Rio Salado Habitat Restoration Project, Phoenix, Arizona: Water Supply Development Summary

Gary Gin, R.G.
Andrew Messer, R.G.
Blair Linford
URS Corporation
and
Gary Corbell
Welenco

URS

RioSalado
HABITAT RESTORATION PROJECT

welenco

Questions

- How do we evaluate sustainability of an aquifer?
- What factors should be considered to ensure a sustainable water supply?

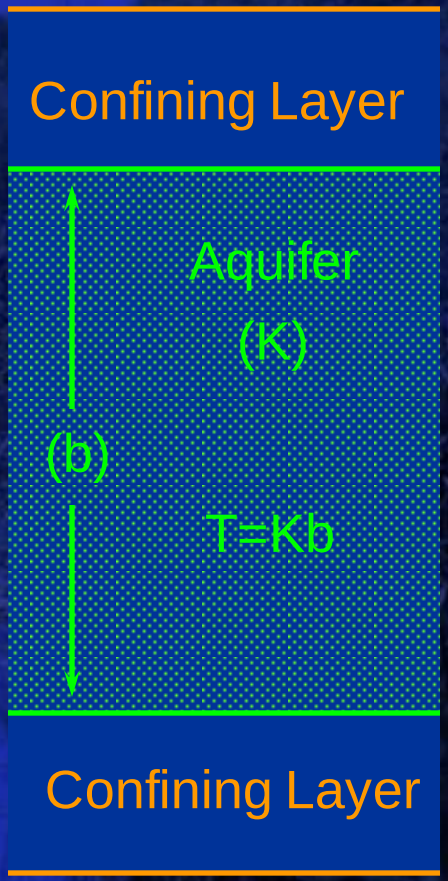
Explanation of Terms

Hydraulic Conductivity (K): A measure of the ability of water to flow through a medium.

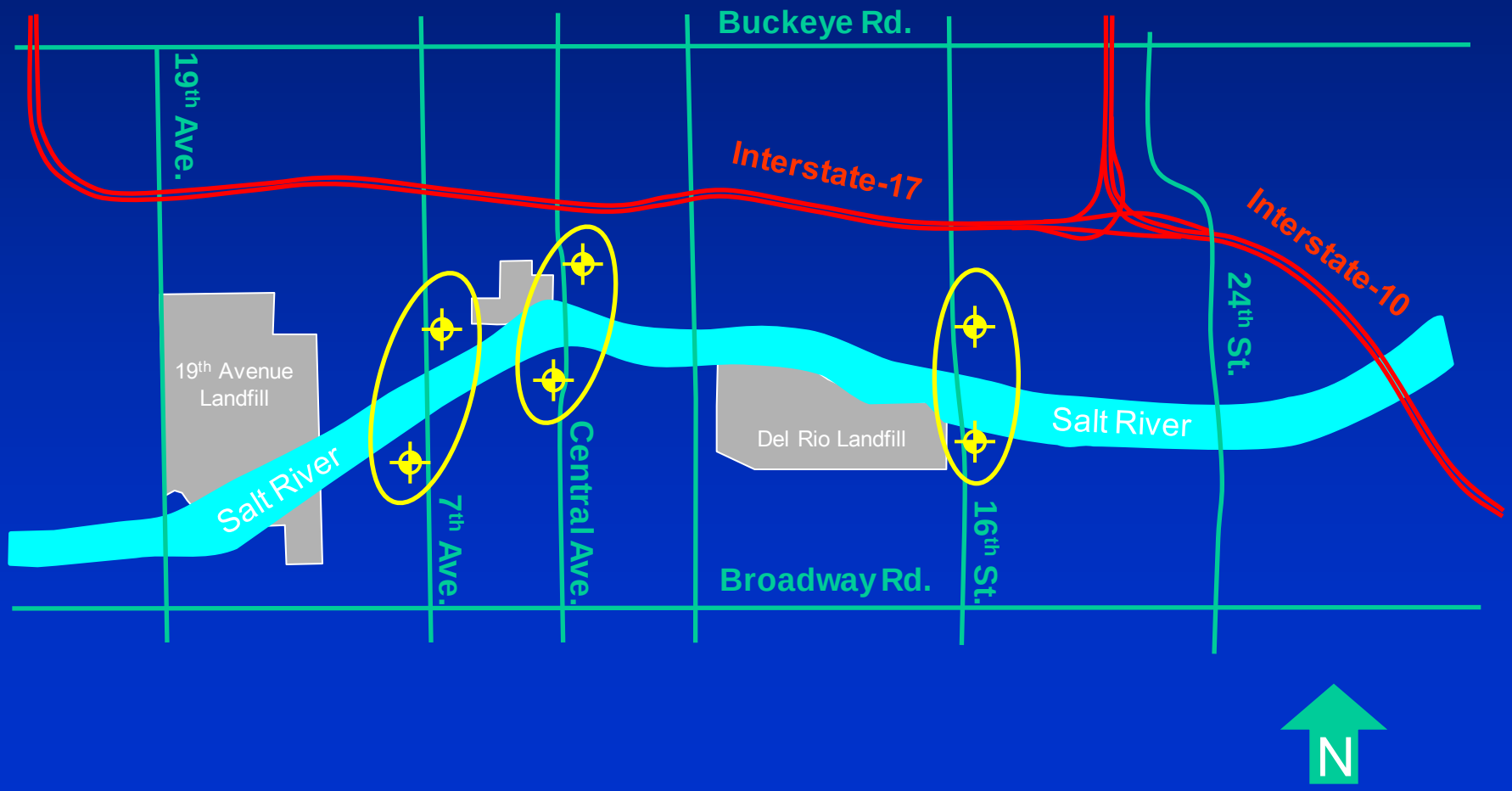
Units = feet per day (ft/d)

Transmissivity (T): A measure of an aquifer's capacity to transmit water. Equal to the product of the aquifer thickness (b) and hydraulic conductivity (K).

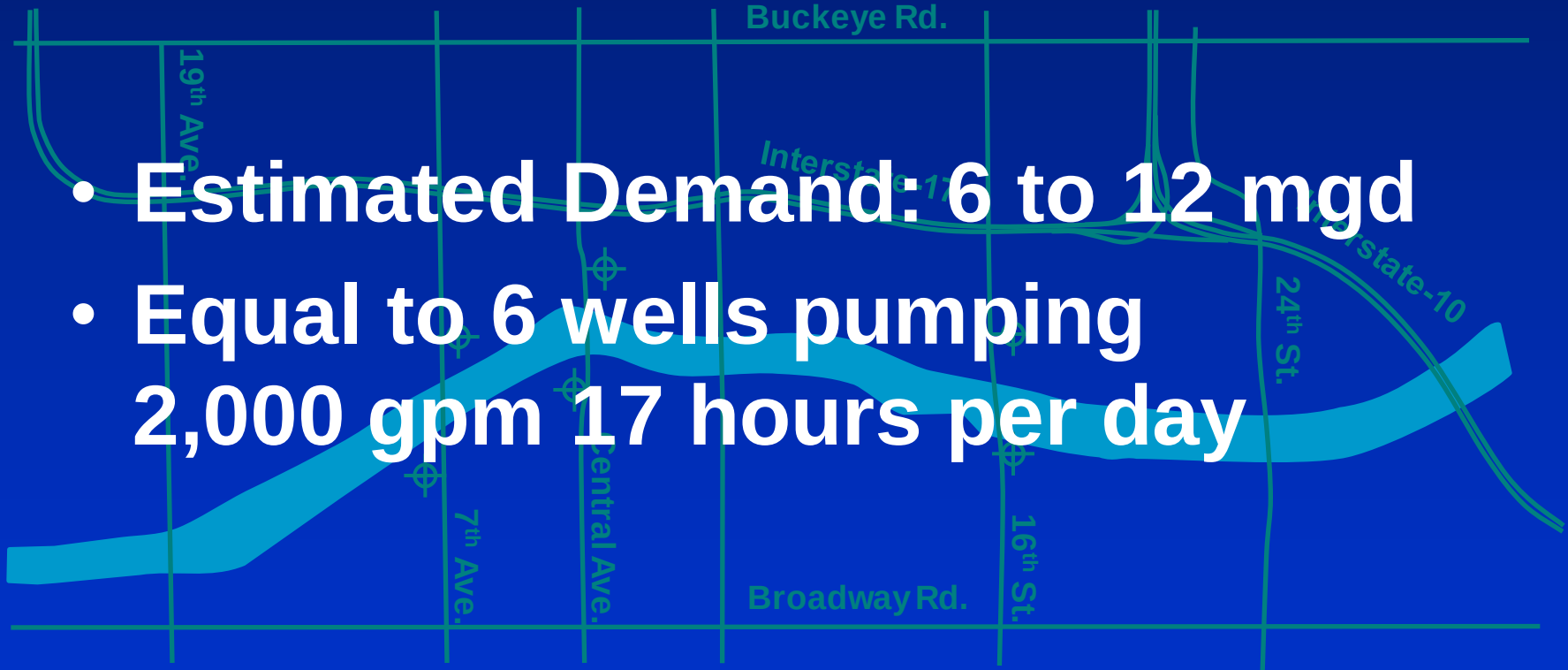
Units = gallons per day per foot (gpd/ft)



Project Water Supply

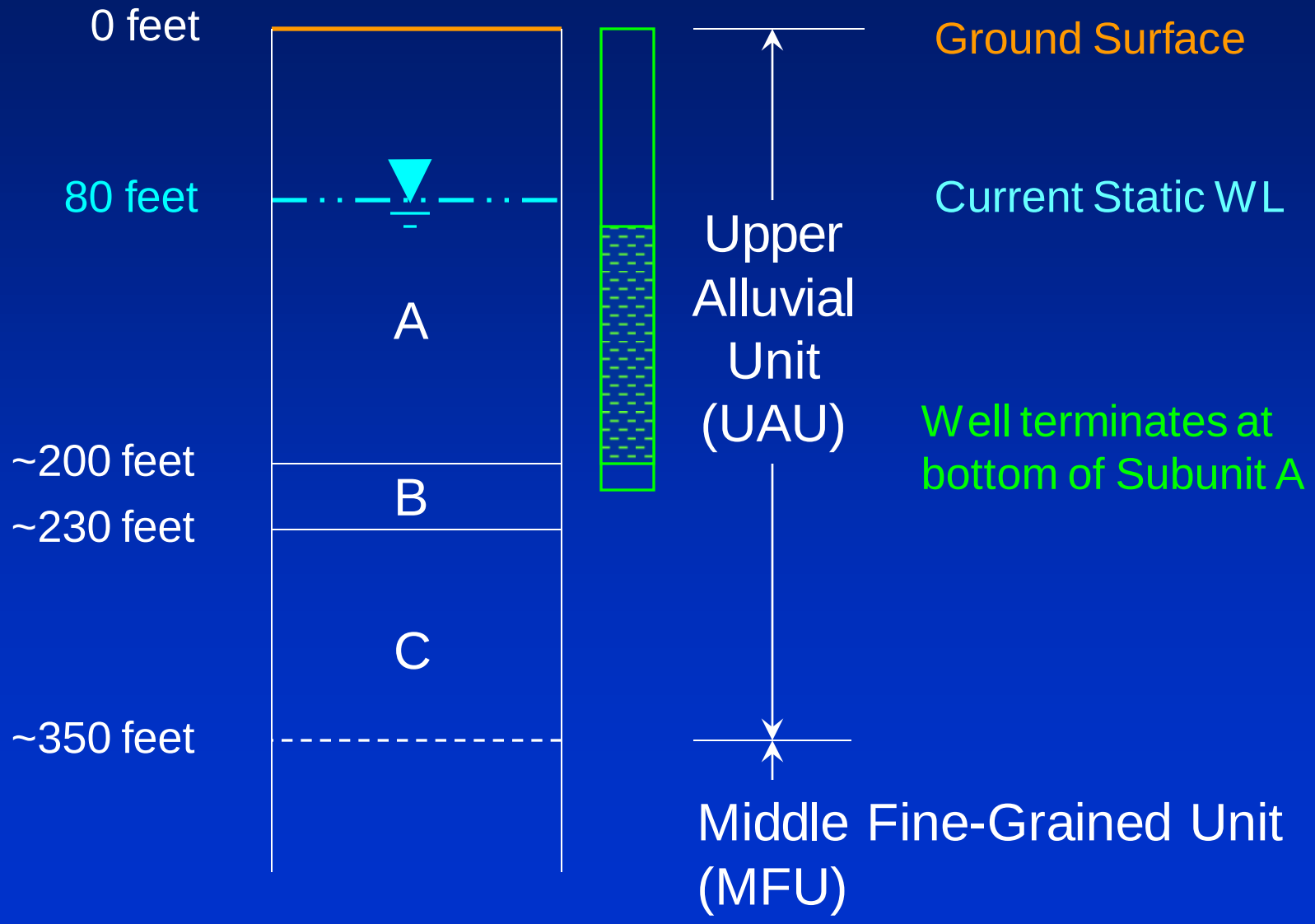


Project Water Supply

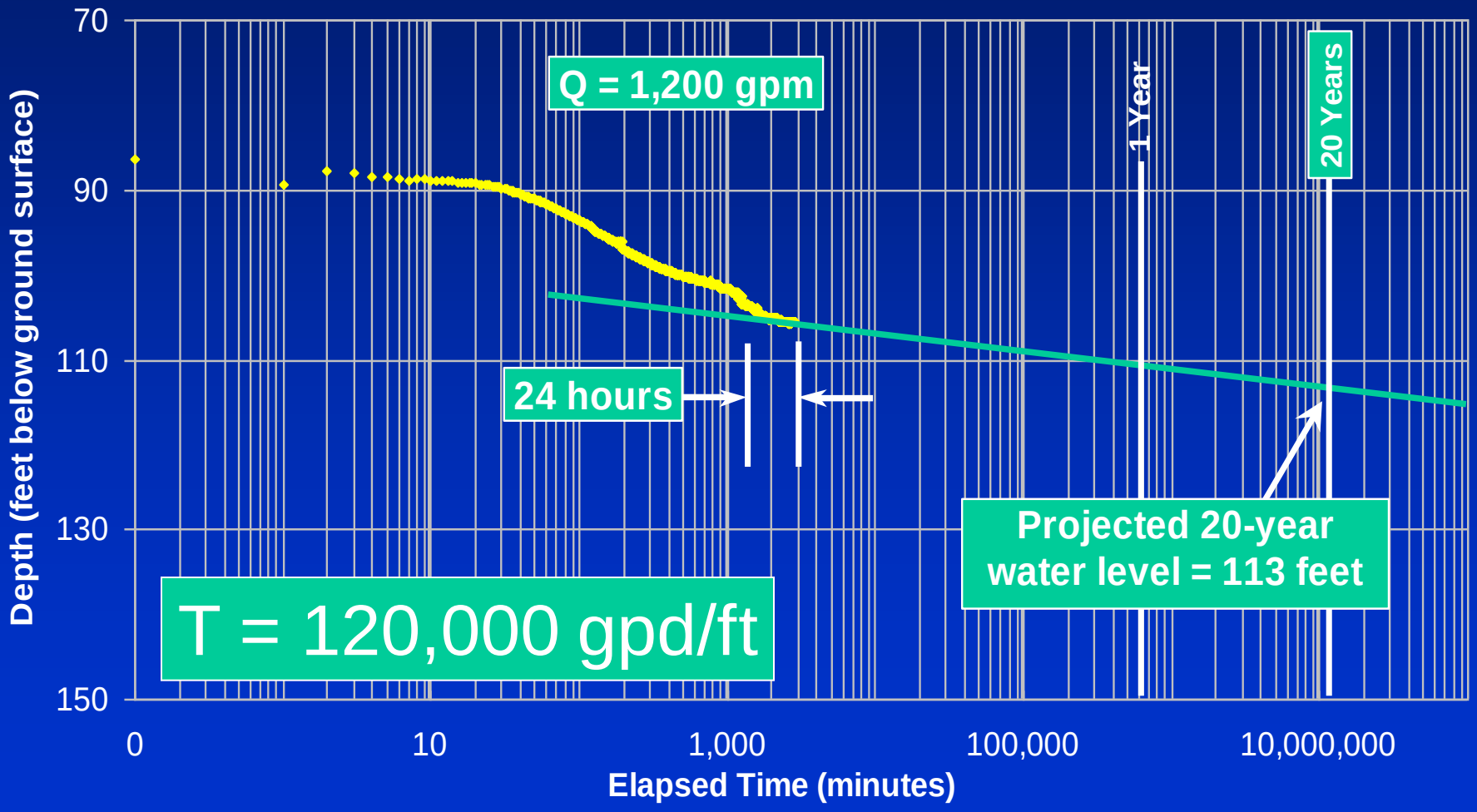


- **Estimated Demand: 6 to 12 mgd**
- **Equal to 6 wells pumping 2,000 gpm 17 hours per day**

Well Design & General Stratigraphy



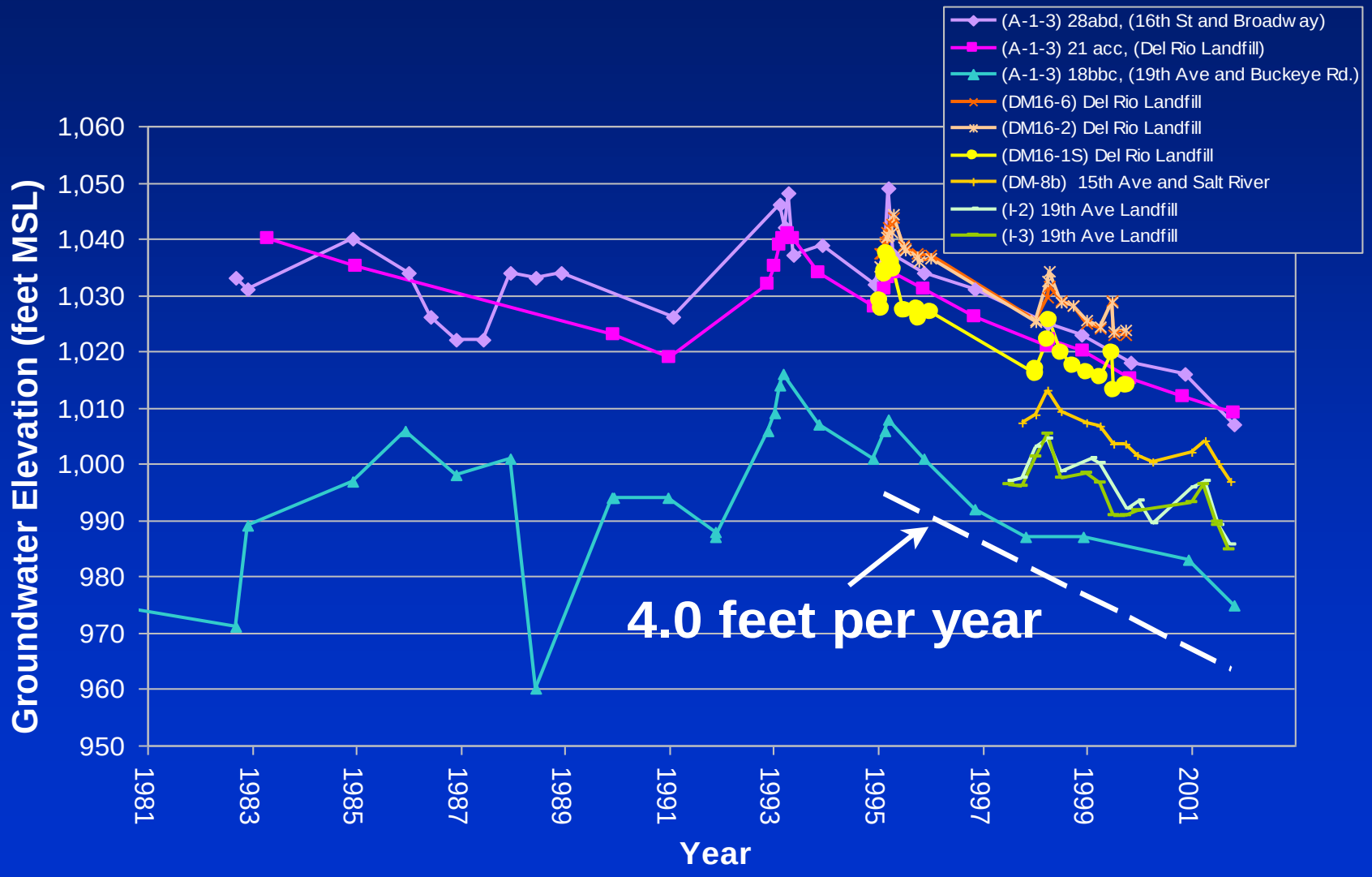
RSSW-2 Constant-Rate Test



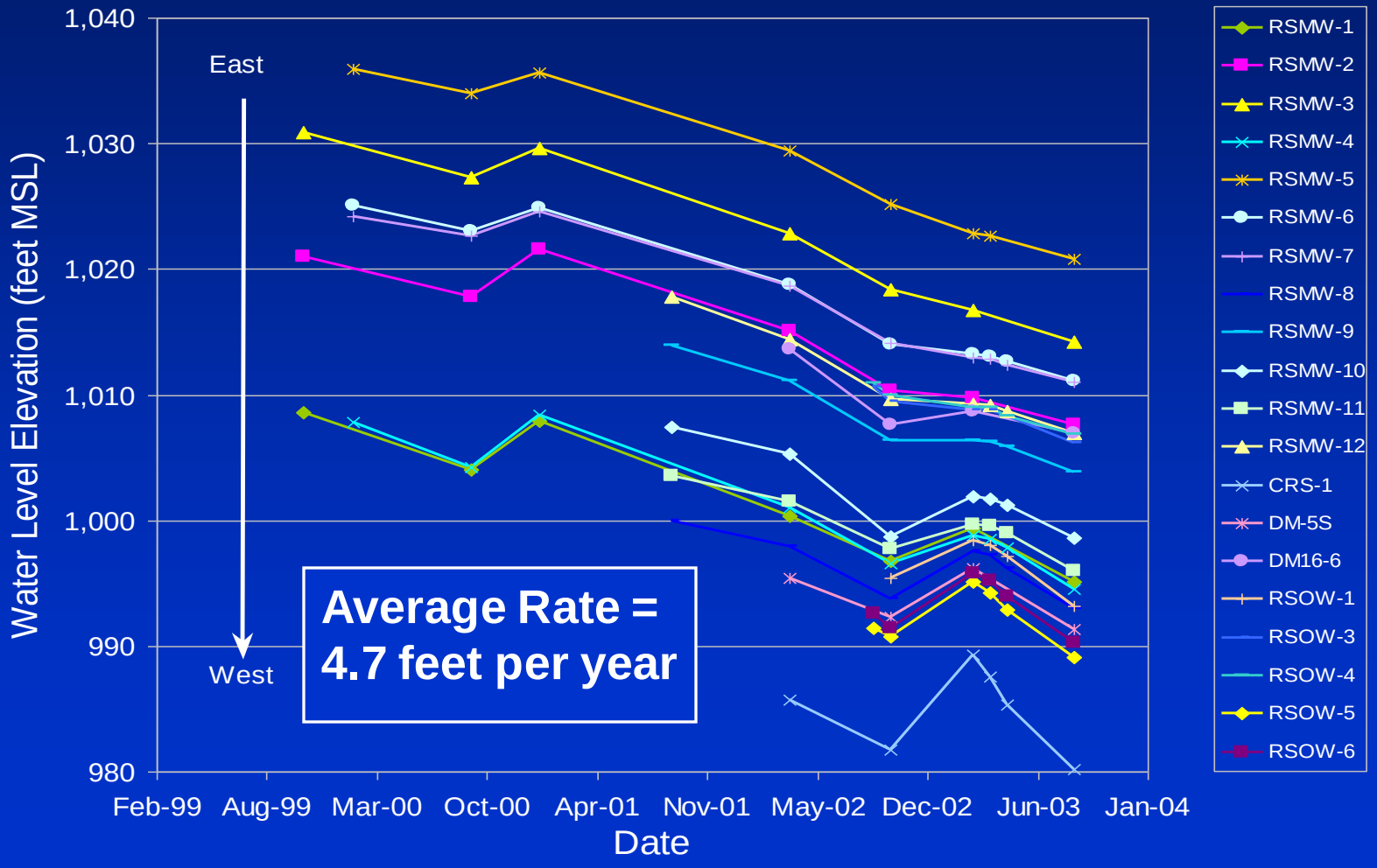
Drawdown Trend Assumptions

- No recharge
- No aquifer boundaries
- No interference from other wells
- Regional water level remains constant

Hydrographs from Nearby Wells



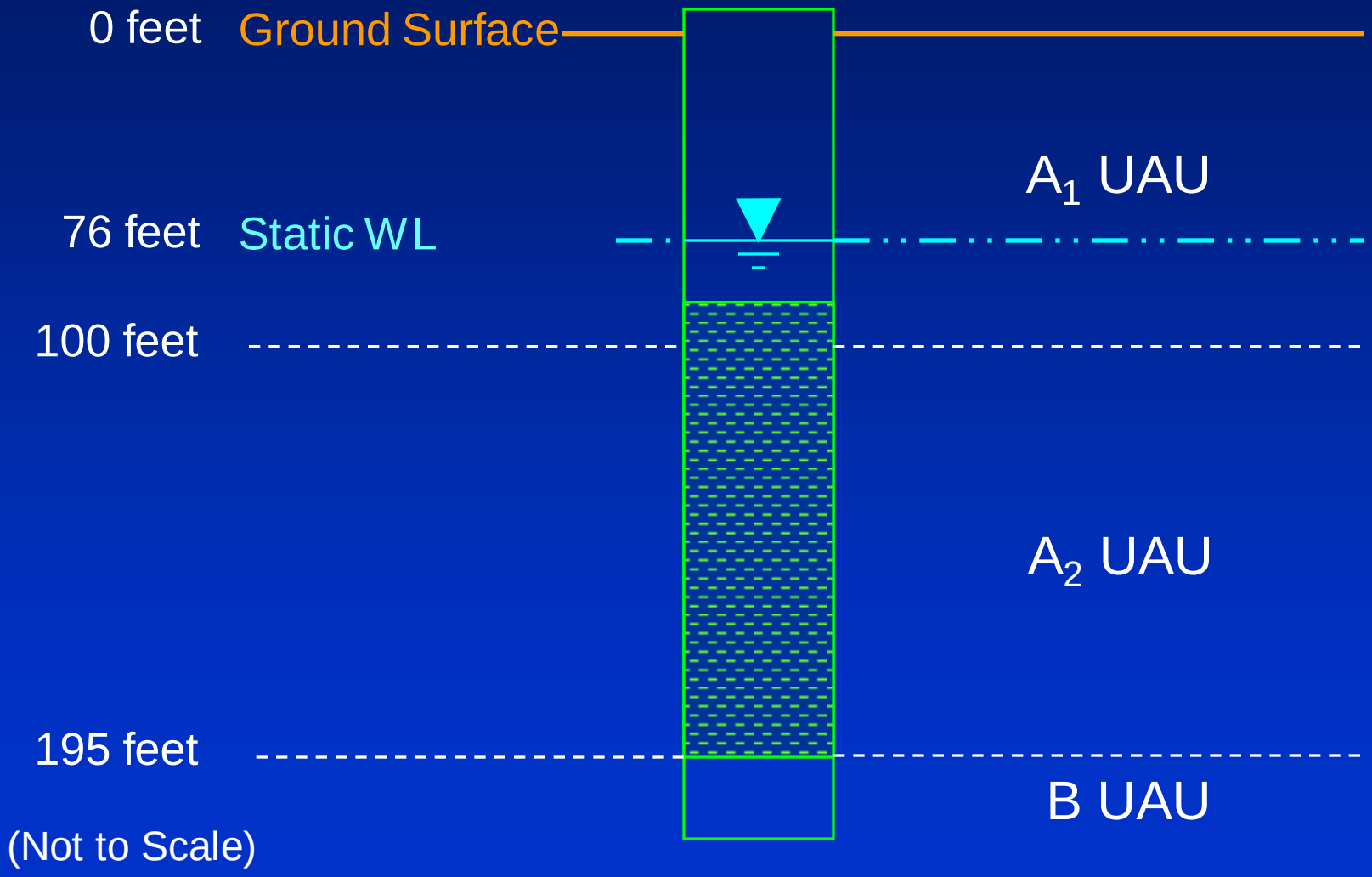
Continued Groundwater Decline Evident in Project Monitor Wells



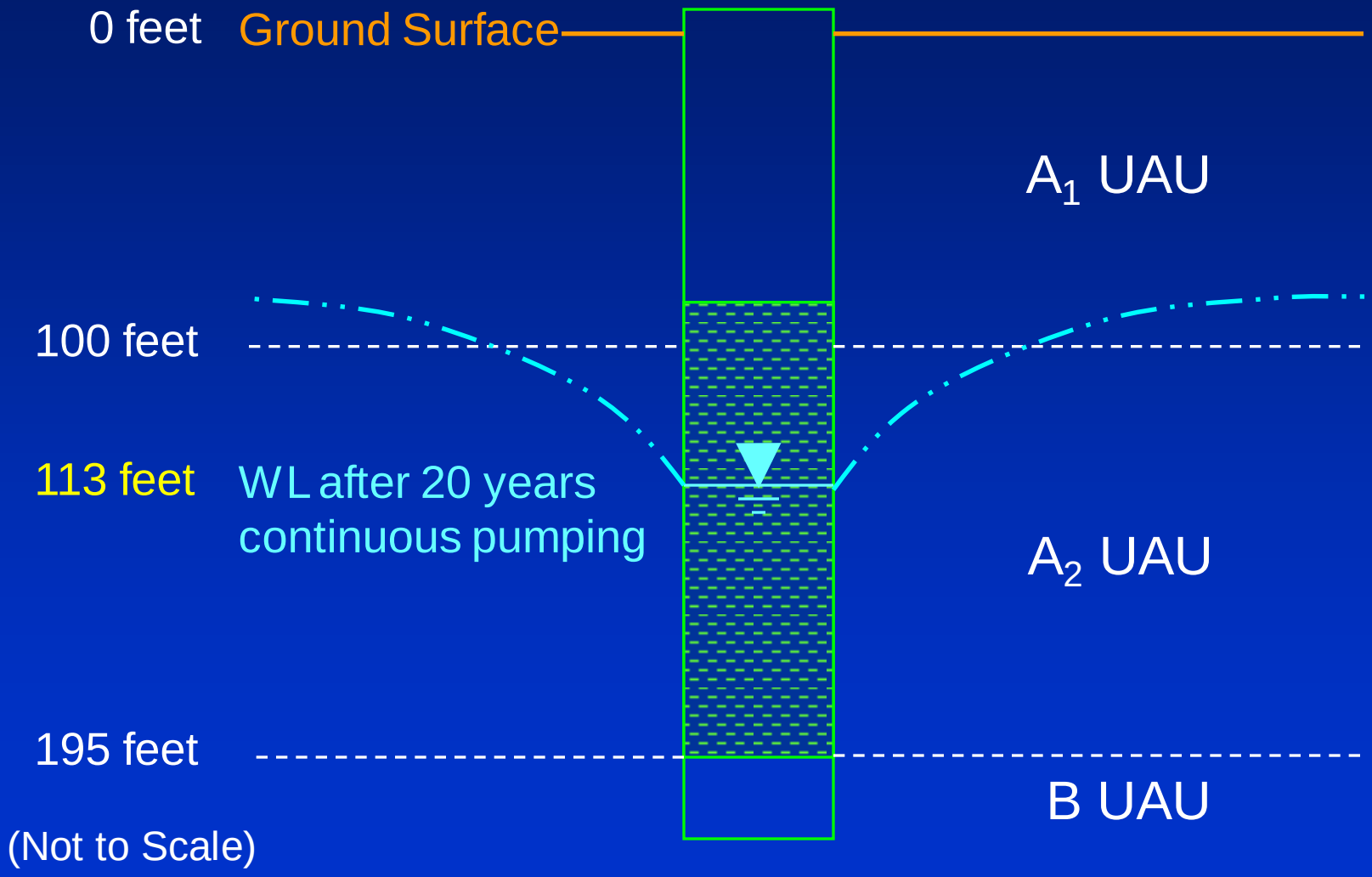
Water Supply Sustainability of Subunit A of UAU

- Will a production capacity of 1,200 gpm per well be sustainable for wells completed solely in Subunit A?

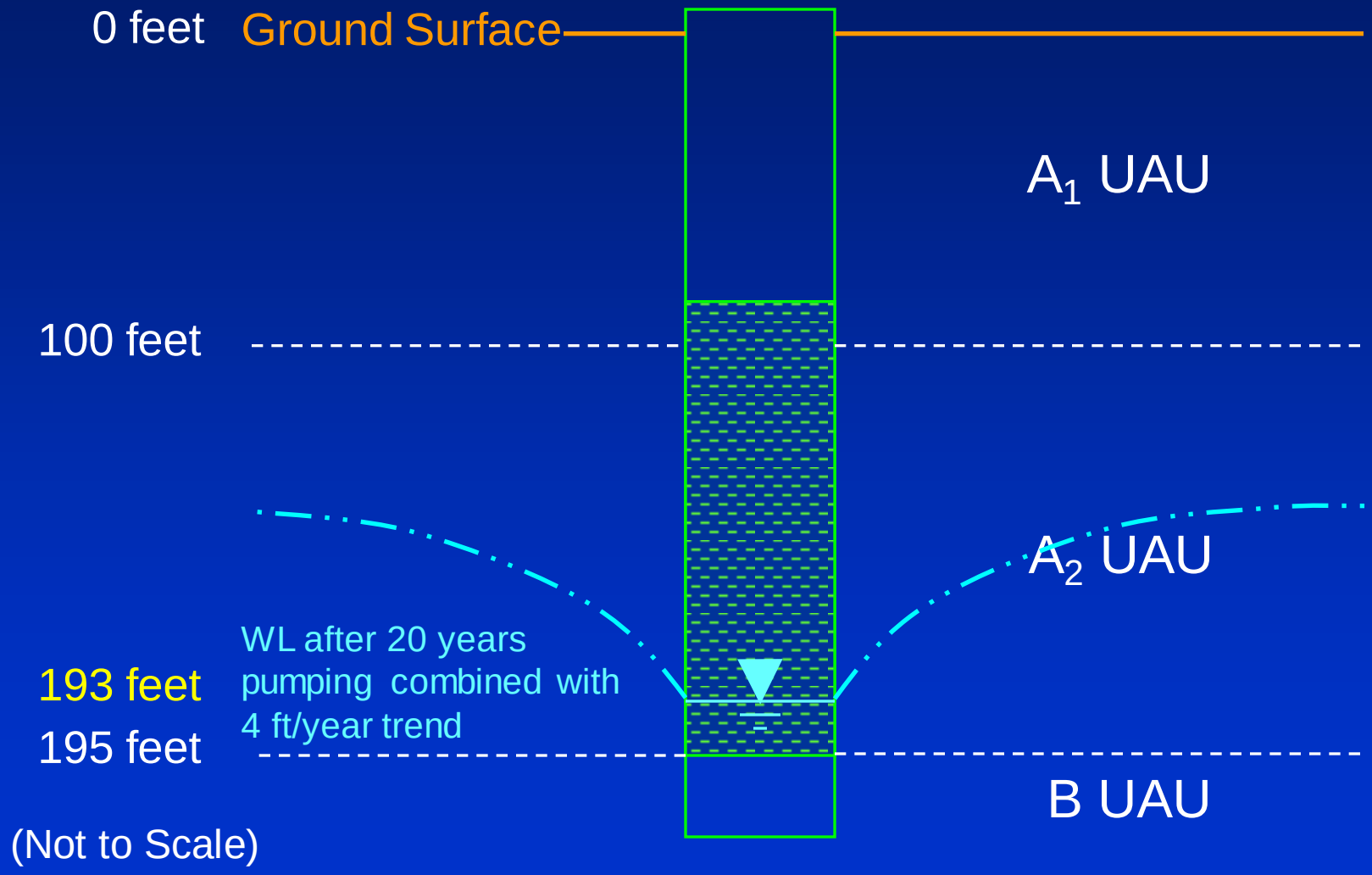
Static Conditions



Pumping Conditions



Projected Pumping Under Continued Dry Regional Conditions



Sustainable Water Supply

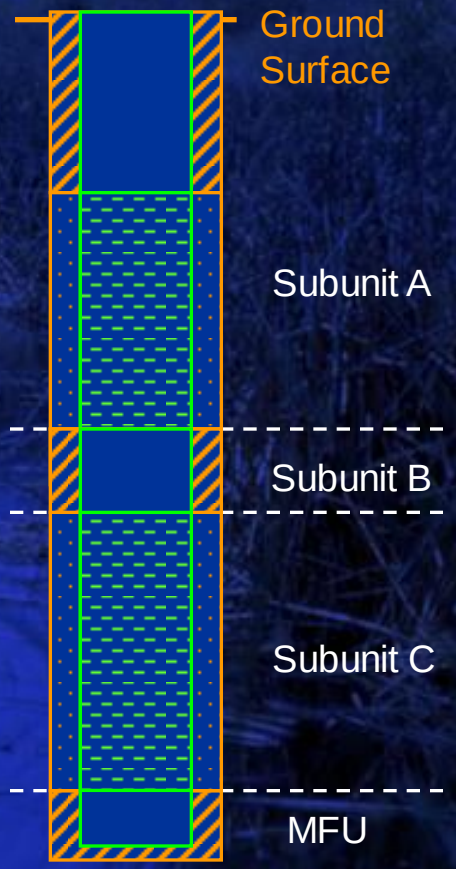
- Subunit A may not sustain the water supply required

WHAT NOW?

- Obtain supplemental groundwater from Subunit C of the UAU to meet water supply demand

Why Install Production Wells to bottom of UAU?

- Subunits A and C have similar hydraulic conductivities
  - approximately 200 ft/d
- Additional 100 to 120 feet of saturated thickness increases T
  - Estimated T = 310,000 gpd/ft
- Drilling beyond UAU may create a conduit
- Wells still qualify as recovery wells

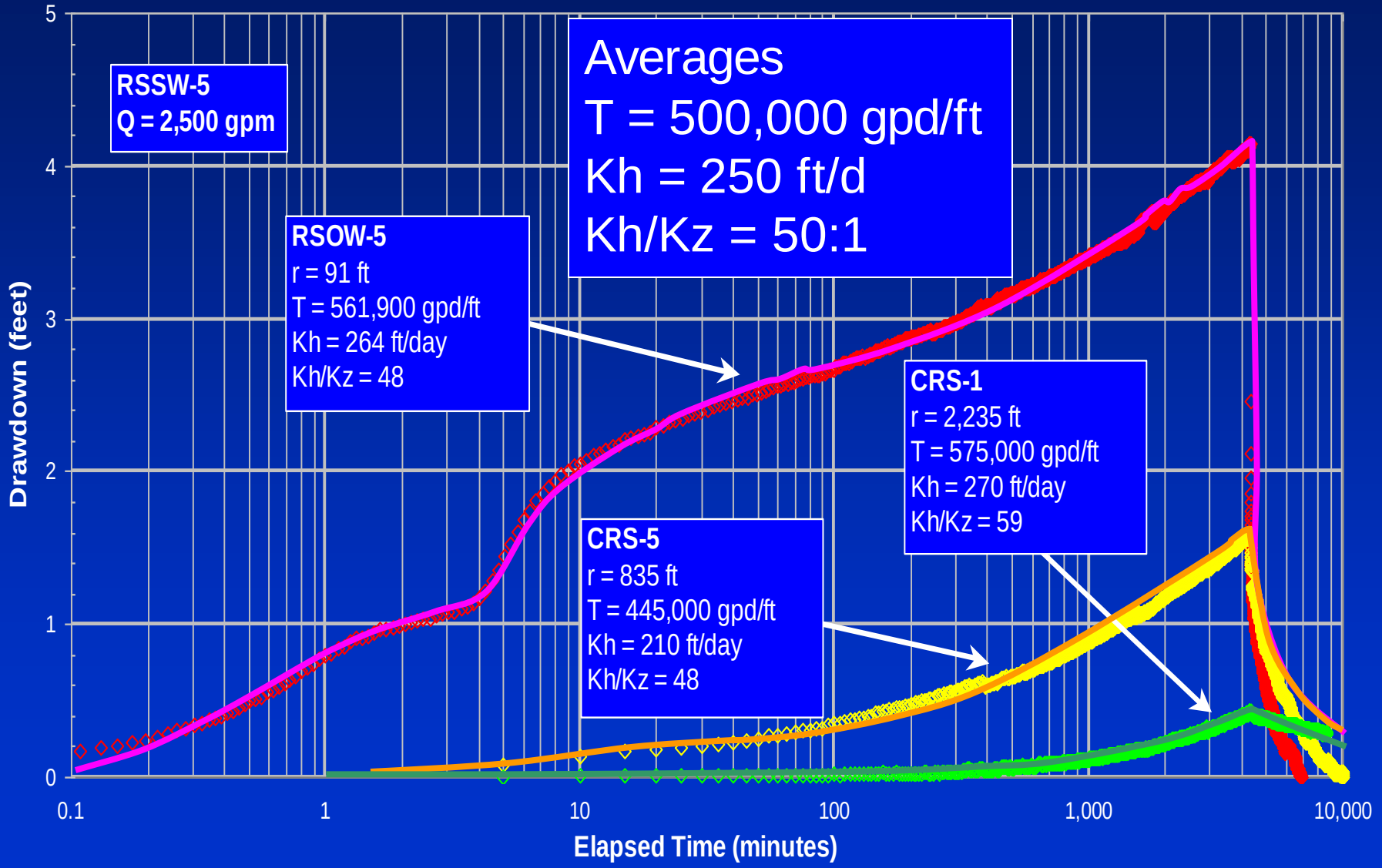


Aquifer Testing

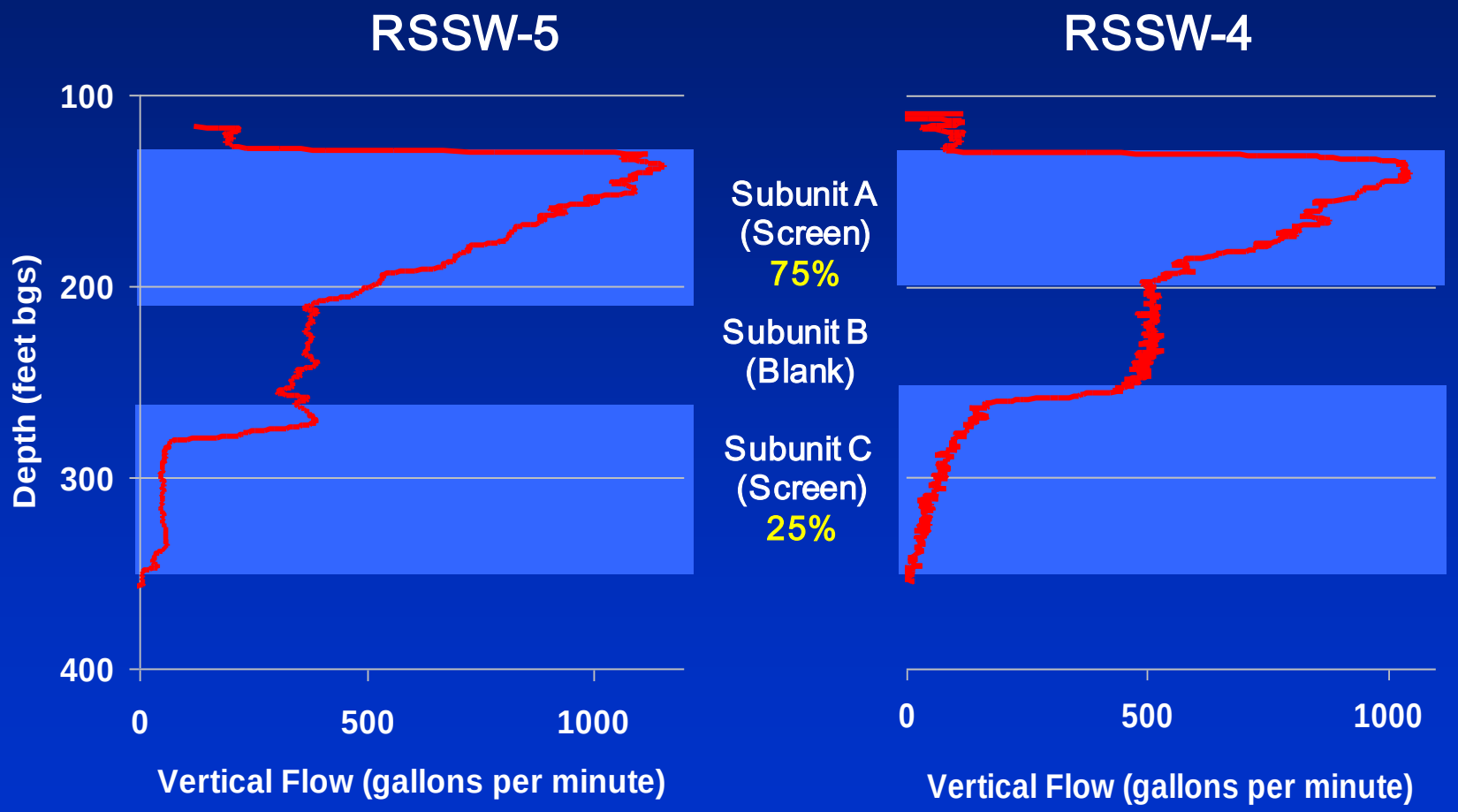
Aquifer Testing

- Estimated aquifer parameters from drawdown data using AQTESOLV®
  - Theis (1935) and Theis Residual Drawdown
  - Cooper-Jacob (1946) Time-Drawdown and Distance-Drawdown
  - Neuman (1974) Delayed Yield

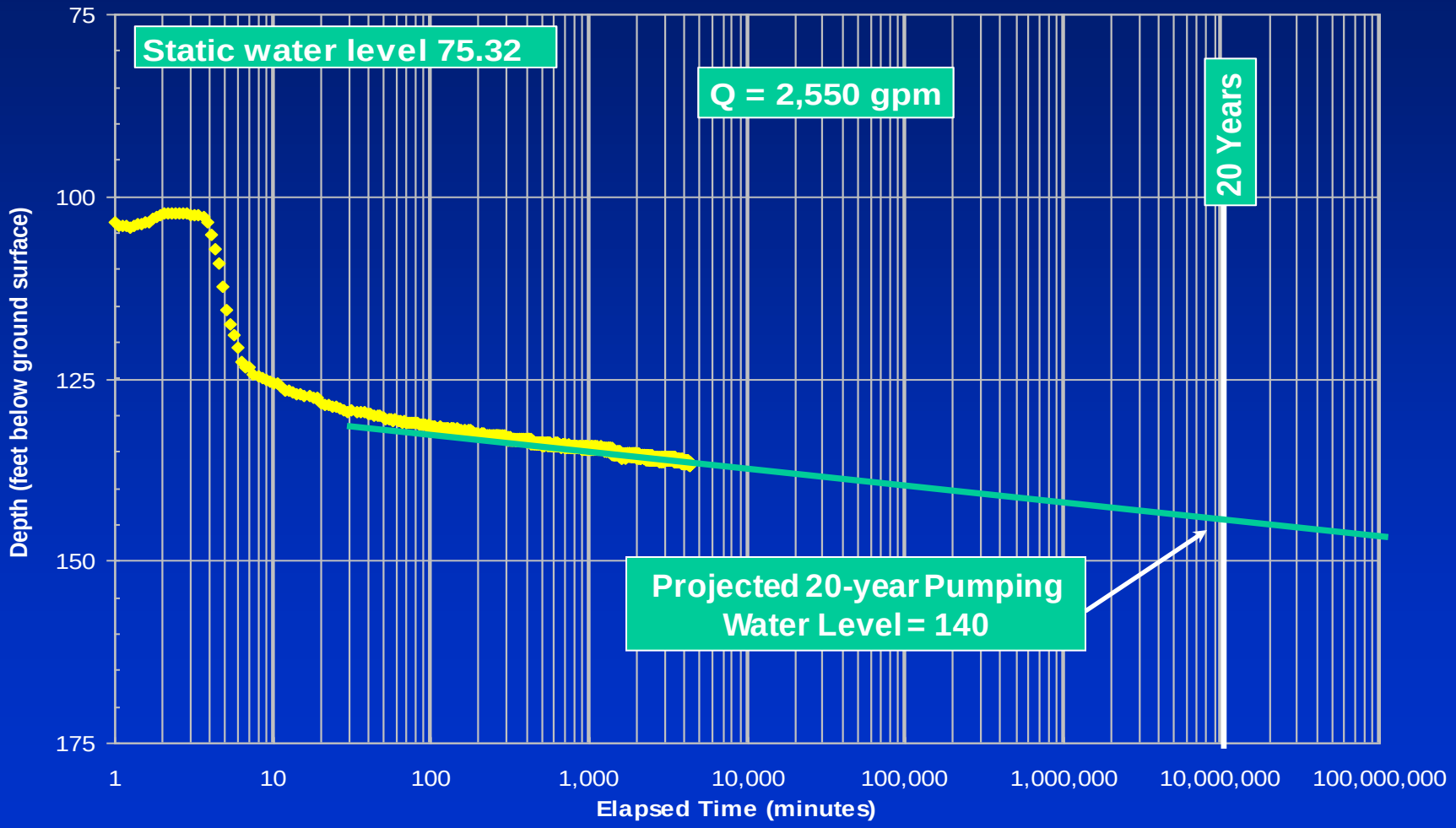
Neuman Curve Matches



Dynamic Spinner Logs



RSSW-5 Drawdown Projection



Conclusions:

- Unique investigation resulted in drilling program modifications
- Assessed hydraulic properties of UAU
  - Subunit A may not sustain supply
  - Subunits A & C will sustain supply
- UAU can sustain long-term pumping
- Reliable water supply for environmental restoration