S.S. PAPADOPULOS & ASSOCIATES, INC.
ENVIRONMENTAL AND WATER RESOURCE CONSULTANTS

Setting the stage: What do hydrogeologists do when they interpret a pumping test?

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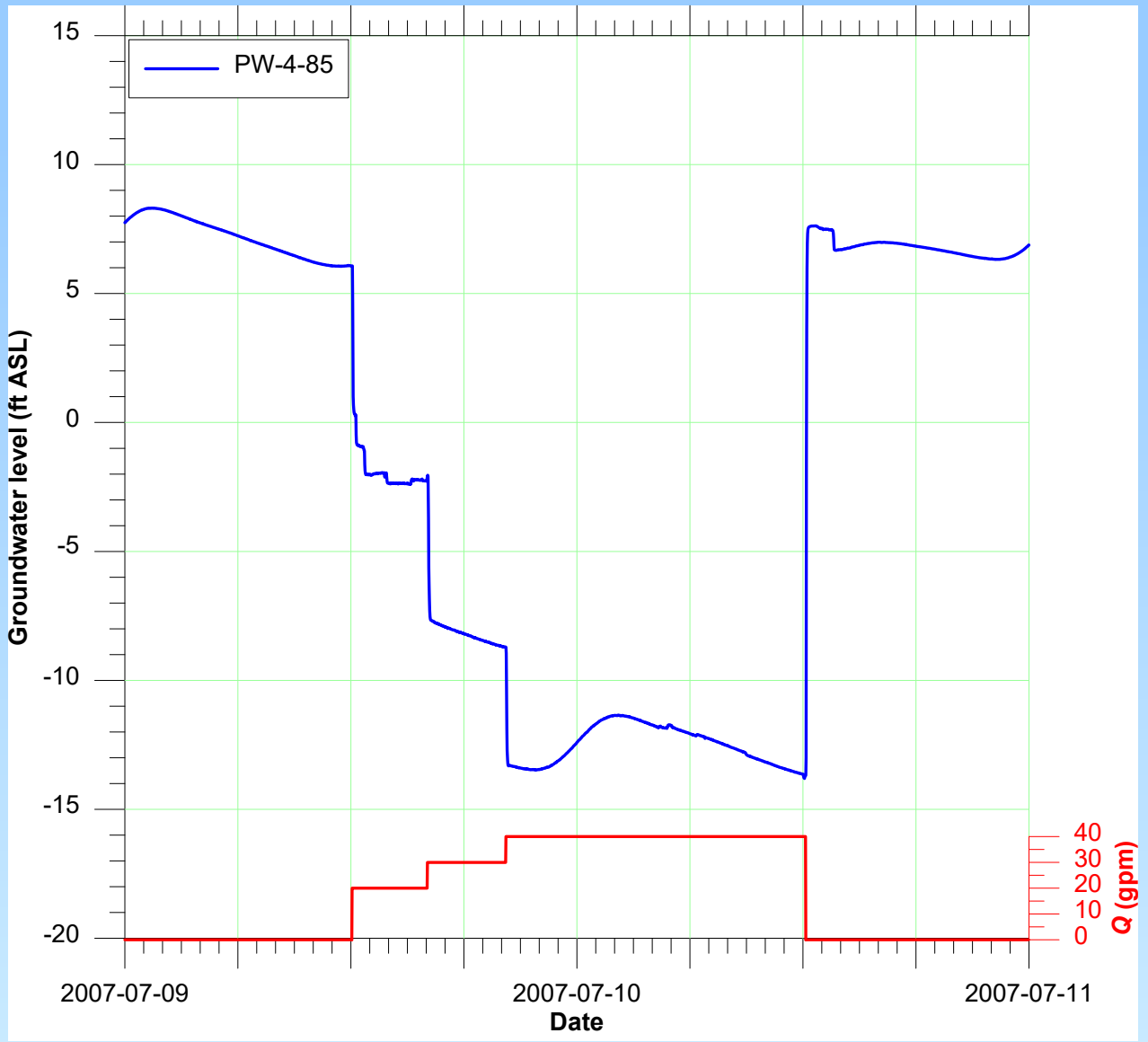
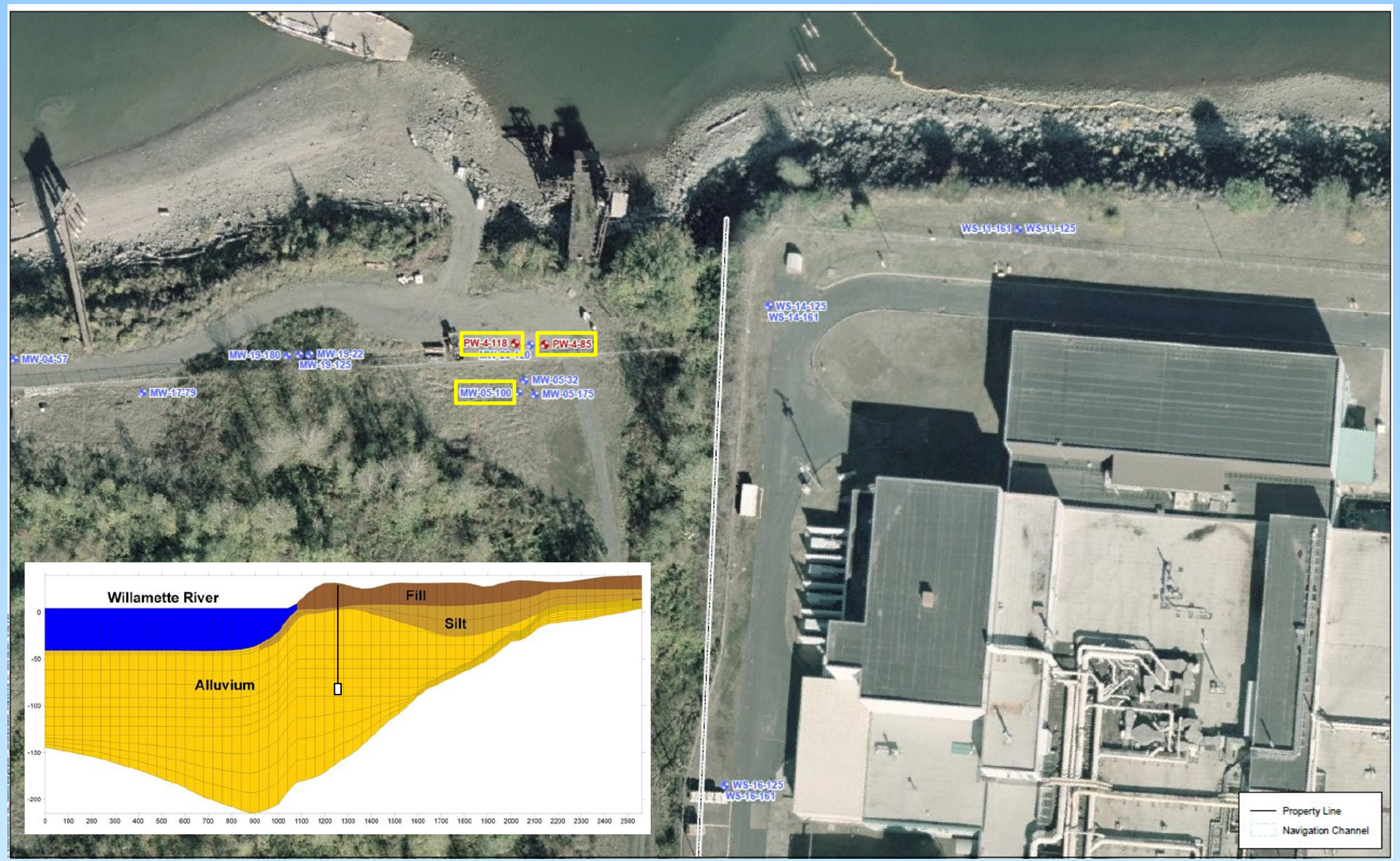
Steps in the interpretation of a pumping test

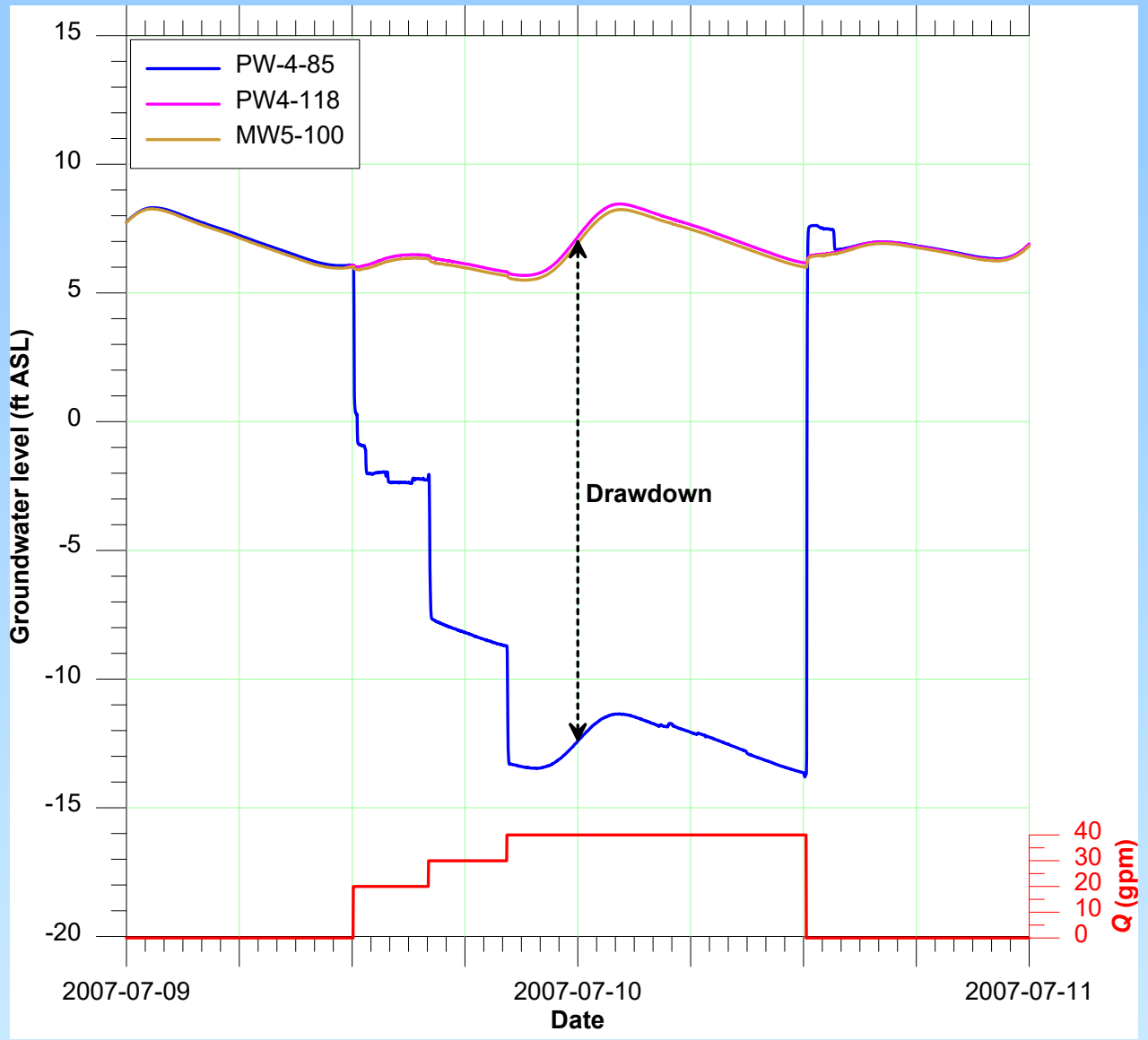
1. Data processing
2. Interpretation
3. Assessment

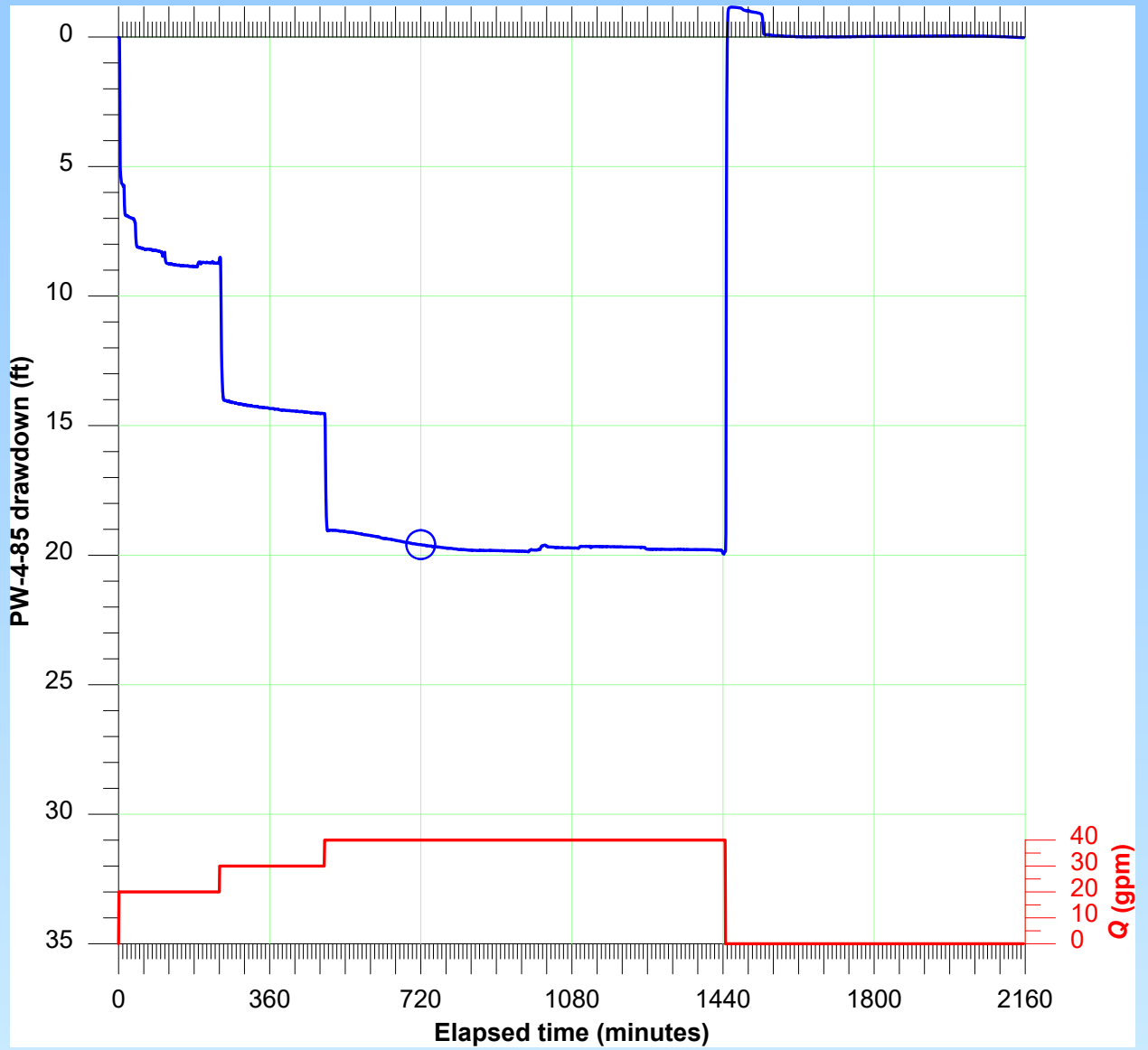
1. Data


PW-4-85
15
10
5
0
-5
-10
-15
-20
Groundwater level (ft ASL)
2007-07-09
2007-07-10
2007-07-11
Date
40
30
20
10
0
Q (gpm)


MW-04-57
MW-19-180
MW-19-22
MW-19-125
MW-17-79
PW-4-118
PW-4-85
MW-05-32
MW-05-100
MW-05-175
WS-11-161
WS-11-125
WS-14-125
WS-14-161
WS-16-125
WS-16-161
Willamette River
Fill
Silt
Alluvium
0
-50
-100
-150
-200
0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000 2100 2200 2300 2400 2500
Property Line
Navigation Channel

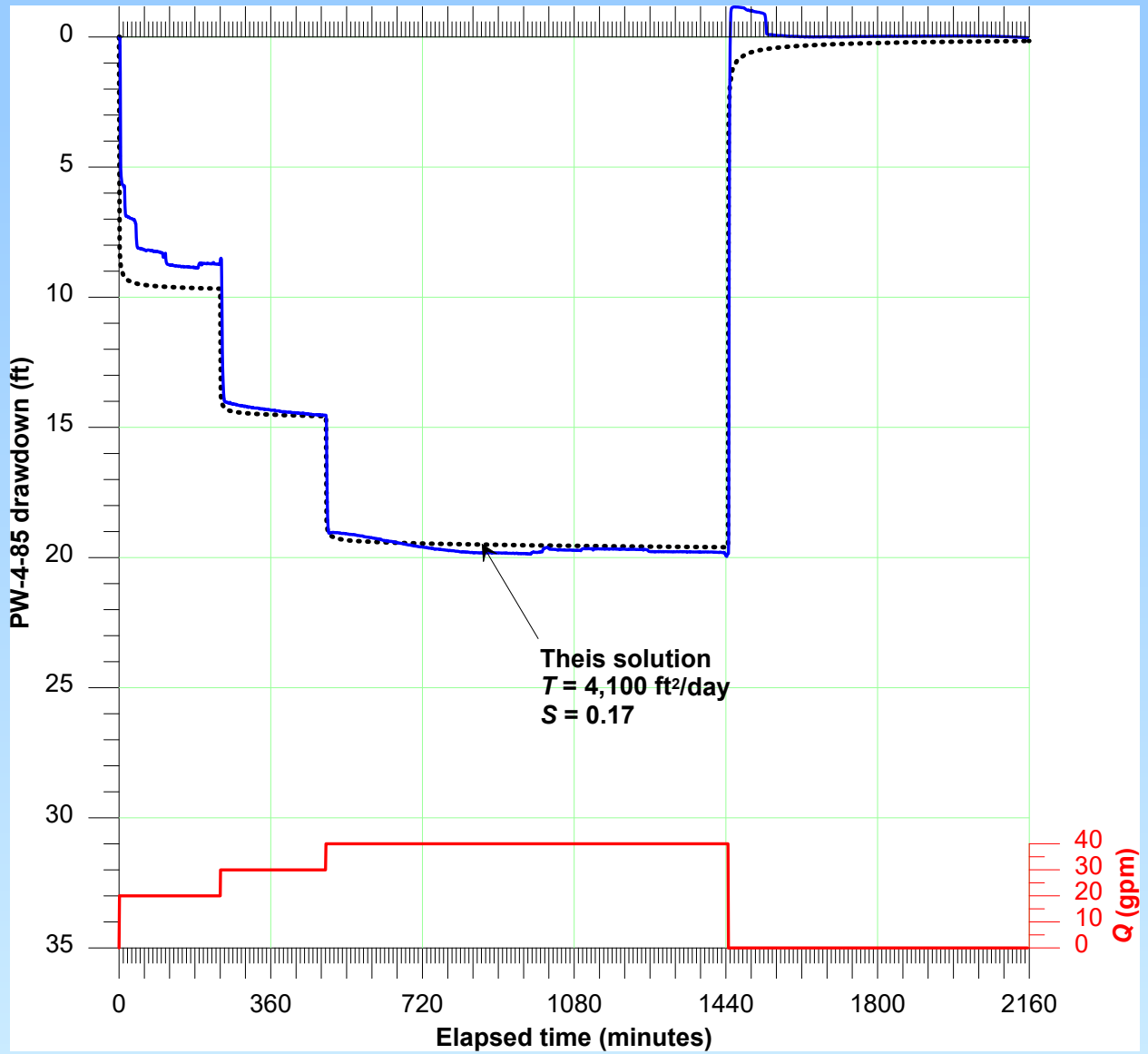
2. Interpretation #1: Drawdown




PW-4-85 drawdown (ft)
0
5
10
15
20
25
30
35
0
360
720
1080
1440
1800
2160
Elapsed time (minutes)
Q (gpm)
40
30
20
10
0

Interpretation #2: Modeling

In this context, modeling means matching the data with a theoretical model.



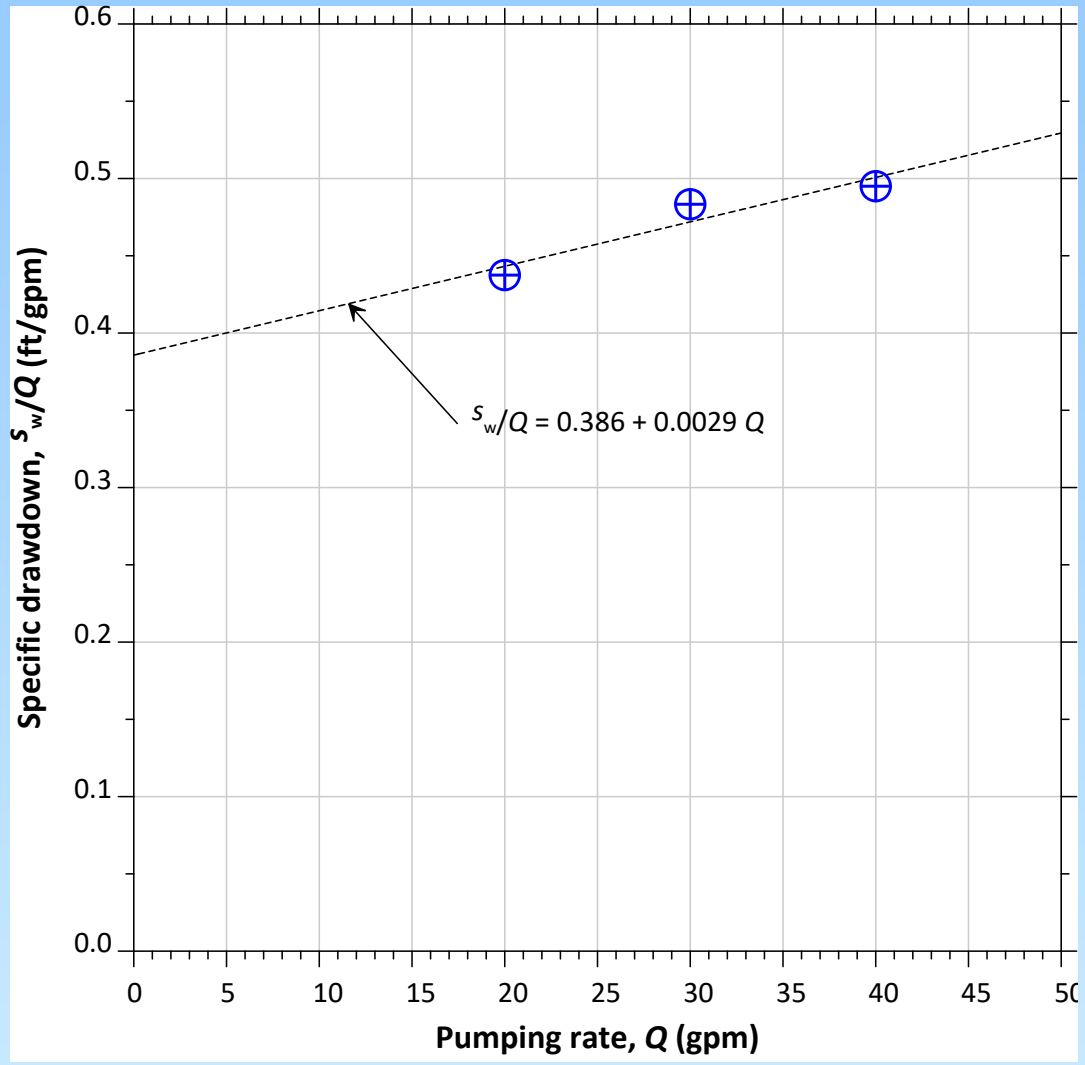
3. Assessment

1. Can we match the data with a theoretical model?

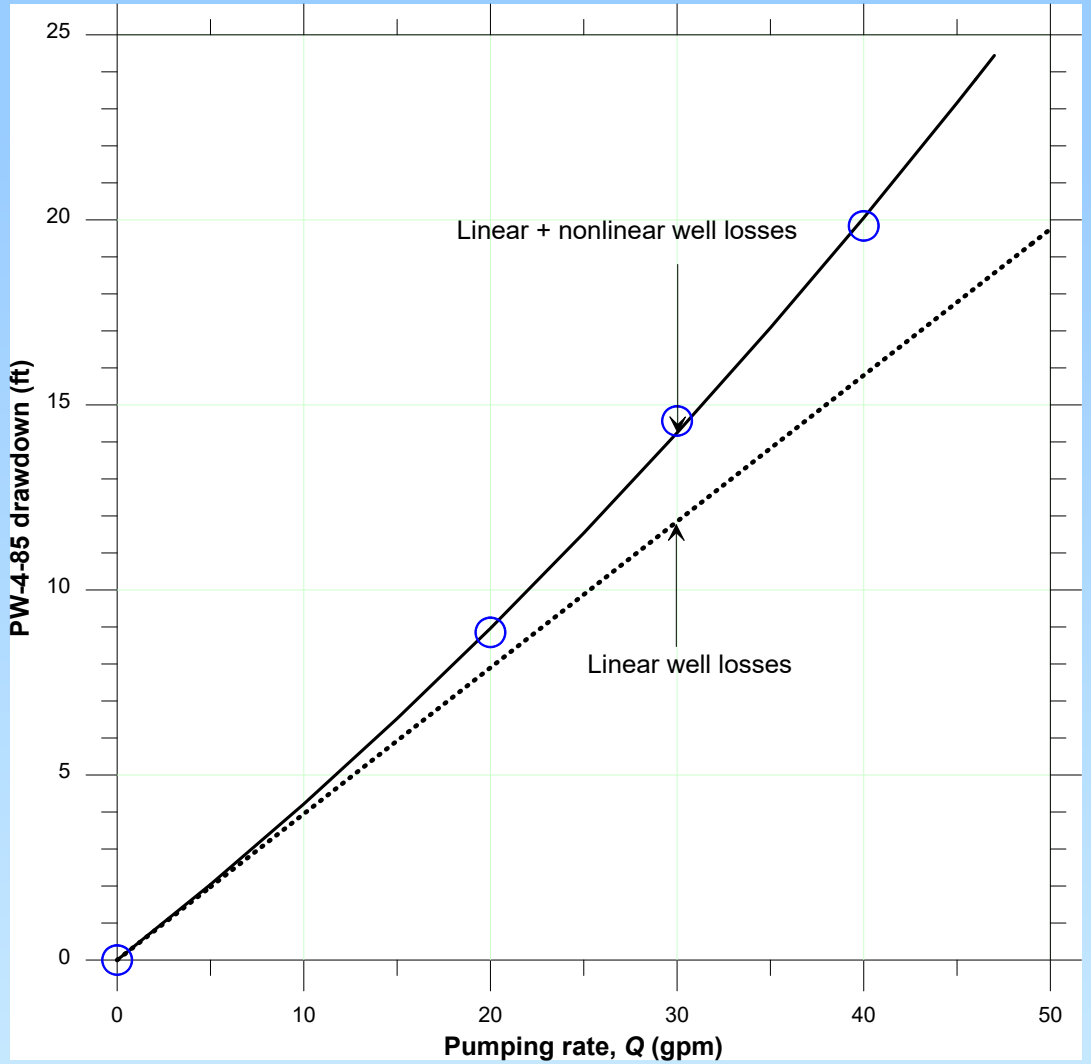
2. Do our inferred parameters make sense?

More Modeling

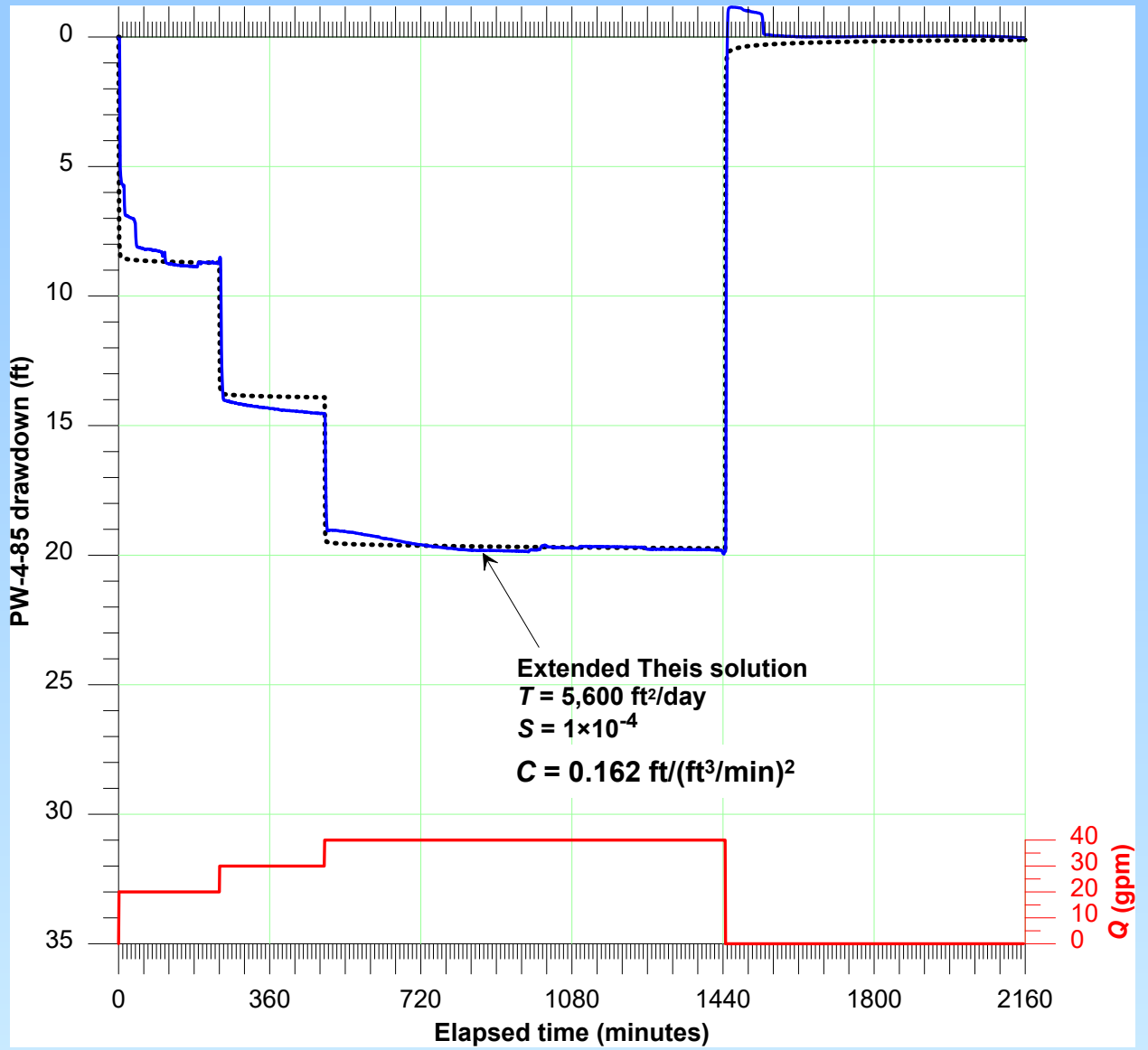
1. PW-4-85 is a pumping well in a confined aquifer.
2. *S* = 0.17 is not realistic.
3. There must be additional well losses.



Distinguishing between the sources of drawdown in the pumping well



Yet more modeling



$C = 0.0029$ ft/(gpm)^2

$= 0.162$ ft/(ft^3/min)^2

Key points

1. We measure the pumping rate and the groundwater levels. These are the data.

2. Everything else is interpretation (modeling).

3. The key step in our analyses is the assessment of whether our interpretations make sense.