WORKSHOP ON THE USE OF THE PONDS COMPUTER PROGRAM TO MODEL STORMWATER MANAGEMENT SYSTEMS IN MARION COUNTY AND SURROUNDING AREAS

presented by
Devo Seereeram, Ph.D., P.E.
Professional Geotechnical Engineer
www.iag.net/~devo

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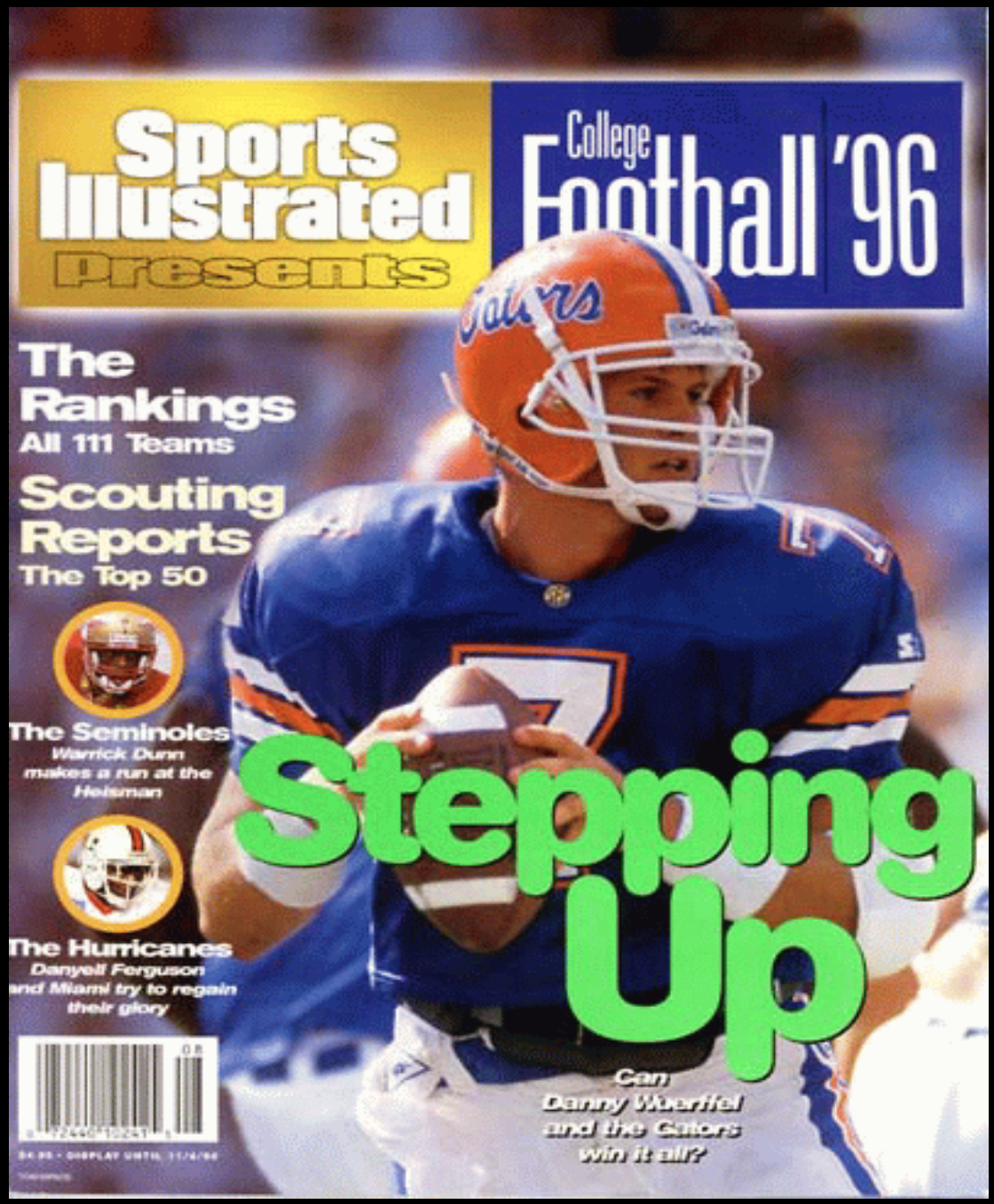

Sports Illustrated Presents
College Football '96
The Rankings
All 111 Teams
Scouting Reports
The Top 50
The Seminoles
Warrick Dunn makes a run at the Heisman
The Hurricanes
Danyell Ferguson and Miami try to regain their glory
Stepping Up
Can Danny Wuerffel and the Gators win it all?

AGENDA

PONDS WORKSHOP - MARION COUNTY

- ★ Review list of “Essential Tools” needed by engineer
- ★ Review conceptual models which typify Marion County & the surrounding areas
- ★ Overview the unique hydrogeology of the Marion County area and its bearing on the performance of stormwater management & WWTF percolation ponds
- ★ Overview of the *PONDS* computer program and input data requirements. Special review of the soil and groundwater parameters.
- ★ Field & laboratory geotechnical test procedures to estimate the soil & ground water parameters

AGENDA (continued)

PONDS WORKSHOP - MARION COUNTY

- ★ Computer demonstration of example problems using criteria of the following permitting agencies: SWFWMD, SJRWMD, City of Ocala, Marion County, FDEP, and FDOT. Note: representatives of the above agencies are here to answer directly any questions you may have regarding regulatory criteria.
- ★ Computer demonstration of *PONDS* Version 3.0.3 Beta for Windows 95 (the latest version) and its new features and enhancements.
- ★ Geotechnical construction considerations for stormwater & perc ponds in the Marion County area.

ESSENTIAL TOOLS

PUBLISHED DATA IN YOUR LIBRARY - HYDROGEOTECHNICAL

- ★ **USGS 7.5 minute series quadrangle map**
- ★ **NRCS Soil Survey Book.**
  - **Official soil series descriptions can also be found at the following internet web site:**
    - *http://www.statlab.iastate.edu/cgi-bin/masoud/osd/get_osd*
- ★ **Most recent potentiometric surface map for area (normally available from USGS office in Altamonte Springs, phone: 865-7575; or Tampa 813-243-5800)**

ESSENTIAL TOOLS (continued)

PUBLISHED DATA IN YOUR LIBRARY - HYDROGEOTECHNICAL (contd)

- St. Johns River Water Management District. August 1993. *Full-Scale Hydrologic Monitoring of Stormwater Retention Ponds and Recommended Hydro-geotechnical Design Methodologies.* Special Publication SJ93-SP10. This is a free publication which can be obtained by calling 904-329-4132

- Faulkner, G.L. March 1973. *Geohydrology of the Cross-Florida Barge Canal Area With Special Reference to The Ocala Vicinity*. Water-Resources Investigation 1-73, U.S. Geological Survey. Out of print; get copy from friend

- Phelps, G.G. 1994. *Hydrogeology, Water Quality, and Potential for Contamination of the Upper Floridan Aquifer in the Silver Springs Ground-Water Basin, Central Marion County, Florida.* U.S. Geological Survey Water Resources Investigations Report 92-4159. Call USGS office in Altamonte Springs

ESSENTIAL TOOLS (continued)

PUBLISHED DATA IN YOUR LIBRARY - HYDROGEOTECHNICAL (contd)

- Lane, Ed and R.W. Hoenstine. 1991. *Environmental Geology and Hydrogeology of the Ocala Area, Florida.* Special Publication No. 31, Florida Geological Survey
- Rohrer, K. August 1984. *Hydrologic Reconnaisance of Marion County*. Technical Publication SJ84-6, St. Johns River Water Management District.
- Southwest Florida Water Management District. August 1987. *Ground-Water Resource Availability Inventory: Marion County, Florida*.
- Sinclair, W.C., et al. 1985. *Types, Features, and Occurence of Sinkholes in the Karst of West-Central Florida*. Water-Resources Investigations Report 85-4126, U.S. Geological Survey.
- St. Johns River Water Management District. May 1988. *"Draft Applicant's Handbook - Karst Sensitive Areas*". Department of Resource Management

ESSENTIAL TOOLS (continued)

SITE-SPECIFIC DATA

- ★ Plan of property with topographic contours and location of pond; predevelopment ground surface elevations
- ★ Characteristics of the predevelopment & postdevelopment contributing drainage area
- ★ Stage-area data of pond, including proposed pond bottom elevation relative to existing grade
- ★ Geotechnical report with borings and recommended aquifer parameters
- ★ Conseqeunce of failure of pond - how sensitive?
- ★ Proximity of proposed ponds to adjacent ponds

ESSENTIAL TOOLS (continued)

RELEVANT REGULATORY CRITERIA - NEED TO KNOW
design storm events, discharge rates, discharge volumes, recovery times

- ★ MARION COUNTY
- ★ CITY OF OCALA
- ★ SJRWMD
- ★ SWFWMD
- ★ FDOT (we will talk about the 48 storm matrix & how Version 3 of Ponds will take care of this time consuming task)
- ★ FDEP (mainly for WWTF perc ponds & sprayfields)

ESSENTIAL TOOLS (continued)

SOFTWARE

- ★ **TR 55 Version 2 - used for computing time of concentration and weighted curve numbers. Available free from NRCS office in Gainesville (904-338-9555, ask for Gene Daugherty or Jesse Wilson)**
- ★ **PONDS Version 2.26 or Version 3**
- ★ **May need USGS MODFLOW for WWTF percolation pond analysis. Will explain why later. However, this should only be used by experienced modelers.**
- ★ **May need adICPR to interface with PONDS if dealing with complicated system of interconnected ponds.**

WHAT IS A CONCEPTUAL MODEL?

PONDS WORKSHOP - MARION COUNTY

A conceptual model is a pictorial representation of the ground water flow system. In the practice of developing a conceptual model, it is desirable to strive for parsimony, by which it is implied that the conceptual model has been simplified as much as possible yet retains enough complexity so that it adequately reproduces system behavior.

The conceptual models described in this presentation can be applied to the majority of design situations in the Marion County area & similar settings.

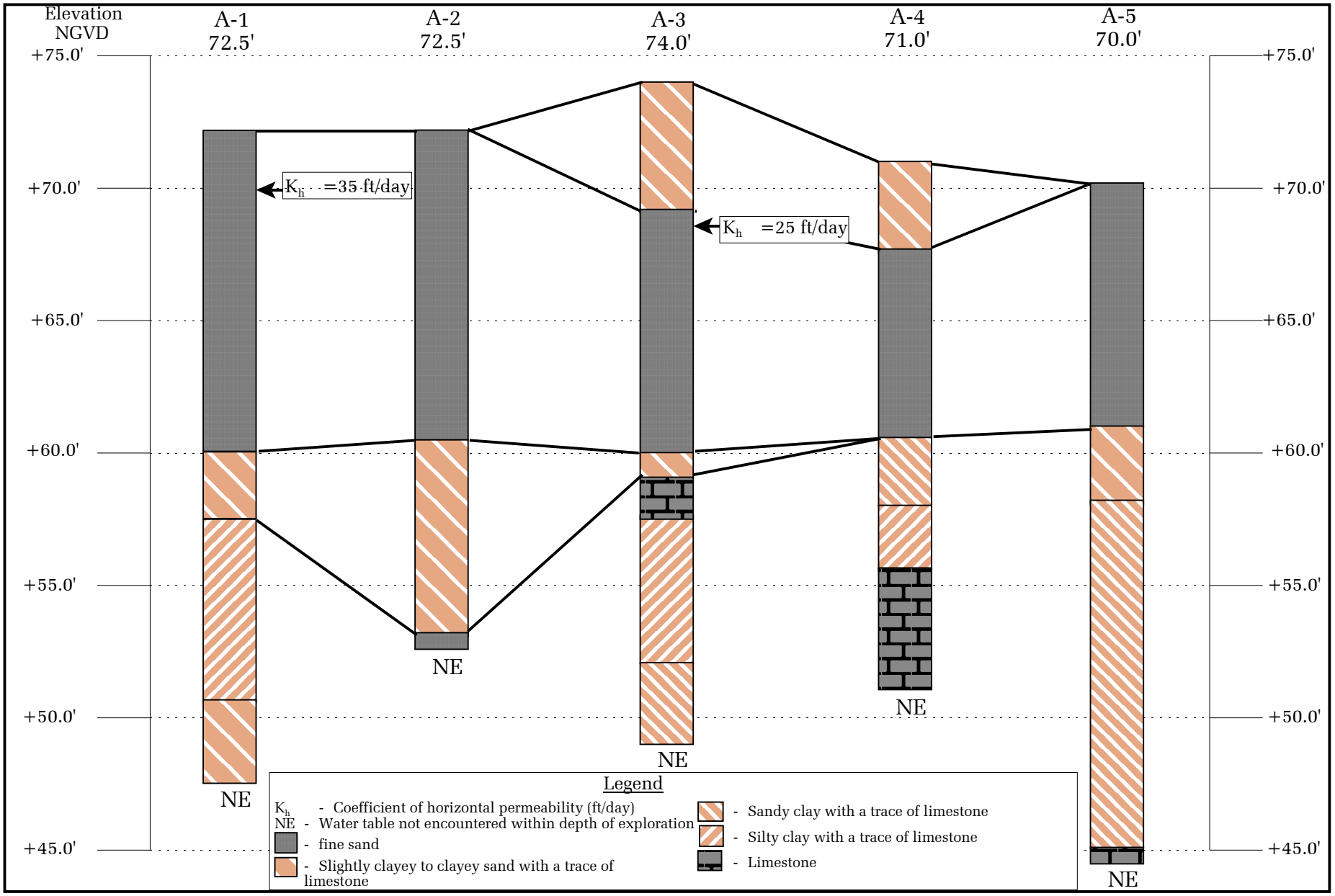


Figure 9. Site Specific Stratigraphic Cross-Section (A-1, A-2, A-3, A-4 & A-5) Project: Marion Landings

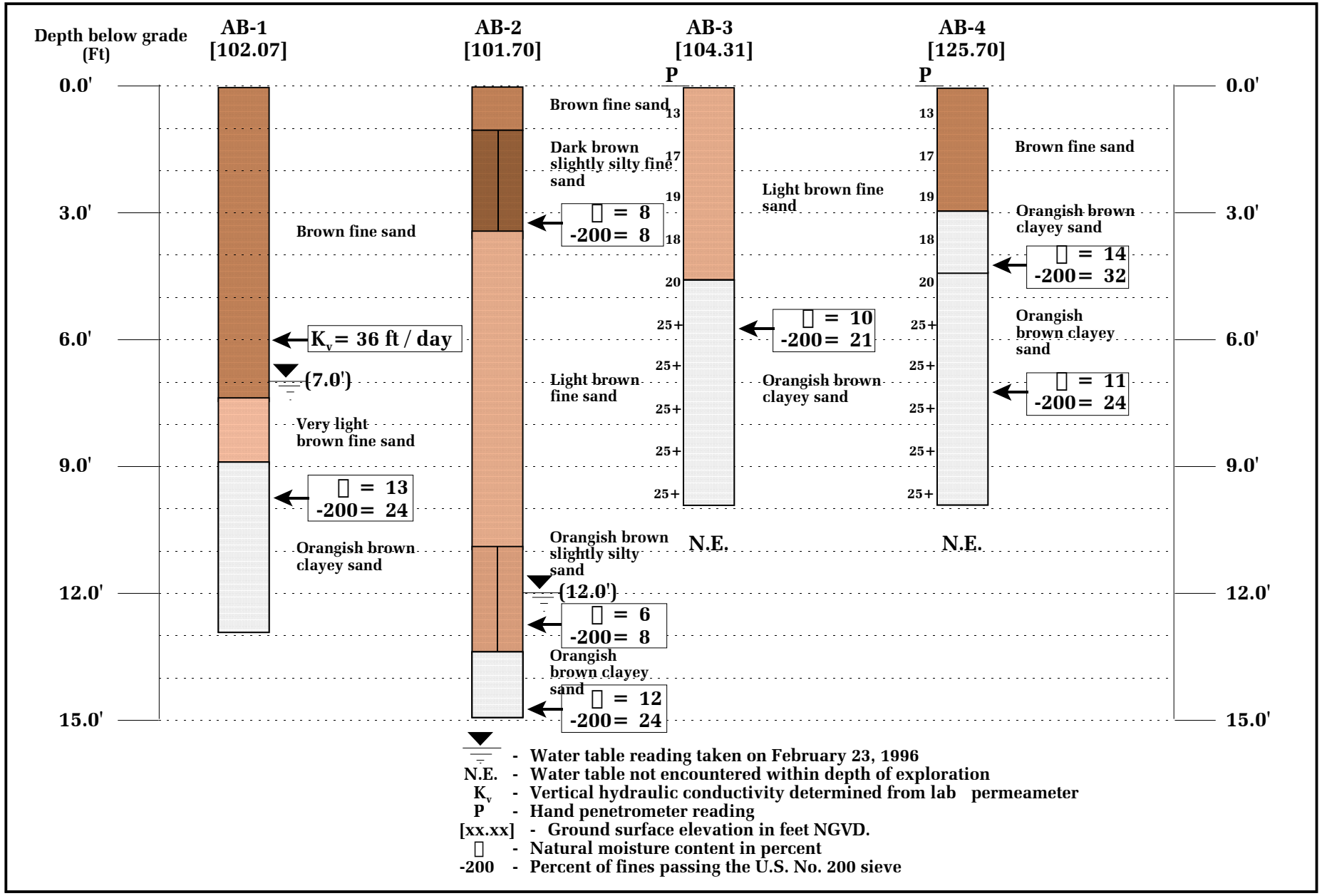


Figure 4. Soil Profiles AB-1, AB-2, AB-3 & AB-4 **Project: Stonecrest Golf Course Maintenance Facility**

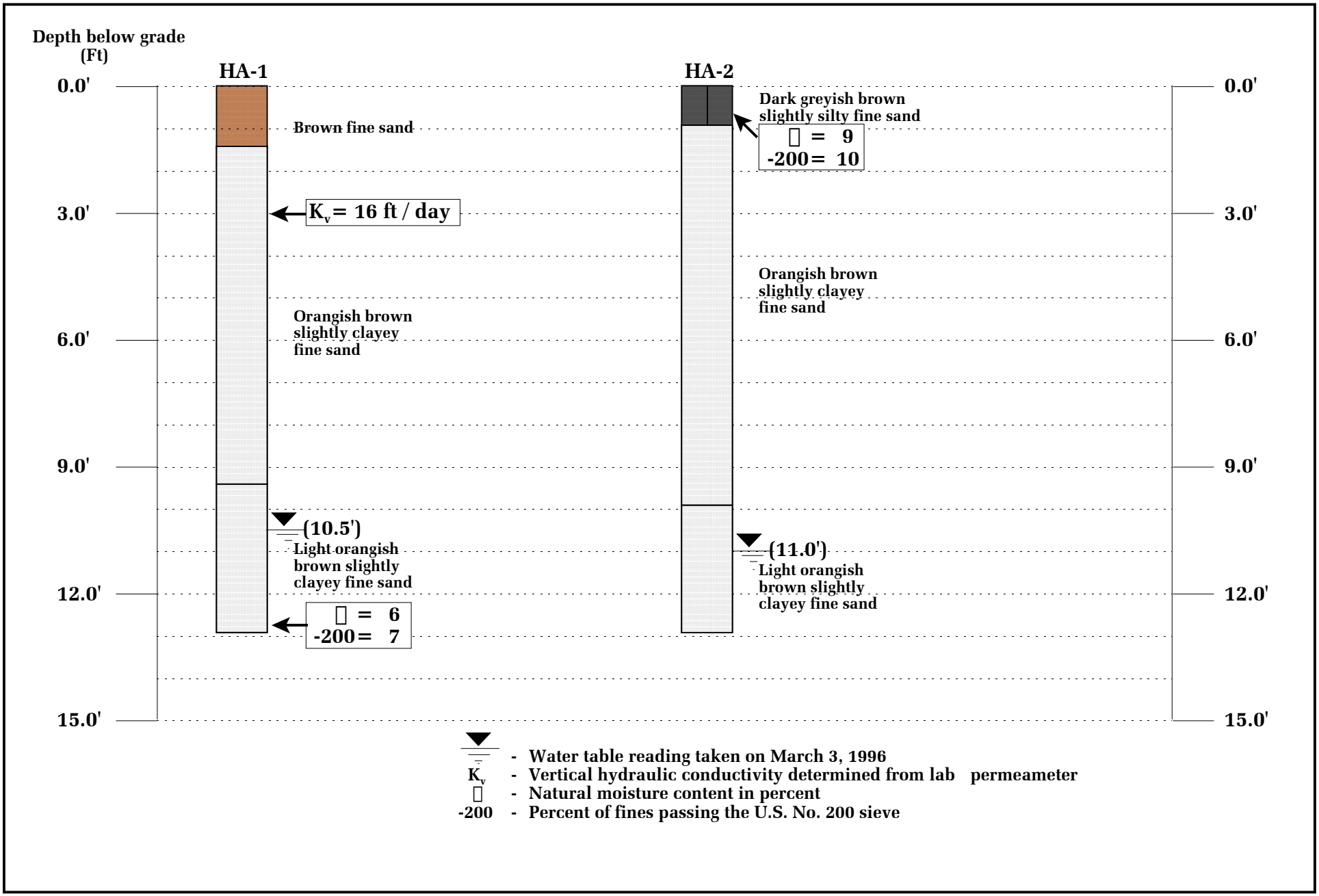
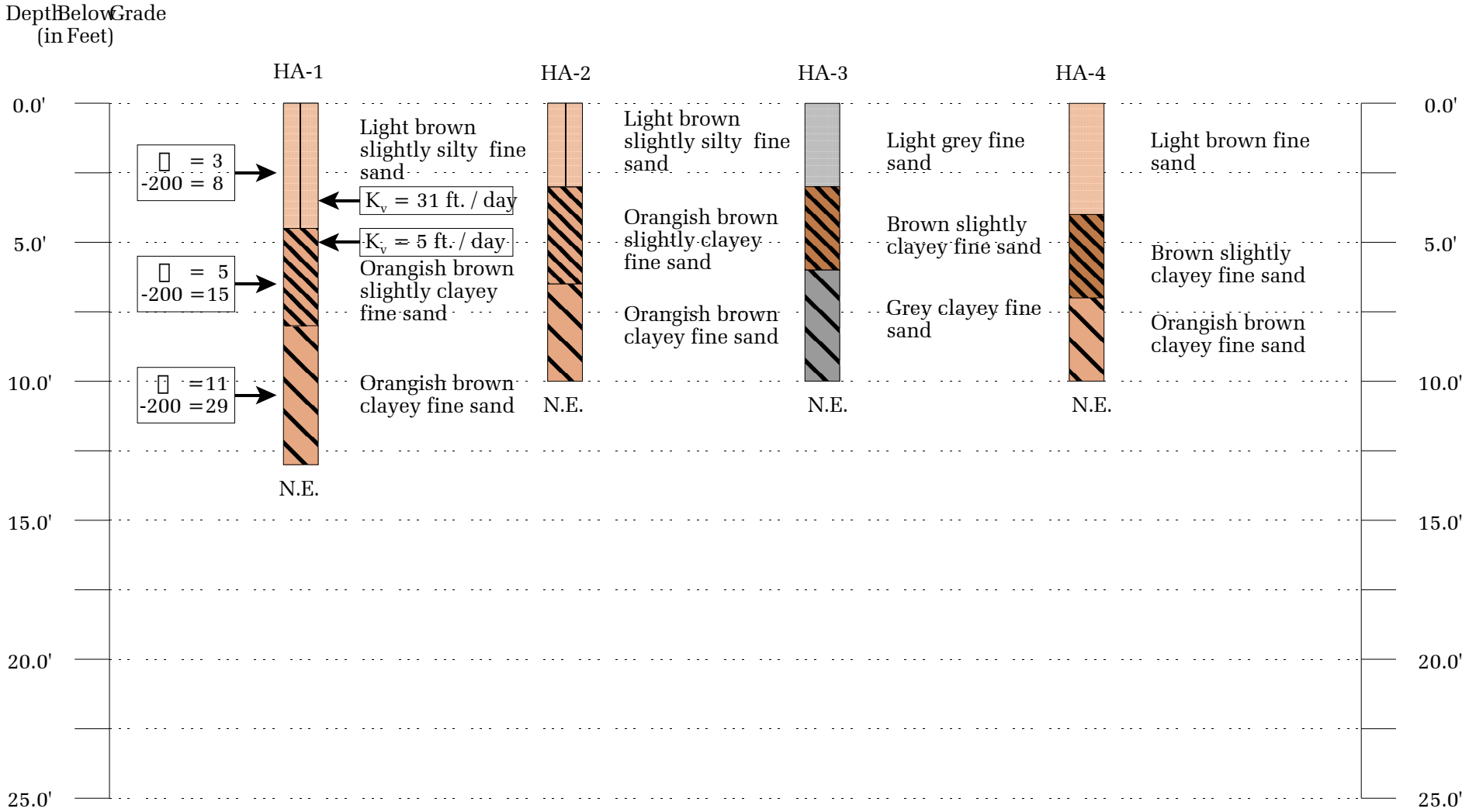


Figure 4. Soil Profiles HA-1& HA-2 **Project: Palm Chevy- Geo Used Car Lot**



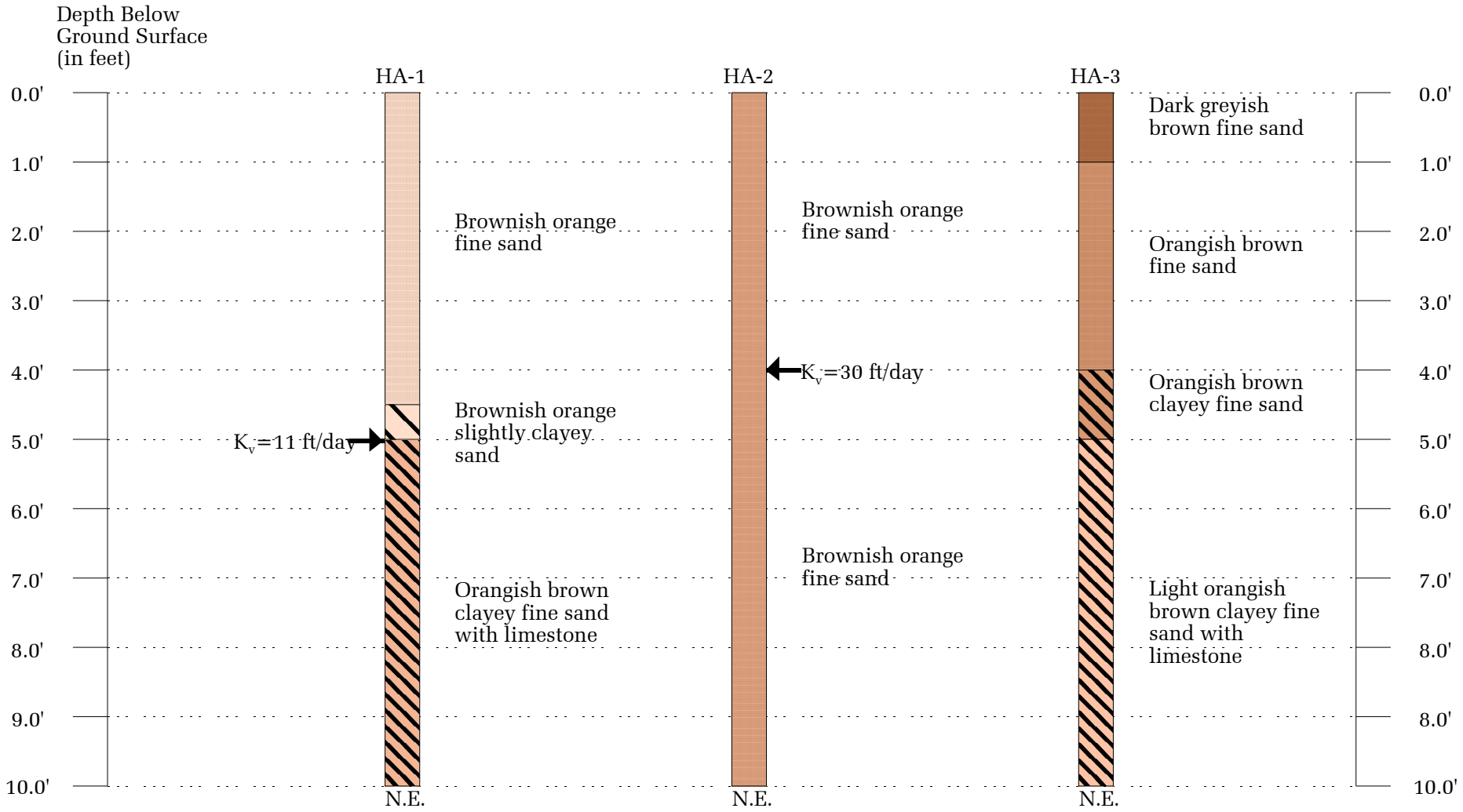
Water table readings taken on December 16, 1995

- Natural moisture content in percent

-200 - Percent of fines passing the U.S. No. 200 sieve

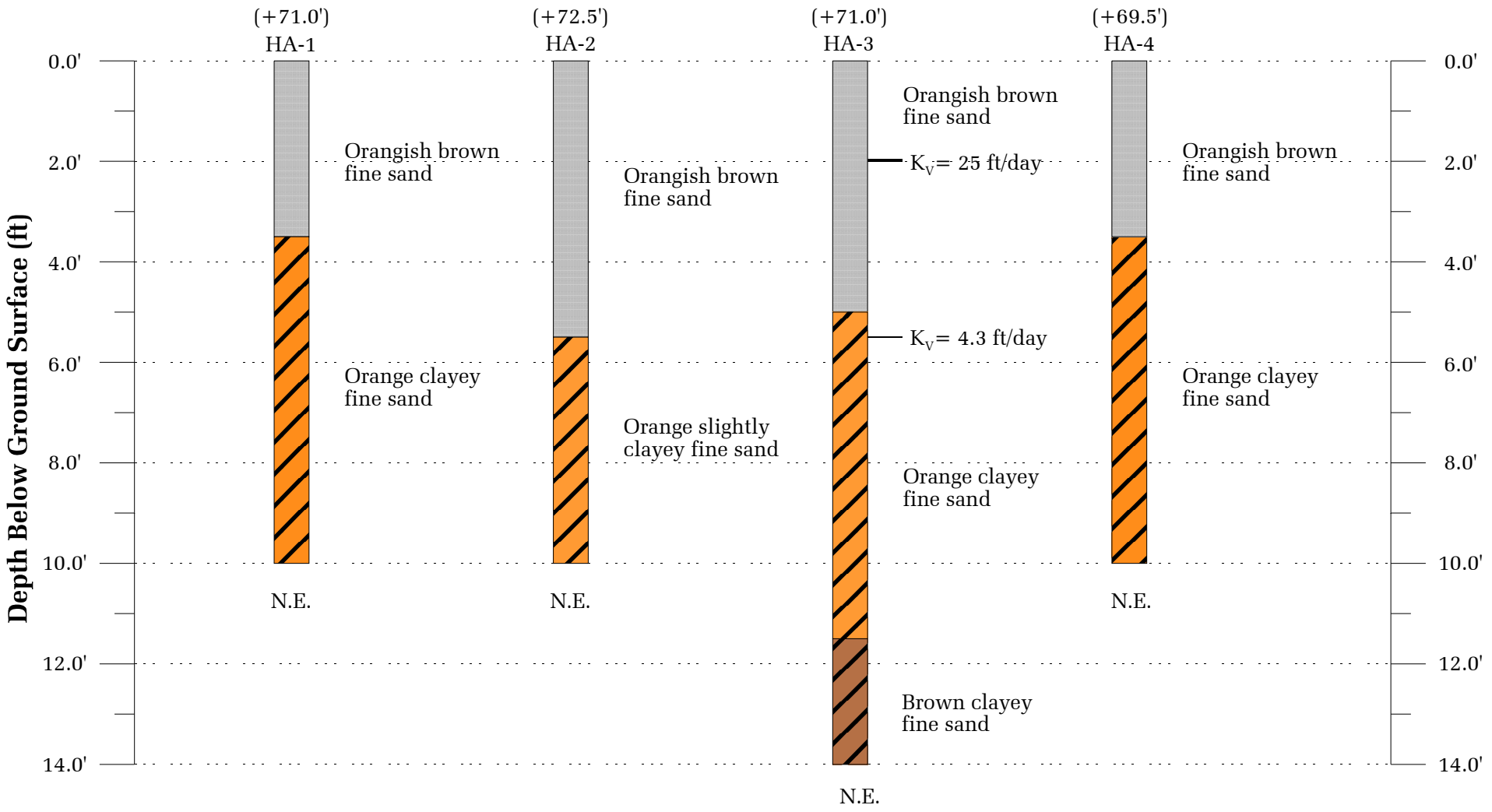
N.E. - Water table not encountered within depth of exploration

K_v - Vertical hydraulic conductivity determined from lab permeameter



N.E. = water table was not encountered within depth of exploration on date of drilling (Sep. 23, 1995)

K_v = Vertical hydraulic conductivity measured in laboratory permeameter apparatus

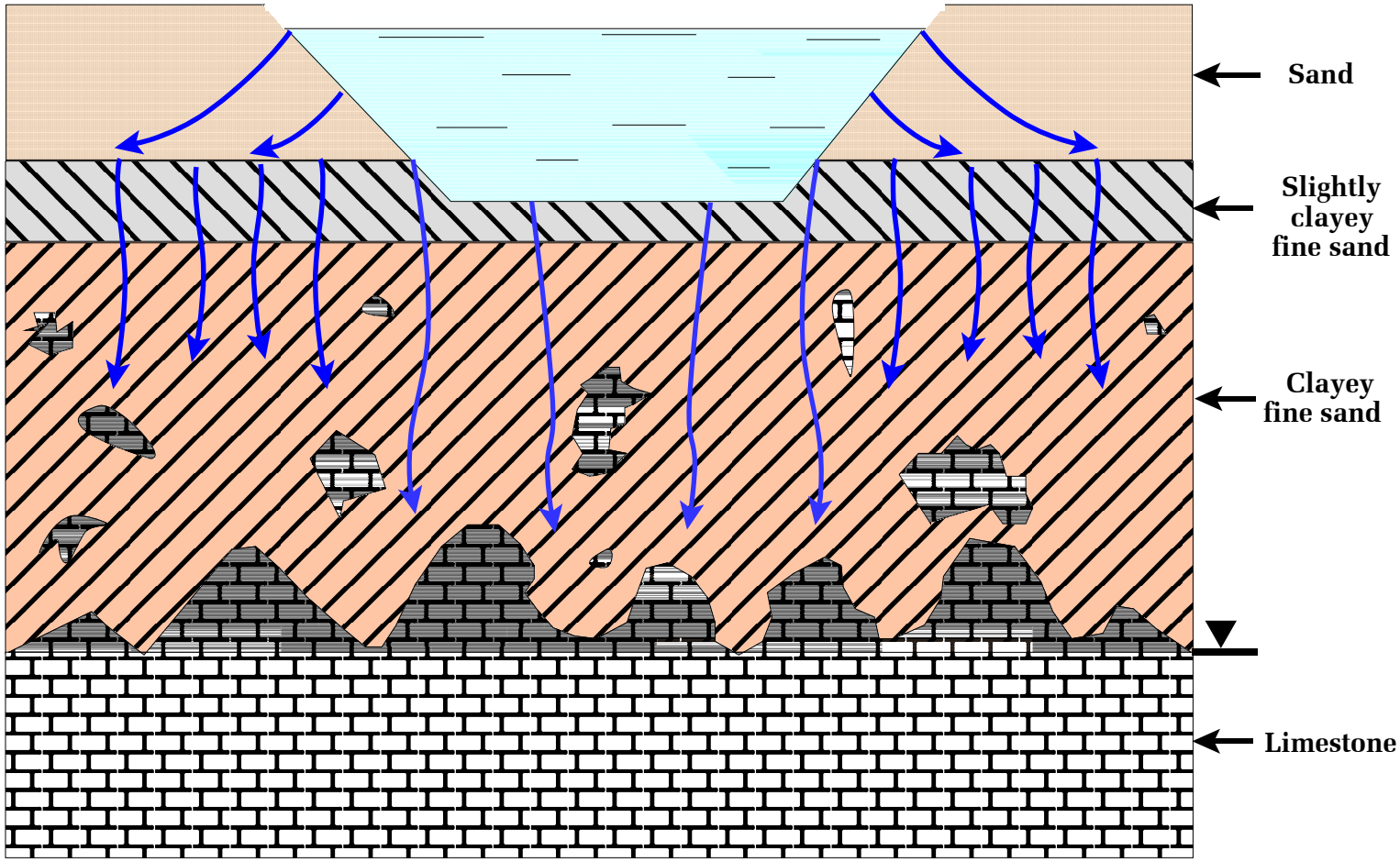


K_V= Vertical hydraulic conductivity as determined by laboratory permeameter test

N.E. = Water table was not encountered at depth of exploration

(+71.0') = Approximate ground surface elevation (ft NGVD)

CONCEPTUAL MODEL #1 - STORMWATER POND

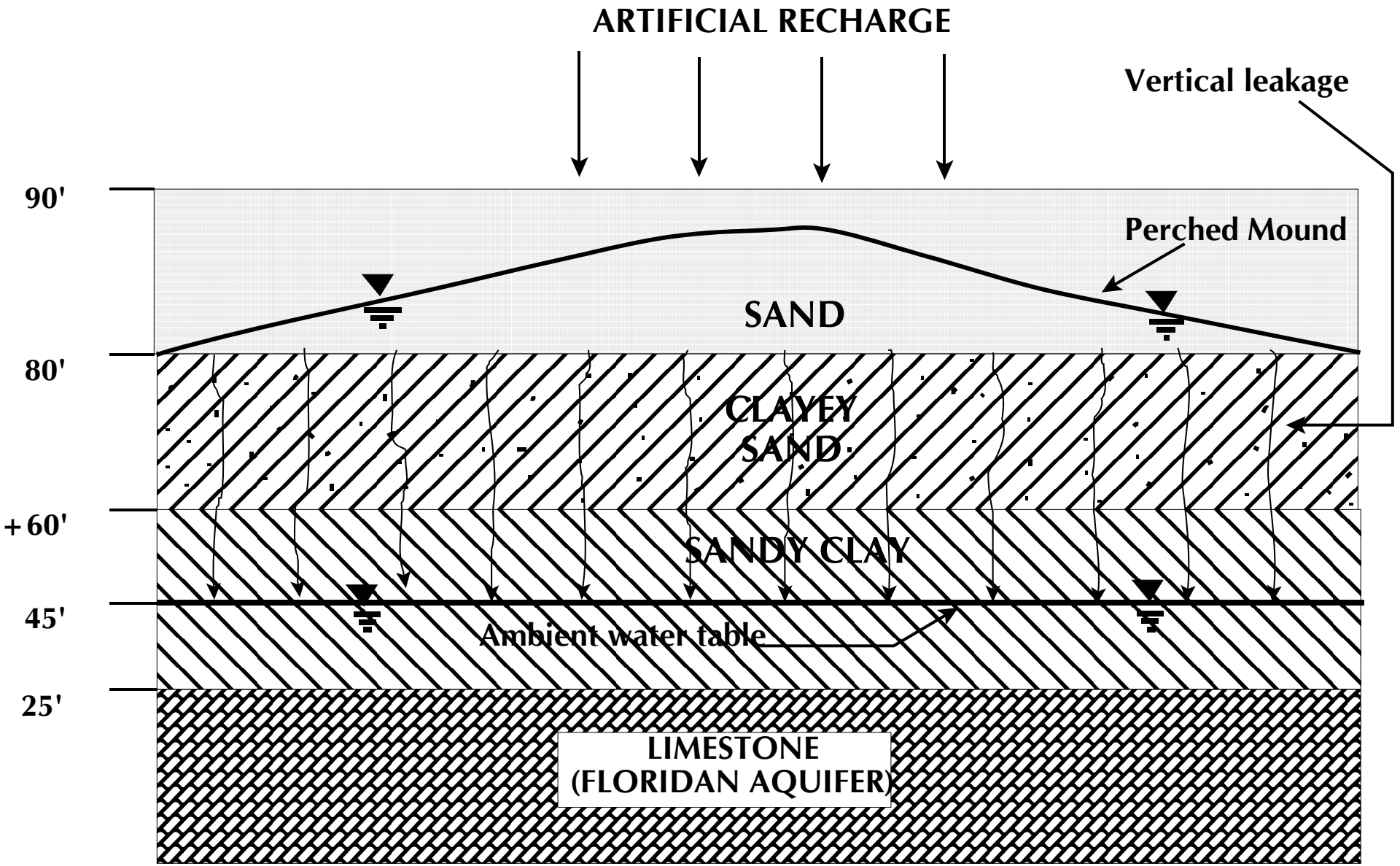


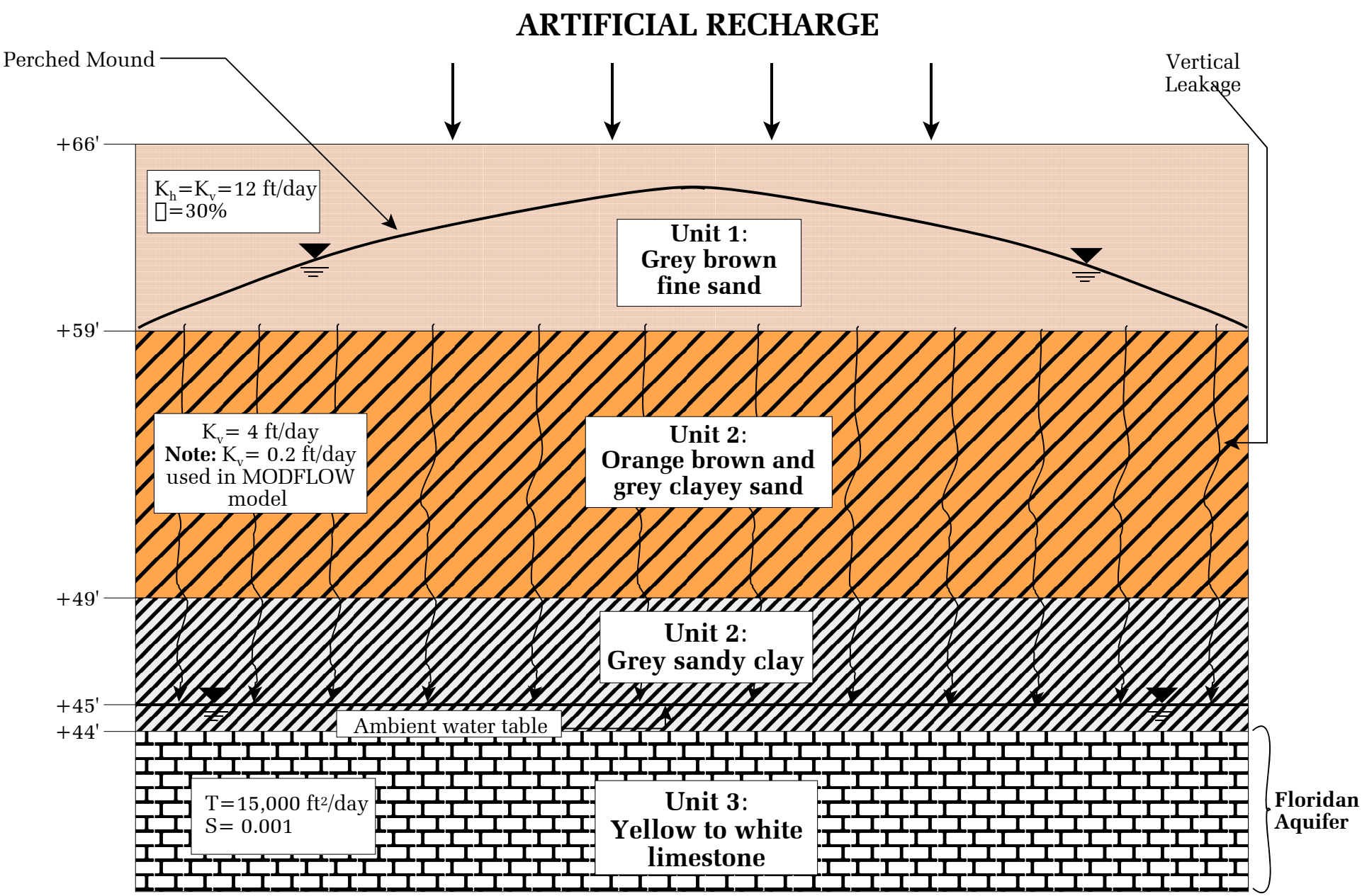
pond bottom excavated into first clayey sand layer
important not to remold & compact clayey sand layer
note: loading rate is rapid, water does not have much time to spread out


clay was compacted in
bottom, leading to
perched condition

CONCEPTUAL MODEL #2 - WWTF PERC POND

note: the lateral mounding in the upper sand is significant here, loading is long-term





Note: Perched mound develops only if artificial recharge rate exceeds the vertical leakage rate

Model Predicted Ground Water Mound in Layer #1
Oak Muir Village Mobile Home Park - 35,000 gpd Perc Pond
(scale: 1" = 100 ft)