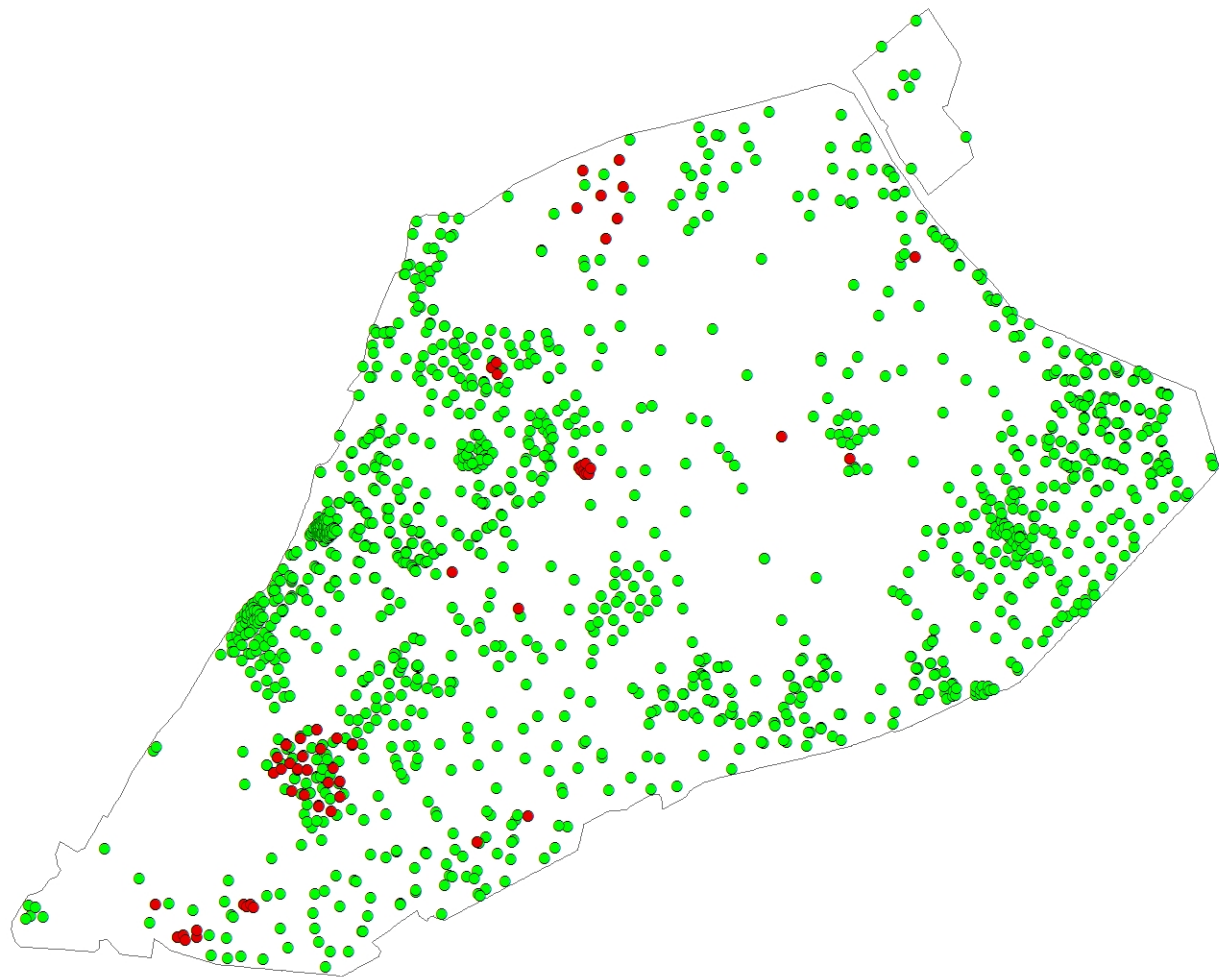


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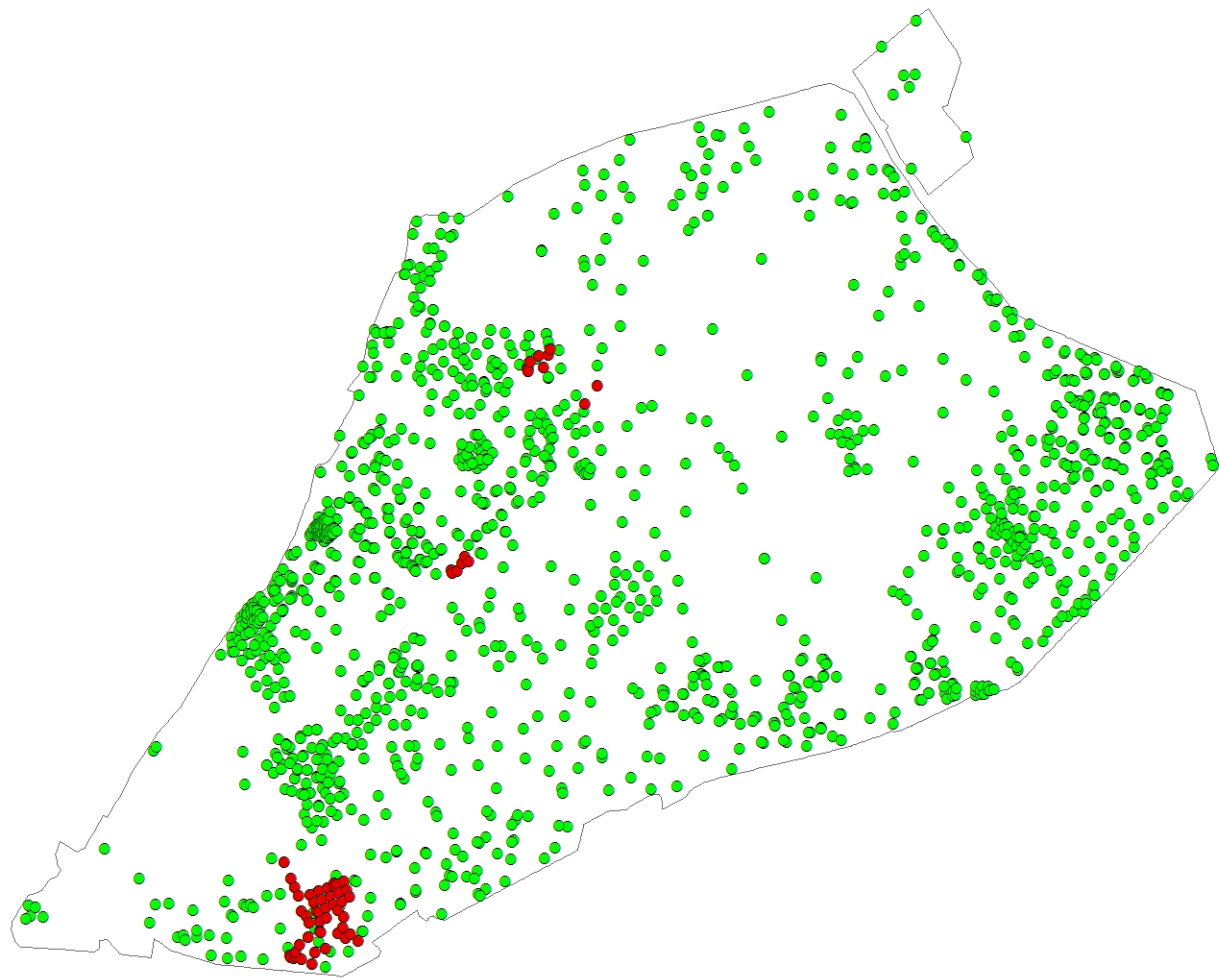


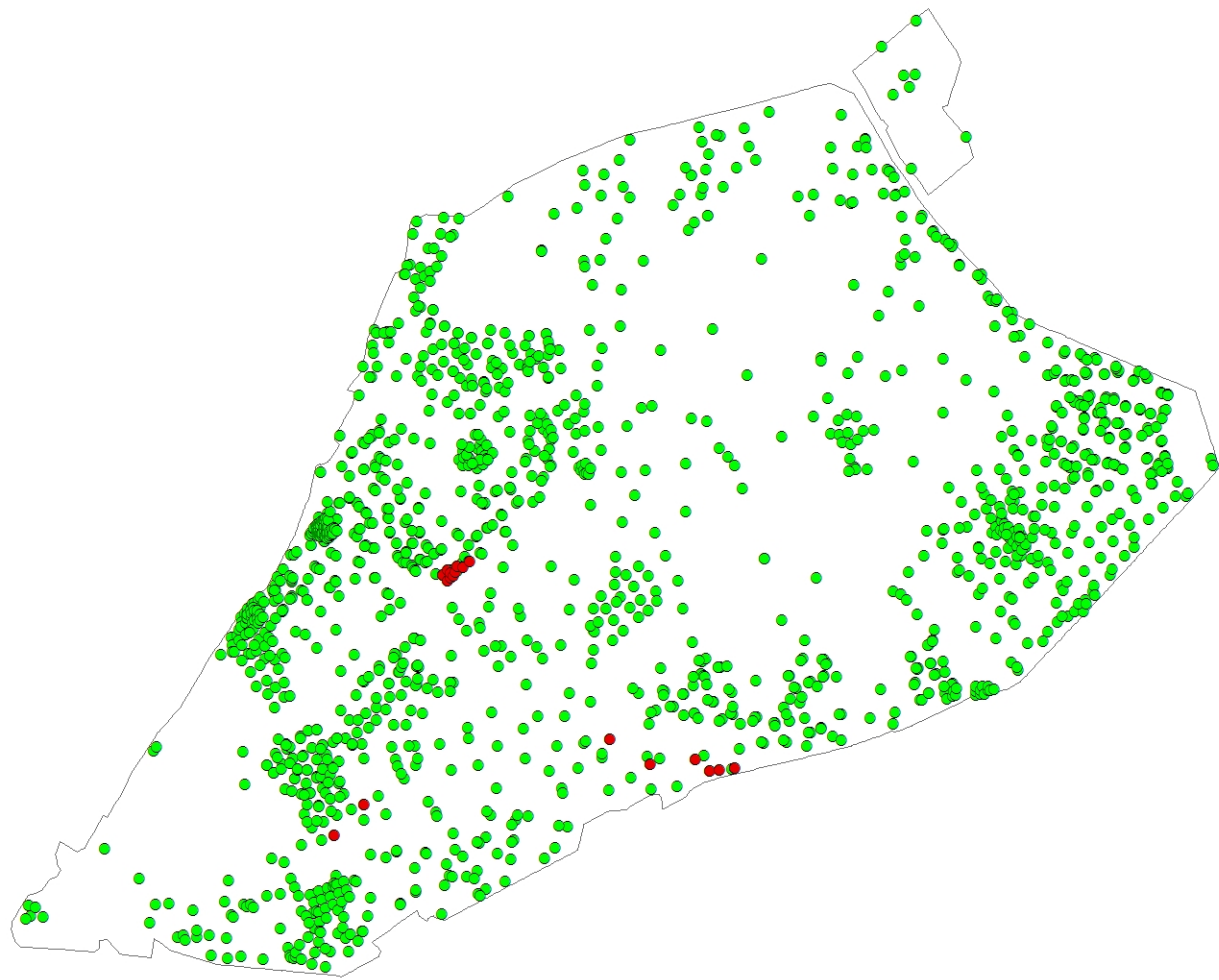
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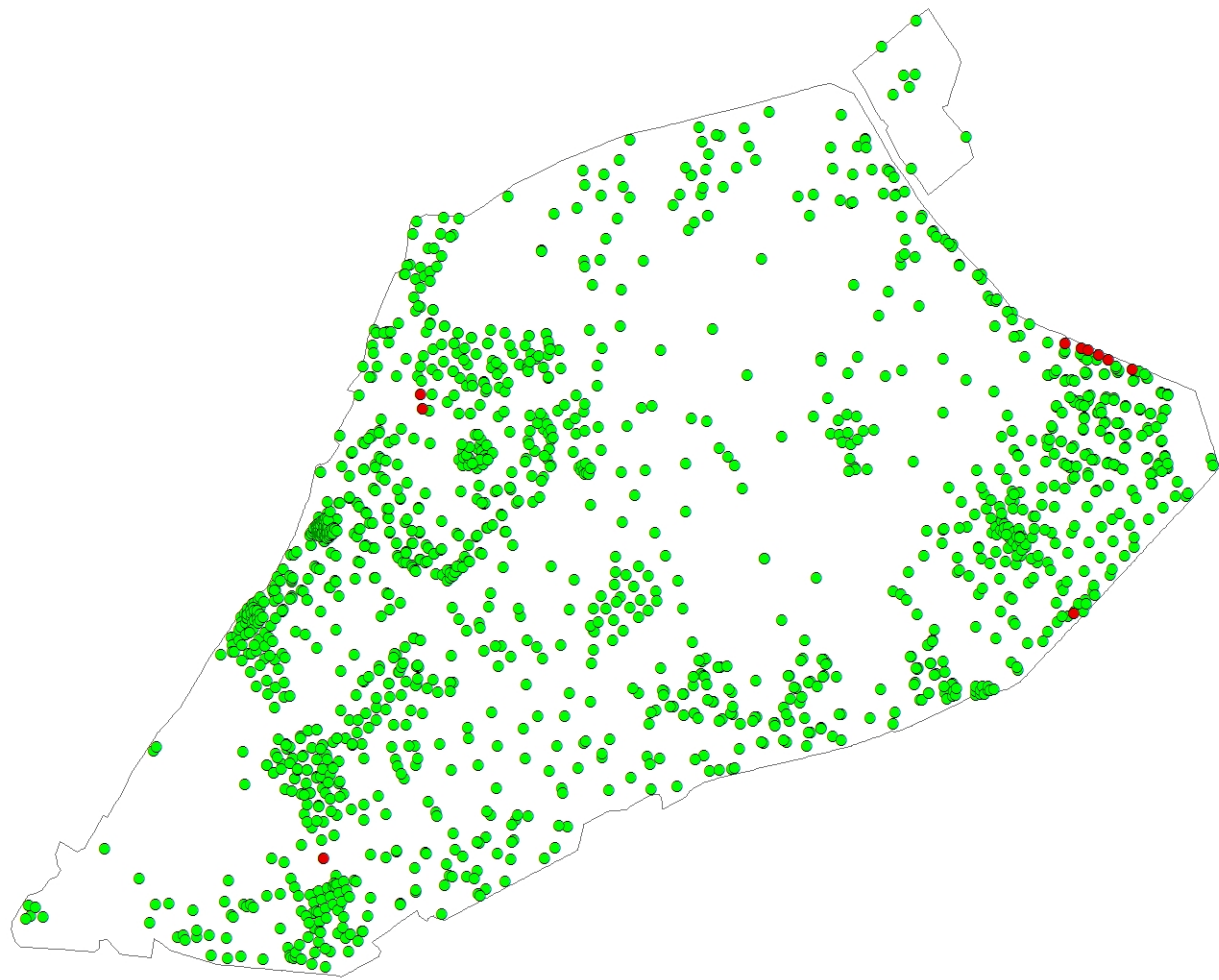


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Thank you for your time

Questions ?