South Dunedin Groundwater Modelling

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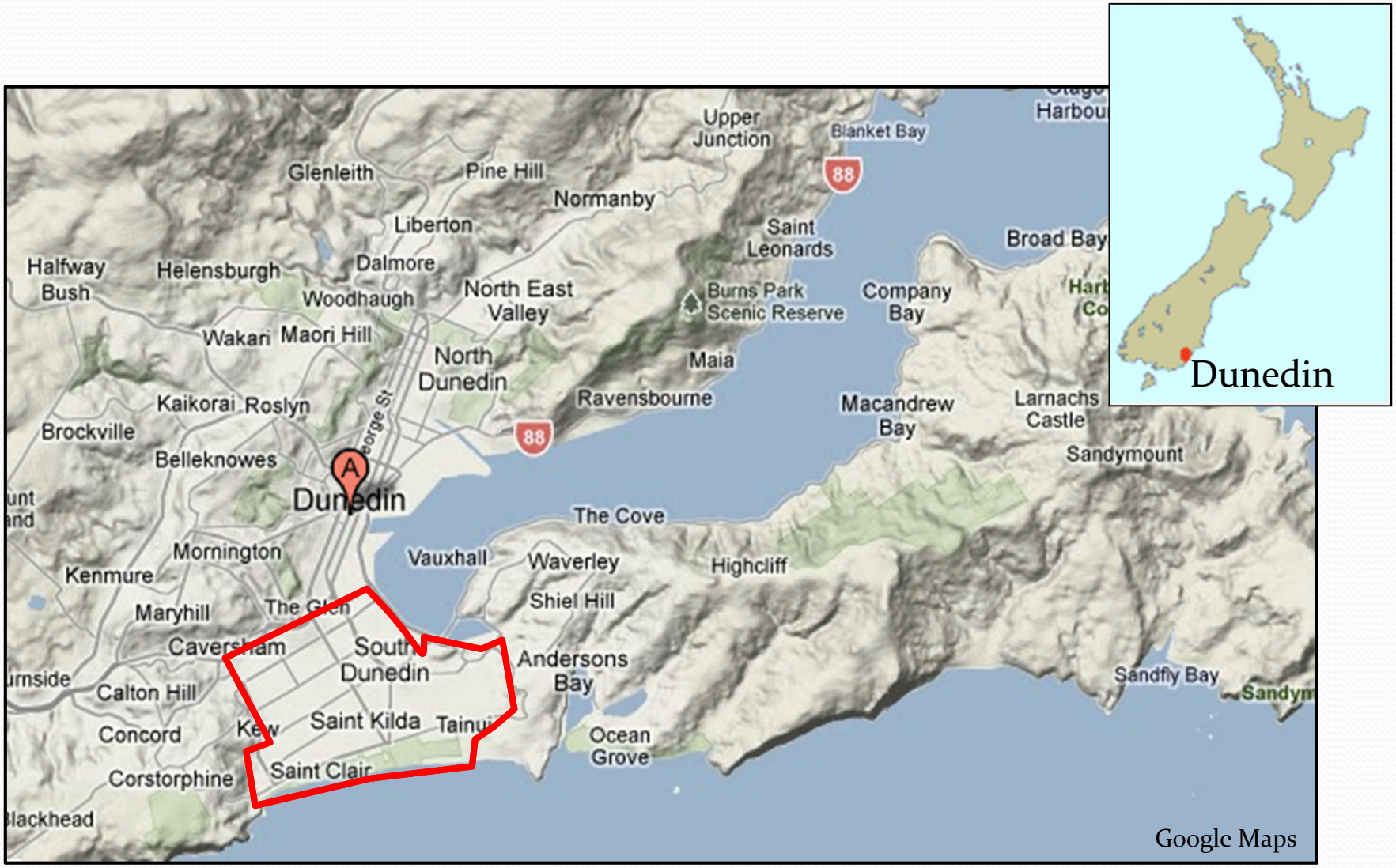
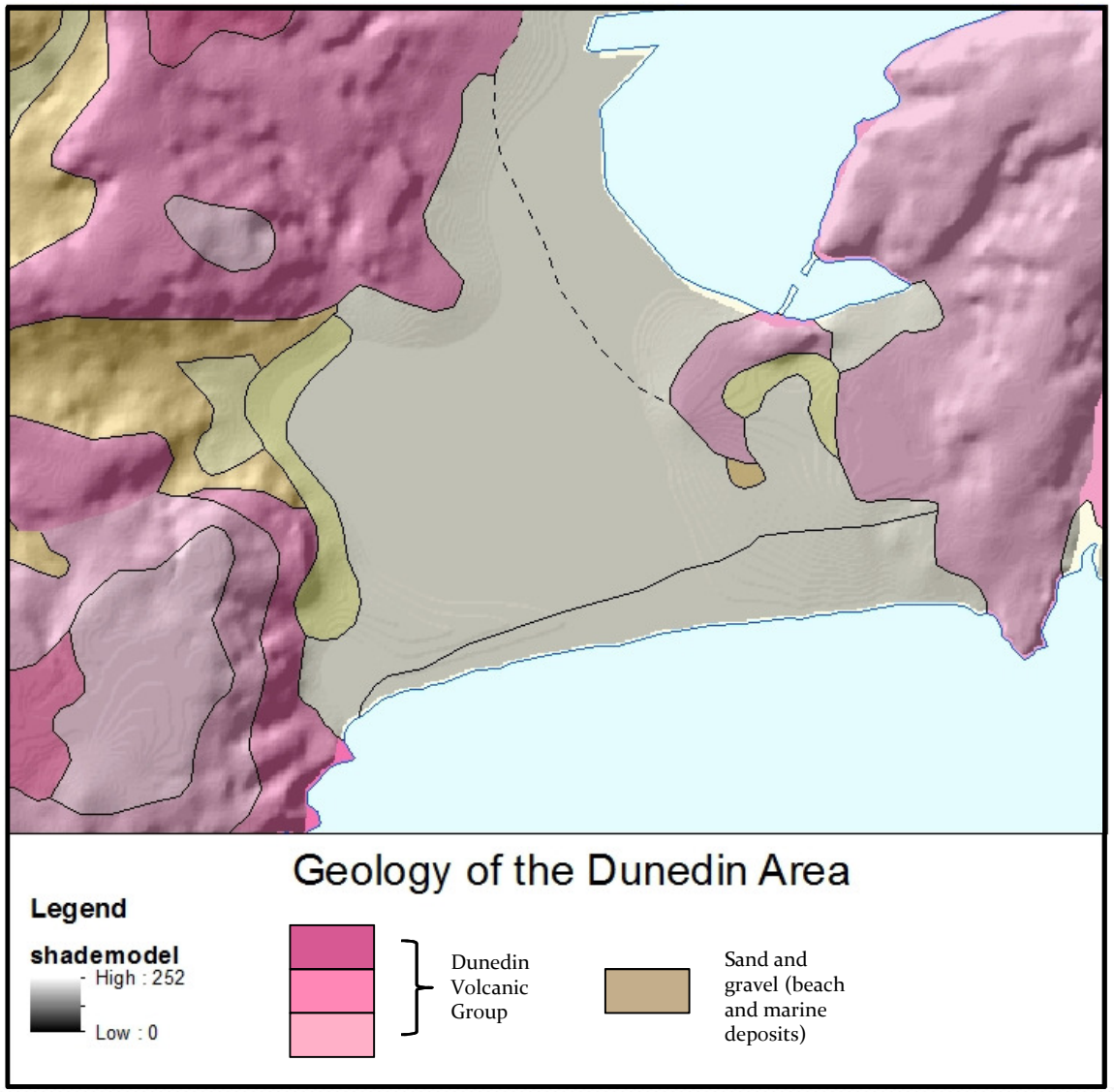
Study site: South Dunedin



South Dunedin Geology



Source: GNS 1:250000 Geological Map

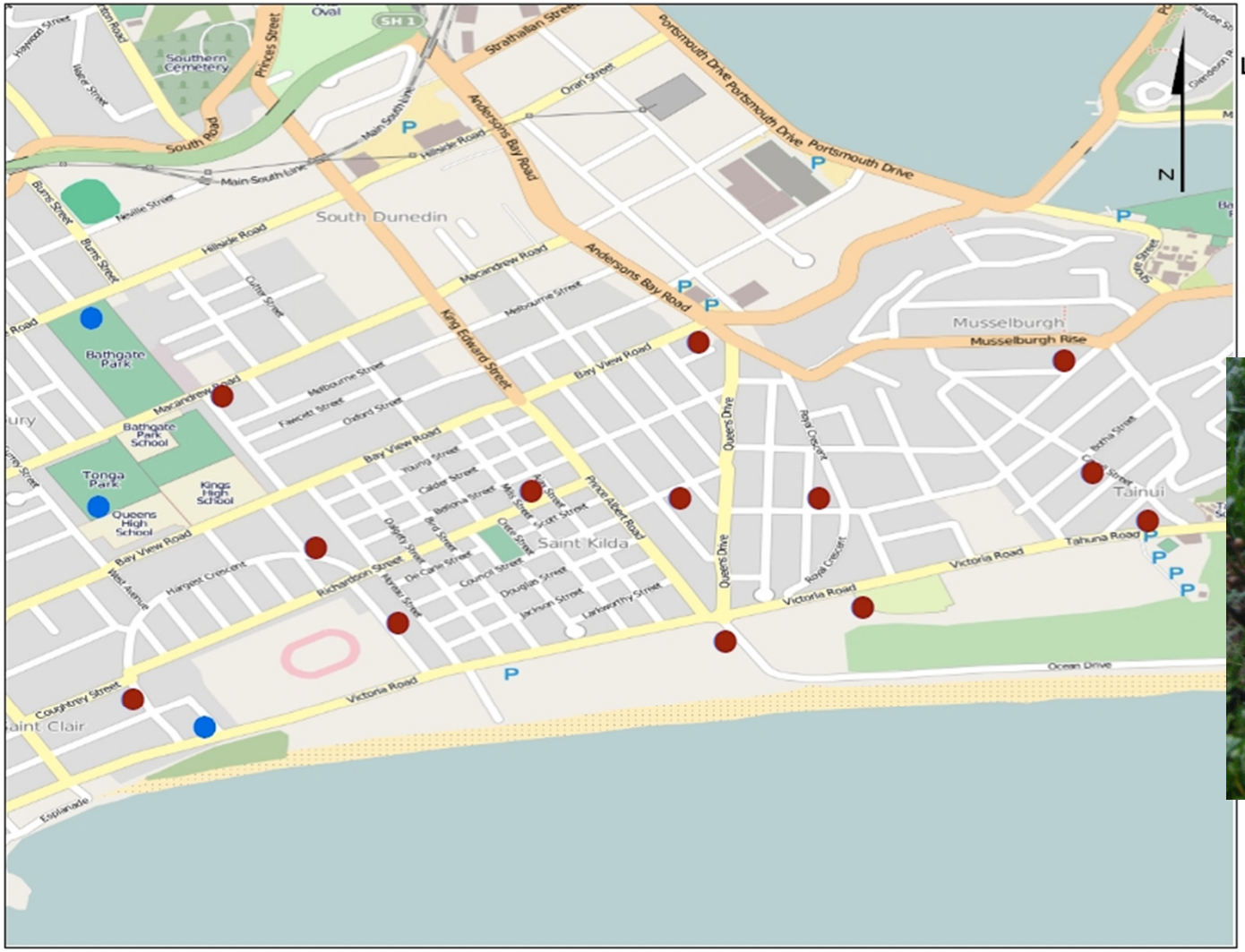
Research objective

To explore how the water table in South Dunedin could be affected by climate change impacts such as sea level rise and extreme precipitation events.

Research questions:

1. Where is the water table located, in relation to the ground surface, in south Dunedin?
2. How does the water table level change over time?
3. Estimate hydraulic conductivity and identify any spatial variation in this parameter?
4. How will the water table respond to future scenarios of sea level rise and extreme precipitation events?

Monitoring sites



Inset: photo of PVC pipe installed at a monitoring site

Figure 1: Map showing location of monitoring boreholes in South Dunedin, New Zealand

Location of the water table

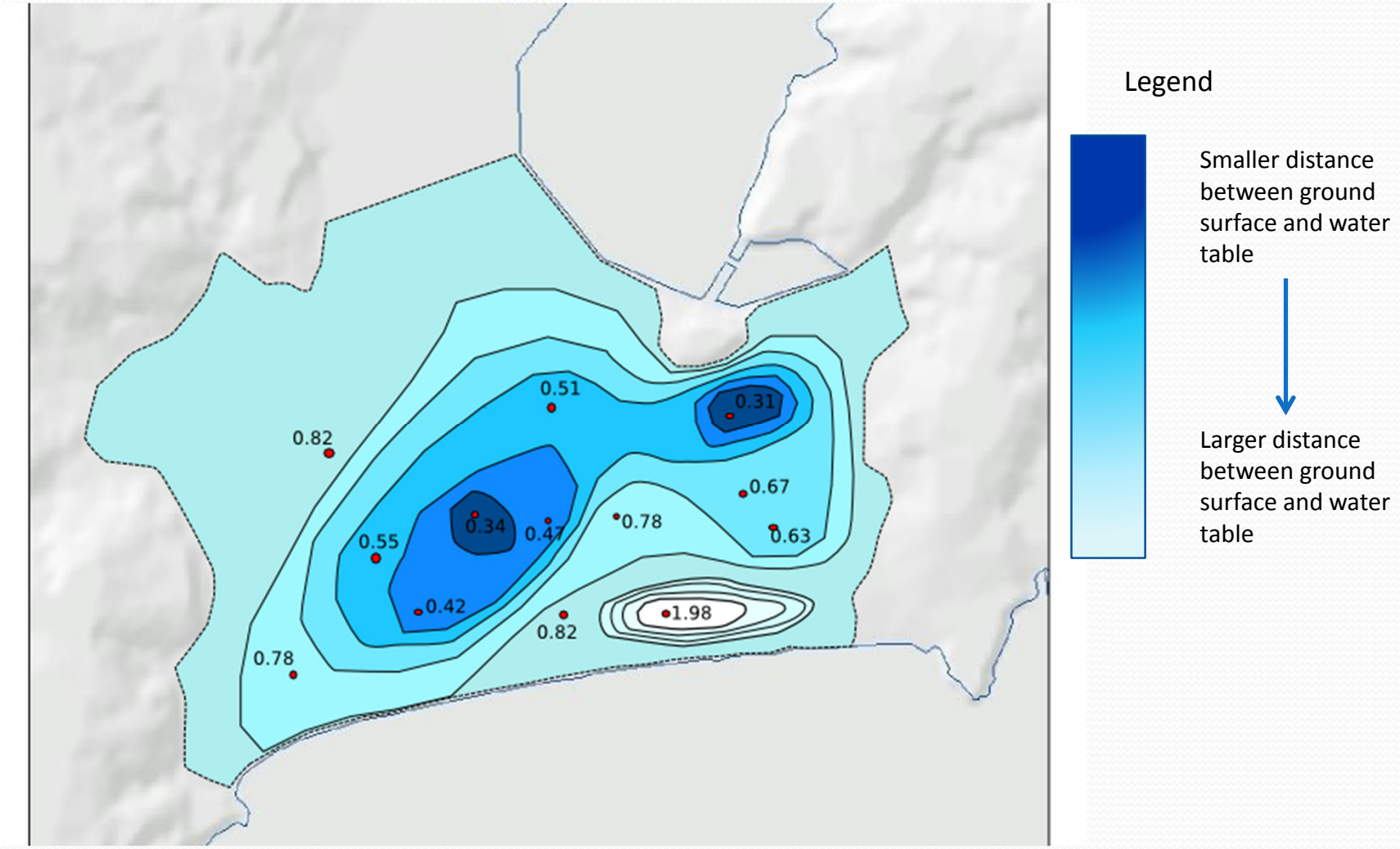
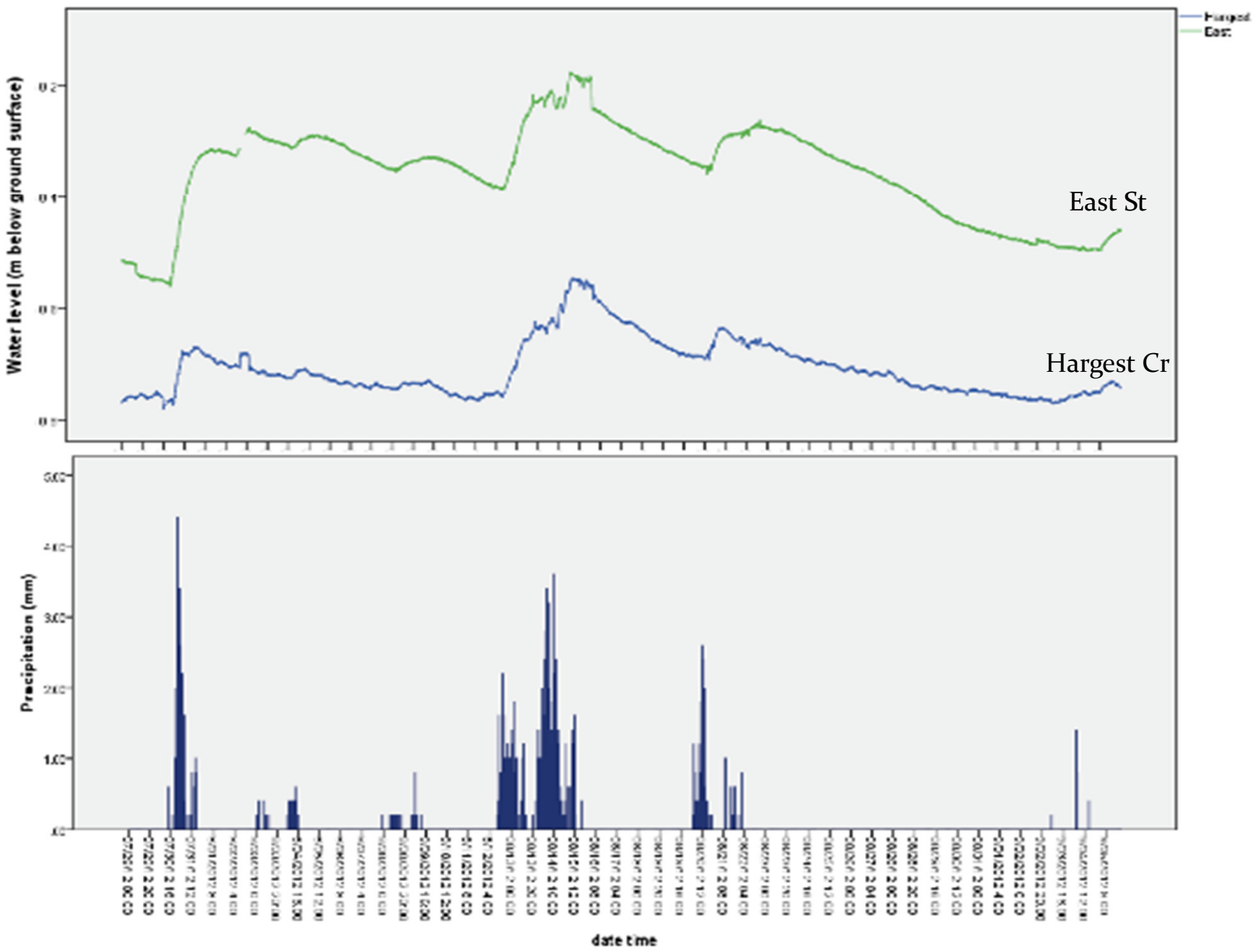
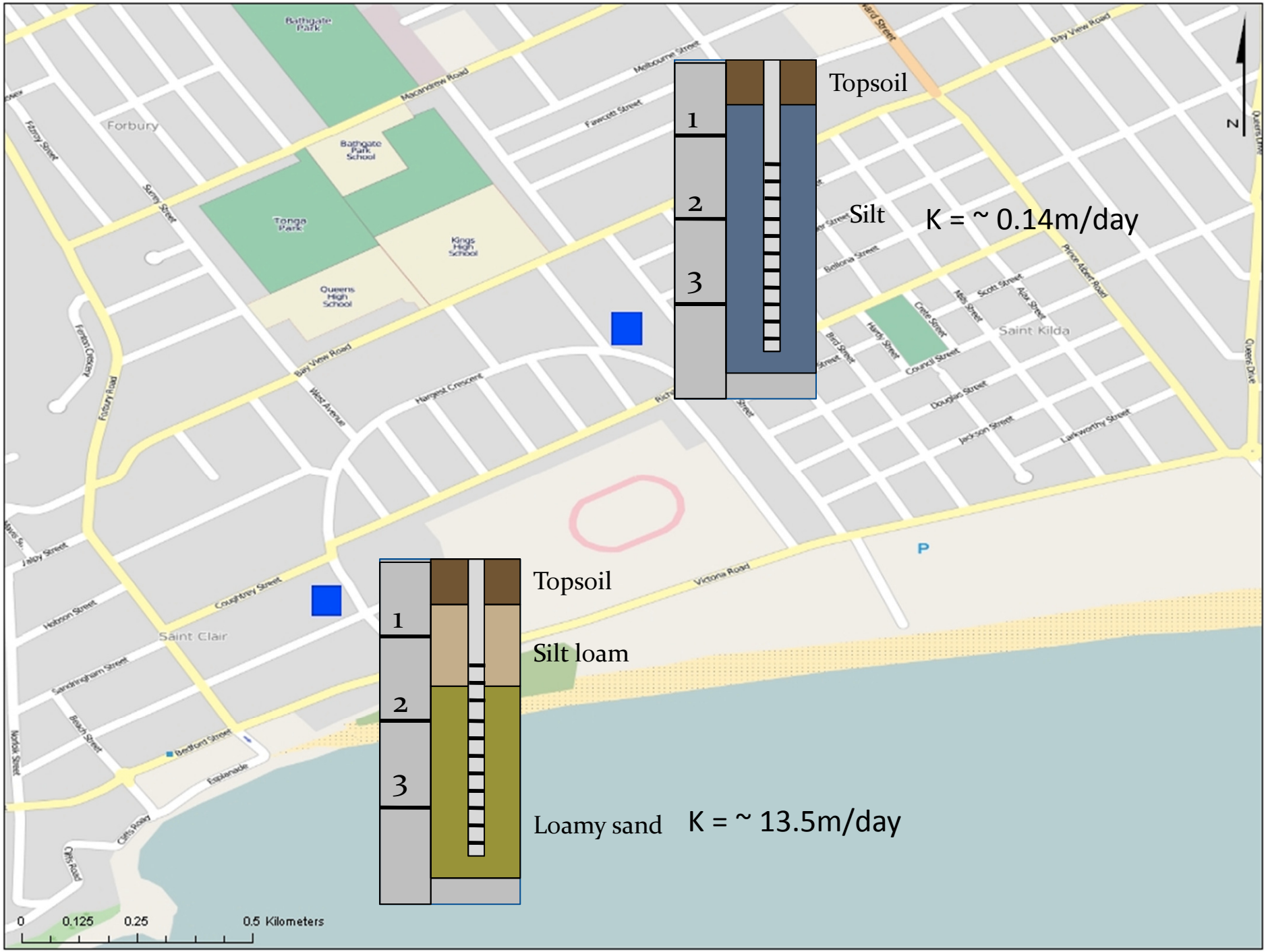
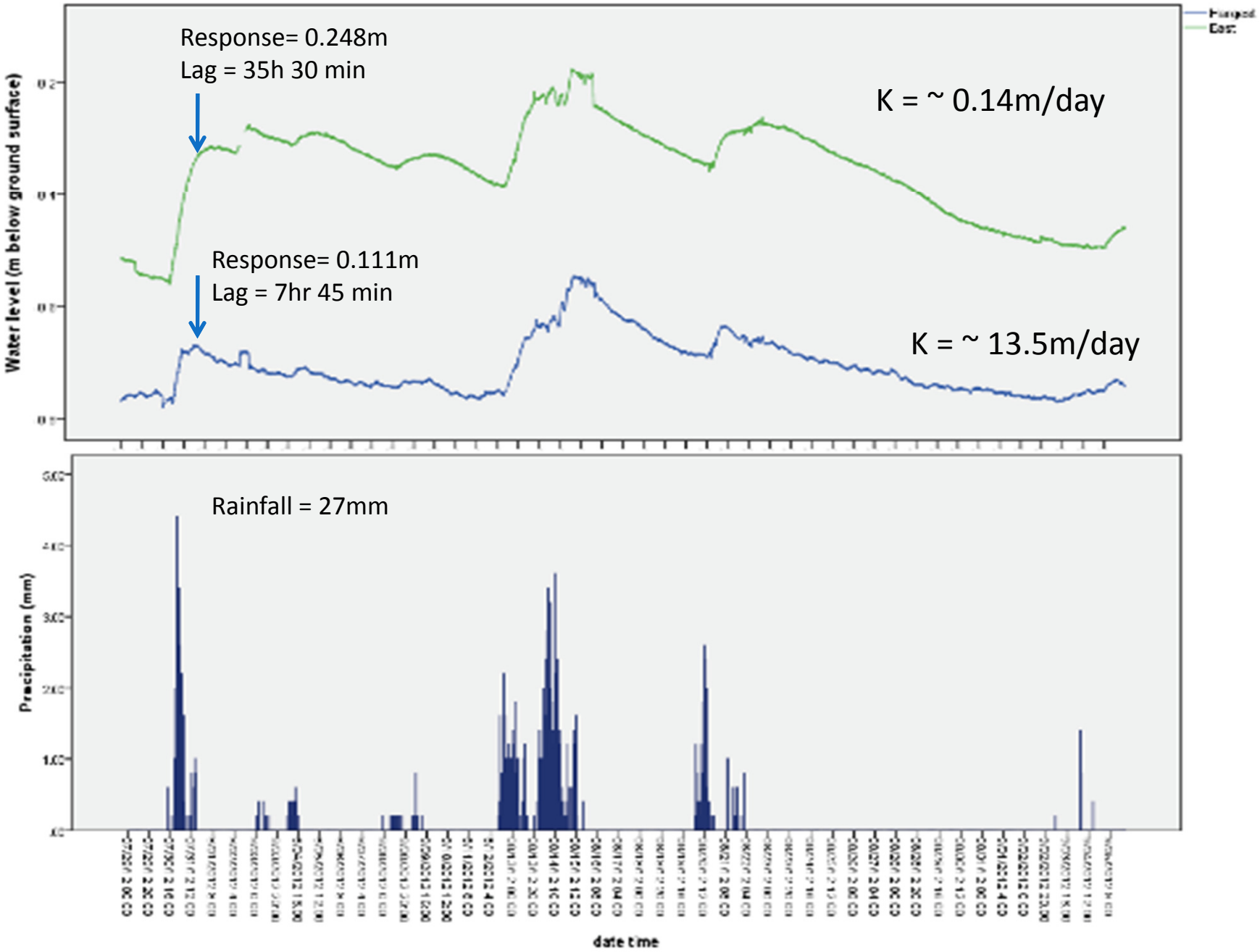


Figure 2: Map showing the mean depth (m) from the ground surface to the water table at 13 locations in South Dunedin and inferred contours


Water level (m below ground surface)
East St
Hargest Cr
Precipitation (mm)
date time


Topsoil
1
2
Silt
3
K = ~ 0.14m/day
Topsoil
1
Silt loam
2
3
Loamy sand
K = ~ 13.5m/day
Bathgate Park
Forbury
Bathgate Park School
Tonga Park
Kings High School
Queens High School
Macandrew Road
Bay View Road
Saint Kilda
Saint Clair
Victoria Road
Esplanade
0
0.125
0.25
0.5 Kilometers
N


Response= 0.248m
Lag = 35h 30 min
K = ~ 0.14m/day
Response= 0.111m
Lag = 7hr 45 min
K = ~ 13.5m/day
Water level (m below ground surface)
Rainfall = 27mm
Precipitation (mm)
date time

Next steps

- Refine estimates of hydraulic conductivity
- Analyse water table hydrographs to estimate response to rainfall ratio
- Develop a groundwater model for south Dunedin
  - Project the response of the water table to changes in eustatic sea level and precipitation events
- Consider the location of stormwater and wastewater pipes and how the water table may interact with pipe network


Questions?