COVER SYSTEM DESIGN REPORT

4/22/2026

Schmitt Decline Abandoned Uranium Mine Site Closure, McKinley County, NM

Prepared by:
Stephen F Dwyer, PhD, PE

Prepared for:
New Mexico Environment Department
Office of the Secretary
Office of Strategic Initiatives
Uranium Mine Reclamation Program
Harold Runnels Building
1190 South Saint Francis Drive
Santa Fe, NM 87505

EXECUTIVE SUMMARY

A final cover system has been designed for the closure of the Schmitt Decline Uranium Mine Site to isolate the underlying mine adit and waste rock from the surrounding environment. The analyses in this design report show that the cover profile will meet the applicable or relevant and appropriate requirements (ARARs). It will achieve this by 1) providing long-term erosion protection, 2) reducing radon flux to not exceed 20 picocuries per meter squared per second (piC/m2s), and 3) minimizing the flux of meteoric water through the cover into the underlying waste rock. This cover system, known as an Evapotranspiration (ET) Cover, will also support the growth of native vegetation and visually blend with the surrounding topography.

Table of Contents

FIGURES

TABLES

1.0 INTRODUCTION

The Schmitt Decline Mine is located in the San Mateo Creek (SMC) Basin along the southern margin of the underlying San Juan Basin. The Schmitt Decline Mine (NM0261, Site) is approximately 13 miles northeast of Milan, New Mexico in the northern portion of the Central Study Area of the SMC Basin. The Schmitt Decline Mine is located approximately 1.32 miles northwest of the intersection between New Mexico State Highways 509 and 605 within New Mexico Land Office managed land. It has sparse vegetation and an arid desert climate. An Evapotranspiration (ET) Cover was selected to be part of the final site closure capping the mine adit and waste rock material. The information summarized in this design report demonstrates the long-term effectiveness of the chosen approach.

2.0 Performance Objectives & Regulatory Criteria for Cover System

Refer to the Work Plan (EA 2025) for the Schmitt Decline Mine Site Assessment, McKinley County, New Mexico for regulatory and performance requirements governing the closure design and construction.

An Evapotranspiration (ET) Cover System is to be installed as the final cover system for the Schmitt Decline Mine site. This report presents an ET Cover System to achieve the regulatory and performance requirements, along with the performance objectives noted below.

To address the ARARs, a cover system is to be installed to restrict radon flux to meet the 20 picocuries per square meter per second (piC/m^2/s) requirement per 40CFR 192. The cover system was designed to ensure long-term performance up to 1,000 years (at least 200 years). The specific requirements for the 200-year performance are not explicitly stated. However, the following performance objectives can be inferred based on successful implementations of closures at similar sites:

- Erosion – minimize the potential for the formation of rills/gullies while reducing soil loss caused by surface water runoff and wind.
- Maintenance – design a system that requires minimal maintenance.
- Water balance – minimize the movement of water into the underlying waste materials.
- Vegetation – promotes the growth of vegetation native to the area.
- Aesthetics – constructs a cover system that blends with the surrounding topography.

3.0 EROSION

A significant challenge for maintaining the long-term integrity of a final cover system in the San Mateo, NM environment is erosion mitigation. To address this, the final geometry of the cover system was optimized using suitable and available local borrow soils and appropriate surface slope lengths. Additionally, rock will be incorporated into the top layer of the cover system to form a stable long-term surface sometimes referred to as a 'desert pavement'. This natural feature can be observed on stable side slopes such as that shown in Figure 1 on a hazardous waste site closure located in Farmington, NM. The combination of rock and cover soil on this upper surface prevents the formation of rills or gullies and minimizes soil loss caused by wind and surface runoff.

Figure 1. Desert Pavement' near Farmington, NM

The following subsections summarize the design methodology and calculations that were performed in order to develop an effective 'desert pavement'. Section 3.1 provides a summary of the design approach used for the rock/soil admixture. Section 3.2 outlines the long-term stability analysis conducted on the final slope according to the guidelines set forth in NUREG 1623 (NRC 2002), specifically for rocky soil conditions.

3.1 DESIGN OF COVER SURFACE LAYER (ROCK/SOIL ADMIXTURE)

Rock/soil admixtures provide an excellent means to minimize erosion while allowing for vegetation establishment without a significant reduction in evaporation (Waugh et al., 1994; Dwyer, 2003; Dwyer et al., 2007; EPA, 2011). Research conducted by Ligotke (1994) on erosion and Waugh (1994) on water balance indicates that incorporating a moderate amount of gravel into the topsoil cover can effectively control both water and wind erosion. It is expected that some fine particles will be removed from the admixture as wind and water flow over the cover, resulting in a durable, erosion-resistant surface often referred to as a "desert pavement".

3.1.1 DESIGN RAINFALL EVENT

The rainfall intensity value used for calculating the runoff volume was determined using data from the National Oceanic and Atmospheric Administration (NOAA) National Weather Service (NWS)

Hydrometerological Design Studies Center. Specifically, data from NOAA Atlas 14, Volume 1, Version 5 for San Mateo, NM was utilized. According to these data, the 1-hour precipitation frequency estimate for a 1000-year return period is 2.78 inches. It should be noted that the 1-hour time of concentration is considered conservative for any contributory area smaller than 50 acres (20 hectares) (Lindeburg 1989).

3.1.2 RUNOFF PREDICTION

The "rational method" was employed to estimate runoff volumes. This method is widely used in civil engineering applications and is recommended by DOE (1989) for designing cover systems for sites regulated by the Uranium Mill Tailings Radiation Control Act (UMTRA). The rational method assumes that rainfall is evenly distributed throughout the watershed at a constant intensity for the duration equivalent to the time of concentration.

Using the rational method, the peak rate of runoff, (Q), in cubic feet per second (cfs) is given by the following expression:

$$Q = C\ I\ A \qquad \text{Equation 1}$$

where:

C = Runoff coefficient (dimensionless) = 0.3 (Lindbergh 1989)

I = Rainfall intensity (in/hr)

A = Surface area that contributes to runoff (acres) = $L^2/4$

The length (L) of the runoff area is 114.3 feet. The width is assumed to be ¼ of the length for erosion feature formation purposes. The estimated slope is 0.1 ft/ft.

The time of concentration was calculated based on the following equation (DOE 1989):

$$t_c = c*(L/S*i^2)^{1/3} \qquad \text{Equation 2}$$

where:

c = Coefficient = 1.0 bare area;

L = slope length (ft) = 114.3 ft;

S = slope (ft/ft) = 0.1; and

i =rainfall intensity (in/hr) = 2.78 in/hr for 1000 year, 1-hour storm.

The resulting time of concentration (t_c) is 5.29 minutes. The incremental rainfall duration percentage based on this computed time of concentration is 45.72% (Table 4.1, DOE 1989).

The adjusted rainfall intensity based on the time of concentration is based on the following equation (DOE 1989):

$$I = \left[i_{t_c} * \frac{60}{t_c}\right] * (\%I/100) \qquad \text{Equation 3}$$

Therefore, the adjusted rainfall intensity is 14.42 in/hr. Refer to table 1 for a summary of these calculation results.

Table 1. Adjusted Rainfall Intensity

c	Slope Length (L)	Slope (S)	i (in/hour)	t_c	%I	I (in/hr)
1	114.3 ft	10%	2.78	5.29 min.	45.72%	14.42

The erosion analysis/design incorporates the worst-case erosion scenario, which involves the longest drainage pattern (114.3 ft) across the final cover system (Refer to Figure 2).

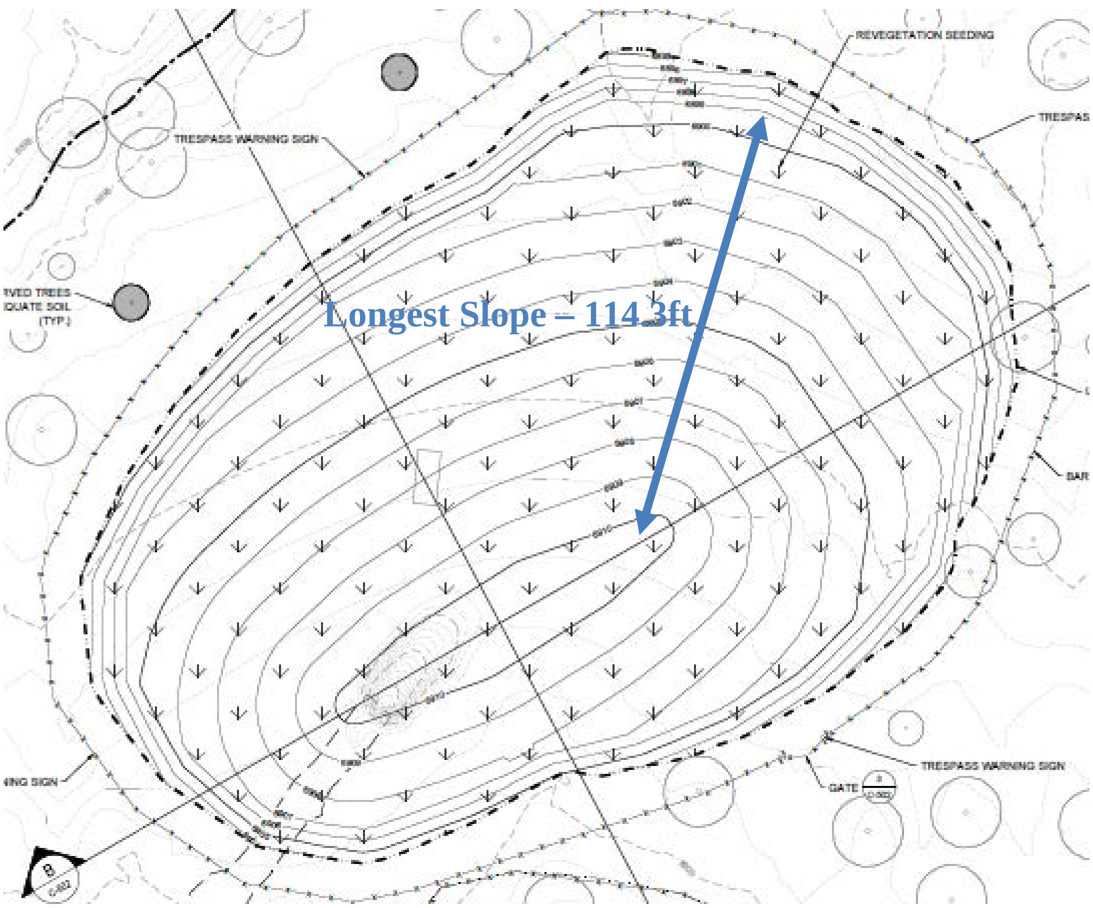


Figure 2. Plan View of Schmitt Decline Mine Cover System

3.1.3 Channel Geometry

The assumed channel geometry is based on regression equations developed from analysis of many channels (Simon, Li & Assoc. 1982). The channel width is given by:

$$b = 37(Q_m^{0.38} / M^{0.39}) \qquad \text{Equation 4}$$

where:

b = width of flow (ft);

Q_m = mean annual flow (cfs);

M = percentage of silts and clays in soils (total fines content for applicable soil less added rock).

The mean annual flow (Q_m) is assumed to be between 10% and 20% of the peak rate of runoff (Q) (Dwyer et al. 2007). In this case, 20% was conservatively used.

For the given discharge point of geometry, the hydraulic depth (d_h), defined as the flow cross-sectional area divided by the width of water surface, is half of the gully depth (d).

For flows at the critical slope:

$$b = 0.5\, F^{0.6}\, F_r^{-0.4} Q^{0.4} \quad \text{Equation 5}$$

where:

F = width to depth ratio = b/dh;

F_r = Froude Number ≈ 1.0.

3.1.4 Incipient Particle Size

The incipient particle size is the particle that is on the brink of movement at the assumed conditions. Any increase in the erosional forces acting on the particle, due to an increase in velocity or slope, for example, will cause its movement. This incipient particle size (D_c) was calculated using the Shield's Equation:

$$D_c = \tau / F_s(\gamma_s - \gamma) \quad \text{Equation 6}$$

where:

τ = total average shear stress (pcf);

F_s = Shield's dimensionless shear stress = 0.047;

γ_s = specific weight of soil;

γ = water density = 62.4 pcf.

The D_c is assumed to be the D_{50} for construction purposes. The D_{50} for a rock source is the median rock size.

The total average shear stress is given by:

$$\tau = \gamma\, d_h\, S \quad \text{Equation 7}$$

where:

S = slope (ft/ft).

d_h = hydraulic depth (ft)

3.1.5 Depth of Scour and Armoring Required

The incipient particle size defines the maximum size of particle that will be eroded for a given set of conditions. The material larger than the incipient particle size will not be displaced or eroded and can form an armoring that will protect the channel from further erosion from similar or lesser storm events.

The depth of scour (Y_s) to establish an armor layer is given by (Pemberton and Lara 1984):

$$Y_s = Y_a\,[(1/P_{c)}-1] \qquad \text{Equation 8}$$

where:

Y_s = scour depth;

Y_a = armor layer thickness;

P_c = decimal fraction of material coarser than the incipient particle size.

3.1.6 Rock/Soil Summary

An excel spreadsheet was utilized to simultaneously solve the multiple equations. Tables 1 and 2 presents the calculated results for the surface layer's rock/soil admixture. Soil for the upper portion of the cover profile is planned to be purchased from C&E Concrete, Inc. located in Milan, NM. The fines content from a data sheet provided from their soil stockpile was used in the calculations. It had a relatively low fines content. Consequently, a set of sensitivity analyses was performed from soil data measured from other potential cover soil borrow sources to ensure the rock size and admixture mix and depth is adequate in case soil textures from the other borrow sources investigated are included in the top layer of the cover. Measured soil data is provided in Appendix A of this report.

Table 2. Rock/Soil Admixture Summary

Soil texture	Q (cfs)	Q_m (cfs)	M (%fines)[1]	b (in)	dH (in)	τ (psf)	D_c (in)	use D_{50} (in)	% rock (Vol.)	Y_a (in)	Y_s (in)	total depth (in)[2]
C&E	0.3244	0.0649	21.2	47.72	0.7113	0.3699	0.95	1.25	33	3.75	7.61	11.36
Clay from Schmitt ranch (sample 7)	0.3244	0.0649	62.5	31.299	0.9419	0.4898	1.25	1.25	33	3.75	7.61	11.36
Ranch Loam Clay Mix	0.3244	0.0649	43.4	36.087	0.8567	0.4455	1.16	1.25	33	3.75	7.61	11.36
Schmitt Loam Clay Mix	0.3244	0.0649	32.7	40.3	0.796	0.4139	1.08	1.25	33	3.75	7.61	11.36
Ranch Loam	0.3244	0.0649	39.2	37.549	0.8344	0.4339	1.14	1.25	33	3.75	7.61	11.36
Schmitt Loam	0.3244	0.0649	50.6	33.99	0.8916	0.4636	1.18	1.25	33	3.75	7.61	11.36

[1] M = conservatively did not reduce fines content given the addition of 33% rock

[2] 12-inches used for conservatism and constructability

3.2 LONG-TERM STABILITY OF ROCKY SOIL COVER

The long-term stability of the cover surface with the addition of the rock/soil admixture can be determined by the following equation (NRC 2002):

$S_s^{7/6} = [65*t^{5/3}]/[I*L*F*n]$ Equation 9

where:

S_s = maximum stable slope (%);
t = allowable shear stress = 0.4*D_{75} = 0.5 psf; (Note: the computed long-term stable slope is conservative since the rock size used to compute it was based on the D_{50} instead of the D_{75} particle size. The D_{50} represents the mean particle size while the D_{75} (used in the NRC calculations per NRC 2002) called for is actually the particle size whereby 75% of the other particle in the rock/soil admixture are smaller than the size used. That is, the D_{75} is actually larger than the D_{50}.)
I = rainfall intensity = 14.42 in/hr (Table 1);
L = slope length = 114.3 ft;
F= flow concentration factor = 3 (NUREG 1623);
n = roughness factor = 0.03.

solving, S_s = 18.3%

Since S_s = 18.3% is greater than the proposed cover slope of 10%, the cover slope surface will be stable for the long-term.

3.3 EROSION CONTROL FOR SURFACE DRAINAGE

The surface areas utilized in the drainage calculations were approximated based on the Drawings. The area and flow length of these drainage areas were also approximated based on the Drawings. The "rational method" was used to estimate runoff volumes (Equation 1). The time of concentration (t_c) is a characteristic of the geometry and slopes of the drainage areas and is computed using the Kirpich equation, as presented in NUREG/CR-4620. As specified in the UMTRA Technical Approach Document (TAD) (DOE 1989), t_c is limited to a minimum of 2.5 minutes (DOE 1989). Using the tabular values in DOE (1989), the percentage of rainfall intensity for a t_c of less than 1 hour can be determined.

The contributory surface area was calculated based on the critical slope length (USEPA 2011, Dwyer et al. 2007). The contributory area, slope, and slope lengths for side slopes and adjacent apron are summarized in Table 4. The rainfall 1-hour intensity corresponding to the computed time of concentration (t_c) was then computed using Equation 2 (DOE 1989, p. 66). A value of 1.0 was used for the runoff concentration factor to calculate the runoff.

3.3.1 Riprap Sizing for Side Slopes

The erosional stability of the side slopes is analyzed using the Abt and Johnson (1991) method, as discussed in NUREG-1623 (NRC 2002). This method is recommended for slopes greater than 10%. The D_{50} rock sizes using the Abt and Johnson method are calculated as:

$$D_{50} = 5.23 * S^{0.43} q^{0.56}$$ Equation 10

where:

q = unit discharge (cfs/ft)

S = Slope (ft/ft).

3.3.2 Riprap Sizing for Bottom of Side Slopes

The perimeter apron will: (1) serve as an impact basin and provide for energy dissipation of runoff, (2) provide erosion protection, and (3) transition flow from side slopes to natural ground. The median rock size required in the perimeter apron was calculated using the equations derived by Abt et al. (1998), as outlined in NUREG 1623 (NRC 2002) as follows:

$$D_{50} = 10.46 * S^{0.43}\left(C_f * q_d\right)^{0.56} \qquad \text{Equation 11}$$

where:

D_{50} = median stone diameter (in.),

S = embankment side slope in decimal form,

C_f = flow concentration factor = 2 (Abt et al, 1991),

q_d = design unit discharge (cfs/ft).

Table 3 provides a summary of the computed results for the side slopes and for the apron or base of each side slope.

Table 3. Riprap – Drainage Side Slopes and Apron Adjacent to Cover

Section	Area (acres)	C	L (ft)	S (ft/ft)	t_c (min.)	i (in./hr)	I (in./hr)	Q (cfs)	q_d (cfs/ft)	D50 (in.), min.
Northwest Side Slope	0.55	1	100	0.1	2.5	2.78	18.4	10.12	0.04	0.58
Northwest Side Apron	0.05	1	9	0.33	2.5	2.78	18.4	11.03	0.05	2.16

[1] As specified in UMTRA TAD (DOE 1989), t_c is limited to a minimum of 2.5 minutes.
[2] Rock thickness more than doubled instead of the recommended 1.5 times the D_{50} for conservatism.

4.0 COVER PROFILE DEVELOPMENT

Unsaturated flow modeling was conducted to evaluate an ET Cover profile using measured soil and vegetation parameters, along with existing climate data from a site near the area. Extreme climate conditions were also taken into account, as the cover system needs to be effective in the long term. Historical weather records from the San Mateo, NM area was examined to determine typical and extreme climate conditions.

The average precipitation for the site is about 9-in (22.9 cm) while the average potential evapotranspiration (PET) is about 57.6-in (146.3 cm) per year distributed as shown in Figure 3. It can be seen that for every month of the year (Figure 3), the climate's demand for water (PET) far exceeds the actual supply of water (precipitation). The climate's annual demand for water referred to as PET is about 6.5 times more than the actual supply of water (precipitation). Consequently a "store and release" type cover designed to take advantage of variances between the demand for water and actual supply of water such as an ET Covers is well suited for this climate.

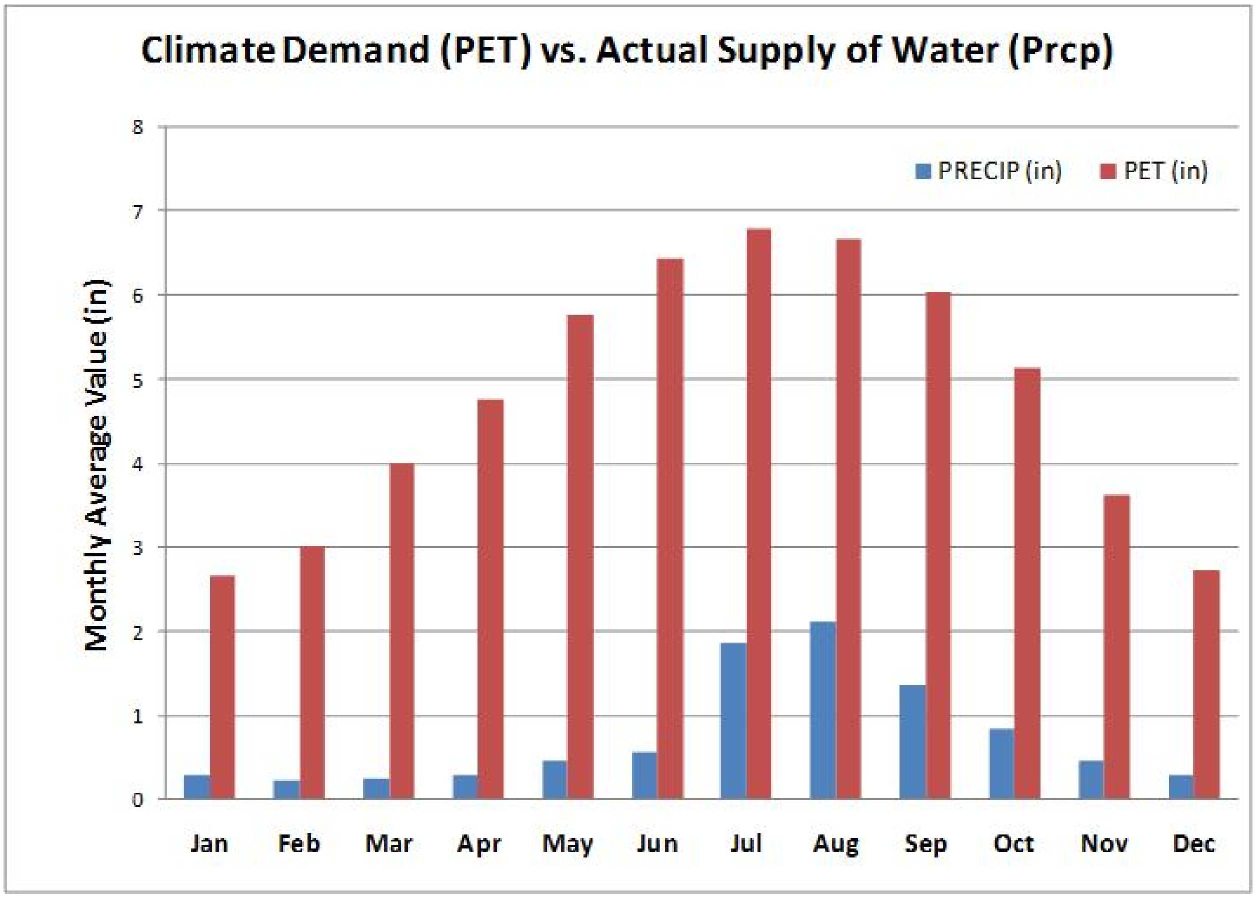


Figure 3. Average Climate Demand for Water (PET) vs. Actual Supply of Water (Precipitation) for San Mateo, NM

Software more applicable for the analyses of water flow within an alternative earthen cover system is based on the Richard's Equation (ITRC 2003). One of the most common software (ITRC 2003) that is based on the Richard's equation used today is UNSAT H (Fayer 2000). This unsaturated modeling software was designed specifically for earthen covers. It has been recommended for use on alternative earthen covers in the ITRC (2003) design guidance documents. Consequently, UNSAT H was used on this project.

4.1 UNSATURATED MODELING OF COVER SYSTEM

UNSAT-H has been used to design many recent alternative earthen cover designs (Dwyer 2003). UNSAT-H is a one-dimensional, finite-difference computer program developed at the Pacific Northwest National Laboratory by Fayer and Jones (1990). UNSAT-H can simulate the water balance of earthen covers as well as soil heat flow (Fayer 2000). UNSAT-H simulates water flow through soils by solving Richards' equation and simulates heat flow by solving Fourier's heat conduction equation. Two separate files were written for each modeled year: one file represented the daily PET values calculated using the Samani Method (Samani and Pessarkli, 1986), and the other file consisted of the daily precipitation values.

The lower boundary condition was a unit gradient. With the unit gradient, the calculated drainage flux depended on the hydraulic conductivity of the lower boundary node. The unit gradient corresponded to gravity-induced drainage and was most appropriate when drainage was not impeded.

4.1.1 BOUNDARY CONDITIONS

Weather from San Mateo, NM was utilized as the upper boundary condition. Historical weather data for San Mateo and surrounding weather stations were evaluated from 1918 to present. A typical climatic year was used to evaluate the modeled profiles. The specific year used to evaluate the profiles under average conditions was 1977 (Figure 3) with an annual precipitation of 9.57 in (24.3 cm). Extreme climatic conditions were also evaluated. The year of 1986 was the wettest on record with an annual precipitation of 16.1 in (40.8 cm). The monthly precipitation and PET are presented in Figure 4 for the wettest year on record.

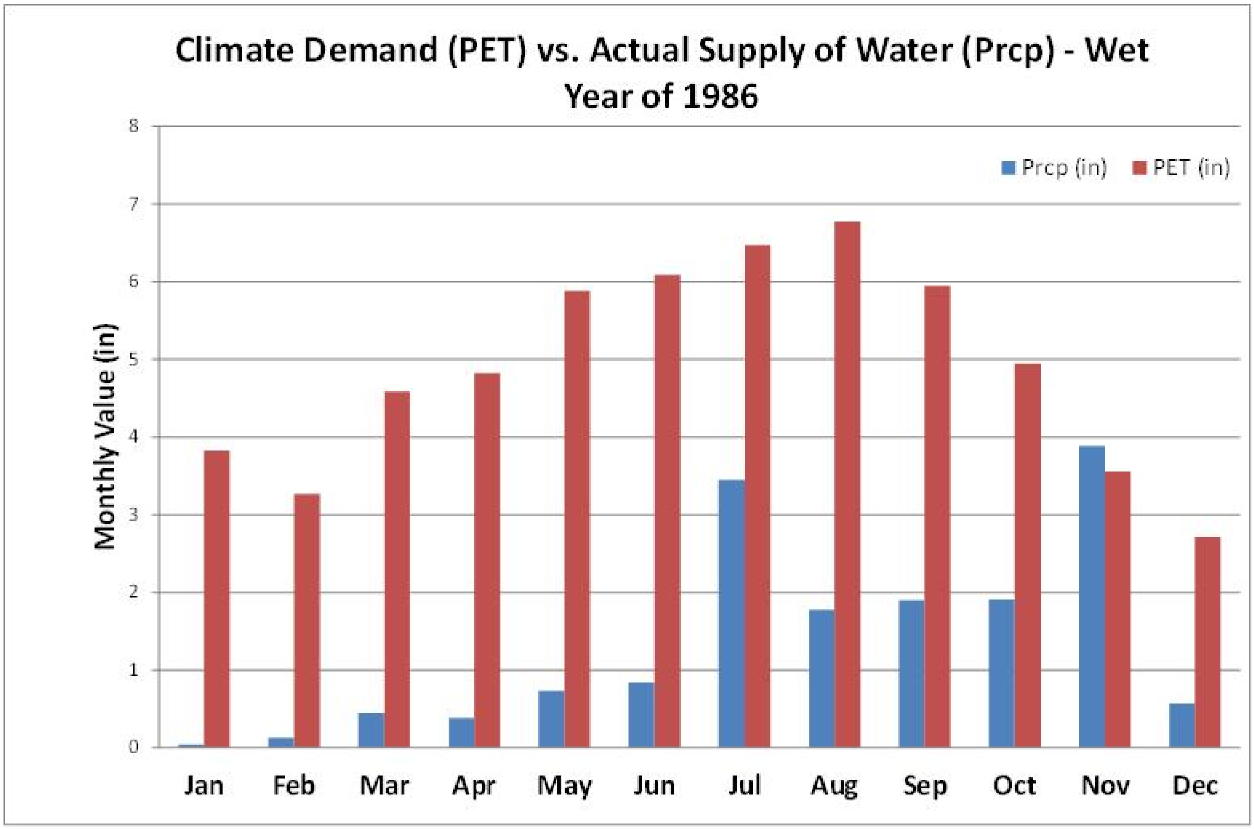


Figure 4. Climate Demand for Water vs. Supply of Water for the Wettest Year on Record

The flow of water across the surface and lower boundary of the cover profile of interest is determined by boundary condition specifications. For infiltration events, the upper boundary was conservatively set to a maximum hourly flux for these computer simulations of 0.4 inches (1 cm) per hour that produced effectively no runoff while maximizing infiltration. This is conservative because it is expected at the site given the designed slopes that a significant percentage of precipitation will runoff the site without infiltrating into the cover profile.

4.1.2 INPUT PARAMETERS

Input parameters were developed for simulations using UNSAT-H for the ET cover. These parameters were based on measured values. Multiple cover soil borrow sources were evaluated (Figure 5). However, due to various constraints, it was decided that the upper portion of the cover profile would utilize soil purchased from C&E Concrete while the lower portion would be composed of soil excavated from the Ranch Soil Sample location (Figure 5). The hydraulic properties for these soils were measured at a remolded density of 90% of the maximum dry density per ASTM D698. This density represents the planned installation and compaction density of the cover soil, closely mimicking the in-situ conditions of similar undisturbed soils. Hydraulic properties for the C&E soil was utilized from previous soil sampling done in the area with similar soil texture. The Ranch soil sample data is provided in Appendix A. A summary of the soil input parameters for the UNSAT H computer simulation is provided in Table 4.

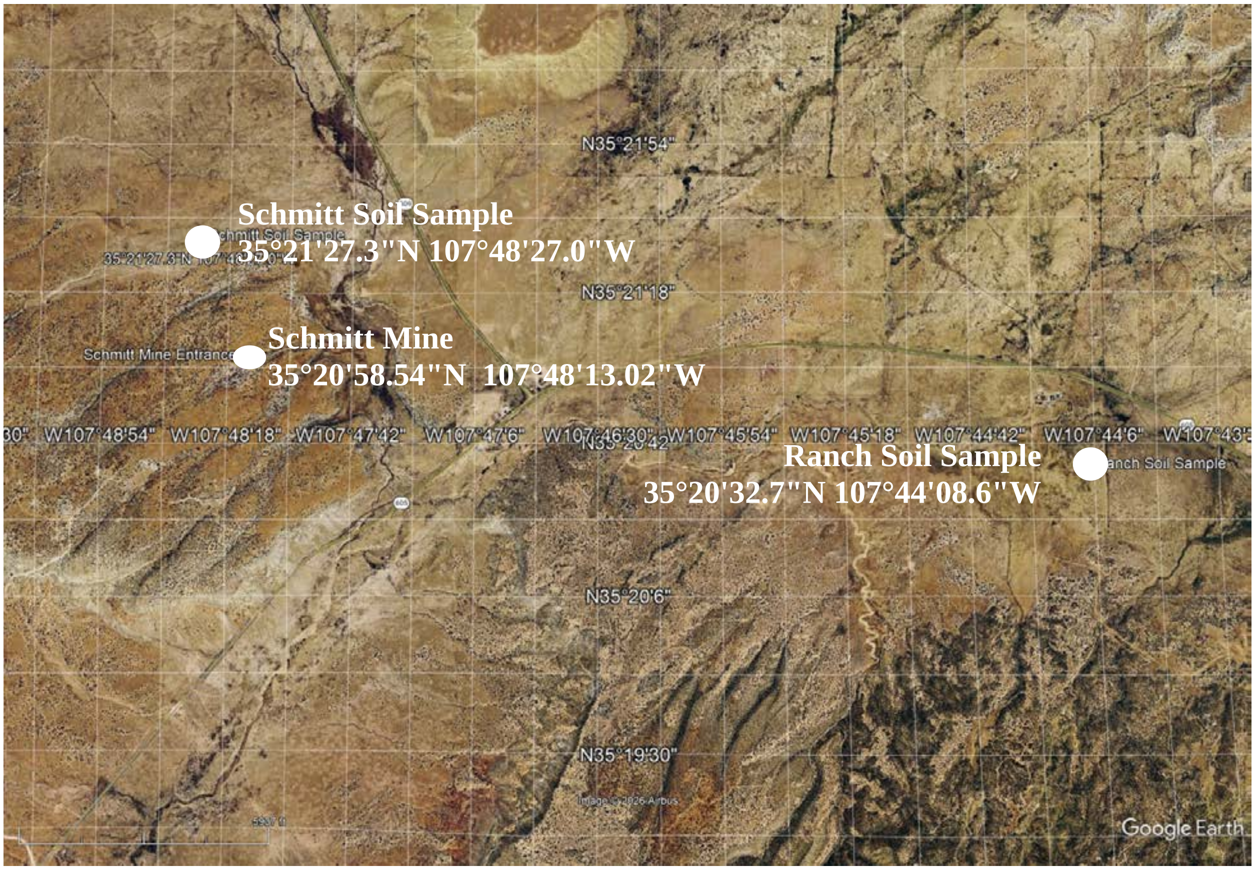


Figure 5. Potential Cover Soil Borrow Sources Relative to Schmitt Decline Mine Site

The upper layer of the cover profile will have a mixture of rock and soil in a volumetric ratio of 33% rock to 67% soil. The rock size will have a D_{50} of 1.25-in (Table 3). The addition of rock to the soil effectively alters its hydraulic properties. Therefore, the hydraulic properties were adjusted for this upper layer using ASTM D4718. The following equation (Equation 12) was used to modify the saturated hydraulic conductivity based on the addition of rock (Peck and Watson 1979).

$$\boldsymbol{K_b = [K_s * 2(1 - V_r)]/(2 + V_r)} \qquad \textbf{Equation 12}$$

$$where: K_b = saturated\ hydraulic\ conductivty, bulk$$

$$K_s = saturated\ hydraulic\ conductivty, soil$$

$$V_r = volume\ of\ rock$$

The calculated bulk saturated hydraulic conductivity was then increased by an order of magnitude for the upper foot to account for dynamic processes such as freeze/thaw cycles, wet/dry cycles, and biointrusion. The moisture retention data for the cover soil was also adjusted to reflect the addition of rock. The actual volumetric moisture content versus soil suction measurements made in the laboratory served as the basis. Each respective measured volumetric moisture content was adjusted according to ASTM D4718 and Bouwer & Rice (1984), as shown in equation 13.

$$\theta_b = (1 - V_r)\theta_s \qquad \textbf{Equation 13}$$

$$where: \theta_b = bulk\ volumetric\ moisture\ content$$
$$\theta_s = saturated\ moisture\ content$$
$$V_r = volume\ of\ rock$$

Table 4. Soil Input Parameters

Borrow Source	Cover Profile Layer	Depth BGS[d]	K_{sat}	Van Genuchten Parameters			
				θ_s	θ_r	α (1/cm)	n
C&E Concrete	Rock/Loam Soil Admixture	0 to -12-in (0 to 31 cm)	7.46E-03cm/sec[a,c]	0.2443[b]	0.0113[b]	0.0329	1.4596
C&E Concrete	Loam Cover Soil	12-in to 24-in (31 cm to 62 cm)	1.31E-03cm/sec	0.3665	0.017	0.0329	1.4596
Ranch Soil Loam Clay Mixture	Loam/Clay Mixture Cover Soil	24-in to 36-in (62 cm to 91 cm)	4.91E-06 cm/sec	0.3636	0.28	0.0147	1.1912
Ranch Soil Loam	Waste Rock	Below 36-in (below 91 cm)	4.21E-05 cm/sec	0.3585	0.0	0.0101	1.2177

[a] altered value for K_b per equation 1
[b] altered value per equation 2
[c] increased saturated hydraulic conductivity one order of magnitude
[d] below ground surface

The soil properties for the Ranch Soil Loam were used to represent the properties of the waste rock. This is conservative given the waste rock is more granular and coarse and thus would act as a capillary barrier increasing the storage capacity of the overlying finer grained soil. Soil property measurements are not available for this existing soil.

The input parameters for vegetation include the leaf area index (LAI), rooting depth and density, root growth rate, and the suction head values that correspond to the soil's field capacity, wilting point, and water content above which plants do not transpire due to anaerobic conditions. The onset and termination of the growing season for the site are defined in terms of Julian days. The time required for maximum rooting depth establishment was set at full depth beginning on day 1. The rooting depth was set at 3 ft (91 cm), which is conservative considering that native grasses can reach depths up to 9 ft (2.74 m). A LAI of 0.64 was used (Cedar Creek 2014). This value is also conservative, as a poor stand of grass is typically 1.0 (Schroeder et al., 1994). The onset and termination of the growing season for the site were Julian days 63 and 343, respectively. The LAI transitioned from 0 to 0.64 starting on Julian day 63 and ending on day 170. From day 170 to 266, the full LAI of 0.64 was utilized. The LAI then transitioned back down from 0.64 to 0 from Julian day 266 to 343. This approach is conservative, as it is possible for plants to transpire for longer periods at this site. An average percent bare area of 64.9% was used (Cedar Creek 2014). Suction head values corresponding to the wilting point, field capacity, and a head value corresponding to the water content above which plants do not transpire due to anaerobic conditions were also defined (Fayer and Walters, 1995).

4.1.3 MODEL OUTPUT

The output of the computer simulations is summarized in Table 5 and Figures 6 and 7. The simulations involved running typical climate year followed by the wettest year on record for San Mateo, NM. Table 5 presents data for the tenth year of the consecutive modeled typical climate years as well as the wettest year on record for San Mateo, NM. Ten consecutive typical climate years were modeled to eliminate biases introduced by initial conditions. The table includes summaries of the following variables for each year: (1) applied precipitation; (2) applied potential evapotranspiration (PET); (3) calculated transpiration; (4) calculated evaporation; (5) calculated runoff; and (6) percolation through the cover. Figures 6 and 7 provide graphical representations of soil depth versus annual flux for the typical climate year and wettest year on record.

The depth of cover at which flux is minimized is known as the Dwyer et al (2007) Point of Diminishing Returns (PODR) Method. The PODR is defined as the depth at which flux is effectively minimized, in these cases where flux is zero. In other words, it is the depth at which adding more soil will no longer reduce the flux. The percolation through the cover system is zero in all simulations for all climatic years applied. The 3-ft (91 cm) thick cover is actually conservative given that the PODR for all simulations is less than 3-ft (91 cm) in all simulations performed (Figures 6 and 7).

Table 5. Computer Simulation Water Balance Results with Vegetation

Cover Soil Borrow	Climate	Precip.	PET	Transp.	Evap.	Runoff	Percolation
Ranch Soil	Typical Year	24.308 cm (9.57 in)	143.035cm (56.32 in)	6.926 cm (2.72 in)	17.481 cm (6.88 in)	0	0
	Wettest Year	40.792 cm (16.06 in)	149.535 cm (58.87 in)	7.614 cm (3.00 in)	31.115 cm (12.25 in)	0	0

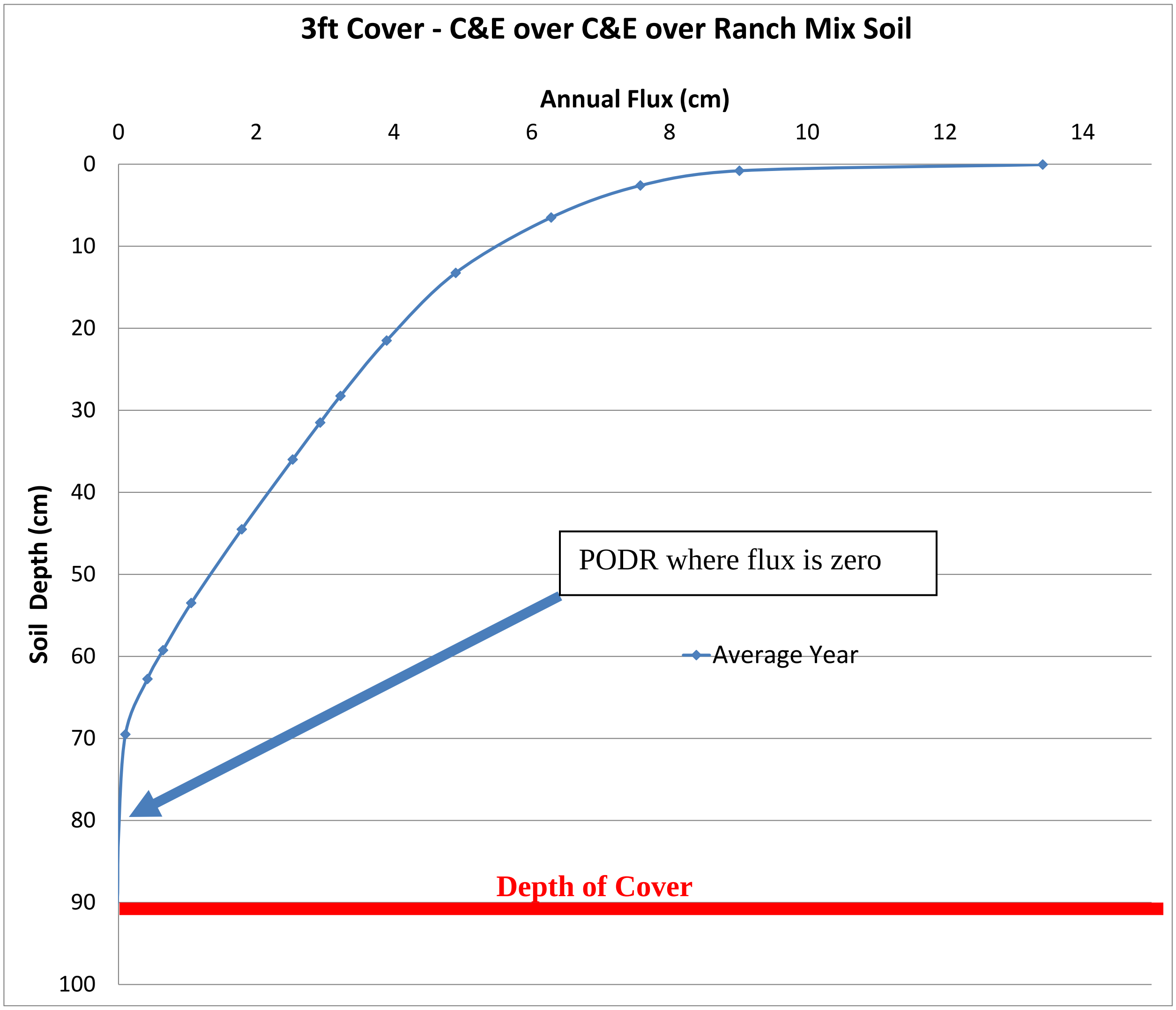


Figure 6. Computer Simulation Results for Typical Climate

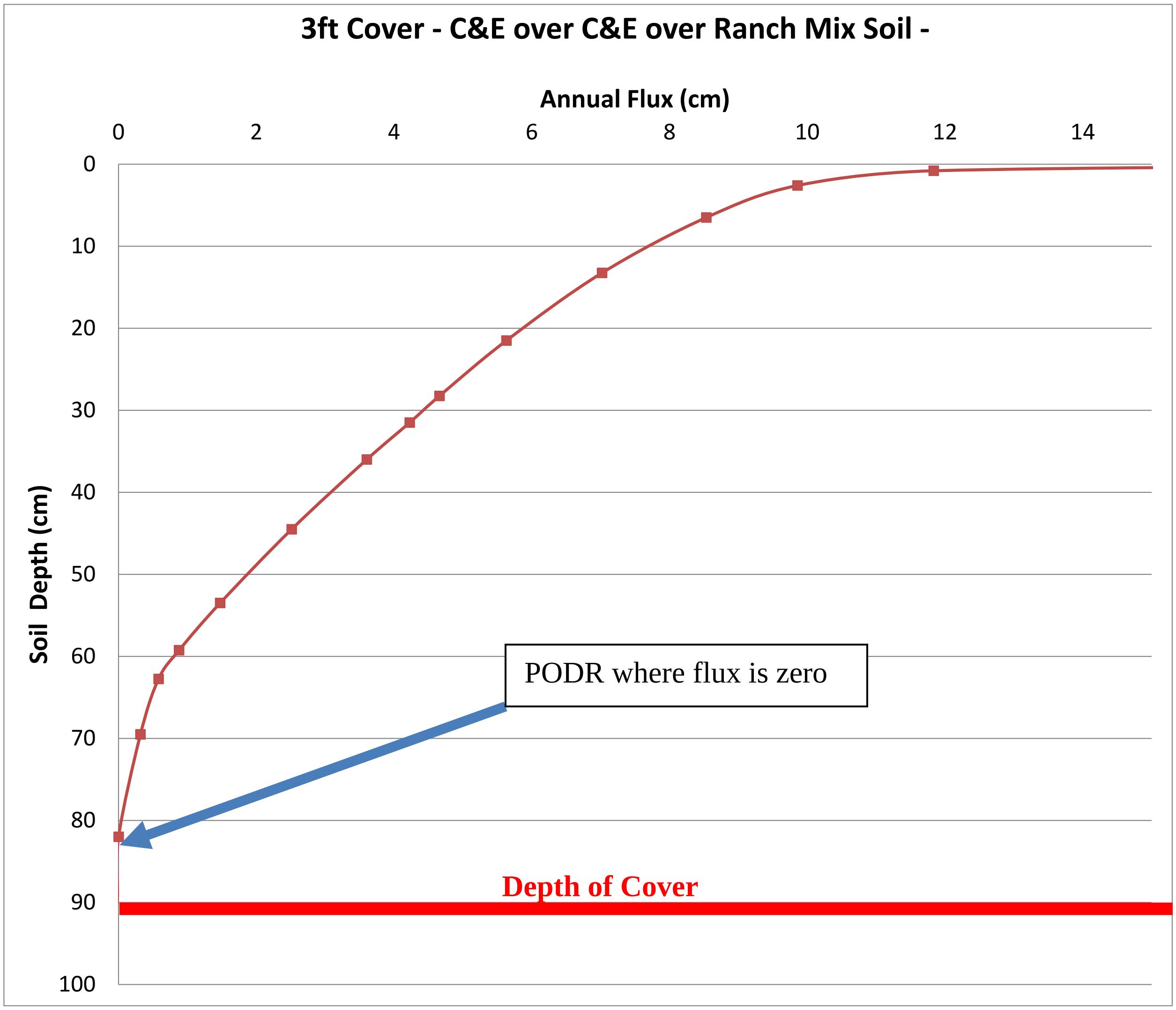


Figure 7. Computer Simulation Wettest Year on Record

Conservatism was incorporated into the model by limiting the precipitation rate to encourage 100% infiltration into the cover profile. That is, zero runoff was included. The modeling is 1-dimensional and does not take slope into account, so there was no runoff due to slope. For the computer simulations, the saturated hydraulic conductivity of the upper 12 inches of the cover profile was increased by an order of magnitude to account for potential changes in soil hydraulic properties caused by factors such as freeze/thaw cycles, wet/dry cycles, biointrusion, and uncertainty in rock mixtures.

Further conservatism was evaluated by modeling the cover profiles without vegetation under typical climatic conditions. The results in Table 6 demonstrate that only a de minims percolation is achieved at a shallow depth indicating that the covers do not rely on vegetation to minimize flux. This is supported by Figure 3, which shows that the climatic demand for water (PET) far exceeds the climatic supply of water (precipitation) for every month of the year. The ratio of PET to precipitation for the typical climate conditions at the site is over 6.5.

Table 6. Computer Simulation Water Balance Results with No Vegetation

Cover Soil Borrow	Climate	Precip.	PET	Evap.	Runoff	Percolation
Ranch Soil	Typical Year	24.308 cm (9.57 in)	143.035cm (56.32 in)	24.100 cm (9.49 in)	0	0.226 cm (0.09 in)

5.0 Radon Attenuation

Some radioactive wastes emit radon-222 (222Rn) as a heavier-than-air gas. Inhaling radon gas at sufficient concentrations poses a health risk to humans. 40CFR192 stipulates that a cover have a design which provides reasonable assurance of control of radiological hazards to limit releases of radon-222 to the atmosphere so as not to exceed an average release rate of 20 picocuries per square meter per second to the extent practicable. The cover soil acts as an effective barrier to gas diffusion; however, air-filled voids in the soil need to be discontinuous. Gas diffuses very slowly through wet soils that contain only occasional, unconnected air bubbles.

The radon flux through the cover soil was calculated using the RAECOM code (Radiation Attenuation Effectiveness and Cover Optimization with Moisture Effects), as described in [Rogers 1984 a&b]. The RAECOM code performs one-dimensional, steady-state radon diffusion calculations for a multi-layer system. An overview of the input data utilized in these calculations is as follows:

5.1 Input Data for Radon Flux Modeling

Input parameters for modeling of radon flux through a cover profile include the following:

- **Layer Data:** The profile was modeled with a bottom layer(s) of contaminated soils capped with a two layered cover system (rock/soil admixture over cover soil).
- **Ra-226 Activity Concentration [pCi/g]:** The Ra-226 activity concentration for the Schmitt Decline Mine area (Table 7). The Ra-226 concentration is based on the average of measured values (EA 2026)
- **Rn-222 Emanation Fraction:** a fraction of the total amount of radon-222 produced by radium decay that escapes from the soil particles and gets into the pores of the soil. The default value of 0.35 was used.
- **Porosity:** the ratio of the pore volume (air- and water-filled) to the total volume of the soil. The porosity for each respective soil texture was utilized in the calculations as measured (Appendix A).
- **Moisture Contents [dry wt_%]:** the percentage of water weight to dry soil weight.
- **Fraction Passing #200 Mesh (75 µm)** is the fraction by weight of the soil passing a No. 200 Mesh, corresponding to a particle diameter of 75 µm or less.
- **Rn-222 Effective Diffusion Coefficient [m^2/s]:** defined from Fick's equation as the ratio of the diffusive flux density of radon activity across the pore area to the gradient of the radon activity concentration in the pore or interstitial space. This value was calculated based on the other input parameters identified.

Soil moisture is a highly sensitive input parameter in the calculation of radon flux through a soil profile. Soil moisture content is expressed as the percentage of water weight to dry soil weight. It is important to note that soil moisture content varies over time. Therefore, it is advisable to use conservative values that estimate long-term dry conditions for the specific soil textures. The following equation was used to represent the long-term moisture content of a given soil texture:

w = 0.026 + 0.005(% clay) + 0.015(%organic matter) (NRC 1989)

- **w:** Weight-percent soil moisture content.
- **%clay:** The percentage of clay particles in the soil.
- **%organic matter:** The percentage of organic material present in the soil.

Table 7. Soil Properties and Computed Moisture Content (Appendix A)

Soil Sample	%Clay	% Organics	Porosity	Rock Corrected Porosity [a]	Dry Moisture Content	Rock Corrected Dry Moisture Content [a]
Ranch Loam	21.6	0	35.5		13.42%	
Ranch Loam Clay Mix	24.1	0	35.5		14.67%	
C&E Loam	10.6	0	38.2	25.4	7.90%	5.27%

[a] moisture content in surface layer (top foot) corrected for the addition of rock

5.2 Radon Flux Sensitivity Modeling

The cover profile was simulated to assess the levels of radium-226 at the Schmitt Decline Mine Site. The input parameters are summarized in table 8.

The average value of 71.1 pCi/g derived from all of the recorded radium-226 values (EA Engineering 2026, Table E-2-1 Soil Samples). Since the performance criterion of radon flux is determined based on an average flux over the entire site, the average radium values of measured soil samples was used as the radium concentration input parameter.

Table 8. Input Radon Analyses

Layer (Bottom to Top)	Thickness (ft)	Thickness (cm)	Rn222 Eman Factor	Ra226 activity (piC/g)	Porosity	Moisture
Waste Rock (Ranch Loam)	13.1	400	0.35	71.1	0.355	13.42%
Bottom Layer (Ranch Clay loam Mixture)	1	31	0.35	0	0.355	14.67%
Middle Cover layer (C&E Loam)	1	31	0.35	0	0.382	7.9%
Top Layer (C&E mixed with Rock)	1	31	0.35	0	0.254	5.27%[a]

[a] The moisture content for the upper foot was reduced due to the addition rock per equation 2

A sensitivity analysis (Table 9) was performed to verify that the moisture content of the waste rock did not have a significant impact on the estimated radon flux. Consequently, the waste rock was assumed to have a 6% moisture content which is the lowest recommended by the NRC for western soils.

Table 9. Input Radon Analyses – Waste Rock @ 6% Moisture Content

Layer	Thickness (ft)	Thickness (cm)	Rn222 Eman Factor	Ra226 activity (piC/g)	Porosity	Moisture
Waste Rock (Ranch Loam)	13.1	400	0.35	71.1	0.355	6%
Bottom Layer (Ranch Clay loam Mixture)	1	31	0.35	0	0.355	14.67%
Middle Cover layer (C&E Loam)	1	31	0.35	0	0.382	7.9%
Top Layer (C&E mixed with Rock)	1	31	0.35	0	0.254	5.27% [a]

[a] The moisture content for the upper foot was reduced due to the addition rock per equation 2

5.3 Radon Flux Output

For the input parameters presented in Table 8, the exit flux concentration of radon is summarized in Table 10. The radon flux at the surface of the cover is 8.43 piC/m2s, well below the criterion of 20 pCi/m2s. All scenarios estimate a radon exit flux that is below the 20 piC/m2s criterion.

Table 10. Radon Exit Flux Analyses Output

Layer	**Radon Exit Flux (piC/m2s)**
Waste Rock	19.71
Bottom Layer	12.25
Middle Cover layer	9.20
Top Layer	8.43

For the assumed input parameters presented in Table 9, the exit flux concentration of radon is summarized in Table 11. The radon output for the sensitivity analysis whereby the waste rock was assumed to have a moisture content of 6% is presented in table 11. The radon flux at the surface of the cover is 8.16 piC/m2s, well below the criterion of 20 piC/m2s. Thus, the moisture content of the waste rock has minimal impact on the radon flux exiting the top of the cover profile.

Table 11. Radon Exit Flux Analyses Output– Waste Rock @ 6% Moisture Content

Layer	**Radon Exit Flux (piC/m2s)**
Waste Rock	19.08
Bottom Layer	11.86
Middle Cover layer	8.90
Top Layer	8.16

6.0 SUMMARY

The design process of the cover profile took into consideration the impact of climate change. An analysis of climate change in the southwestern United States, published by the EPA in 2016, suggests that climate change will likely result in warmer temperatures and reduced precipitation. Additionally, a study published by the New Mexico Bureau of Geology and Mineral Resources (New Mexico Tech 2022), temperatures in New Mexico are projected to increase by 3 to 7°F. The study explains that as temperatures rise, the atmosphere can hold more water, leading to increased evaporation and drier surface conditions overall. These factors were considered in the design of the cover.

While it is difficult to predict the exact outcome of climate change, it is important to acknowledge that the climate is constantly changing. The design process took into account the possibility of a wetter climate, which would impact the water balance of the cover system. Water balance modeling was used to determine the minimum thickness of the cover profile, including extreme wet conditions. This was done to develop a cover profile that would allow for sufficient water storage even during the most extreme precipitation events.

The design also considered the possibility of a warmer climate with less precipitation, which would pose a challenge for vegetation. To address this, the cover profile includes a mixture of rocks and soil intended to create a "desert pavement" that prevents the formation of rills and gullies, and minimizes soil erosion. This design assumes that no vegetation would be present to help resist erosion.

The proposed ET cover system is designed to close the Schmitt Decline Mine site. The cover system will consist of three layers: 1) the top layer comprising a combination of rock and soil, 3) the middle layer composed of loam soil; and 2) the bottom layer will be made up of the mixture of clay and loam soil. Please refer to Figure 8 for a visual representation of the final cover system's profile.

The calculations presented in this design report demonstrate that the proposed ET cover system will be effective for 1,000 years. Erosion calculations indicate that the cover system will prevent the formation of rills or gullies, thus reducing soil loss caused by erosion. Water balance simulations have shown that there will be no net flux resulting from meteoric water infiltrating the underlying waste material. Furthermore, the profile significantly reduces radon flux below the regulated performance criterion.

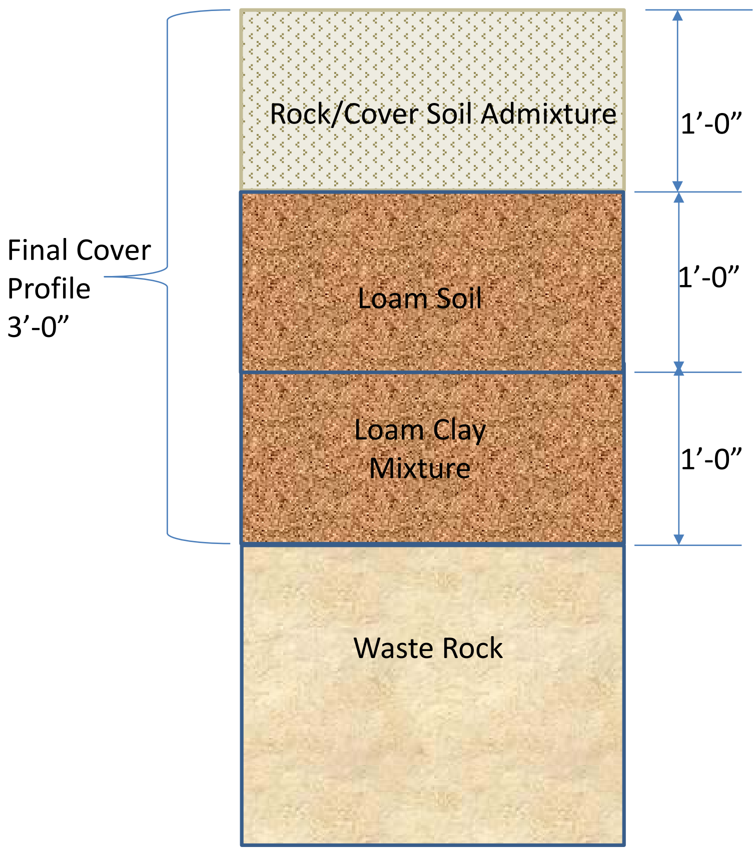


Figure 8. Conceptual Cover Profile

7.0 REFERENCES

1. 40 CFR Part 192. Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings.
2. Abt, S. R., and T. L. Johnson, 1991, "Riprap design for overtopping flow," *J. Hydr. Engng.*, ASCE 117(8): 959–972.
3. Abt, S. R., T. L. Johnson, C. I. Thornton, and S. C. Trabant, 1998, "Riprap Sizing at the Toe of Embankment Slopes," *J. of Hydr. Engr.*, ASCE.
4. ASTM D4718. Standard Practice for Correction of Unit Weight and Water Content for Soils Containing Oversize Particles.
5. Bouwer H. and R. Rice, 1984. Hydraulic Properties of Stony Vadose Zones. Ground Water, 22 (6) (1984), pp. 696–705
6. Cedar Creek Associates, 2014, *Vegetation Characterization and Biointrusion Surveys, Church Rock Mill Site*, July.
7. DOE (U.S. Department of Energy) 1989. (DOE), Technical Approach Document Revision II, UMTRA–DOE/AL 050425.0002, Albuquerque Operations Office, Albuquerque, New Mexico.
8. Dwyer, SF, R Rager, J Hopkins. 2007. Cover System Design Guidance and Requirements Document. Los Alamos National Laboratory report LA-UR-06-4715.
9. Dwyer, SF. 2003. Water Balance Measurements and Computer Simulations of Landfill Closures. PhD Dissertation. University of New Mexico, Albuquerque, NM.
10. EA Engineering, Science, and Technology, Inc. 2026. Stage 2 Abandoned Uranium Mine Site Investigation Report, Schmitt Decline mine (NM0261) McKinley County, New Mexico. January 2026.
11. EA Engineering, Science, and Technology, Inc. 2025. Work Plan for the Schmitt Decline Mine Site Assessment, McKinley County, New Mexico. September 2025.
12. EPA, 2011, Closing Small Tribal Landfills and Open Dumps: How to Design Environmentally Safe Covers Including Additional Design Guidance for Arid Regions, EPA-909-R-11-007.
13. EPA. 2016. What Climate Change Means for Arizona. EPA Report EPA430-F-16-005.
14. Fayer, M. J., and T. B. Walters, 1995, *Estimated Recharge Rates at the Hanford Site*, PNL-10285, Pacific Northwest Laboratory.
15. Fayer, M. J., and T. L. Jones. 1990. UNSAT-H version 2.0: Unsaturated soil water and heat flow model. PNL-6779, Pacific Northwest Laboratory, Richland, WA.
16. Fayer, M.J. 2000. UNSAT-H Version 3.0: Unsaturated Soil Water and Heat Flow Model, Theory, User Manual, and Examples. Pacific Northwest Laboratory, Richland, WA.
17. ITRC. 2003. Technical and Regulatory Guidance for Design, Installation, and Monitoring of Alternative Final Landfill Covers. Interstate Technology and Regulatory Council, Alternative Landfill Technologies Team, Washington DC.
18. Ligotke, M. W. 1994. Control of Eolian Soil Erosion from Waste-Site Surface Barriers, in In-Situ Remediation: Scientific Basis for Current and Future Technologies, edited by G. W. Gee, G. W. and N. R. Wing, Battelle Press, Richland, Washington, pp. 545-559.
19. Lindeburg, M., (editor) 1989, *Civil Engineering Reference Manual*, 5th ed. Professional Publications, Belmont, CA.

20. New Mexico Tech. 2022. Climate Change and New Mexico's Water Resource: a 50-Year Outlook. New Mexico Earth Matters. Published by the New Mexico Bureau of Geology and mineral Resources. Winter 2022.
21. NUREG-1623. 2002, Design of Erosion Protection for Long-Term Stabilization: U.S. Nuclear Regulatory Commission, Office of Nuclear Material Safety and Safeguards, Washington, DC.
22. Peck, A. J., and J. D. Watson, 1979, "Hydraulic Conductivity and Flow in Non-Uniform Soil," *Workshop on Soil Physics and Field Heterogeneity, CSIRO Division of Environmental Mechanics, Canberra, Australia*.
23. Pemberton, E. L., and J. M. Lara, 1984, *Computing degradation and local scour: U.S. Bureau of Reclamation, Technical Guideline*, 48 pp.
24. Rogers and Associates Engineering (1984a). "Radon Attenuation Effectiveness and Cover Optimization with Moisture Effects (RAECOM)," computer program, U.S. Nuclear Regulatory Commission, Washington, DC.
25. Rogers and Associates Engineering (1984b). "Radon Attenuation Handbook for Uranium Mill Tailings Cover System," NUREG/CR-3533, U.S. Nuclear Regulatory Commission, Washington, DC.
26. Samani, Z. A. and M.Pessarakli, 1986: Estimating Potential Crop Evapotranspiration with Minimum Data in Arizona, Transactions of the ASAE Vol. 29, No. 2, pp. 522-524.
27. Schroeder, PR, CM Lloyd, PA Zappi, NM Aziz. 1994. The Hydrologic Evaluation of Landfill Performance (HELP) Model, users guide for version 3. EPA/600/R-94/168a, September 1994.
28. Simon, Li & Associates. 1982. Engineering Analysis of Fluvial Systems, Ft. Collins, CO.
29. U.S. Nuclear Regulatory Commission (NRC), 1986, NUREG/CR-4620, *Methodologies for evaluating long-term stabilization designs of uranium mill tailings impoundments*, Nelson, J. D., S. R. Abt, R. L. Volpe, D. Van Zye, N. E. Hinkle, and W. P. Staub.
30. U.S. Nuclear Regulatory Commission (NRC), 2002, NUREG 1623, *Design of Erosion Protection for Long-Term Stabilization*, U.S. Nuclear Regulatory Commission, Office of Nuclear Material Safety and Safeguards, Washington, D.C.
31. U.S. Nuclear Regulatory Commission (NRC). 1989. Calculation of Radon Flux Attenuation by Earthen Uranium Mill Tailings Covers, Regulatory Guide 3.64.
32. Van Genuchten, M.Th., F.J. Leij, and S.R. Yates. 1991. The RETC code for quantifying the hydraulic functions of unsaturated soils.
33. Waugh, W. J., K. L. Peterson, S. O. Link, B. N. Bjornstad, and G. W. Gee, 1994. Natural Analogs of the Long-term Performance of Engineered Covers, p. 379-409 In Gee, G. W. and N. R. Wing, editors, 1994, In-Situ Remediation, Scientific Basis for Current and Future Technologies, Part 1, The Thirty-Third Hanford Symposium on Health and the Environment, November 7-11, 1994, Battelle Press, Richland, Washington.
34. Waugh, W. Joseph, 1994. Paleoclimatic Data Application: Long-Term Performance of Uranium Mill Tailings Repositories. Workshop Proceedings: Climate Change in the Four Corners and Adjacent Regions, September 12-14, 1994 in Grand Junction, CO.

Appendix A

Soil Data

Interim Laboratory Report
NMED AML

Prepared for

EAEST, Inc.

Prepared by

DBS&A
a Geo-Logic Company

DBS&A Soil Testing & Research Laboratory
4400 Alameda Blvd. NE, Suite C
Albuquerque, New Mexico 87113
(505) 889-7752
www.dbstephens.com
DB26.1048.00

March 30, 2026

March 30, 2026

Colleen Rust
EAEST, Inc
320 Gold Avenue SW, Suite 1300
Albuquerque, NM 87102
(505) 321-4515

Re: DBS&A Laboratory Report for NMED AML

Dear Colleen Rust:

Enclosed is the report for the requested laboratory services. Please review this report and provide any comments as samples will be held for a maximum of 30 days. After 30 days samples will be returned or disposed of in an appropriate manner.

All testing results were evaluated subjectively for consistency and reasonableness, and the results appear to be reasonably representative of the material tested. However, DBS&A does not assume any responsibility for interpretations or analyses based on the data enclosed, nor can we guarantee that these data are fully representative of the undisturbed materials at the field site. We recommend that careful evaluation of these laboratory results be made for your particular application.

The testing utilized to generate the enclosed report employs methods that are standard for the industry. The results do not constitute a professional opinion by DBS&A, nor can the results affect any professional or expert opinions rendered with respect thereto by DBS&A. You have acknowledged that all the testing undertaken by us, and the report provided, constitutes mere test results using standardized methods, and cannot be used to disqualify DBS&A from rendering any professional or expert opinion, having waived any claim of conflict of interest by DBS&A.

We are pleased to provide this service and look forward to future laboratory testing on other projects. If you have any questions about the enclosed data, please do not hesitate to call.

Sincerely,

DANIEL B. STEPHENS & ASSOCIATES, INC.
SOIL TESTING & RESEARCH LABORATORY

Thane Morgan
Laboratory Manager

Summaries

Summary of Tests Performed

Laboratory Sample Number	Initial Soil Properties[1]			Saturated Hydraulic Conductivity[2]			Moisture Characteristics[3]								Particle Size[4]			Specific Gravity[5]		Air Perm-eability	Atterberg Limits	Proctor Compaction
	G	VM	VD	CH	FH	FW	HC	PP	FP	DPP	RH	EP	WHC	K_{unsat}	DS	WS	H	F	C			
Ranch Loam	X	X			X		X	X		X	X			X		X	X	X				X
Ranch Loam Clay Mix	X	X			X		X	X		X	X			X		X	X	X				X
Schmitt Loam	X	X			X		X	X		X	X			X		X	X	X				X
Schmitt Loam Clay Mix	X	X			X		X	X		X	X			X		X	X	X				X

1 G = Gravimetric Moisture Content, VM = Volume Measurement Method, VD = Volume Displacement Method

2 CH = Constant Head Rigid Wall, FH = Falling Head Rigid Wall, FW = Falling Head Rising Tail Flexible Wall

3 HC = Hanging Column, PP = Pressure Plate, FP = Filter Paper, DPP = Dew Point Potentiometer, RH = Relative Humidity Box, EP = Effective Porosity, WHC = Water Holding Capacity, Kunsat = Calculated Unsaturated Hydraulic Conductivity

4 DS = Dry Sieve, WS = Wet Sieve, H = Hydrometer

5 F = Fine (<4.75mm), C = Coarse (>4.75mm)

Notes

Sample Receipt:

Four samples were received on February 11, 2026. All samples were loose material contained in 5-gallon buckets sealed with plastic lids. All samples were received in good order.

Sample Preparation and Testing Notes:
Two samples were mixes with clay - these were thoroughly mixed and cone-and-quartered.

Subsamples were moisture corrected and analyzed by proctor compaction.

Subsamples were remolded targeting 90% of maximum compaction and optimum water content, as directed by the client, and subjected to saturated hydraulic conductivity measurement by the rigid wall falling head method. These samples were then used to collect the hanging column and pressure pot portions of the soil water characteristic curve.

Additional subsamples were taken to determine the humidity chamber and dewpoint potentiometer portions of the soil water characteristic curve.

Subsamples were analyzed by wet sieve and hydrometer measurement techniques, and particle density determined by water pycnometer.

Summary of Proctor Compaction Tests

Sample Number	Measured: Optimum Moisture Content (% g/g)	Measured: Maximum Dry Bulk Density (g/cm^3)	Measured: Maximum Dry Bulk Density (pcf)	Oversize Corrected: Optimum Moisture Content (% g/g)	Oversize Corrected: Maximum Dry Bulk Density (g/cm^3)	Oversize Corrected: Maximum Dry Bulk Density (pcf)
Ranch Loam	14.0	1.83	114.4	NA	NA	NA
Ranch Loam Clay Mix	14.5	1.84	114.6	NA	NA	NA
Schmitt Loam	14.8	1.75	109.3	NA	NA	NA
Schmitt Loam Clay Mix	16.1	1.76	109.7	NA	NA	NA

--- = Oversize correction is unnecessary since coarse fraction < 5% of composite mass
NR = Not requested
NA = Not applicable

Summary of Particle Density Tests

Sample Number	Particle Density (g/cm^3)	Specific Gravity
Ranch Loam	2.56	2.56
Ranch Loam Clay Mix	2.57	2.57
Schmitt Loam	2.61	2.61
Schmitt Loam Clay Mix	2.57	2.58

Summary of Initial Moisture Content, Dry Bulk Density Wet Bulk Density and Calculated Porosity

	Moisture Content						
	As Received		Remolded				
Sample Number	Gravimetric (%, g/g)	Volumetric (%, cm^3/cm^3)	Gravimetric (%, g/g)	Volumetric (%, cm^3/cm^3)	Dry Bulk Density (g/cm^3)	Wet Bulk Density (g/cm^3)	Calculated Porosity (%)
Ranch Loam	NA	NA	13.8	22.8	1.65	1.88	35.5
Ranch Loam Clay Mix	NA	NA	14.2	23.5	1.66	1.89	35.5
Schmitt Loam	NA	NA	14.9	23.5	1.57	1.81	39.7
Schmitt Loam Clay Mix	NA	NA	16.1	25.5	1.58	1.84	38.5

NA = Not analyzed

--- = This sample was not remolded

Summary of Saturated Hydraulic Conductivity Tests

Sample Number	K_{sat} (cm/sec)	Oversize Corrected K_{sat} (cm/sec)	Method of Analysis	
			Constant Head	Falling Head
Ranch Loam	4.2E-05	NA		X
Ranch Loam Clay Mix	4.9E-06	NA		X
Schmitt Loam	2.0E-05	NA		X
Schmitt Loam Clay Mix	1.2E-05	NA		X

--- = Oversize correction is unnecessary since coarse fraction < 5% of composite mass
NR = Not requested
NA = Not applicable

Summary of Moisture Characteristics of the Initial Drainage Curve

Sample Number	Pressure Head (-cm water)	Moisture Content (%, cm^3/cm^3)
Ranch Loam	0	35.6
	18	34.6
	51	34.2
	129	31.7
	765	20.8
	8668	14.7
	24577	11.1
	76485	8.7
	408532	5.5
	855879	4.6
Ranch Loam Clay Mix	0	36.4
	22	34.9
	73	32.1
	151	30.6
	765	22.4
	2346	17.7
	60882	11.5
	517243	7.2
	855879	5.1
Schmitt Loam	0	40.2
	18	38.8 ‡‡
	51	38.2 ‡‡
	129	35.1 ‡‡
	765	25.8
	15195	16.1
	49562	13.2
	98513	11.5
	610962	7.1
	855879	6.5

‡‡ Volume adjustments are applicable at this matric potential (see data sheet for this sample).

Summary of Moisture Characteristics of the Initial Drainage Curve (Continued)

Sample Number	Pressure Head (-cm water)	Moisture Content (%, cm^3/cm^3)
Schmitt Loam Clay Mix	0	37.6
	18	37.4
	51	37.0
	129	33.2
	765	24.0
	15093	12.7
	31308	10.3
	97595	7.5
	733032	4.2
	855879	3.1

‡‡ Volume adjustments are applicable at this matric potential (see data sheet for this sample).

Summary of Calculated Unsaturated Hydraulic Properties

					Oversize Corrected	
Sample Number	α (cm^{-1})	N (dimensionless)	θ_r (% vol)	θ_s (% vol)	θ_r (% vol)	θ_s (% vol)
Ranch Loam	0.0101	1.2177	0.00	35.85	NA	NA
Ranch Loam Clay Mix	0.0147	1.1912	0.28	36.36	NA	NA
Schmitt Loam	0.0109	1.1857	0.00	40.16	NA	NA
Schmitt Loam Clay Mix	0.0069	1.2507	0.00	38.01	NA	NA

--- = Oversize correction is unnecessary since coarse fraction < 5% of composite mass
NR = Not requested
NA = Not applicable

Summary of Particle Size Characteristics

Sample Number	d_{10} (mm)	d_{50} (mm)	d_{60} (mm)	C_u	C_c	Method	USCS Classification	USDA Classification
Ranch Loam	NA	0.12	0.16	NA	NA	WS/H	Classification by ASTM 2487 requires Atterberg test	NA
Ranch Loam Clay Mix	NA	0.11	0.14	NA	NA	WS/H	Classification by ASTM 2487 requires Atterberg test	NA
Schmitt Loam	NA	0.065	0.11	NA	NA	WS/H	Classification by ASTM 2487 requires Atterberg test	NA
Schmitt Loam Clay Mix	NA	0.13	0.16	NA	NA	WS/H	Classification by ASTM 2487 requires Atterberg test	NA

Est = Reported values for d_{10}, C_u, C_c, and soil classification are estimates, since extrapolation was required to obtain the d_{10} diameter

$$C_u = \frac{d_{60}}{d_{10}}$$

$$C_c = \frac{(d_{30})^2}{(d_{10})(d_{60})}$$

DS = Dry sieve

H = Hydrometer

WS = Wet sieve

† Greater than 10% of sample is coarse material

d_{50} = Median particle diameter

Percent Gravel, Sand, Silt and Clay

Sample Number	% Gravel (>4.75mm)	% Sand (>0.075mm)	% Silt (>0.002mm)	% Clay (<0.002mm)
Ranch Loam	0.0	60.8	17.5	21.6
Ranch Loam Clay Mix	0.2	56.4	19.3	24.1
Schmitt Loam	0.0	49.4	26.1	24.5
Schmitt Loam Clay Mix	0.1	67.2	14.2	18.6

Proctor Compaction

Proctor Compaction Data

Job Name:	EAEST(2-26)	*Split (3/4", 3/8", #4):*	#4
Job Number:	DB26.1048.00	*Mass of coarse material* (g):	NA
Sample Number:	Ranch Loam	*Mass of fines material* (g):	NA
Project Name:	NMED AML	*Mold weight (g):*	4219.5
Date Received:	2/11/26	*Mold volume* (cm^3):	940.77
Test Date:	16-Feb-26	*Compaction Method:*	A
		Preparation Method:	Dry
As Received Moisture Content (% g/g):	NA	*Type of Rammer:*	Mechanical

Trial	Weight of Mold and Compacted Soil (g)	Weight of Container and Wet Soil (g)	Weight of Container and Dry Soil (g)	Weight of Container (g)	Dry Bulk Density (g/cm^3)	Moisture Content (% g/g)
1	6198	631.12	583.63	271.58	1.83	15.22
2	6164	591.17	543.41	268.03	1.76	17.34
3	6107	619.19	561.94	268.43	1.68	19.51
4	6088	526.80	501.32	269.40	1.79	10.99
5	5988	660.09	628.56	288.53	1.72	9.27

Soil Fractions		Properties of Coarse Material	
Coarse Fraction (% g/g):	NA	*Assumed particle density* (g/cm^3):	2.65
Fines Fraction (% g/g):	NA	*Assumed Initial Moisture Content (% g/g):*	0.0

Oversize Corrected Values for Dry Bulk Density and Moisture Content

Trial	Dry Bulk Density of Composite (g/cm^3)	Moisture Content of Composite (% g/g)
1	NA	NA
2	NA	NA
3	NA	NA
4	NA	NA
5	NA	NA

--- = Oversize correction is unnecessary since coarse fraction < 5% of composite mass

NA = Not applicable

Laboratory analysis by: N. Dolan

Data entered by: N. Dolan

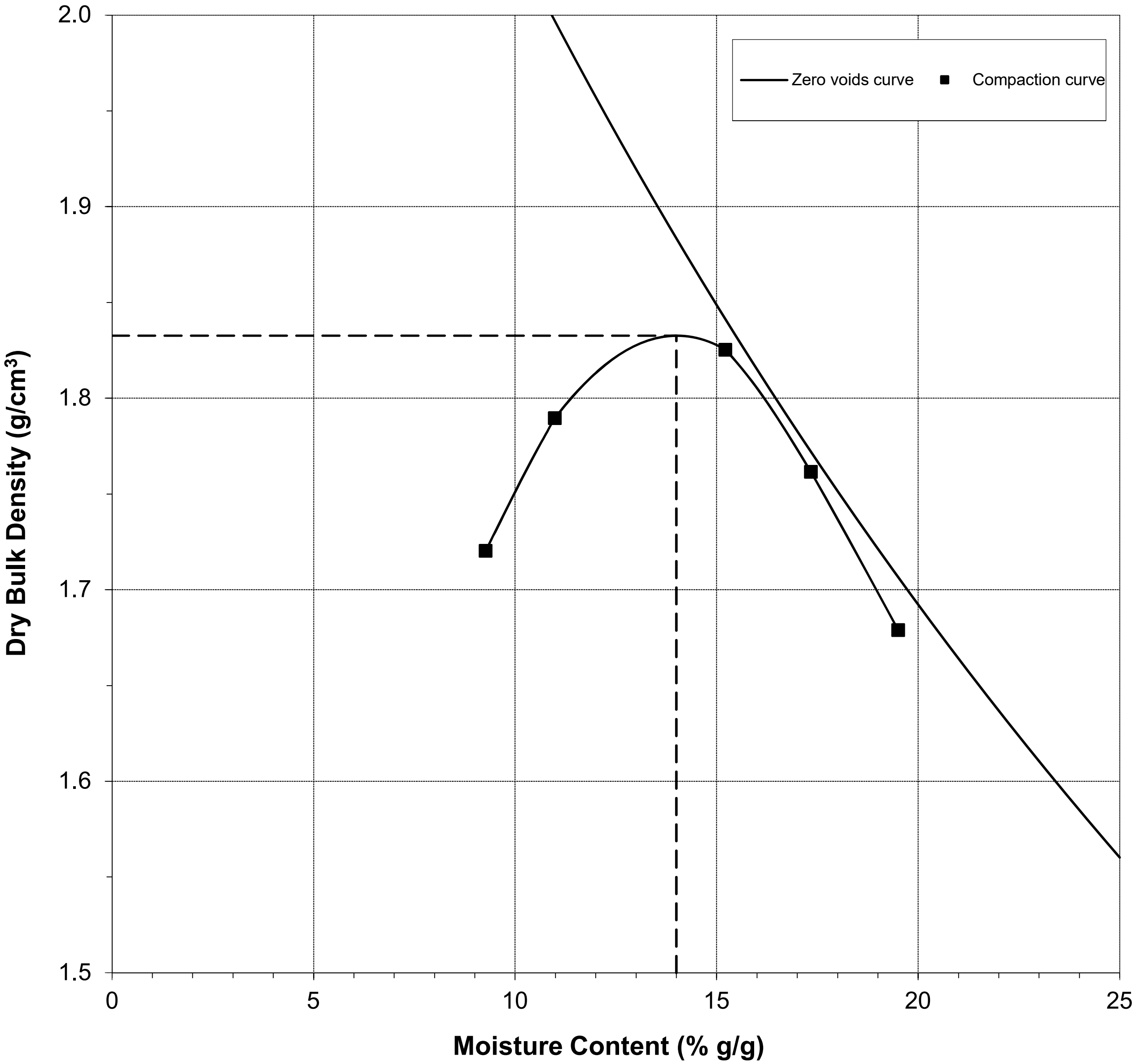
Checked by: T. Morgan

Proctor Compaction Data Points with Fitted Curve

Sample Number: Ranch Loam

	Measured	Corrected
Optimum Moisture Content (% g/g):	14.0	NA
Maximum Dry Bulk Density (g/cm^3):	1.83	NA

Test Date: 16-Feb-26



--- = Oversize correction is unnecessary since coarse fraction < 5% of composite mass

NA = Not applicable

Laboratory analysis by: N. Dolan
Data entered by: N. Dolan
Checked by: T. Morgan

Proctor Compaction Data

Job Name:	EAEST(2-26)	*Split (3/4", 3/8", #4):*	#4
Job Number:	DB26.1048.00	*Mass of coarse material* (g):	NA
Sample Number:	Ranch Loam Clay Mix	*Mass of fines material* (g):	NA
Project Name:	NMED AML	*Mold weight (g):*	4219.5
Date Received:	2/11/26	*Mold volume* (cm^3):	940.77
Test Date:	16-Feb-26	*Compaction Method:*	A
		Preparation Method:	Dry
As Received Moisture Content (% g/g):	NA	*Type of Rammer:*	Mechanical

Trial	Weight of Mold and Compacted Soil (g)	Weight of Container and Wet Soil (g)	Weight of Container and Dry Soil (g)	Weight of Container (g)	Dry Bulk Density (g/cm^3)	Moisture Content (% g/g)
1	5991	538.97	513.64	268.12	1.71	10.32
2	6107	632.88	595.39	291.65	1.79	12.34
3	6197	556.29	512.74	212.62	1.84	14.51
4	6177	629.71	580.62	286.90	1.78	16.71
5	6129	742.61	669.22	277.90	1.71	18.75

Soil Fractions		Properties of Coarse Material	
Coarse Fraction (% g/g):	NA	*Assumed particle density* (g/cm^3):	2.65
Fines Fraction (% g/g):	NA	*Assumed Initial Moisture Content (% g/g):*	0.0

Oversize Corrected Values for Dry Bulk Density and Moisture Content

Trial	Dry Bulk Density of Composite (g/cm^3)	Moisture Content of Composite (% g/g)
1	NA	NA
2	NA	NA
3	NA	NA
4	NA	NA
5	NA	NA

--- = Oversize correction is unnecessary since coarse fraction < 5% of composite mass

NA = Not applicable

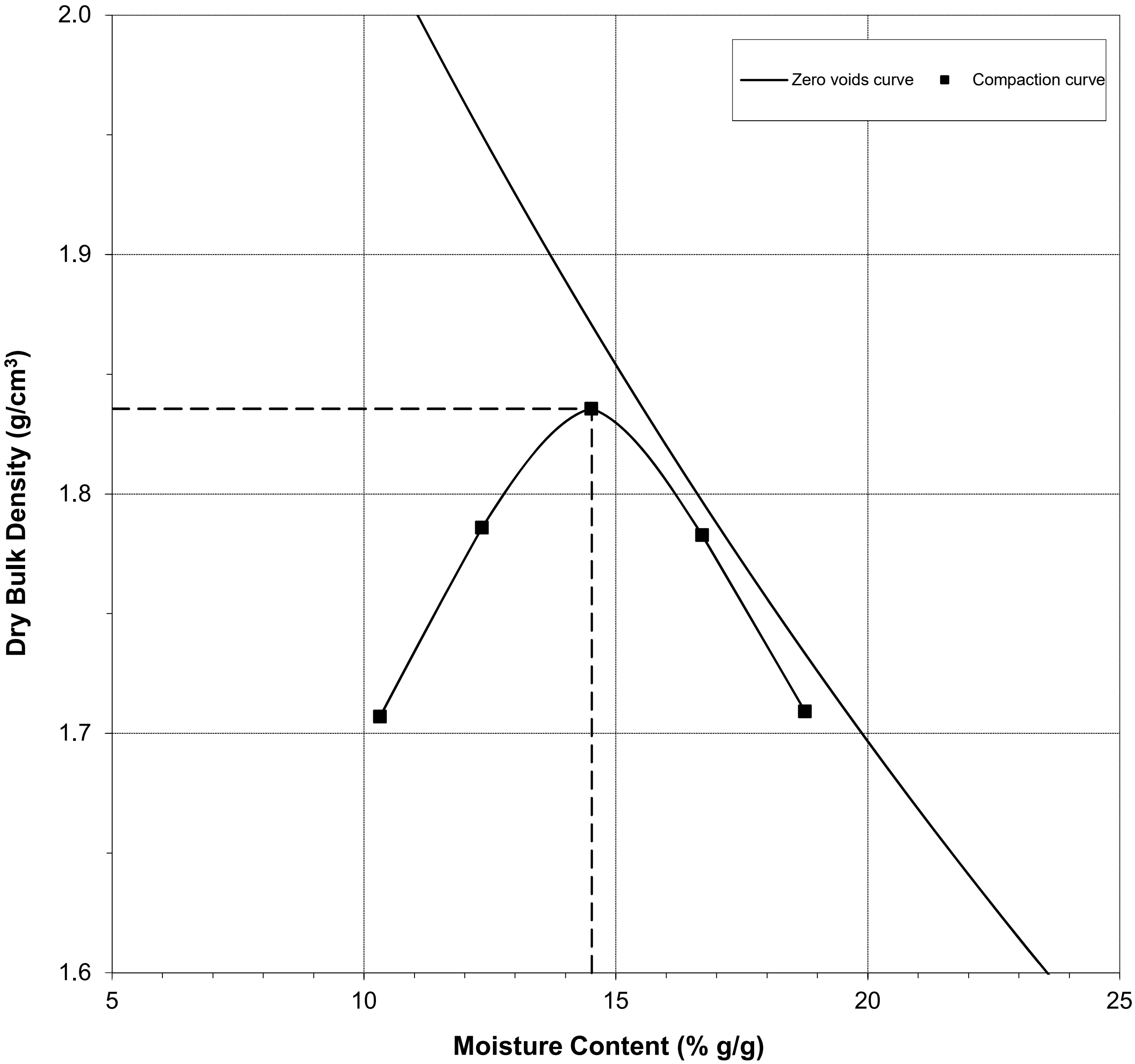
Laboratory analysis by: N. Dolan
Data entered by: N. Dolan
Checked by: T. Morgan

Proctor Compaction Data Points with Fitted Curve

Sample Number: Ranch Loam Clay Mix

	Measured	Corrected
Optimum Moisture Content (% g/g):	14.5	NA
Maximum Dry Bulk Density (g/cm^3):	1.84	NA

Test Date: 16-Feb-26



--- = Oversize correction is unnecessary since coarse fraction < 5% of composite mass

NA = Not applicable

Laboratory analysis by: N. Dolan
Data entered by: N. Dolan
Checked by: T. Morgan

Proctor Compaction Data

Job Name: EAEST(2-26)
Job Number: DB26.1048.00
Sample Number: Schmitt Loam
Project Name: NMED AML
Date Received: 2/11/26

Test Date: 16-Feb-26

As Received Moisture Content (% g/g): NA

Split (3/4", 3/8", #4): #4
Mass of coarse material (g): NA
Mass of fines material (g): NA
Mold weight (g): 4219.5
Mold volume (cm^3): 940.77

Compaction Method: A
Preparation Method: Dry
Type of Rammer: Mechanical

Trial	Weight of Mold and Compacted Soil (g)	Weight of Container and Wet Soil (g)	Weight of Container and Dry Soil (g)	Weight of Container (g)	Dry Bulk Density (g/cm^3)	Moisture Content (% g/g)
1	6081	576.52	543.02	297.74	1.74	13.66
2	6123	607.50	562.86	284.00	1.74	16.01
3	6104	625.28	564.99	267.79	1.67	20.29
4	6055	577.64	522.61	278.79	1.59	22.57
5	5964	647.29	607.94	277.35	1.66	11.90

Soil Fractions

Coarse Fraction (% g/g): NA
Fines Fraction (% g/g): NA

Properties of Coarse Material

Assumed particle density (g/cm^3): 2.65
Assumed Initial Moisture Content (% g/g): 0.0

Oversize Corrected Values for Dry Bulk Density and Moisture Content

Trial	Dry Bulk Density of Composite (g/cm^3)	Moisture Content of Composite (% g/g)
1	NA	NA
2	NA	NA
3	NA	NA
4	NA	NA
5	NA	NA

--- = Oversize correction is unnecessary since coarse fraction < 5% of composite mass
NA = Not applicable

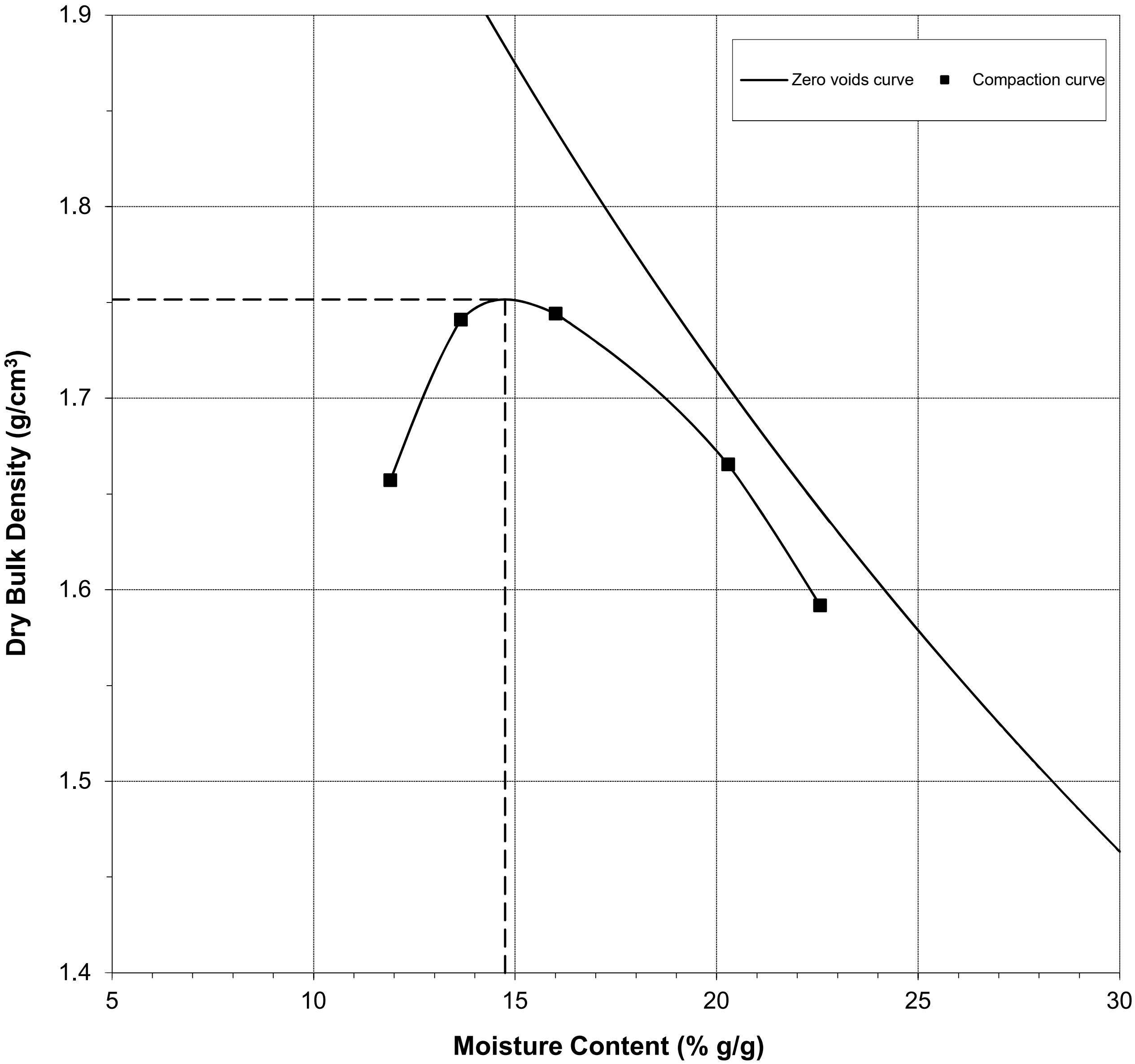
Laboratory analysis by: N. Dolan
Data entered by: N. Dolan
Checked by: T. Morgan

Proctor Compaction Data Points with Fitted Curve

Sample Number: Schmitt Loam

	Measured	Corrected
Optimum Moisture Content (% g/g):	14.8	NA
Maximum Dry Bulk Density (g/cm^3):	1.75	NA

Test Date: 16-Feb-26



--- = Oversize correction is unnecessary since coarse fraction < 5% of composite mass

NA = Not applicable

Laboratory analysis by: N. Dolan
Data entered by: N. Dolan
Checked by: T. Morgan

Proctor Compaction Data

Job Name:	EAEST(2-26)	*Split (3/4", 3/8", #4):*	#4
Job Number:	DB26.1048.00	*Mass of coarse material* (g):	NA
Sample Number:	Schmitt Loam Clay Mix	*Mass of fines material* (g):	NA
Project Name:	NMED AML	*Mold weight (g):*	4219.5
Date Received:	2/11/26	*Mold volume* (cm^3):	940.77
Test Date:	16-Feb-26	*Compaction Method:*	A
		Preparation Method:	Dry
As Received Moisture Content (% g/g):	NA	*Type of Rammer:*	Mechanical

Trial	Weight of Mold and Compacted Soil (g)	Weight of Container and Wet Soil (g)	Weight of Container and Dry Soil (g)	Weight of Container (g)	Dry Bulk Density (g/cm^3)	Moisture Content (% g/g)
1	6009	749.01	698.52	280.06	1.70	12.07
2	6089	671.29	624.28	292.18	1.74	14.16
3	6146	633.71	583.45	282.82	1.75	16.72
4	6113	661.49	601.91	284.44	1.69	18.77
5	6076	595.67	539.66	269.75	1.63	20.75

Soil Fractions		Properties of Coarse Material	
Coarse Fraction (% g/g):	NA	*Assumed particle density* (g/cm^3):	2.65
Fines Fraction (% g/g):	NA	*Assumed Initial Moisture Content (% g/g):*	0.0

Oversize Corrected Values for Dry Bulk Density and Moisture Content

Trial	Dry Bulk Density of Composite (g/cm^3)	Moisture Content of Composite (% g/g)
1	NA	NA
2	NA	NA
3	NA	NA
4	NA	NA
5	NA	NA

--- = Oversize correction is unnecessary since coarse fraction < 5% of composite mass

NA = Not applicable

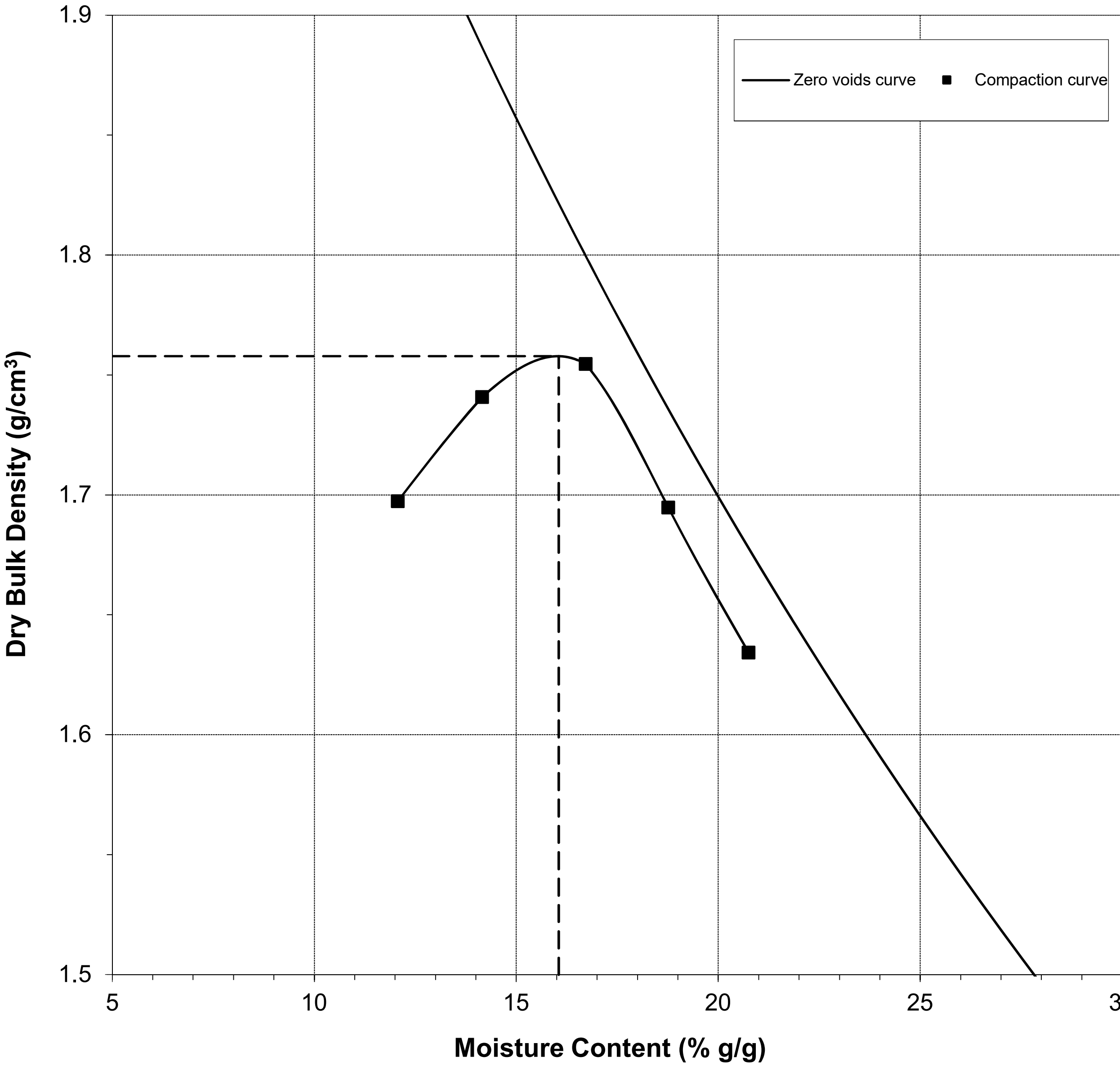
Laboratory analysis by: N. Dolan
Data entered by: N. Dolan
Checked by: T. Morgan

Proctor Compaction Data Points with Fitted Curve

Sample Number: Schmitt Loam Clay Mix

	Measured	Corrected
Optimum Moisture Content (% g/g):	16.1	NA
Maximum Dry Bulk Density (g/cm^3):	1.76	NA

Test Date: 16-Feb-26



--- = Oversize correction is unnecessary since coarse fraction < 5% of composite mass

NA = Not applicable

Laboratory analysis by: N. Dolan
Data entered by: N. Dolan
Checked by: T. Morgan

Specific Gravity

Specific Gravity and Particle Density

Job Name:	EAEST(2-26)
Job Number:	DB26.1048.00
Sample Number:	Ranch Loam
Project Name:	NMED AML
Date Received:	2/11/26
Test Date:	11-Mar-26

Trial 1

Weight of pycnometer filled w/air (g):	92.37
Weight of pycnometer filled w/soil (g):	148.70
Weight of pycnometer filled w/soil & water (g):	375.66
Weight of pycnometer filled w/water (g):	341.32
Observed temperature (°C):	25.25
Density of water at observed temperature (g/cm^3):	0.9970
Particle Density (g/cm^3):	2.55
Specific Gravity:	2.56
Correction factor, K:	0.9988
Particle Density at 20°C (g/cm^3):	2.55
Specific Gravity at 20°C:	2.56

Trial 2

Weight of pycnometer filled w/air (g):	90.65
Weight of pycnometer filled w/soil (g):	144.91
Weight of pycnometer filled w/soil & water (g):	372.80
Weight of pycnometer filled w/water (g):	339.66
Observed temperature (°C):	24.50
Density of water at observed temperature (g/cm^3):	0.9972
Particle Density (g/cm^3):	2.56
Specific Gravity:	2.57
Correction factor, K:	0.9990
Particle Density at 20°C (g/cm^3):	2.56
Specific Gravity at 20°C:	2.57

Average Particle Density (g/cm^3):	2.56
Average Specific Gravity:	**2.56**

Comments:

Laboratory analysis by:	N. Dolan
Data entered by:	N. Dolan
Checked by:	T. Morgan

Specific Gravity and Particle Density

Job Name:	EAEST(2-26)
Job Number:	DB26.1048.00
Sample Number:	Ranch Loam Clay Mix
Project Name:	NMED AML
Date Received:	2/11/26
Test Date:	11-Mar-26

Trial 1

Weight of pycnometer filled w/air (g):	92.73
Weight of pycnometer filled w/soil (g):	145.46
Weight of pycnometer filled w/soil & water (g):	374.01
Weight of pycnometer filled w/water (g):	341.80
Observed temperature (°C):	25.00
Density of water at observed temperature (g/cm^3):	0.9970
Particle Density (g/cm^3):	2.56
Specific Gravity:	2.57
Correction factor, K:	0.9988
Particle Density at 20°C (g/cm^3):	2.56
Specific Gravity at 20°C:	2.57

Trial 2

Weight of pycnometer filled w/air (g):	92.18
Weight of pycnometer filled w/soil (g):	145.64
Weight of pycnometer filled w/soil & water (g):	373.92
Weight of pycnometer filled w/water (g):	341.16
Observed temperature (°C):	25.00
Density of water at observed temperature (g/cm^3):	0.9970
Particle Density (g/cm^3):	2.57
Specific Gravity:	2.58
Correction factor, K:	0.9988
Particle Density at 20°C (g/cm^3):	2.57
Specific Gravity at 20°C:	2.58

Average Particle Density (g/cm^3):	2.57
Average Specific Gravity:	**2.57**

Comments:

Laboratory analysis by:	N. Dolan
Data entered by:	N. Dolan
Checked by:	T. Morgan

Specific Gravity and Particle Density

Job Name:	EAEST(2-26)
Job Number:	DB26.1048.00
Sample Number:	Schmitt Loam
Project Name:	NMED AML
Date Received:	2/11/26
Test Date:	3-Mar-26

Trial 1

Weight of pycnometer filled w/air (g):	92.19
Weight of pycnometer filled w/soil (g):	143.69
Weight of pycnometer filled w/soil & water (g):	373.02
Weight of pycnometer filled w/water (g):	341.27
Observed temperature (°C):	23.40
Density of water at observed temperature (g/cm^3):	0.9974
Particle Density (g/cm^3):	2.60
Specific Gravity:	2.61
Correction factor, K:	0.9992
Particle Density at 20°C (g/cm^3):	2.60
Specific Gravity at 20°C:	2.61

Trial 2

Weight of pycnometer filled w/air (g):	92.72
Weight of pycnometer filled w/soil (g):	144.12
Weight of pycnometer filled w/soil & water (g):	373.69
Weight of pycnometer filled w/water (g):	341.89
Observed temperature (°C):	23.50
Density of water at observed temperature (g/cm^3):	0.9974
Particle Density (g/cm^3):	2.62
Specific Gravity:	2.62
Correction factor, K:	0.9992
Particle Density at 20°C (g/cm^3):	2.62
Specific Gravity at 20°C:	2.62

Average Particle Density (g/cm^3):	2.61
Average Specific Gravity:	**2.61**

Comments:

Laboratory analysis by:	N. Dolan
Data entered by:	N. Dolan
Checked by:	T. Morgan

Specific Gravity and Particle Density

Job Name:	EAEST(2-26)
Job Number:	DB26.1048.00
Sample Number:	Schmitt Loam Clay Mix
Project Name:	NMED AML
Date Received:	2/11/26
Test Date:	3-Mar-26

Trial 1

Weight of pycnometer filled w/air (g):	92.83
Weight of pycnometer filled w/soil (g):	144.15
Weight of pycnometer filled w/soil & water (g):	373.28
Weight of pycnometer filled w/water (g):	341.83
Observed temperature (°C):	24.00
Density of water at observed temperature (g/cm^3):	0.9973
Particle Density (g/cm^3):	2.58
Specific Gravity:	2.58
Correction factor, K:	0.9991
Particle Density at 20°C (g/cm^3):	2.58
Specific Gravity at 20°C:	2.58

Trial 2

Weight of pycnometer filled w/air (g):	95.15
Weight of pycnometer filled w/soil (g):	146.70
Weight of pycnometer filled w/soil & water (g):	375.81
Weight of pycnometer filled w/water (g):	344.25
Observed temperature (°C):	24.00
Density of water at observed temperature (g/cm^3):	0.9973
Particle Density (g/cm^3):	2.57
Specific Gravity:	2.58
Correction factor, K:	0.9991
Particle Density at 20°C (g/cm^3):	2.57
Specific Gravity at 20°C:	2.58

Average Particle Density (g/cm^3):	2.57
Average Specific Gravity:	**2.58**

Comments:

Laboratory analysis by:	N. Dolan
Data entered by:	N. Dolan
Checked by:	T. Morgan

Initial Properties

Data for Initial Moisture Content, Bulk Density, Porosity, and Percent Saturation

Job Name: EAEST(2-26)
Job Number: DB26.1048.00
Sample Number: Ranch Loam
Project Name: NMED AML
Date Received: 2/11/26

	As Received	Remolded
Test Date:	NA	24-Feb-26
Field weight of sample* (g):		905.12
Tare weight, ring (g):		127.89
Tare weight, pan/plate (g):		350.89
Tare weight, other (g):		3.57
Dry weight of sample (g):		371.52
Sample volume (cm^3):		225.27
Measured particle density (g/cm^3):		2.56
Gravimetric Moisture Content (% g/g):		13.8
Volumetric Moisture Content (% vol):		22.8
Dry bulk density (g/cm^3):		1.65
Wet bulk density (g/cm^3):		1.88
Calculated Porosity (% vol):		35.5
Percent Saturation:		64.0

Laboratory analysis by: J. Tafoya
Data entered by: M. Sharma
Checked by: T. Morgan

Comments:

* Weight including tares
NA = Not applicable
--- = This sample was not remolded

Data for Initial Moisture Content, Bulk Density, Porosity, and Percent Saturation

Job Name:	EAEST(2-26)
Job Number:	DB26.1048.00
Sample Number:	Ranch Loam Clay Mix
Project Name:	NMED AML
Date Received:	2/11/26

	As Received	Remolded
Test Date:	NA	24-Feb-26
Field weight of sample* (g):		906.95
Tare weight, ring (g):		136.84
Tare weight, pan/plate (g):		352.34
Tare weight, other (g):		3.64
Dry weight of sample (g):		362.62
Sample volume (cm^3):		219.08
Measured particle density (g/cm^3):		2.57
Gravimetric Moisture Content (% g/g):		14.2
Volumetric Moisture Content (% vol):		23.5
Dry bulk density (g/cm^3):		1.66
Wet bulk density (g/cm^3):		1.89
Calculated Porosity (% vol):		35.5
Percent Saturation:		66.1

Laboratory analysis by:	J. Tafoya
Data entered by:	M. Sharma
Checked by:	T. Morgan

Comments:

* Weight including tares
NA = Not applicable
--- = This sample was not remolded

Data for Initial Moisture Content, Bulk Density, Porosity, and Percent Saturation

Job Name:	EAEST(2-26)
Job Number:	DB26.1048.00
Sample Number:	Schmitt Loam
Project Name:	NMED AML
Date Received:	2/11/26

	As Received	Remolded
Test Date:	NA	24-Feb-26
Field weight of sample* (g):		907.85
Tare weight, ring (g):		137.99
Tare weight, pan/plate (g):		361.57
Tare weight, other (g):		4.94
Dry weight of sample (g):		350.99
Sample volume (cm^3):		223.09
Measured particle density (g/cm^3):		2.61
Gravimetric Moisture Content (% g/g):		14.9
Volumetric Moisture Content (% vol):		23.5
Dry bulk density (g/cm^3):		1.57
Wet bulk density (g/cm^3):		1.81
Calculated Porosity (% vol):		39.7
Percent Saturation:		59.2

Laboratory analysis by:	J. Tafoya
Data entered by:	M. Sharma
Checked by:	T. Morgan

Comments:

* Weight including tares
NA = Not applicable
--- = This sample was not remolded

Data for Initial Moisture Content, Bulk Density, Porosity, and Percent Saturation

Job Name:	EAEST(2-26)
Job Number:	DB26.1048.00
Sample Number:	Schmitt Loam Clay Mix
Project Name:	NMED AML
Date Received:	2/11/26

	As Received	Remolded
Test Date:	NA	24-Feb-26
Field weight of sample* (g):		906.63
Tare weight, ring (g):		138.54
Tare weight, pan/plate (g):		355.27
Tare weight, other (g):		3.55
Dry weight of sample (g):		352.53
Sample volume (cm^3):		222.63
Measured particle density (g/cm^3):		2.57
Gravimetric Moisture Content (% g/g):		16.1
Volumetric Moisture Content (% vol):		25.5
Dry bulk density (g/cm^3):		1.58
Wet bulk density (g/cm^3):		1.84
Calculated Porosity (% vol):		38.5
Percent Saturation:		66.2

Laboratory analysis by:	J. Tafoya
Data entered by:	M. Sharma
Checked by:	T. Morgan

Comments:

* Weight including tares
NA = Not applicable
--- = This sample was not remolded

Saturated Hydraulic Conductivity

Daniel B. Stephens & Associates, Inc.

Saturated Hydraulic Conductivity
Falling Head Method

Job Name:	EAEST(2-26)	*Type of water used:*	TAP
Job Number:	DB26.1048.00	*Backpressure* (psi)*:*	0.0
Sample Number:	Ranch Loam	*Offset* (cm)*:*	4.0
Project Name:	NMED AML	*Sample length* (cm)*:*	7.60
Date Received:	2/11/26	*Sample x-sectional area* (cm^2)*:*	29.63
		Reservoir x-sectional area (cm^2)*:*	0.61

Date	Time	Temp (°C)	Reservoir head (cm)	Corrected head (cm)	Elapsed time (sec)	Ksat (cm/sec)	Ksat @ 20°C (cm/sec)
Test # 1:							
27-Feb-26	10:34:05	21.5	75.2	71.2	240	4.5E-05	4.4E-05
27-Feb-26	10:38:05	21.5	70.4	66.4			
Test # 2:							
27-Feb-26	10:38:25	21.5	70.4	66.4	325	4.2E-05	4.1E-05
27-Feb-26	10:43:50	21.5	64.8	60.8			
Test # 3:							
27-Feb-26	10:44:05	21.5	64.8	60.8	275	4.4E-05	4.2E-05
27-Feb-26	10:48:40	21.5	60.3	56.3			
Test # 4:							
27-Feb-26	10:49:00	21.5	60.3	56.3	300	4.3E-05	4.2E-05
27-Feb-26	10:54:00	21.5	55.8	51.8			

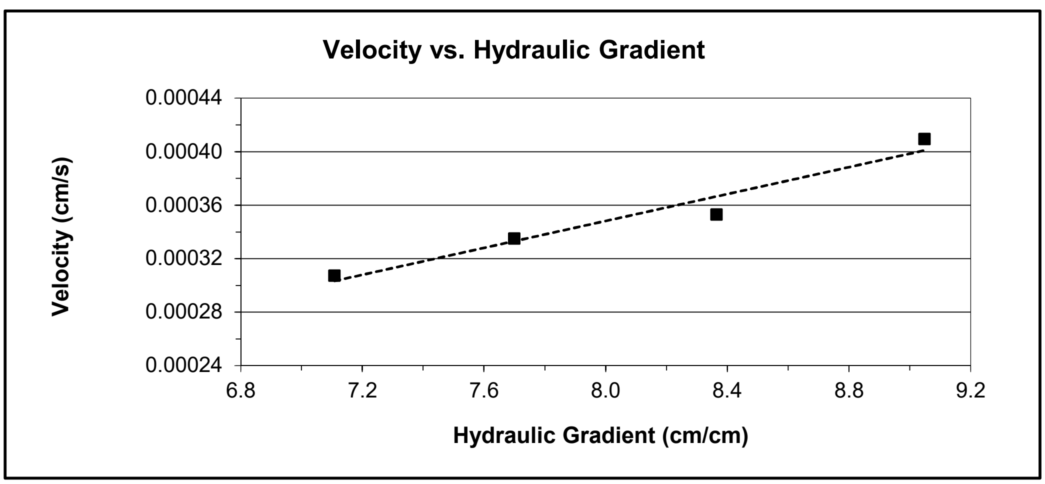
Average Ksat **(cm/sec)*:*** **4.2E-05**

Oversize Corrected Ksat **(cm/sec)*:*** **NA**

Comments:

--- = Oversize correction is unnecessary since coarse fraction < 5% of composite mass

NA = Not applicable



Laboratory analysis by: M. Sharma

Data entered by: M. Sharma

Checked by: T. Morgan

Daniel B. Stephens & Associates, Inc.

Saturated Hydraulic Conductivity
Falling Head Method

Job Name:	EAEST(2-26)	*Type of water used:*	TAP
Job Number:	DB26.1048.00	*Backpressure* (psi):	0.0
Sample Number:	Ranch Loam Clay Mix	*Offset* (cm):	2.0
Project Name:	NMED AML	*Sample length* (cm):	7.54
Date Received:	2/11/26	*Sample x-sectional area* (cm^2):	29.07
		Reservoir x-sectional area (cm^2):	0.61

Date	Time	Temp (°C)	Reservoir head (cm)	Corrected head (cm)	Elapsed time (sec)	Ksat (cm/sec)	Ksat @ 20°C (cm/sec)
Test # 1:							
27-Feb-26	11:10:05	21.5	102	100.0	555	5.4E-06	5.3E-06
27-Feb-26	11:19:20	21.5	100.1	98.1			
Test # 2:							
27-Feb-26	11:20:00	21.5	100.1	98.1	630	5.4E-06	5.2E-06
27-Feb-26	11:30:30	21.5	98	96.0			
Test # 3:							
27-Feb-26	11:31:00	21.5	98	96.0	770	5.0E-06	4.8E-06
27-Feb-26	11:43:50	21.5	95.7	93.7			
Test # 4:							
27-Feb-26	11:44:30	21.5	95.7	93.7	1555	4.5E-06	4.4E-06
27-Feb-26	12:10:25	21.5	91.6	89.6			

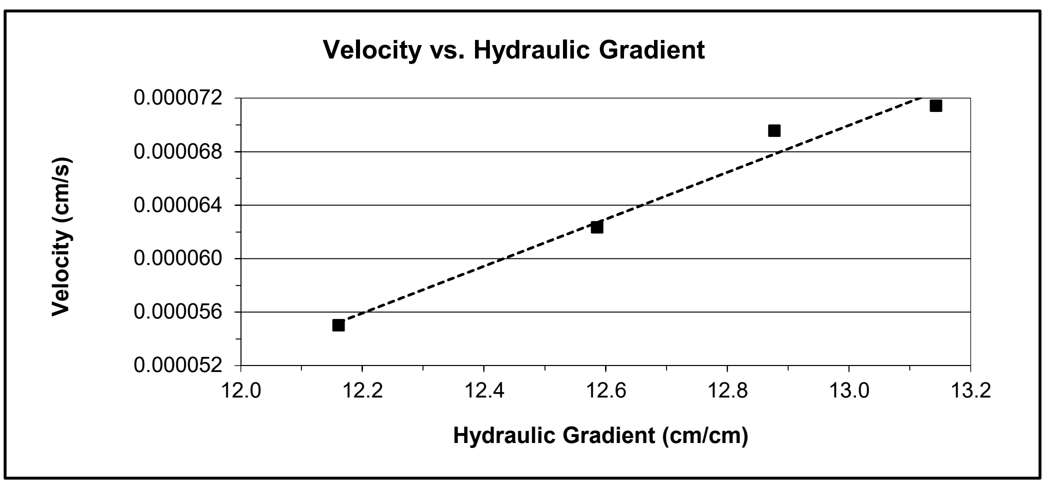
***Average Ksat* (cm/sec):** **4.9E-06**

***Oversize Corrected Ksat* (cm/sec):** **NA**

Comments:

--- = Oversize correction is unnecessary since coarse fraction < 5% of composite mass

NA = Not applicable



Laboratory analysis by: M. Sharma

Data entered by: M. Sharma

Checked by: T. Morgan

Daniel B. Stephens & Associates, Inc.

Saturated Hydraulic Conductivity
Falling Head Method

Job Name:	EAEST(2-26)	*Type of water used:*	TAP
Job Number:	DB26.1048.00	*Backpressure* (psi):	0.0
Sample Number:	Schmitt Loam	*Offset* (cm):	2.0
Project Name:	NMED AML	*Sample length* (cm):	7.61
Date Received:	2/11/26	*Sample x-sectional area* (cm^2):	29.33
		Reservoir x-sectional area (cm^2):	0.61

Date	Time	Temp (°C)	Reservoir head (cm)	Corrected head (cm)	Elapsed time (sec)	Ksat (cm/sec)	Ksat @ 20°C (cm/sec)
Test # 1:							
27-Feb-26	11:06:15	21.5	90.2	88.2	425	2.2E-05	2.1E-05
27-Feb-26	11:13:20	21.5	85.2	83.2			
Test # 2:							
27-Feb-26	11:13:50	21.5	85.2	83.2	449	2.0E-05	2.0E-05
27-Feb-26	11:21:19	21.5	80.5	78.5			
Test # 3:							
27-Feb-26	11:21:40	21.5	80.5	78.5	250	2.0E-05	2.0E-05
27-Feb-26	11:25:50	21.5	78	76.0			
Test # 4:							
27-Feb-26	11:26:10	21.5	78	76.0	310	1.9E-05	1.8E-05
27-Feb-26	11:31:20	21.5	75.2	73.2			

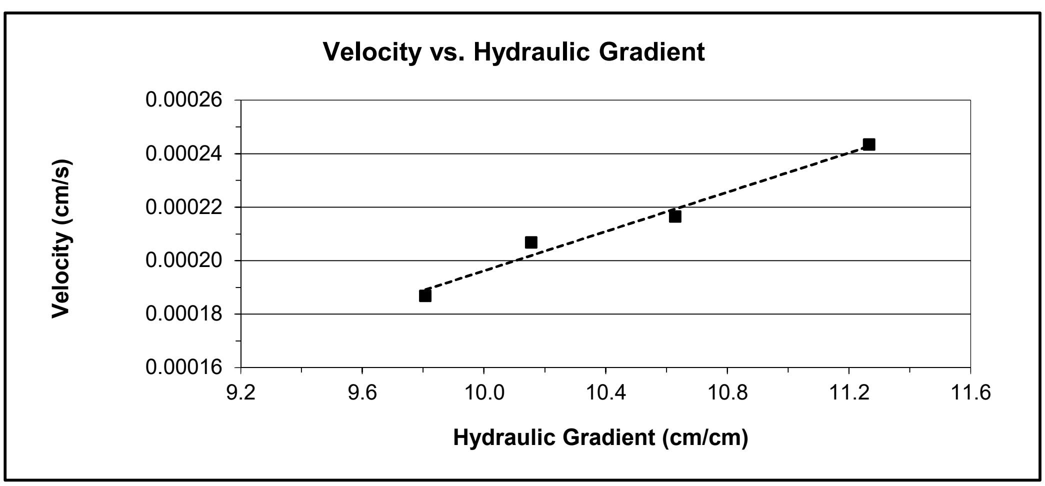
***Average Ksat* (cm/sec): 2.0E-05**

***Oversize Corrected Ksat* (cm/sec): NA**

Comments:

--- = Oversize correction is unnecessary since coarse fraction < 5% of composite mass

NA = Not applicable



Laboratory analysis by: M. Sharma

Data entered by: M. Sharma

Checked by: T. Morgan

Saturated Hydraulic Conductivity
Falling Head Method

Job Name:	EAEST(2-26)	*Type of water used:*	TAP
Job Number:	DB26.1048.00	*Backpressure* (psi)*:*	0.0
Sample Number:	Schmitt Loam Clay Mix	*Offset* (cm)*:*	2.5
Project Name:	NMED AML	*Sample length* (cm)*:*	7.61
Date Received:	2/11/26	*Sample x-sectional area* (cm^2)*:*	29.26
		Reservoir x-sectional area (cm^2)*:*	0.61

Date	Time	Temp (°C)	Reservoir head (cm)	Corrected head (cm)	Elapsed time (sec)	Ksat (cm/sec)	Ksat @ 20°C (cm/sec)
Test # 1:							
27-Feb-26	11:07:00	21.5	88.1	85.6	425	1.4E-05	1.3E-05
27-Feb-26	11:14:05	21.5	85	82.5			
Test # 2:							
27-Feb-26	11:14:35	21.5	85	82.5	445	1.3E-05	1.3E-05
27-Feb-26	11:22:00	21.5	82	79.5			
Test # 3:							
27-Feb-26	11:27:00	21.5	80.2	77.7	300	1.2E-05	1.1E-05
27-Feb-26	11:32:00	21.5	78.5	76.0			
Test # 4:							
27-Feb-26	11:32:25	21.5	78.5	76.0	740	1.0E-05	1.0E-05
27-Feb-26	11:44:45	21.5	74.9	72.4			

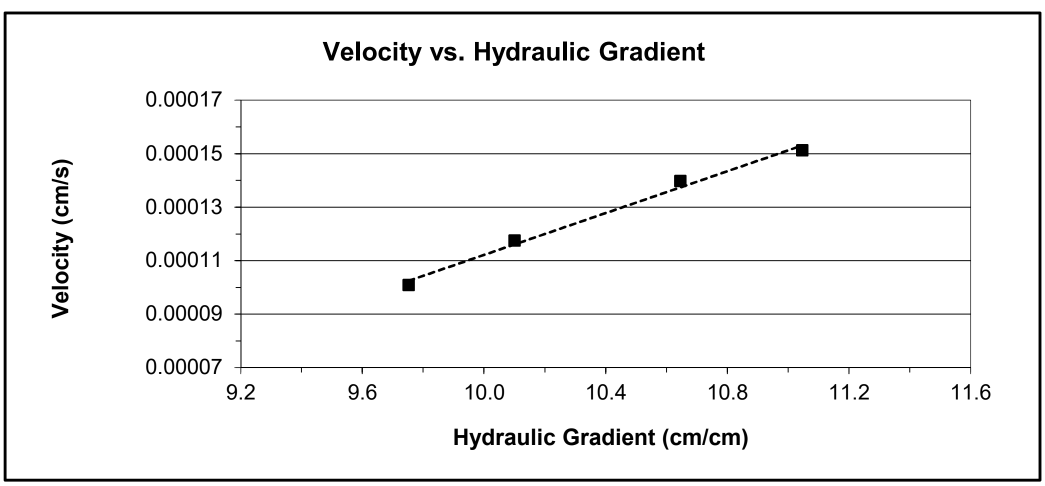
Average Ksat* (cm/sec)*: **1.2E-05**

Oversize Corrected Ksat* (cm/sec)*: **NA**

Comments:

--- = Oversize correction is unnecessary since coarse fraction < 5% of composite mass

NA = Not applicable



Laboratory analysis by: M. Sharma

Data entered by: M. Sharma

Checked by: T. Morgan

Moisture Retention Characteristics

Moisture Retention Data

Hanging Column / Pressure Plate

(Soil-Water Characteristic Curve)

Job Name:	EAEST(2-26)	*Dry wt. of sample* (g):	371.52
Job Number:	DB26.1048.00	*Tare wt., ring* (g):	127.89
Sample Number:	Ranch Loam	*Tare wt., screen & clamp* (g):	26.09
Project Name:	NMED AML	*Initial sample volume* (cm^3):	225.27
Date Received:	2/11/26	*Initial dry bulk density* (g/cm^3):	1.65
		Measured particle density (g/cm^3):	2.56
		Initial calculated total porosity (%):	35.52

	Date	Time	Weight* (g)	Matric Potential (-cm water)	Moisture Content † (% vol)
Hanging column:	27-Feb-26	13:35	605.60	0	35.56
	5-Mar-26	10:48	603.49	18.0	34.62
	11-Mar-26	10:40	602.63	51.0	34.24
	18-Mar-26	9:57	596.95	129.0	31.72
Pressure plate:	27-Mar-38	14:38	572.31	765	20.78

Volume Adjusted Data [1]

	Matric Potential (-cm water)	Adjusted Volume (cm^3)	% Volume Change [2] (%)	Adjusted Density (g/cm^3)	Adjusted Calculated Porosity (%)
Hanging column:	0.0	---	---	---	---
	18.0	---	---	---	---
	51.0	---	---	---	---
	129.0	---	---	---	---
Pressure plate:	765	---	---	---	---

Comments:

[1] Applicable if the sample experienced volume changes during testing. 'Volume Adjusted' values represent each of the volume change measurements obtained after saturated hydraulic conductivity testing and throughout hanging column/pressure plate testing. "---" indicates no volume changes occurred.

[2] Represents percent volume change from original sample volume. A '+' denotes measured sample swelling, a '-' denotes measured sample settling, and '---' denotes no volume change occurred.

* Weight including tares

† Assumed density of water is 1.0 g/cm^3

‡‡ Volume adjustments are applicable at this matric potential (see comment #1). Changes in volume, if applicable, are estimated based on obtainable measurements of changes in sample length and diameter.

Technician Notes:

Laboratory analysis by: M. Sharma
Data entered by: M. Sharma
Checked by: T. Morgan

Moisture Retention Data

Dew Point Potentiometer / Relative Humidity Box

(Soil-Water Characteristic Curve)

Sample Number: Ranch Loam

Initial sample bulk density (g/cm^3)*:* 1.65

Fraction of bulk sample used (<2.00mm fraction) (%): 100.00

Dry weight of dew point potentiometer sample* (g)*:* 180.73

Tare weight, jar (g)*:* 117.61

	Date	Time	Weight* (g)	Water Potential (-cm water)	Moisture Content † (% vol)
Dew point potentiometer:	18-Mar-26	12:34	186.34	8668	14.66
	16-Mar-26	8:50	184.99	24577	11.12
	11-Mar-26	12:30	184.07	76485	8.73
	2-Mar-26	9:00	182.82	408532	5.47

Volume Adjusted Data [1]

	Water Potential (-cm water)	Adjusted Volume (cm^3)	% Volume Change [2] (%)	Adjusted Density (g/cm^3)	Adjusted Calc. Porosity (%)
Dew point potentiometer:	8668	---	---	---	---
	24577	---	---	---	---
	76485	---	---	---	---
	408532	---	---	---	---

Comments:

[1] Applicable if the sample experienced volume changes during testing. ‘Volume Adjusted’ values represent the volume change measurements obtained after the last hanging column or pressure plate point. "---" indicates no volume changes occurred.

[2] Represents percent volume change from original sample volume. A '+' denotes measured sample swelling, a '-' denotes measured sample settling, and '---' denotes no volume change occurred.

* Weight including tares

† Adjusted for >2.00mm (#10 sieve) material not used in DPP/RH testing. Assumed moisture content of material >2.00mm is zero, and assumed density of water is 1.0 g/cm^3.

‡‡ Volume adjustments are applicable at this matric potential (see comment #1).

Laboratory analysis by: M. Sharma, J. Tafoya

Data entered by: M. Sharma

Checked by: T. Morgan

Moisture Retention Data

Dew Point Potentiometer / Relative Humidity Box

(Soil-Water Characteristic Curve)

Sample Number: Ranch Loam

Initial sample bulk density (g/cm^3)*:* 1.65
Fraction of bulk sample used (<2.00mm fraction) (%): 100.00

Dry weight of relative humidity box sample* (g)*:* 61.94
Tare weight (g)*:* 39.50

	Date	Time	Weight* (g)	Water Potential (-cm water)	Moisture Content † (% vol)
Relative humidity box:	30-Mar-26	0:00	62.56	855879	4.59

Volume Adjusted Data [1]

	Water Potential (-cm water)	Adjusted Volume (cm^3)	% Volume Change [2] (%)	Adjusted Density (g/cm^3)	Adjusted Calc. Porosity (%)
Relative humidity box:	855879	---	---	---	---

Comments:

[1] Applicable if the sample experienced volume changes during testing. ‘Volume Adjusted’ values represent the volume change measurements obtained after the last hanging column or pressure plate point. "---" indicates no volume changes occurred.

[2] Represents percent volume change from original sample volume. A '+' denotes measured sample swelling, a '-' denotes measured sample settling, and '---' denotes no volume change occurred.

* Weight including tares

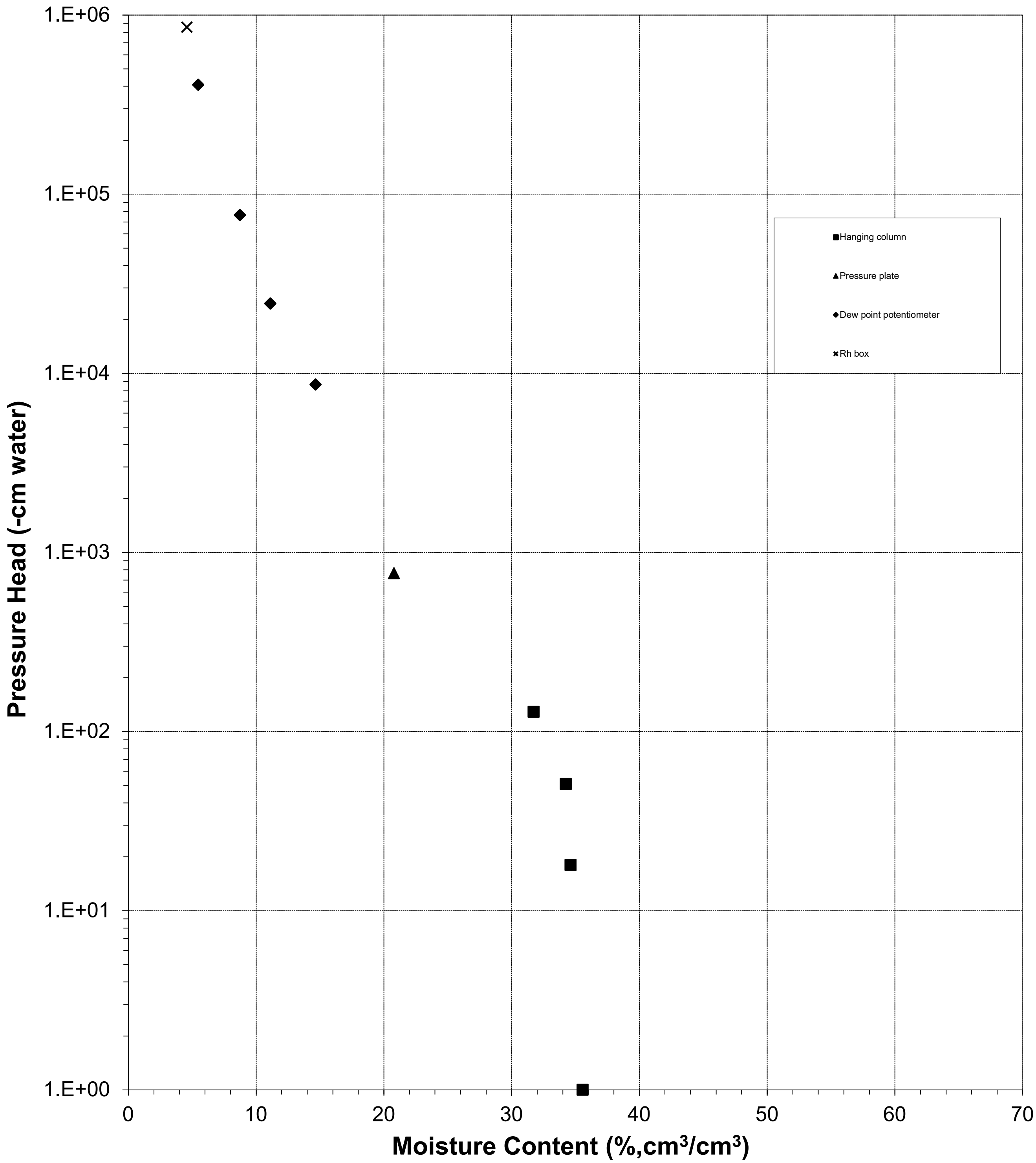
† Adjusted for >2.00mm (#10 sieve) material not used in DPP/RH testing. Assumed moisture content of material >2.00mm is zero, and assumed density of water is 1.0 g/cm^3.

‡‡ Volume adjustments are applicable at this matric potential (see comment #1). Changes in volume, if applicable, are estimated based on obtainable measurements of changes in sample length and diameter.

Laboratory analysis by: M. Sharma, J. Tafoya
Data entered by: M. Sharma
Checked by: T. Morgan

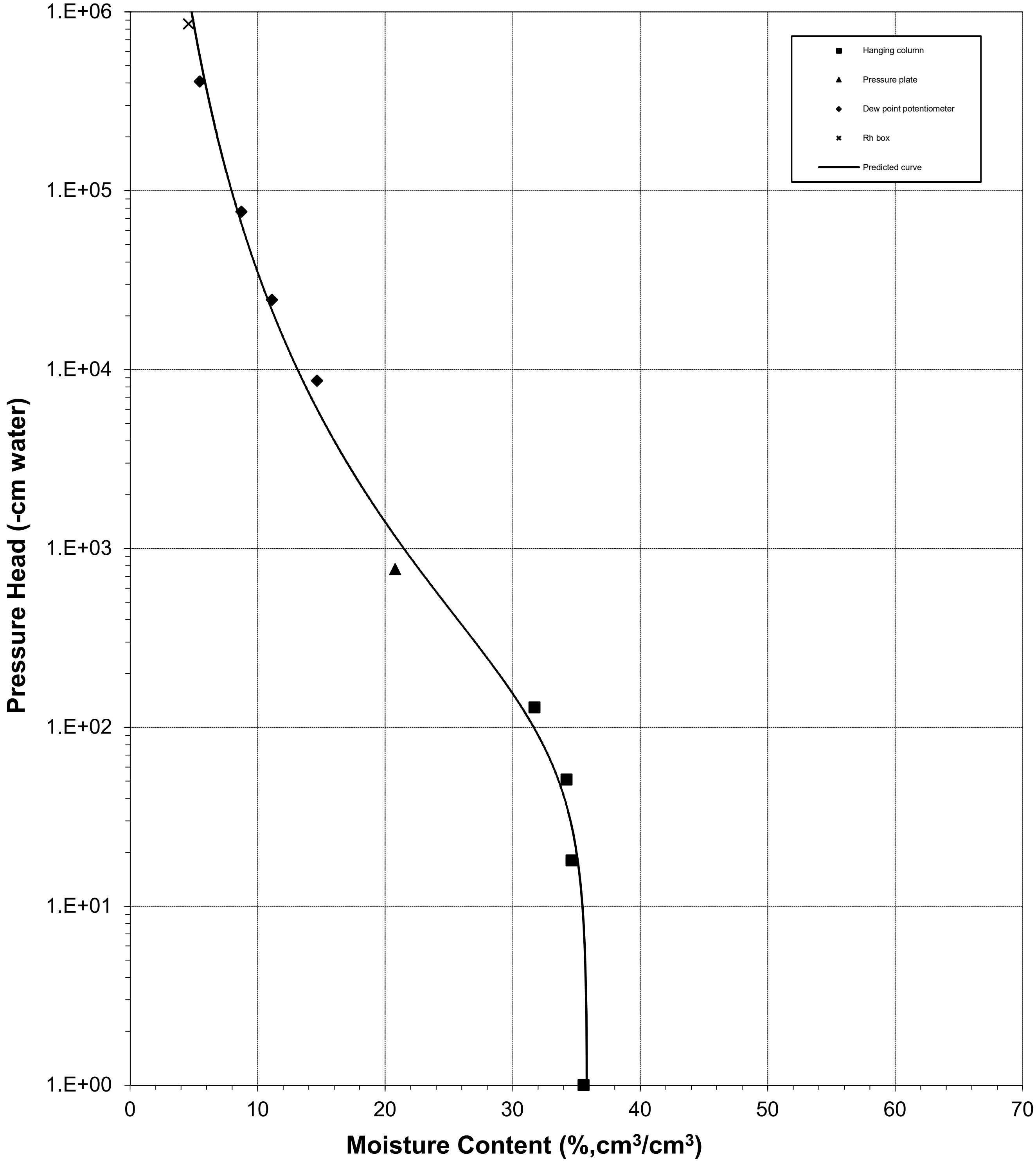
Water Retention Data Points

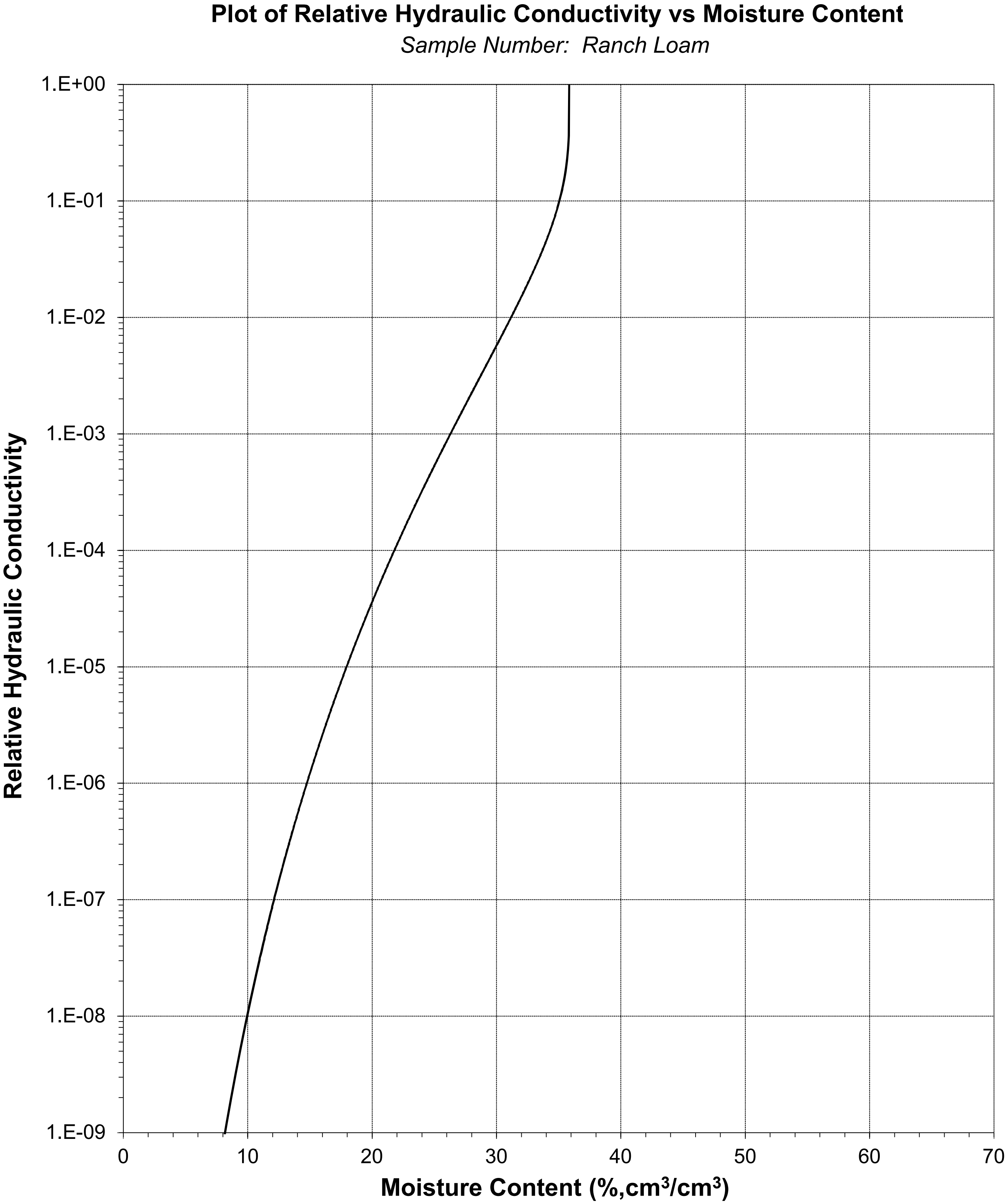
Sample Number: Ranch Loam



Predicted Water Retention Curve and Data Points

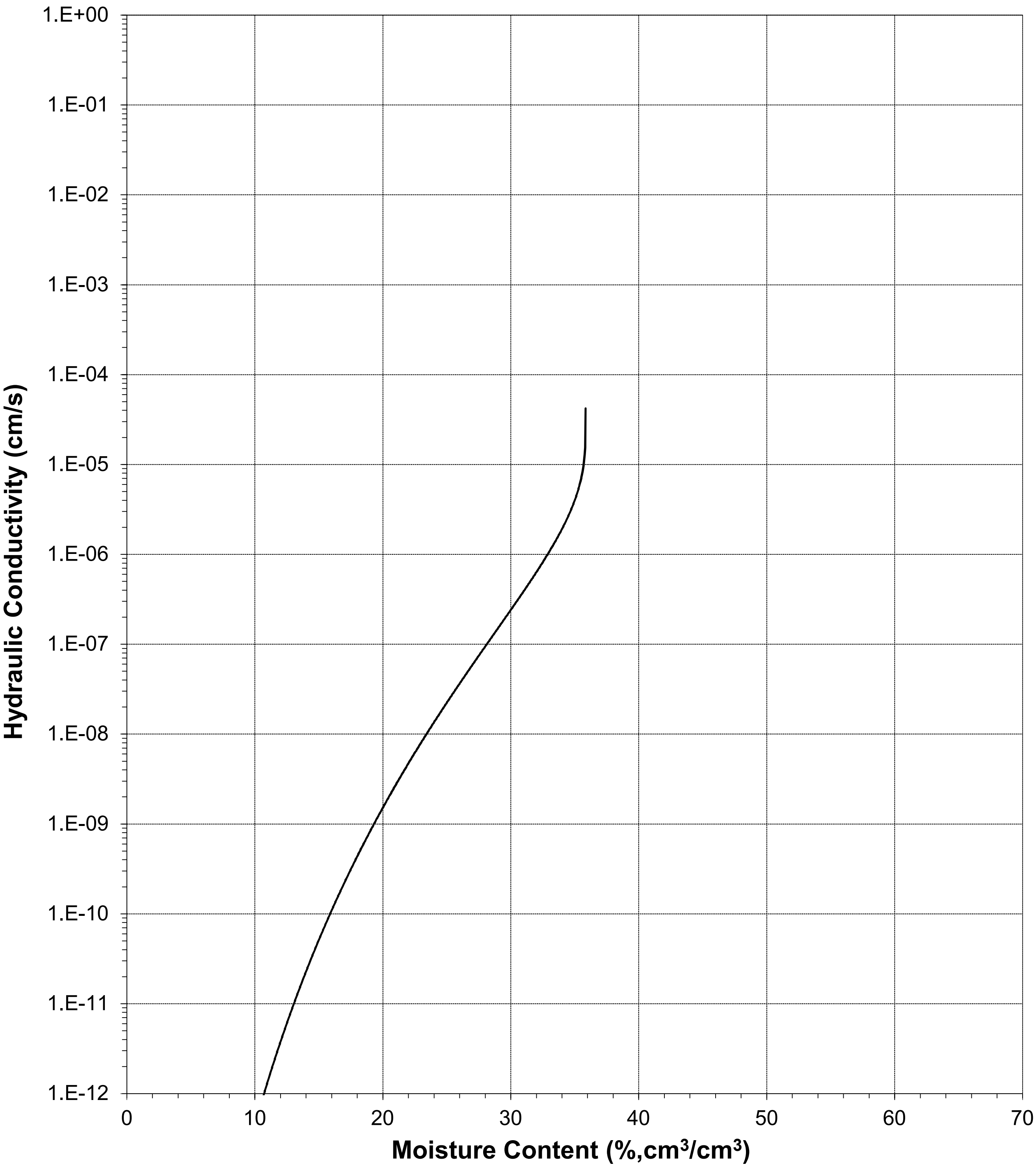
Sample Number: Ranch Loam




Plot of Relative Hydraulic Conductivity vs Moisture Content
Sample Number: Ranch Loam
Relative Hydraulic Conductivity
1.E+00
1.E-01
1.E-02
1.E-03
1.E-04
1.E-05
1.E-06
1.E-07
1.E-08
1.E-09
0
10
20
30
40
50
60
70
Moisture Content (%,cm3/cm3)

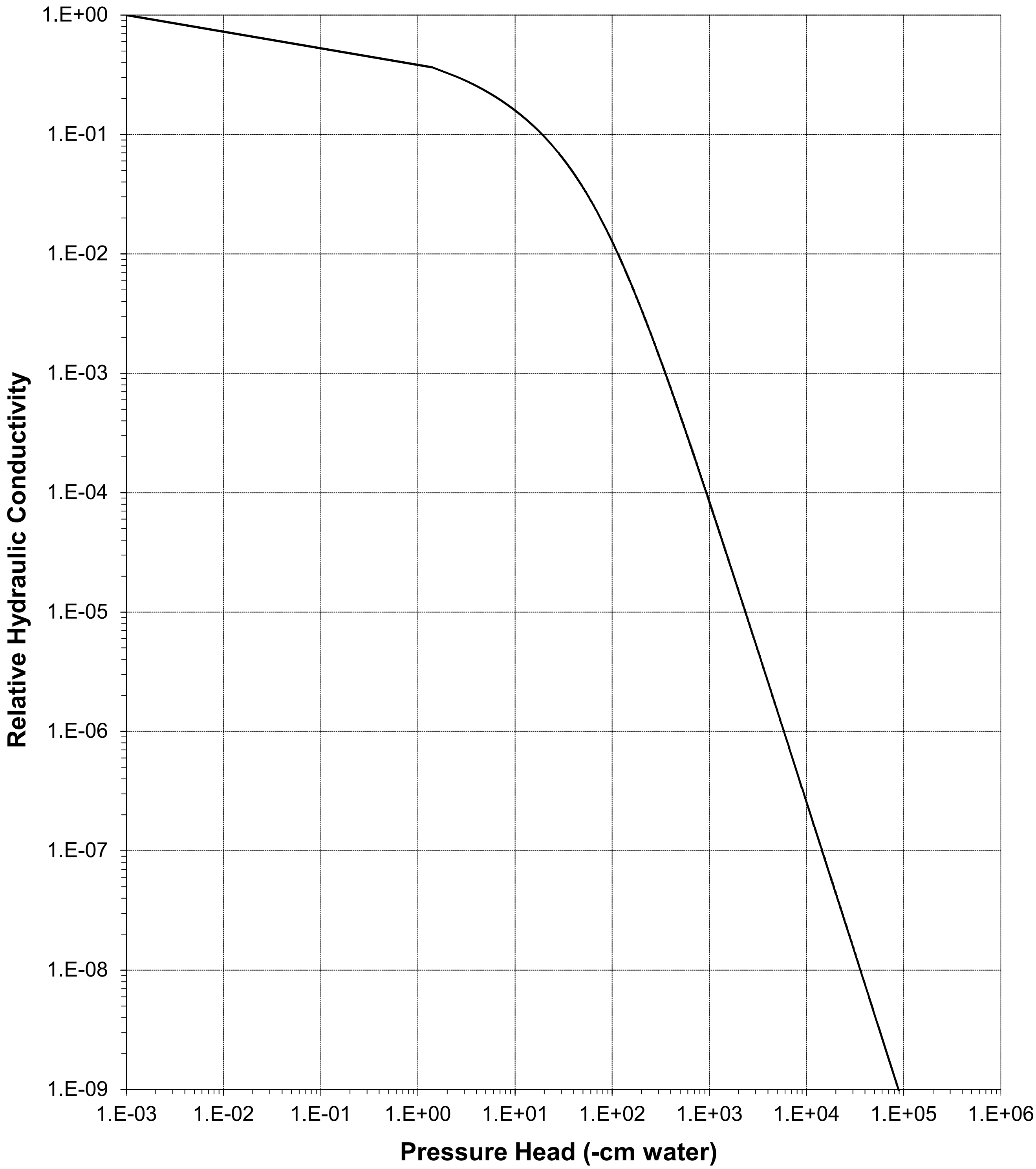
Plot of Hydraulic Conductivity vs Moisture Content

Sample Number: Ranch Loam



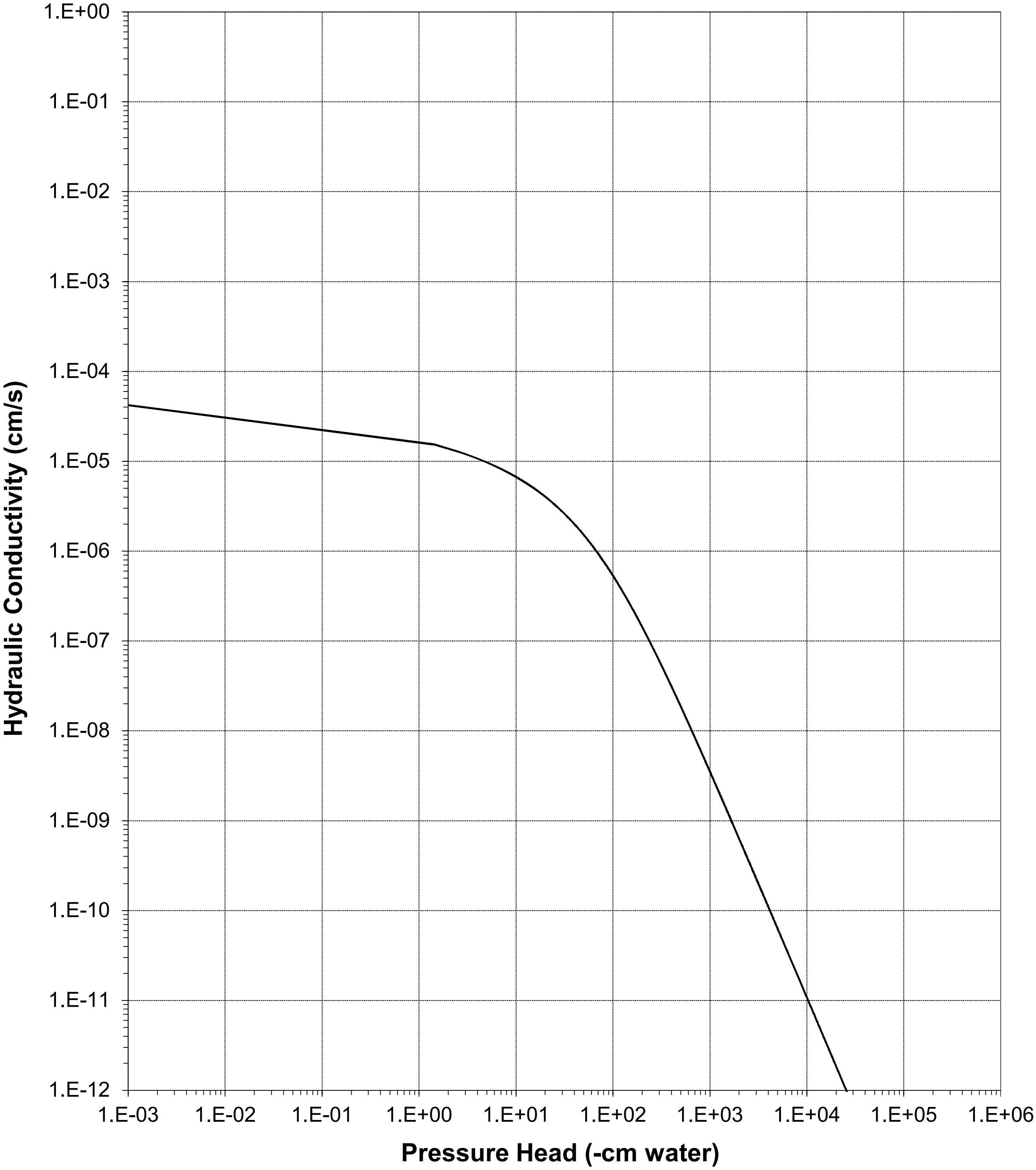
Plot of Relative Hydraulic Conductivity vs Pressure Head

Sample Number: Ranch Loam



Plot of Hydraulic Conductivity vs Pressure Head

Sample Number: Ranch Loam



Daniel B. Stephens & Associates, Inc.

Moisture Retention Data
Hanging Column / Pressure Plate
(Soil-Water Characteristic Curve)

Job Name:	EAEST(2-26)	*Dry wt. of sample* (g):	362.62
Job Number:	DB26.1048.00	*Tare wt., ring* (g):	136.84
Sample Number:	Ranch Loam Clay Mix	*Tare wt., screen & clamp* (g):	27.19
Project Name:	NMED AML	*Initial sample volume* (cm^3):	219.08
Date Received:	2/11/26	*Initial dry bulk density* (g/cm^3):	1.66
		Measured particle density (g/cm^3):	2.57
		Initial calculated total porosity (%):	35.55

	Date	Time	Weight* (g)	Matric Potential (-cm water)	Moisture Content † (% vol)
Hanging column:	27-Feb-26	13:45	606.40	0	36.40
	5-Mar-26	10:57	603.05	22.0	34.87
	11-Mar-26	10:40	597.05	73.0	32.13
	18-Mar-26	10:02	593.64	151.0	30.58
Pressure plate:	27-Mar-38	14:50	575.75	765	22.41

Volume Adjusted Data [1]

	Matric Potential (-cm water)	Adjusted Volume (cm^3)	% Volume Change [2] (%)	Adjusted Density (g/cm^3)	Adjusted Calculated Porosity (%)
Hanging column:	0.0	---	---	---	---
	22.0	---	---	---	---
	73.0	---	---	---	---
	151.0	---	---	---	---
Pressure plate:	765	---	---	---	---

Comments:

[1] Applicable if the sample experienced volume changes during testing. 'Volume Adjusted' values represent each of the volume change measurements obtained after saturated hydraulic conductivity testing and throughout hanging column/pressure plate testing. "---" indicates no volume changes occurred.

[2] Represents percent volume change from original sample volume. A '+' denotes measured sample swelling, a '-' denotes measured sample settling, and '---' denotes no volume change occurred.

* Weight including tares

† Assumed density of water is 1.0 g/cm^3

‡‡ Volume adjustments are applicable at this matric potential (see comment #1). Changes in volume, if applicable, are estimated based on obtainable measurements of changes in sample length and diameter.

Technician Notes:

Laboratory analysis by: M. Sharma
Data entered by: M. Sharma
Checked by: T. Morgan

Moisture Retention Data

Dew Point Potentiometer / Relative Humidity Box

(Soil-Water Characteristic Curve)

Sample Number: Ranch Loam Clay Mix

Initial sample bulk density (g/cm³)*:* 1.66
Fraction of bulk sample used (<2.00mm fraction) (%): 100.00

Dry weight of dew point potentiometer sample* (g)*:* 181.01
Tare weight, jar (g)*:* 116.58

	Date	Time	Weight* (g)	Water Potential (-cm water)	Moisture Content † (% vol)
Dew point potentiometer:	5-Mar-26	15:10	187.89	2346	17.68
	3-Mar-26	14:40	185.51	60882	11.55
	13-Feb-26	12:00	183.82	517243	7.22

Volume Adjusted Data [1]

	Water Potential (-cm water)	Adjusted Volume (cm^3)	% Volume Change [2] (%)	Adjusted Density (g/cm^3)	Adjusted Calc. Porosity (%)
Dew point potentiometer:	2346	---	---	---	---
	60882	---	---	---	---
	517243	---	---	---	---

Dry weight of relative humidity box sample* (g)*:* 63.25
Tare weight (g)*:* 42.05

	Date	Time	Weight* (g)	Water Potential (-cm water)	Moisture Content † (% vol)
Relative humidity box:	30-Mar-26	0:00	63.91	855879	5.11

Volume Adjusted Data [1]

	Water Potential (-cm water)	Adjusted Volume (cm^3)	% Volume Change [2] (%)	Adjusted Density (g/cm^3)	Adjusted Calc. Porosity (%)
Relative humidity box:	855879	---	---	---	---

Comments:

[1] Applicable if the sample experienced volume changes during testing. ‘Volume Adjusted’ values represent the volume change measurements obtained after the last hanging column or pressure plate point. "---" indicates no volume changes occurred.

[2] Represents percent volume change from original sample volume. A '+' denotes measured sample swelling, a '-' denotes measured sample settling, and '---' denotes no volume change occurred.

* Weight including tares

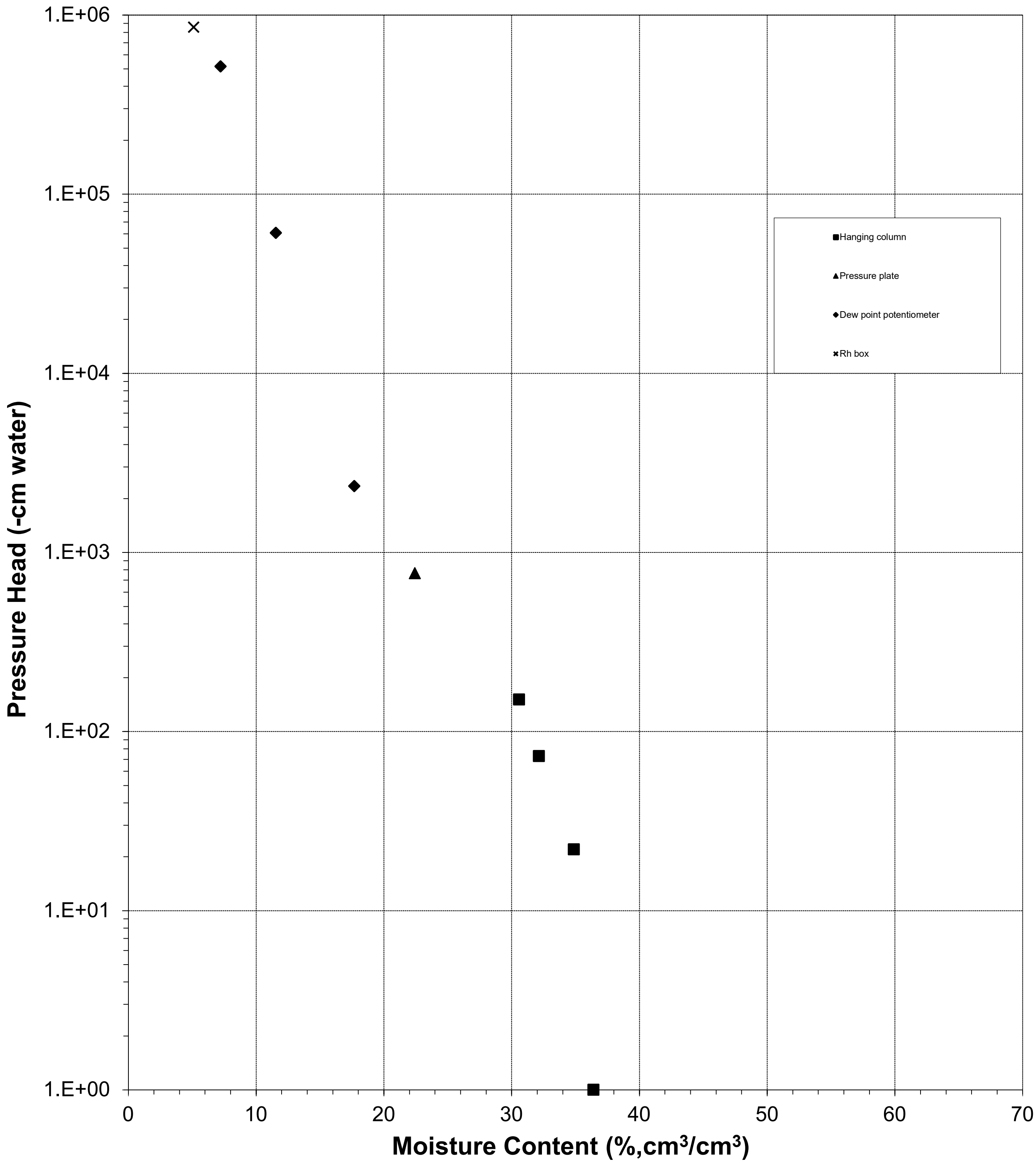
† Adjusted for >2.00mm (#10 sieve) material not used in DPP/RH testing. Assumed moisture content of material >2.00mm is zero, and assumed density of water is 1.0 g/cm^3.

‡‡ Volume adjustments are applicable at this matric potential (see comment #1). Changes in volume, if applicable, are estimated based on obtainable measurements of changes in sample length and diameter.

Laboratory analysis by: M. Sharma, J. Tafoya
Data entered by: M. Sharma
Checked by: T. Morgan

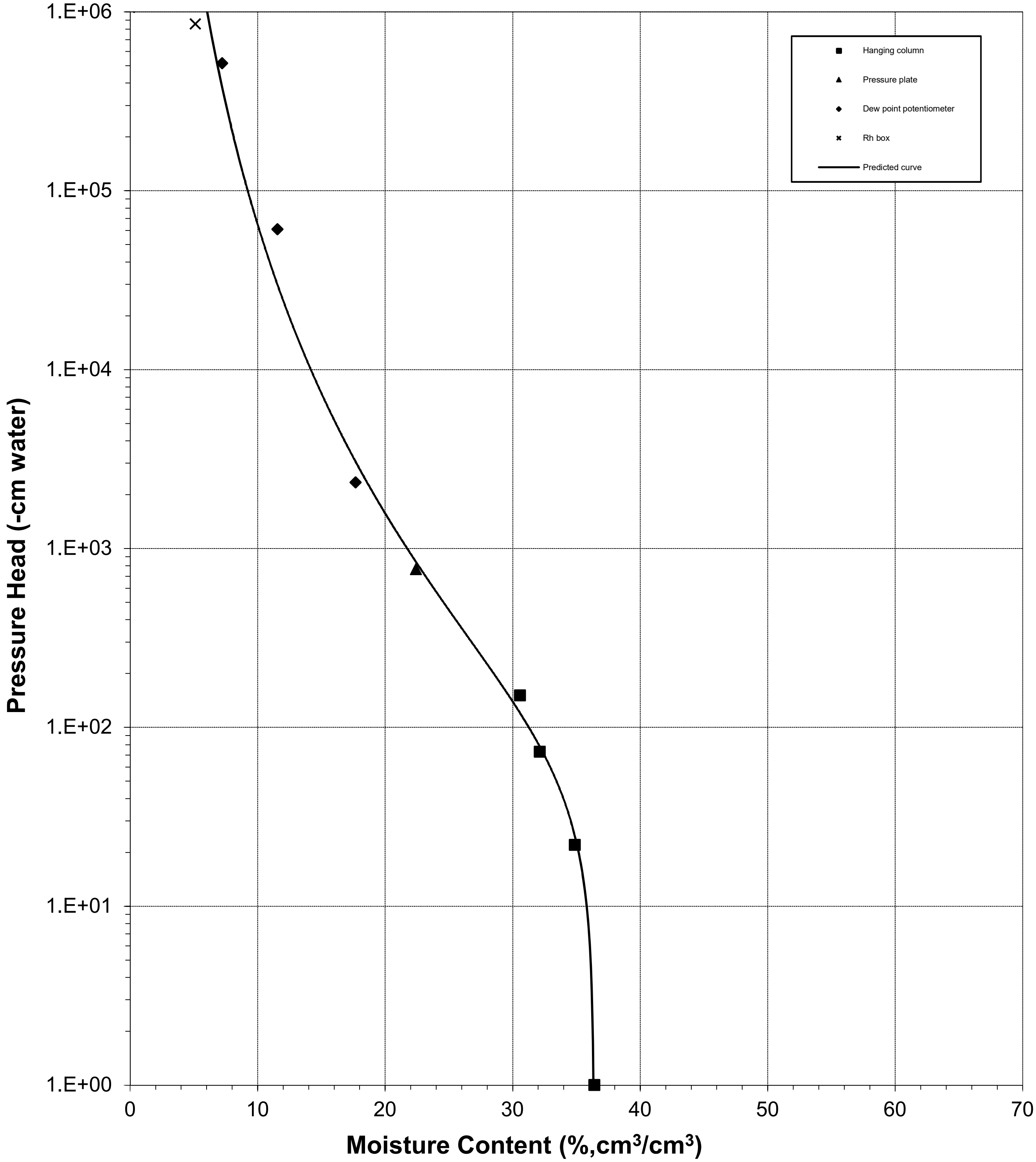
Water Retention Data Points

Sample Number: Ranch Loam Clay Mix



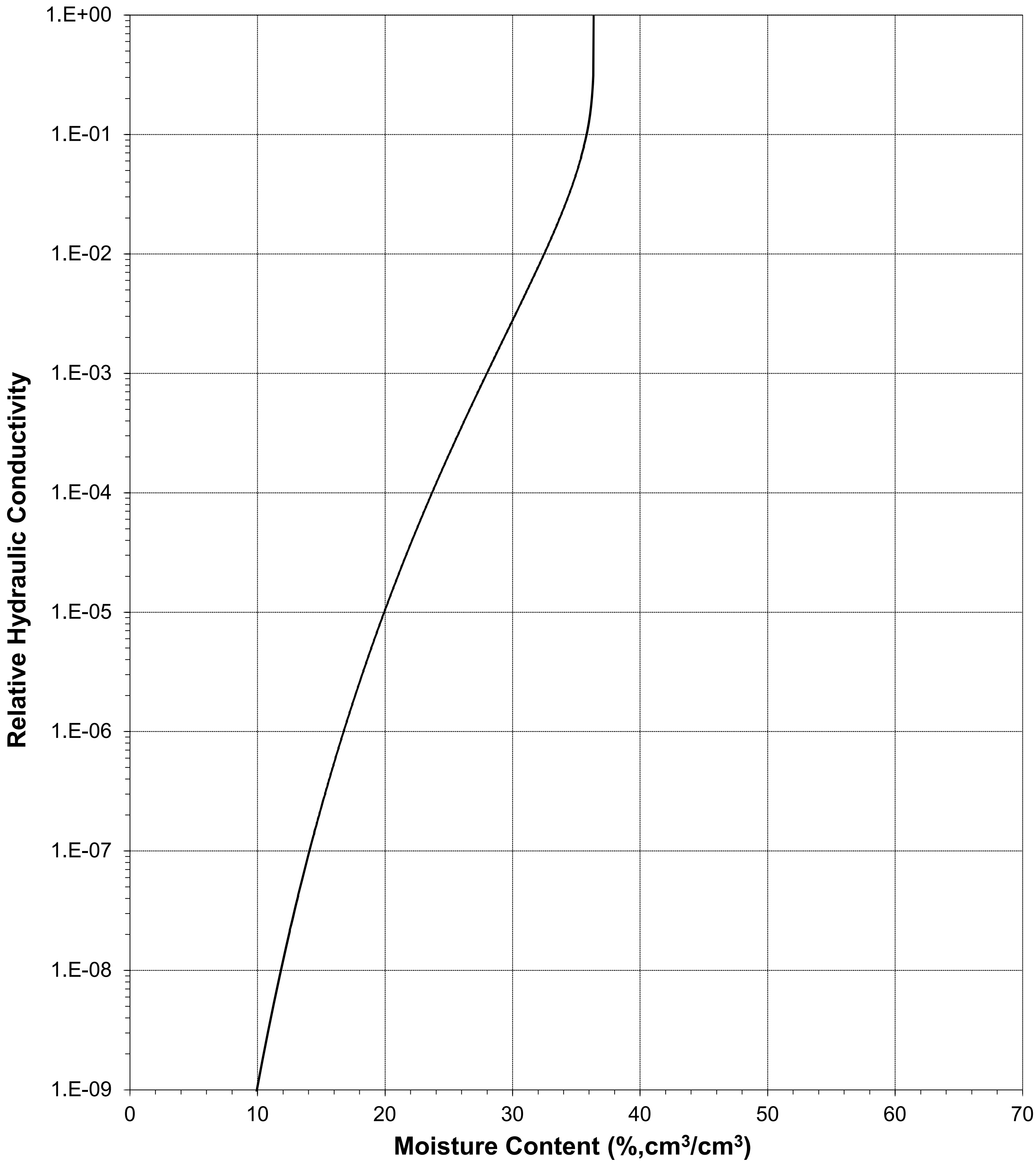
Predicted Water Retention Curve and Data Points

Sample Number: Ranch Loam Clay Mix



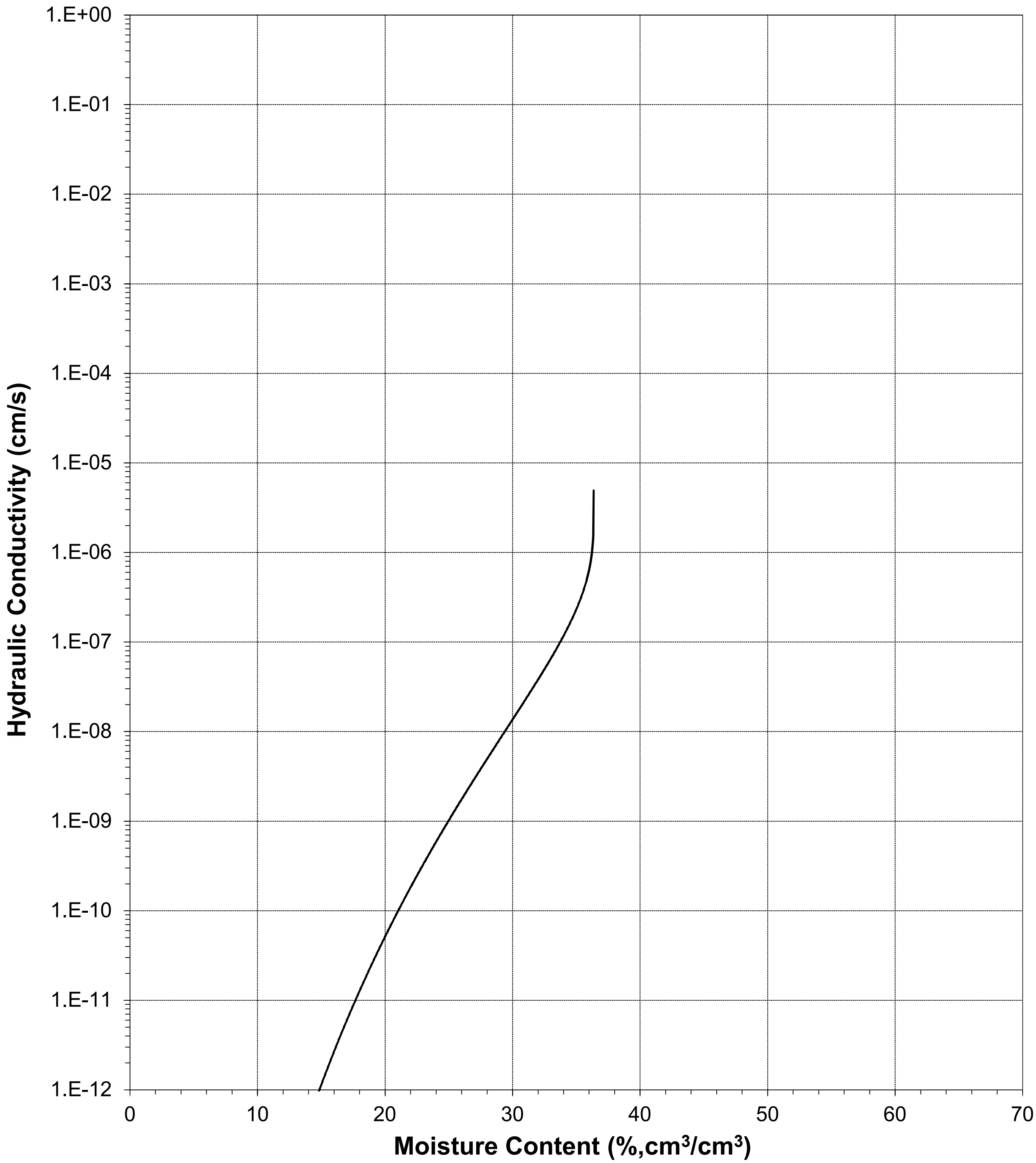
Plot of Relative Hydraulic Conductivity vs Moisture Content

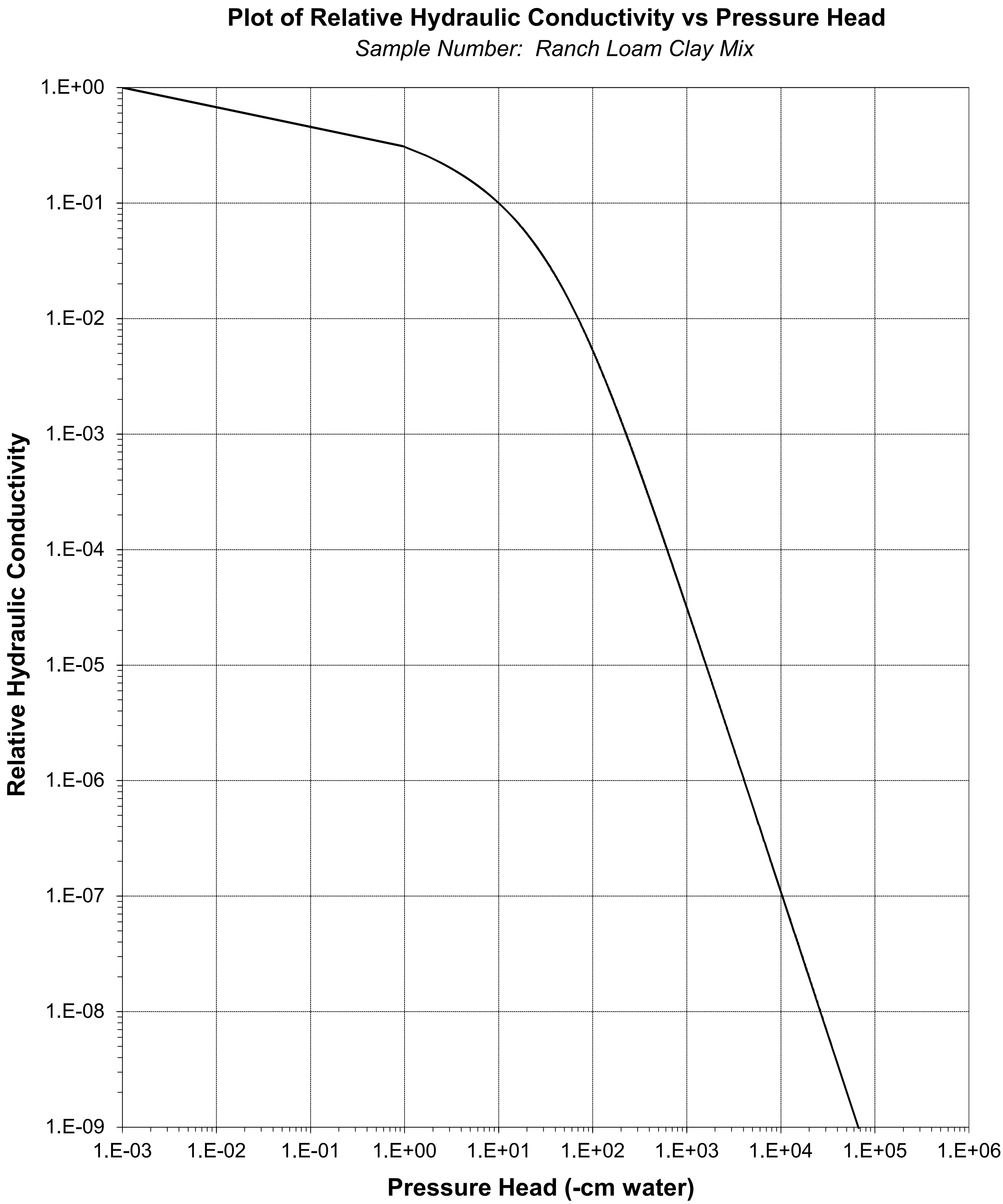
Sample Number: Ranch Loam Clay Mix



Plot of Hydraulic Conductivity vs Moisture Content

Sample Number: Ranch Loam Clay Mix

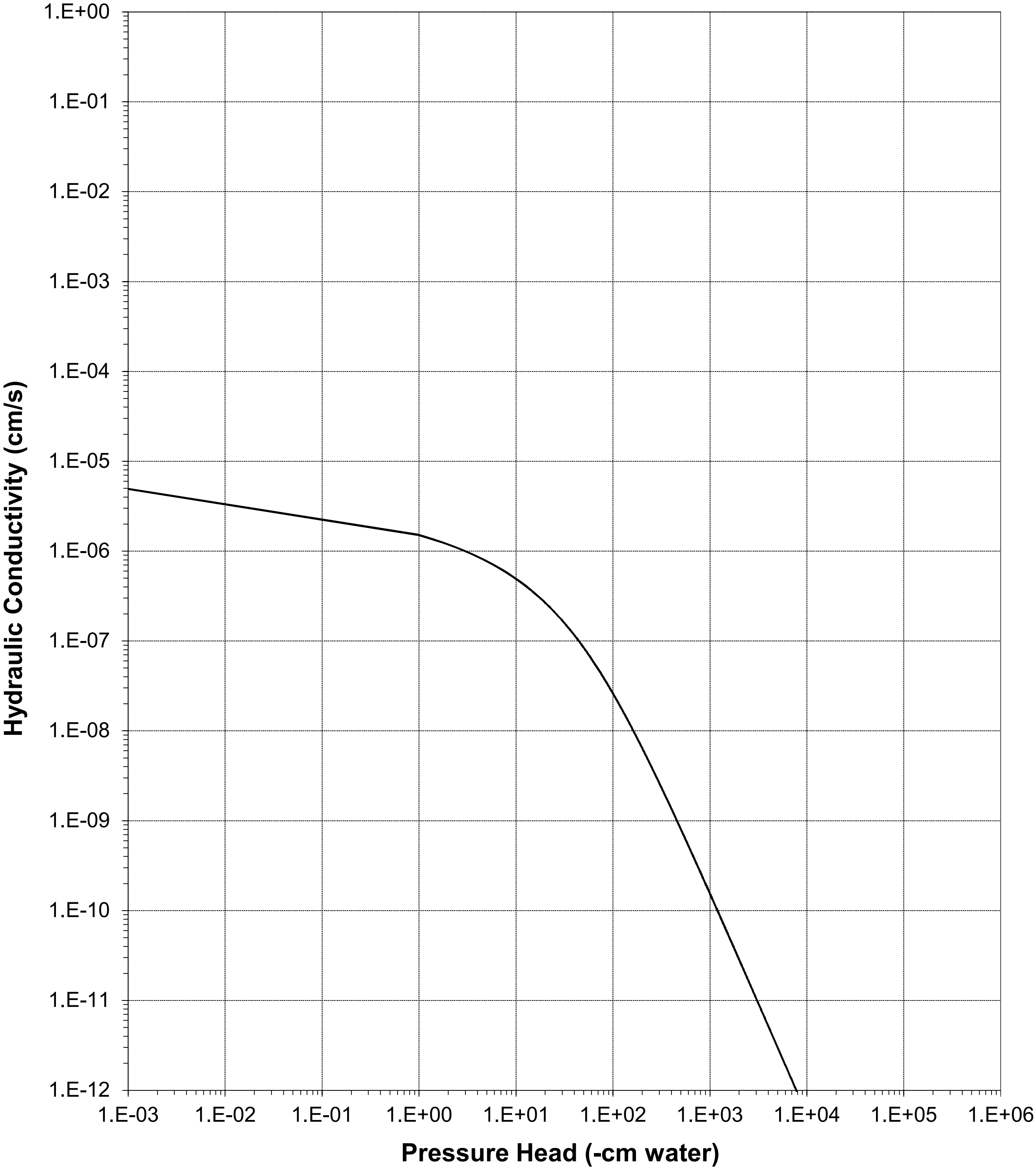




Plot of Relative Hydraulic Conductivity vs Pressure Head
Sample Number: Ranch Loam Clay Mix
1.E+00
1.E-01
1.E-02
1.E-03
1.E-04
1.E-05
1.E-06
1.E-07
1.E-08
1.E-09
Relative Hydraulic Conductivity
1.E-03
1.E-02
1.E-01
1.E+00
1.E+01
1.E+02
1.E+03
1.E+04
1.E+05
1.E+06
Pressure Head (-cm water)

Plot of Hydraulic Conductivity vs Pressure Head

Sample Number: Ranch Loam Clay Mix



Daniel B. Stephens & Associates, Inc.

Moisture Retention Data

Hanging Column / Pressure Plate

(Soil-Water Characteristic Curve)

Job Name:	EAEST(2-26)	*Dry wt. of sample (g):*	350.99
Job Number:	DB26.1048.00	*Tare wt., ring (g):*	137.99
Sample Number:	Schmitt Loam	*Tare wt., screen & clamp (g):*	27.76
Project Name:	NMED AML	*Initial sample volume (cm^3):*	223.09
Date Received:	2/11/26	*Initial dry bulk density (g/cm^3):*	1.57
		Measured particle density (g/cm^3):	2.61
		Initial calculated total porosity (%):	39.68

	Date	Time	Weight* (g)	Matric Potential (-cm water)	Moisture Content † (% vol)	
Hanging column:	27-Feb-26	13:00	606.50	0	40.24	
	5-Mar-26	10:49	604.67	18.0	38.75	‡‡
	11-Mar-26	10:20	603.50	51.0	38.24	‡‡
	18-Mar-26	9:59	596.30	129.0	35.06	‡‡
Pressure plate:	27-Mar-38	14:37	574.35	765	25.82	

Volume Adjusted Data [1]

	Matric Potential (-cm water)	Adjusted Volume (cm^3)	% Volume Change [2] (%)	Adjusted Density (g/cm^3)	Adjusted Calculated Porosity (%)
Hanging column:	0.0	---	---	---	---
	18.0	226.90	+1.71%	1.55	40.69
	51.0	226.90	+1.71%	1.55	40.69
	129.0	226.90	+1.71%	1.55	40.69
Pressure plate:	765	---	---	---	---

Comments:

1 Applicable if the sample experienced volume changes during testing. 'Volume Adjusted' values represent each of the volume change measurements obtained after saturated hydraulic conductivity testing and throughout hanging column/pressure plate testing. "---" indicates no volume changes occurred.

2 Represents percent volume change from original sample volume. A '+' denotes measured sample swelling, a '-' denotes measured sample settling, and '---' denotes no volume change occurred.

* Weight including tares

† Assumed density of water is 1.0 g/cm^3

‡‡ Volume adjustments are applicable at this matric potential (see comment #1). Changes in volume, if applicable, are estimated based on obtainable measurements of changes in sample length and diameter.

Technician Notes:

Laboratory analysis by: M. Sharma
Data entered by: M. Sharma
Checked by: T. Morgan

Moisture Retention Data

Dew Point Potentiometer / Relative Humidity Box

(Soil-Water Characteristic Curve)

Sample Number: Schmitt Loam

Initial sample bulk density (g/cm^3)*:* 1.57
Fraction of bulk sample used (<2.00mm fraction) (%): 100.00

Dry weight of dew point potentiometer sample* (g)*:* 179.61
Tare weight, jar (g)*:* 114.66

	Date	Time	Weight* (g)	Water Potential (-cm water)	Moisture Content† (% vol)
Dew point potentiometer:	4-Mar-26	11:35	186.27	15195	16.12
	3-Mar-26	14:15	185.07	49562	13.22
	11-Mar-26	11:00	184.36	98513	11.52
	18-Feb-26	16:25	182.55	610962	7.13

Volume Adjusted Data [1]

	Water Potential (-cm water)	Adjusted Volume (cm^3)	% Volume Change [2] (%)	Adjusted Density (g/cm^3)	Adjusted Calc. Porosity (%)
Dew point potentiometer:	15195	---	---	---	---
	49562	---	---	---	---
	98513	---	---	---	---
	610962	---	---	---	---

Comments:

[1] Applicable if the sample experienced volume changes during testing. ‘Volume Adjusted’ values represent the volume change measurements obtained after the last hanging column or pressure plate point. "---" indicates no volume changes occurred.

[2] Represents percent volume change from original sample volume. A '+' denotes measured sample swelling, a '-' denotes measured sample settling, and '---' denotes no volume change occurred.

* Weight including tares

† Adjusted for >2.00mm (#10 sieve) material not used in DPP/RH testing. Assumed moisture content of material >2.00mm is zero, and assumed density of water is 1.0 g/cm^3.

‡‡ Volume adjustments are applicable at this matric potential (see comment #1).

Laboratory analysis by: M. Sharma, J. Tafoya
Data entered by: M. Sharma
Checked by: T. Morgan

Daniel B. Stephens & Associates, Inc.

Moisture Retention Data

Dew Point Potentiometer / Relative Humidity Box

(Soil-Water Characteristic Curve)

Sample Number: Schmitt Loam

Initial sample bulk density (g/cm^3): 1.57
Fraction of bulk sample used (<2.00mm fraction) (%): 100.00

Dry weight of relative humidity box sample* (g): 62.35
Tare weight (g): 38.02

	Date	Time	Weight* (g)	Water Potential (-cm water)	Moisture Content † (% vol)
Relative humidity box:	30-Mar-26	0:00	63.36	855879	6.50

Volume Adjusted Data [1]

	Water Potential (-cm water)	Adjusted Volume (cm^3)	% Volume Change [2] (%)	Adjusted Density (g/cm^3)	Adjusted Calc. Porosity (%)
Relative humidity box:	855879	---	---	---	---

Comments:

[1] Applicable if the sample experienced volume changes during testing. 'Volume Adjusted' values represent the volume change measurements obtained after the last hanging column or pressure plate point. "---" indicates no volume changes occurred.

[2] Represents percent volume change from original sample volume. A '+' denotes measured sample swelling, a '-' denotes measured sample settling, and '---' denotes no volume change occurred.

* Weight including tares

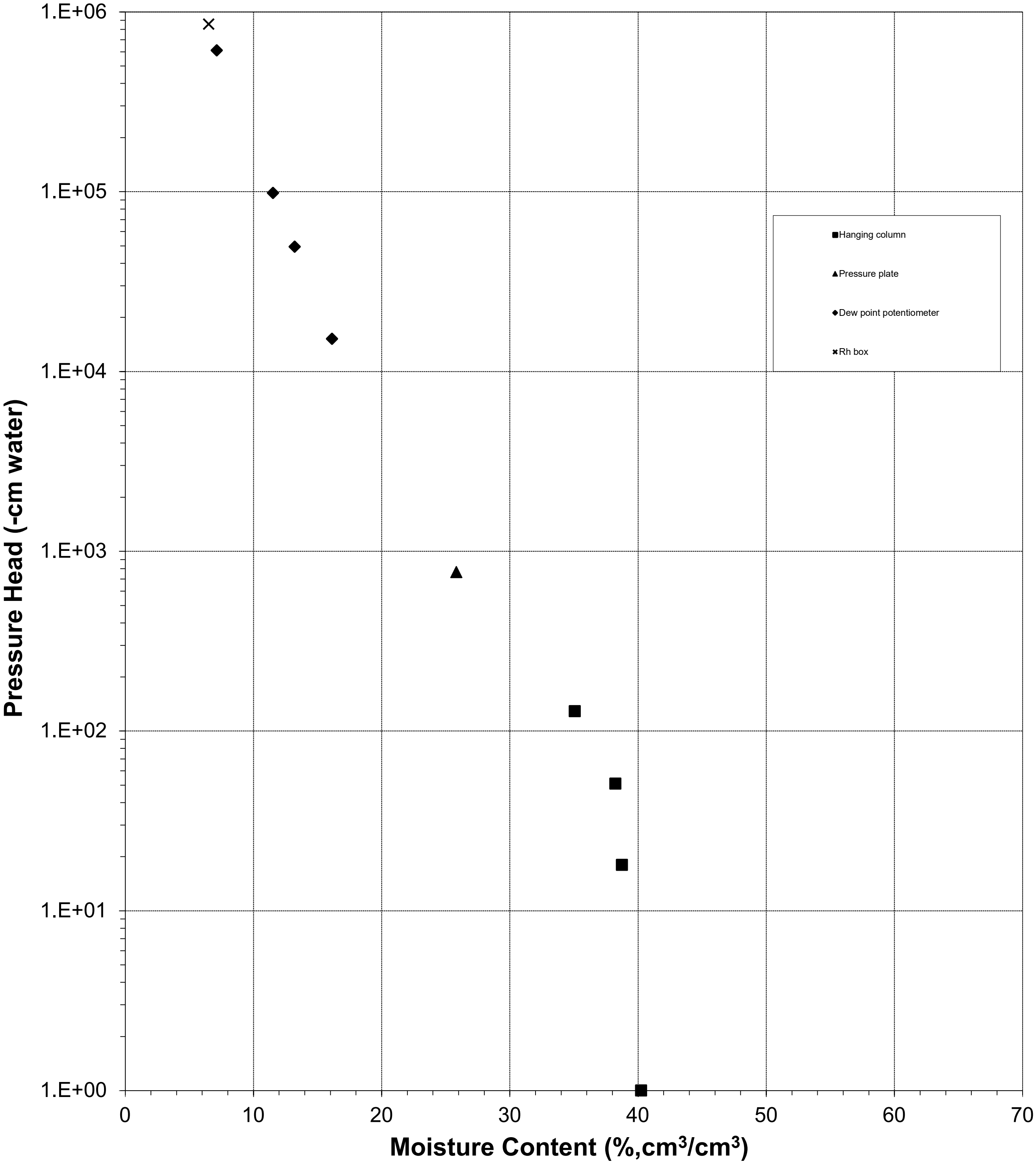
† Adjusted for >2.00mm (#10 sieve) material not used in DPP/RH testing. Assumed moisture content of material >2.00mm is zero, and assumed density of water is 1.0 g/cm^3.

‡‡ Volume adjustments are applicable at this matric potential (see comment #1). Changes in volume, if applicable, are estimated based on obtainable measurements of changes in sample length and diameter.

Laboratory analysis by: M. Sharma, J. Tafoya
Data entered by: M. Sharma
Checked by: T. Morgan

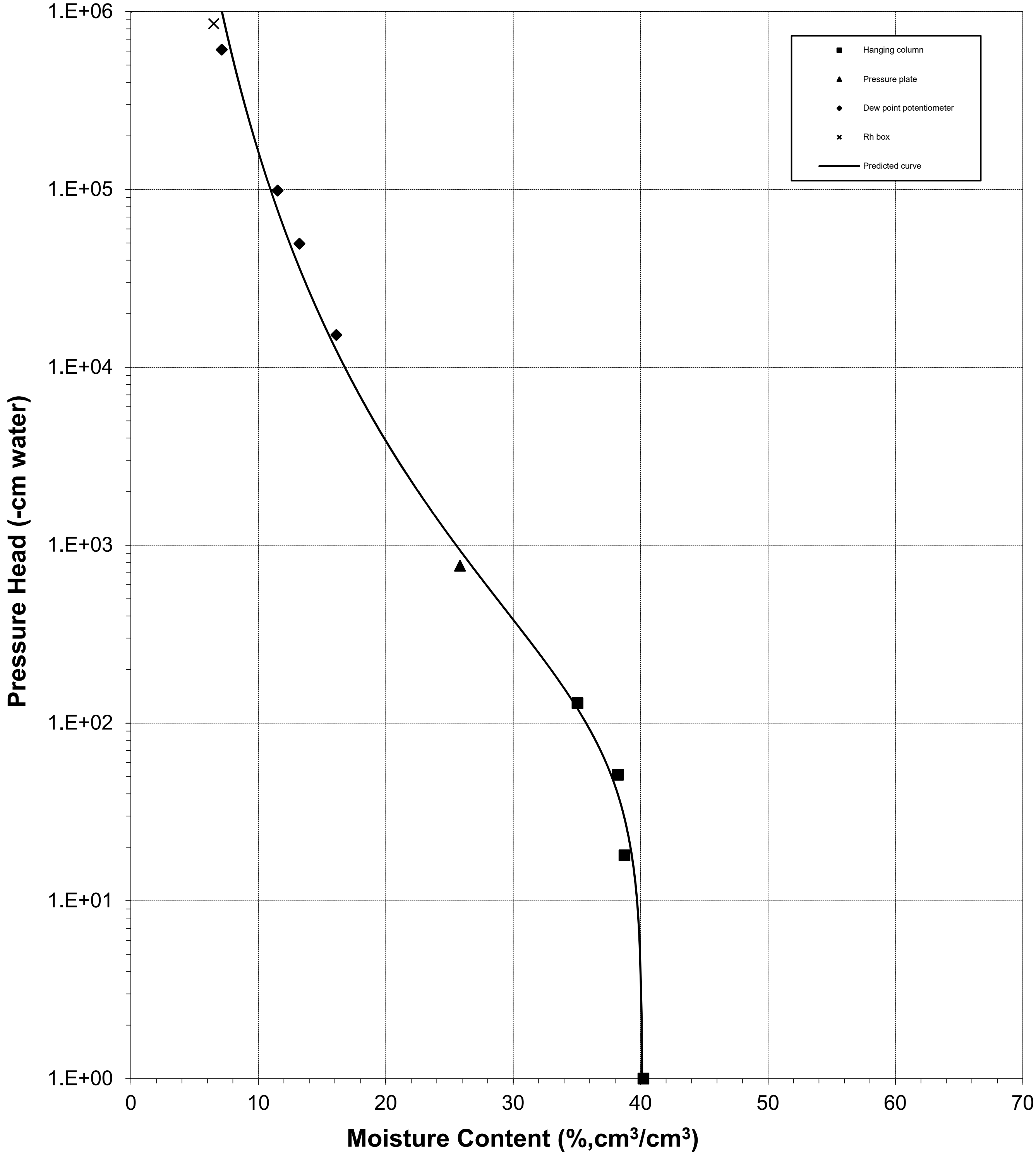
Water Retention Data Points

Sample Number: Schmitt Loam



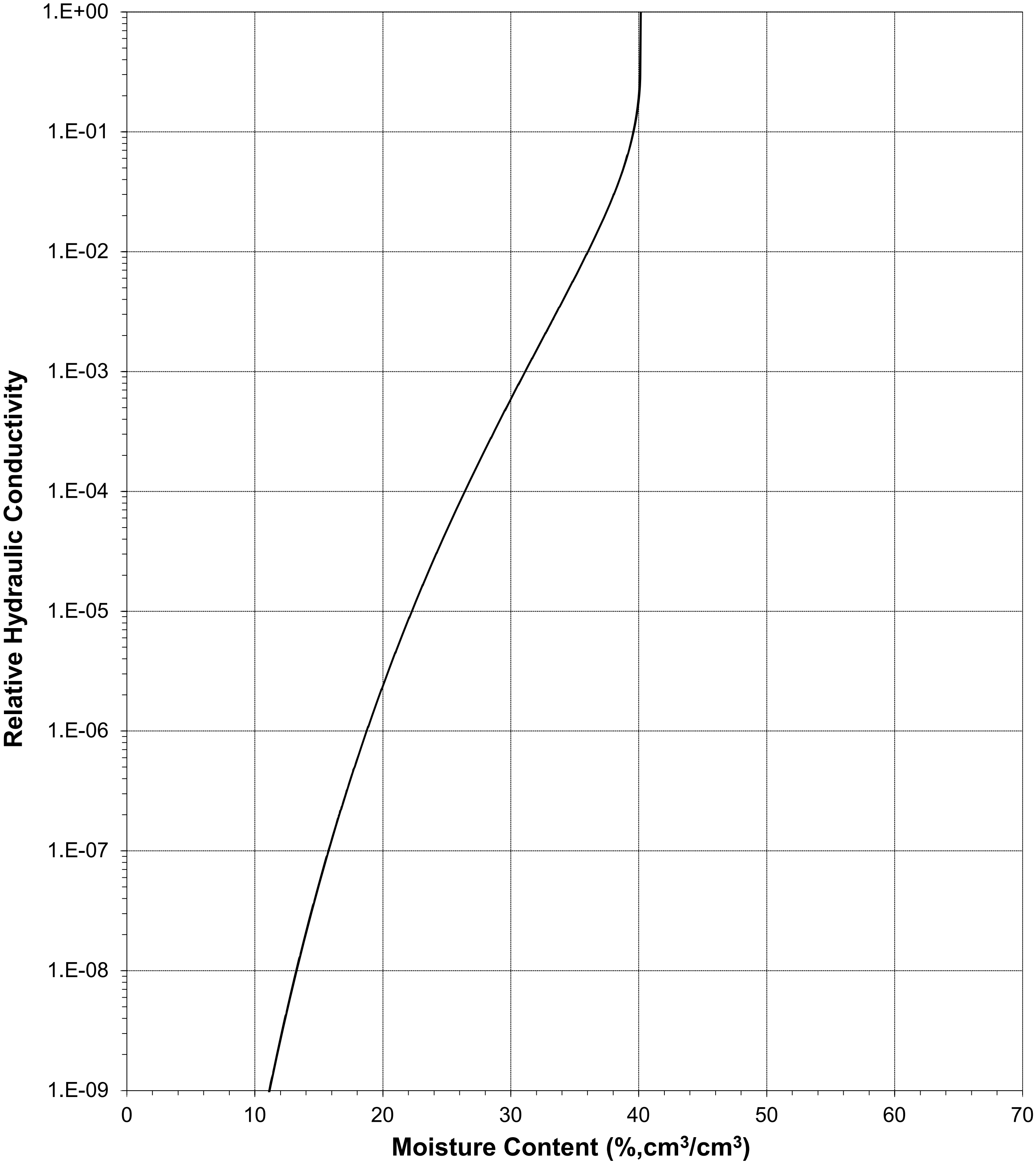
Predicted Water Retention Curve and Data Points

Sample Number: Schmitt Loam



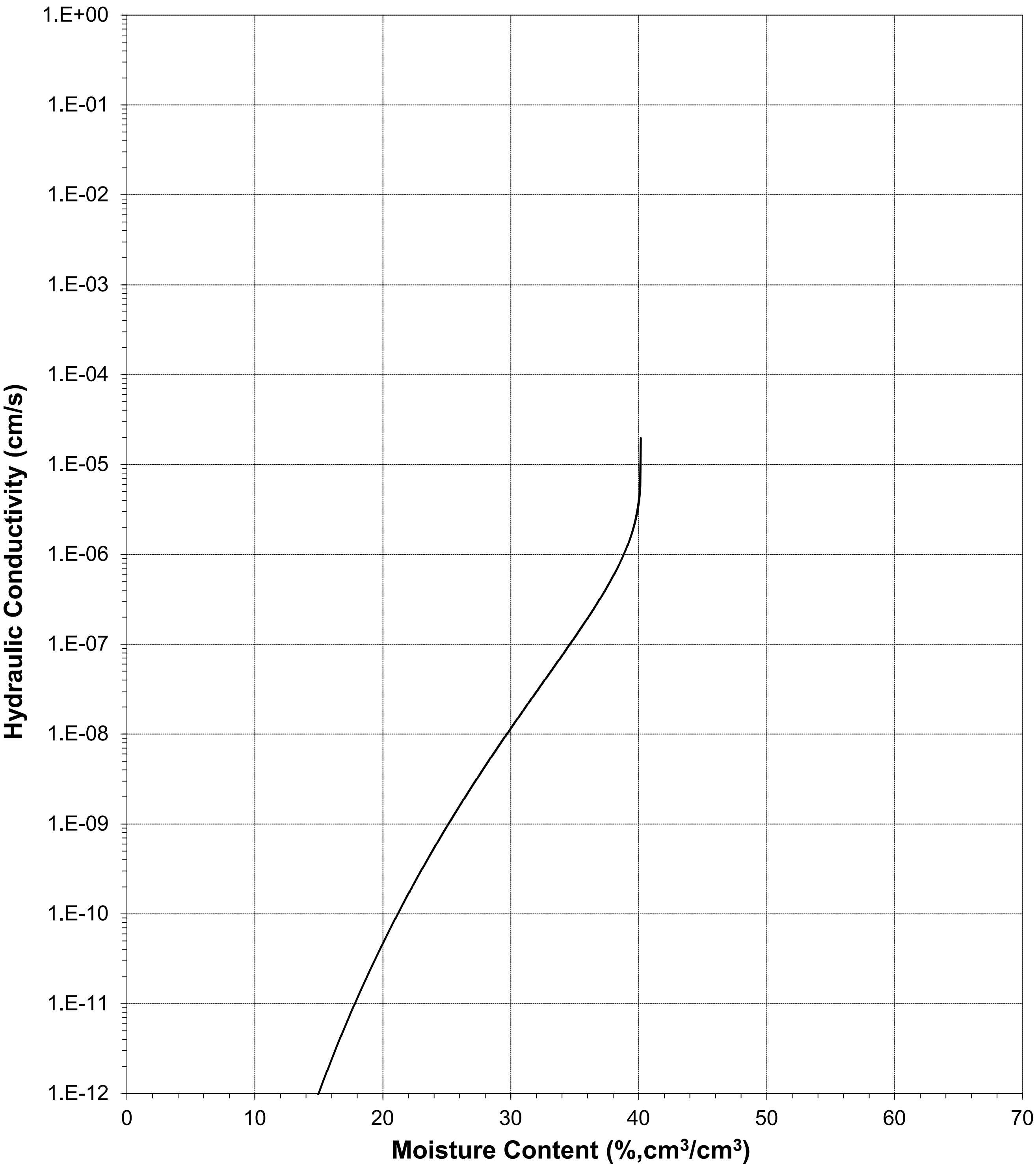
Plot of Relative Hydraulic Conductivity vs Moisture Content

Sample Number: Schmitt Loam



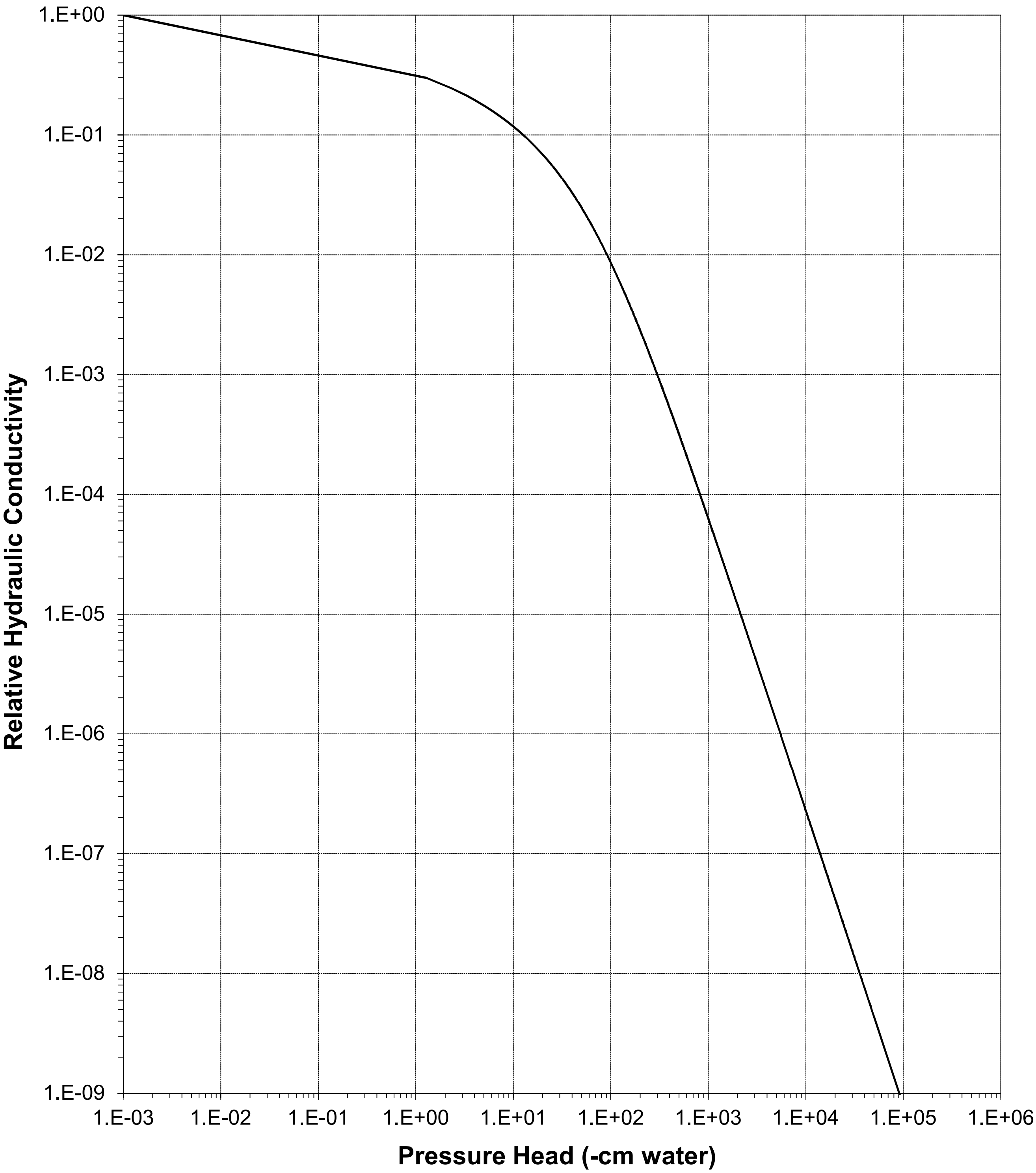
Plot of Hydraulic Conductivity vs Moisture Content

Sample Number: Schmitt Loam



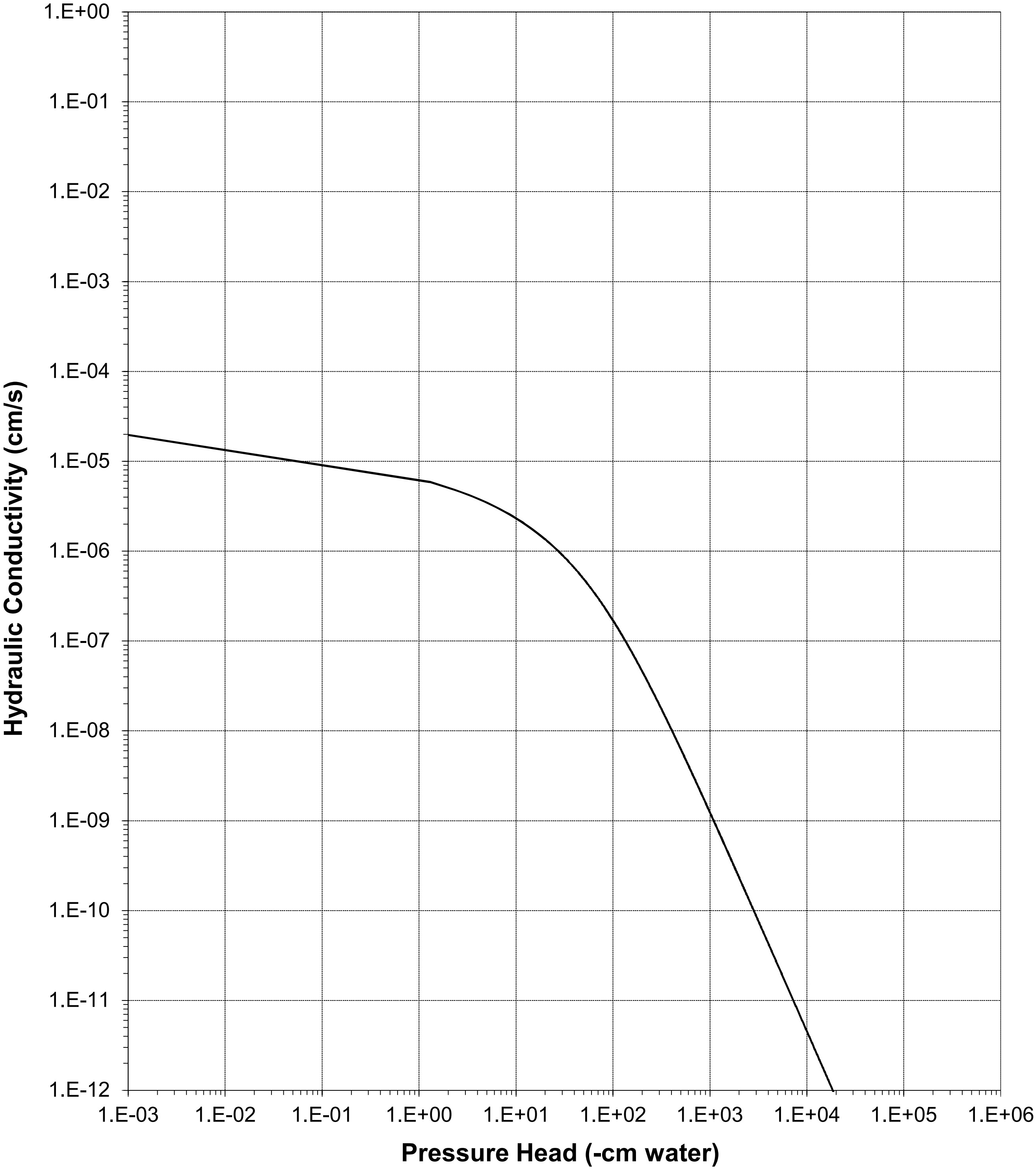
Plot of Relative Hydraulic Conductivity vs Pressure Head

Sample Number: Schmitt Loam



Plot of Hydraulic Conductivity vs Pressure Head

Sample Number: Schmitt Loam



Daniel B. Stephens & Associates, Inc.

Moisture Retention Data

Hanging Column / Pressure Plate

(Soil-Water Characteristic Curve)

Job Name:	EAEST(2-26)	*Dry wt. of sample* (g):	352.53
Job Number:	DB26.1048.00	*Tare wt., ring* (g):	138.54
Sample Number:	Schmitt Loam Clay Mix	*Tare wt., screen & clamp* (g):	27.65
Project Name:	NMED AML	*Initial sample volume* (cm^3):	222.63
Date Received:	2/11/26	*Initial dry bulk density* (g/cm^3):	1.58
		Measured particle density (g/cm^3):	2.57
		Initial calculated total porosity (%):	38.48

	Date	Time	Weight* (g)	Matric Potential (-cm water)	Moisture Content † (% vol)
Hanging column:	27-Feb-26	13:45	602.50	0	37.63
	5-Mar-26	10:46	602.02	18.0	37.42
	11-Mar-26	10:30	601.09	51.0	37.00
	18-Mar-26	9:57	592.73	129.0	33.24
Pressure plate:	27-Mar-38	14:38	572.09	765	23.97

Volume Adjusted Data [1]

	Matric Potential (-cm water)	Adjusted Volume (cm^3)	% Volume Change [2] (%)	Adjusted Density (g/cm^3)	Adjusted Calculated Porosity (%)
Hanging column:	0.0	---	---	---	---
	18.0	---	---	---	---
	51.0	---	---	---	---
	129.0	---	---	---	---
Pressure plate:	765	---	---	---	---

Comments:

[1] Applicable if the sample experienced volume changes during testing. 'Volume Adjusted' values represent each of the volume change measurements obtained after saturated hydraulic conductivity testing and throughout hanging column/pressure plate testing. "---" indicates no volume changes occurred.

[2] Represents percent volume change from original sample volume. A '+' denotes measured sample swelling, a '-' denotes measured sample settling, and '---' denotes no volume change occurred.

* Weight including tares

† Assumed density of water is 1.0 g/cm^3

‡‡ Volume adjustments are applicable at this matric potential (see comment #1). Changes in volume, if applicable, are estimated based on obtainable measurements of changes in sample length and diameter.

Technician Notes:

Laboratory analysis by: M. Sharma
Data entered by: M. Sharma
Checked by: T. Morgan

Moisture Retention Data

Dew Point Potentiometer / Relative Humidity Box

(Soil-Water Characteristic Curve)

Sample Number: Schmitt Loam Clay Mix

Initial sample bulk density (g/cm^3)*:* 1.58

Fraction of bulk sample used (<2.00mm fraction) (%): 100.00

Dry weight of dew point potentiometer sample* (g)*:* 173.72

Tare weight, jar (g)*:* 121.79

	Date	Time	Weight* (g)	Water Potential (-cm water)	Moisture Content † (% vol)
Dew point potentiometer:	23-Mar-26	15:35	177.89	15093	12.70
	19-Mar-26	12:27	177.11	31308	10.32
	16-Mar-26	15:35	176.17	97595	7.46
	18-Feb-26	15:00	175.11	733032	4.24

Volume Adjusted Data [1]

	Water Potential (-cm water)	Adjusted Volume (cm^3)	% Volume Change [2] (%)	Adjusted Density (g/cm^3)	Adjusted Calc. Porosity (%)
Dew point potentiometer:	15093	---	---	---	---
	31308	---	---	---	---
	97595	---	---	---	---
	733032	---	---	---	---

Comments:

[1] Applicable if the sample experienced volume changes during testing. ‘Volume Adjusted’ values represent the volume change measurements obtained after the last hanging column or pressure plate point. "---" indicates no volume changes occurred.

[2] Represents percent volume change from original sample volume. A '+' denotes measured sample swelling, a '-' denotes measured sample settling, and '---' denotes no volume change occurred.

* Weight including tares

† Adjusted for >2.00mm (#10 sieve) material not used in DPP/RH testing. Assumed moisture content of material >2.00mm is zero, and assumed density of water is 1.0 g/cm^3.

‡‡ Volume adjustments are applicable at this matric potential (see comment #1).

Laboratory analysis by: M. Sharma, J. Tafoya
Data entered by: M. Sharma
Checked by: T. Morgan

Moisture Retention Data

Dew Point Potentiometer / Relative Humidity Box

(Soil-Water Characteristic Curve)

Sample Number: Schmitt Loam Clay Mix

Initial sample bulk density (g/cm^3)*:* 1.58
Fraction of bulk sample used (<2.00mm fraction) (%): 100.00

Dry weight of relative humidity box sample* (g)*:* 58.95
Tare weight (g)*:* 37.58

	Date	Time	Weight* (g)	Water Potential (-cm water)	Moisture Content † (% vol)
Relative humidity box:	30-Mar-26	0:00	59.37	855879	3.13

Volume Adjusted Data [1]

	Water Potential (-cm water)	Adjusted Volume (cm^3)	% Volume Change [2] (%)	Adjusted Density (g/cm^3)	Adjusted Calc. Porosity (%)
Relative humidity box:	855879	---	---	---	---

Comments:

[1] Applicable if the sample experienced volume changes during testing. 'Volume Adjusted' values represent the volume change measurements obtained after the last hanging column or pressure plate point. "---" indicates no volume changes occurred.

[2] Represents percent volume change from original sample volume. A '+' denotes measured sample swelling, a '-' denotes measured sample settling, and '---' denotes no volume change occurred.

* Weight including tares

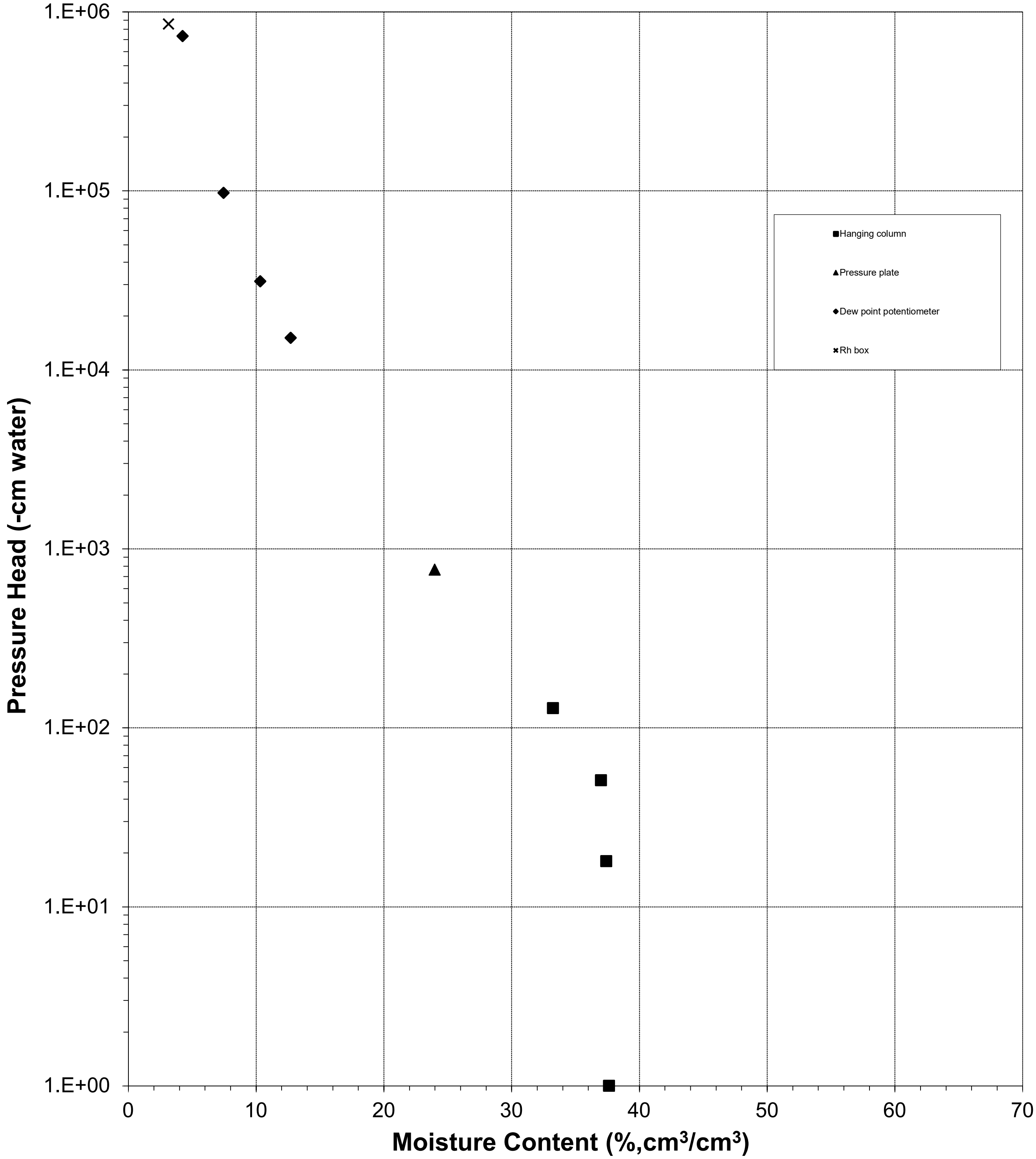
† Adjusted for >2.00mm (#10 sieve) material not used in DPP/RH testing. Assumed moisture content of material >2.00mm is zero, and assumed density of water is 1.0 g/cm^3.

‡‡ Volume adjustments are applicable at this matric potential (see comment #1). Changes in volume, if applicable, are estimated based on obtainable measurements of changes in sample length and diameter.

Laboratory analysis by: M. Sharma, J. Tafoya
Data entered by: M. Sharma
Checked by: T. Morgan

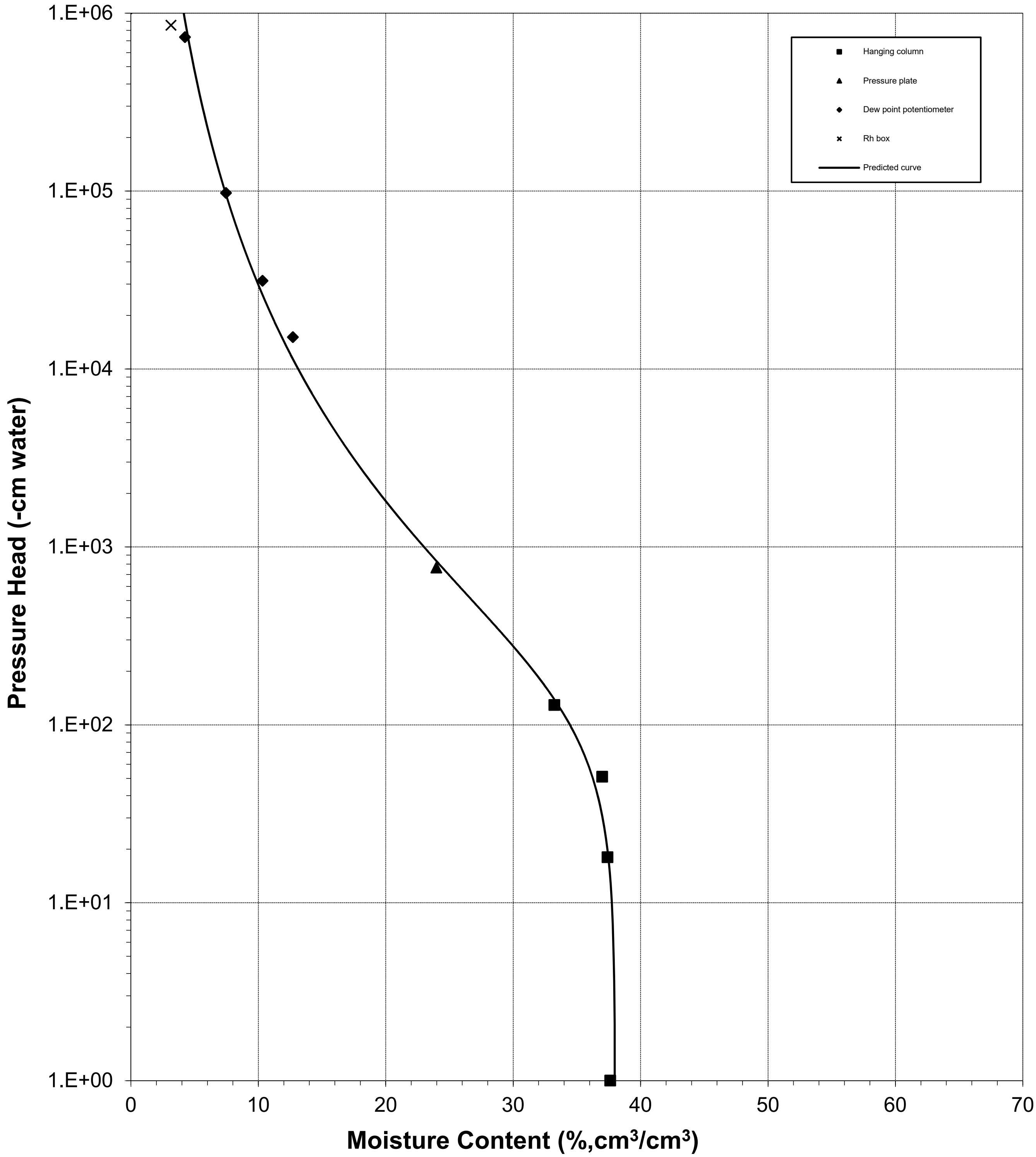
Water Retention Data Points

Sample Number: Schmitt Loam Clay Mix



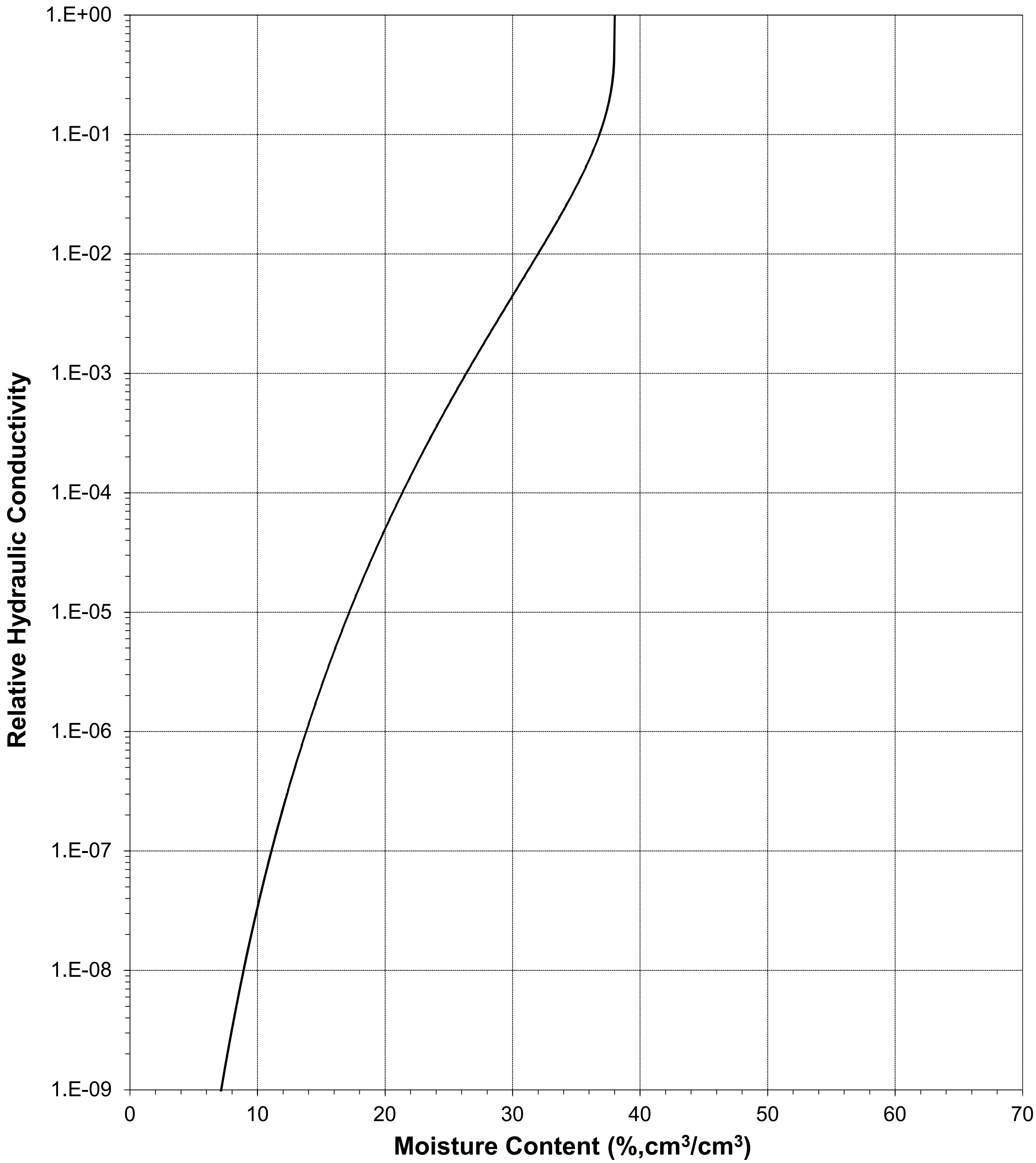
Predicted Water Retention Curve and Data Points

Sample Number: Schmitt Loam Clay Mix



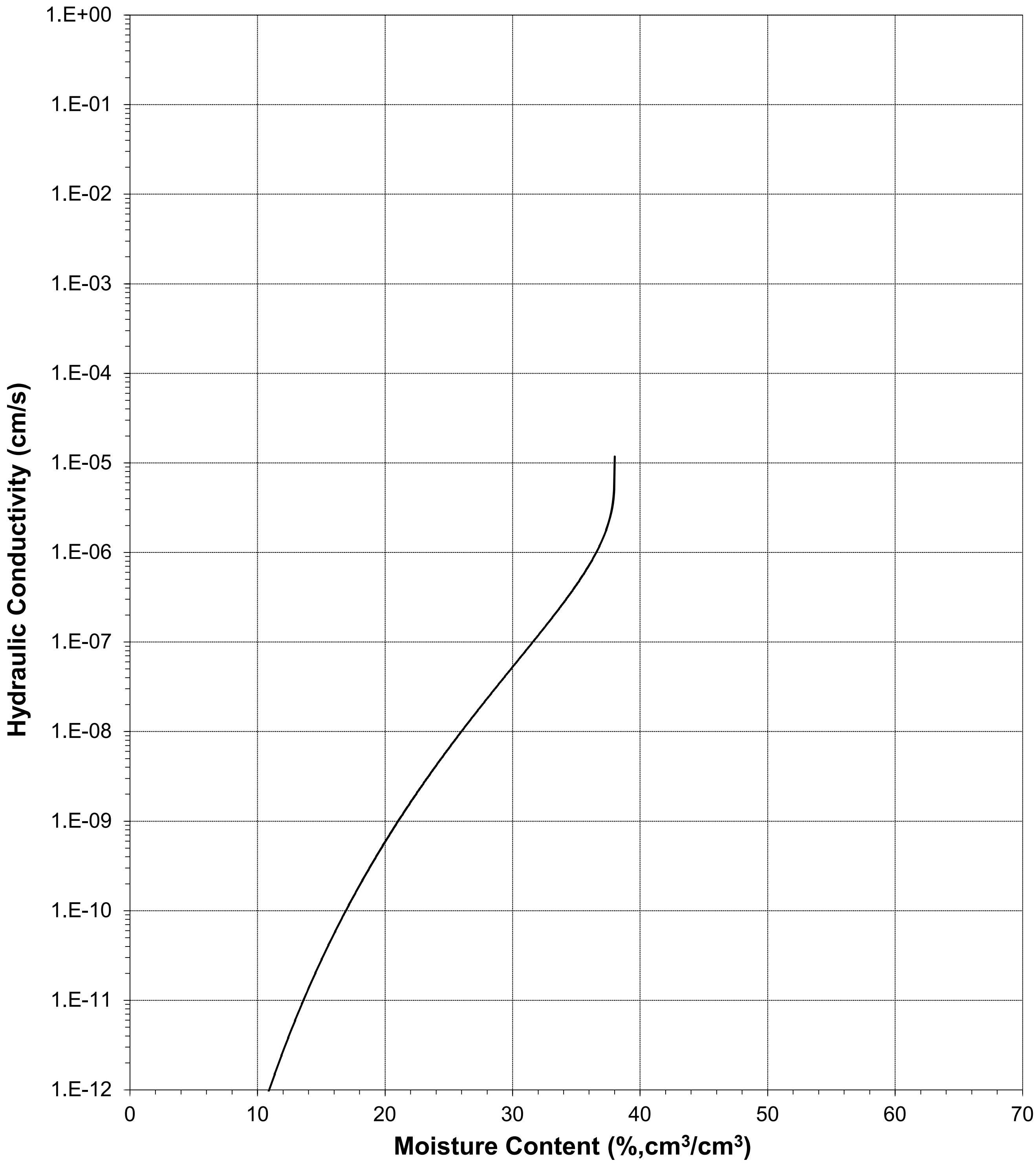
Plot of Relative Hydraulic Conductivity vs Moisture Content

Sample Number: Schmitt Loam Clay Mix



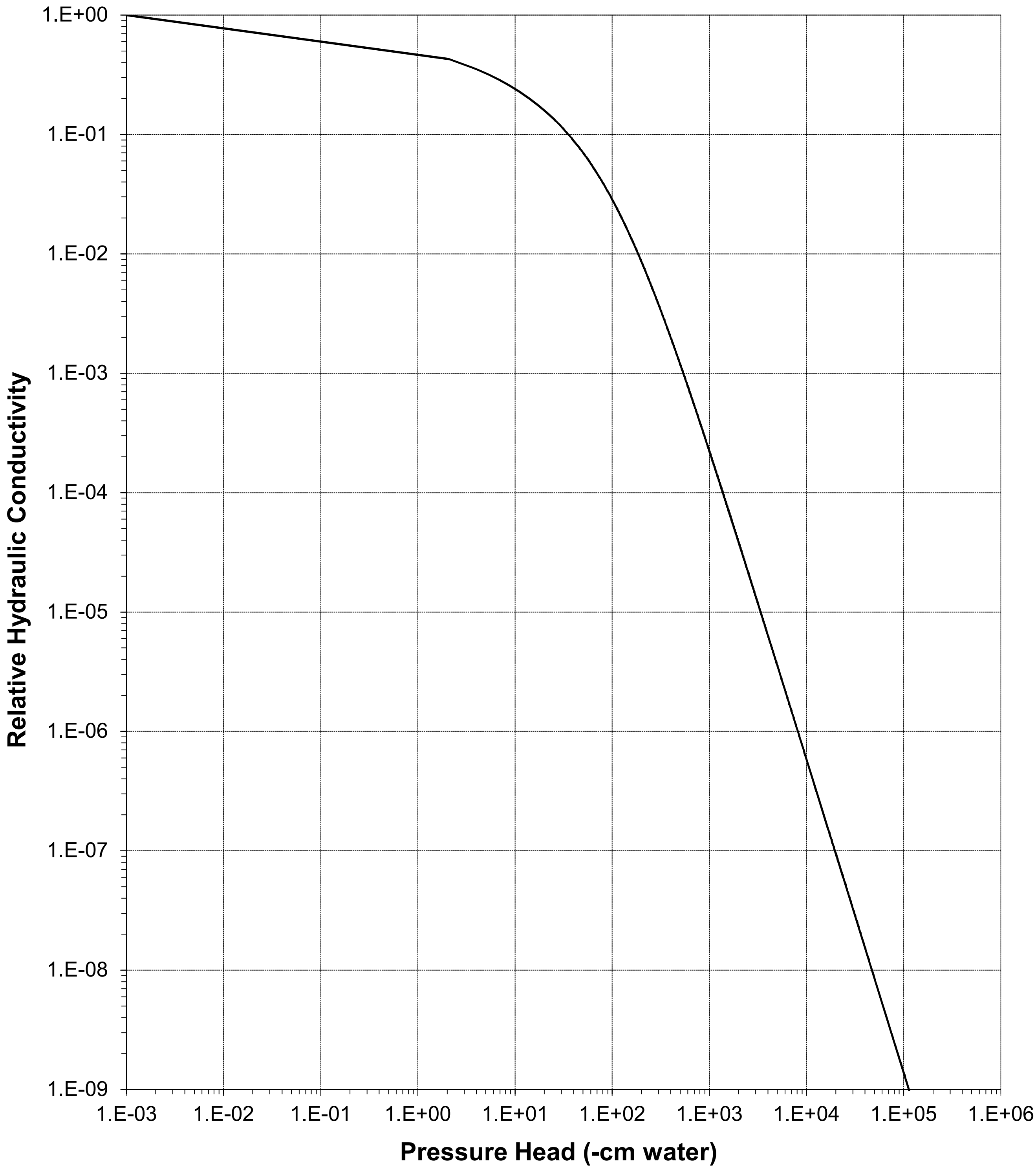
Plot of Hydraulic Conductivity vs Moisture Content

Sample Number: Schmitt Loam Clay Mix



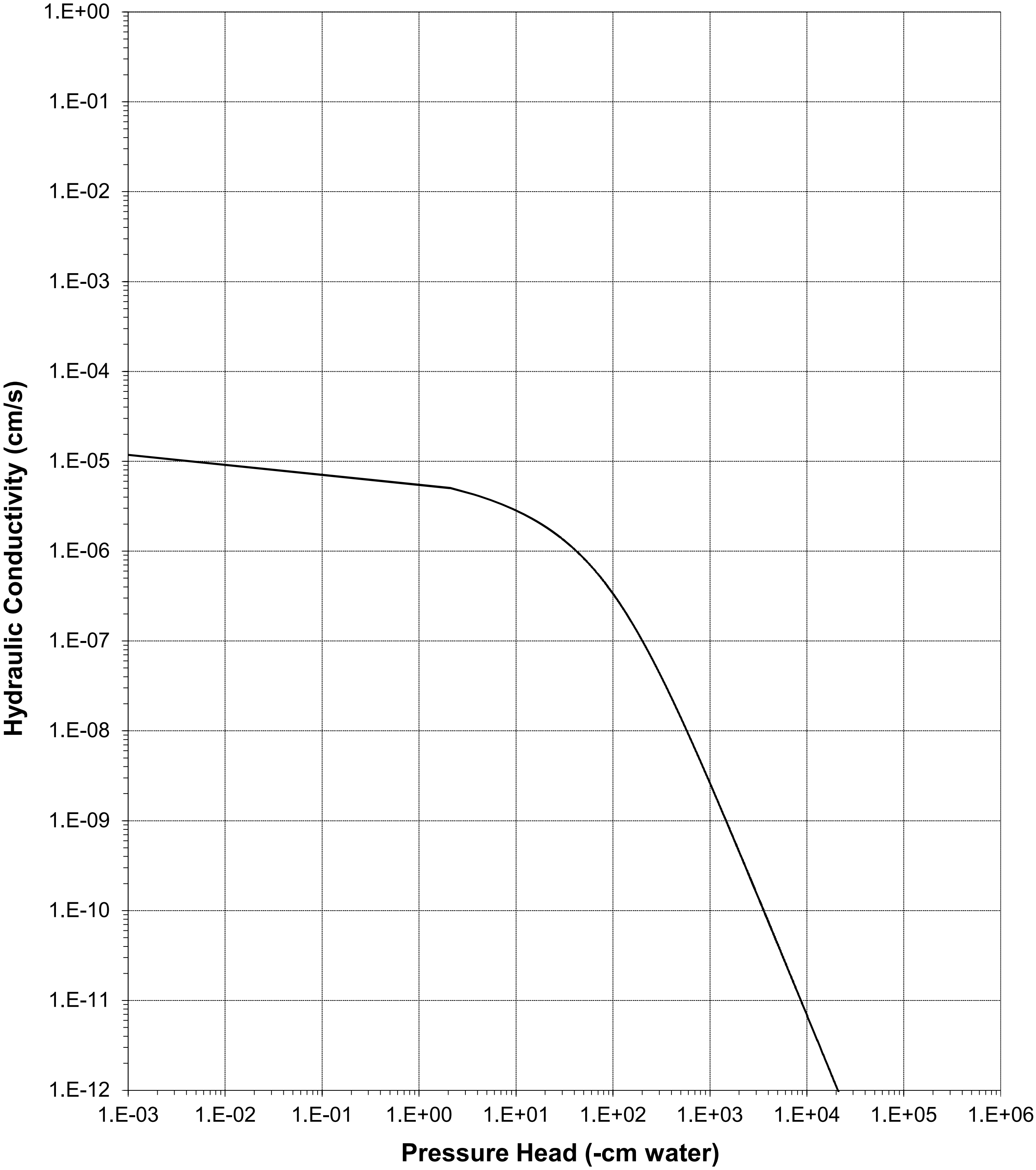
Plot of Relative Hydraulic Conductivity vs Pressure Head

Sample Number: Schmitt Loam Clay Mix



Plot of Hydraulic Conductivity vs Pressure Head

Sample Number: Schmitt Loam Clay Mix



Particle Size Analysis

Daniel B. Stephens & Associates, Inc.

Particle Size Analysis
Sieve Data (#10 Split)

Job Name:	EAEST(2-26)	*Initial Dry Weight of Sample (g):*	516.23
Job Number:	DB26.1048.00	*Weight Passing #10 (g):*	516.11
Sample Number:	Ranch Loam	*Weight Retained #10 (g):*	0.12
Project Name:	NMED AML	*Weight of -10 Sub-Sample (g):*	79.25
Date Received:	2/11/26	*Calculated Weight of Sieve Sample (g):*	79.26
Test Date:	19-Feb-26		

Test Fraction	Sieve Number	Diameter (mm)	Wt. Retained	Cum Wt. Retained	Wt. Passing	% Passing
+10						
	3"	75	0.00	0.00	516.23	100.0
	2"	50	0.00	0.00	516.23	100.0
	1.5"	38.1	0.00	0.00	516.23	100.0
	1"	25	0.00	0.00	516.23	100.0
	3/4"	19.0	0.00	0.00	516.23	100.0
	3/8"	9.5	0.00	0.00	516.23	100.0
	4	4.75	0.00	0.00	516.23	100.0
	10	2.00	0.12	0.12	516.11	100.0
-10			(Based on calculated sieve wt.)			
	20	0.85	0.10	0.12	79.15	99.9
	40	0.425	0.40	0.52	78.75	99.3
	60	0.250	6.84	7.36	71.91	90.7
	100	0.150	26.20	33.56	45.71	57.7
	140	0.106	10.49	44.05	35.22	44.4
	200	0.075	4.15	48.20	31.07	39.2
	dry pan		0.15	48.35	30.92	
	wet pan			30.92	0.00	

d_{10} (mm):	NA	d_{50} (mm):	0.12
d_{16} (mm):	NA	d_{60} (mm):	0.16
d_{30} (mm):	0.012	d_{84} (mm):	0.23

Median Particle Diameter --d_{50} (mm): 0.12

Uniformity Coefficient, Cu --[d_{60}/d_{10}] (mm): NA

Coefficient of Curvature, Cc --[$(d_{30})^2/(d_{10}*d_{60})$] (mm): NA

Mean Particle Diameter --[$(d_{16}+d_{50}+d_{84})/3$] (mm): NA

USCS Soil Classification: Classification by ASTM 2487 requires Atterberg test

USDA Soil Classification: NA

Laboratory analysis by: N. Dolan
Data entered by: N. Dolan
Checked by: T. Morgan

Daniel B. Stephens & Associates, Inc.

Particle Size Analysis
Hydrometer Data

Job Name: EAEST(2-26)
Job Number: DB26.1048.00
Sample Number: Ranch Loam
Project Name: NMED AML
Date Received: 2/11/26

Test Date: 24-Feb-26
Start Time: 8:30

Type of Water Used: DISTILLED
Reaction with H_2O_2*:* MODERATE
Dispersant:* $(NaPO_3)_6$
Measured particle density: 2.56

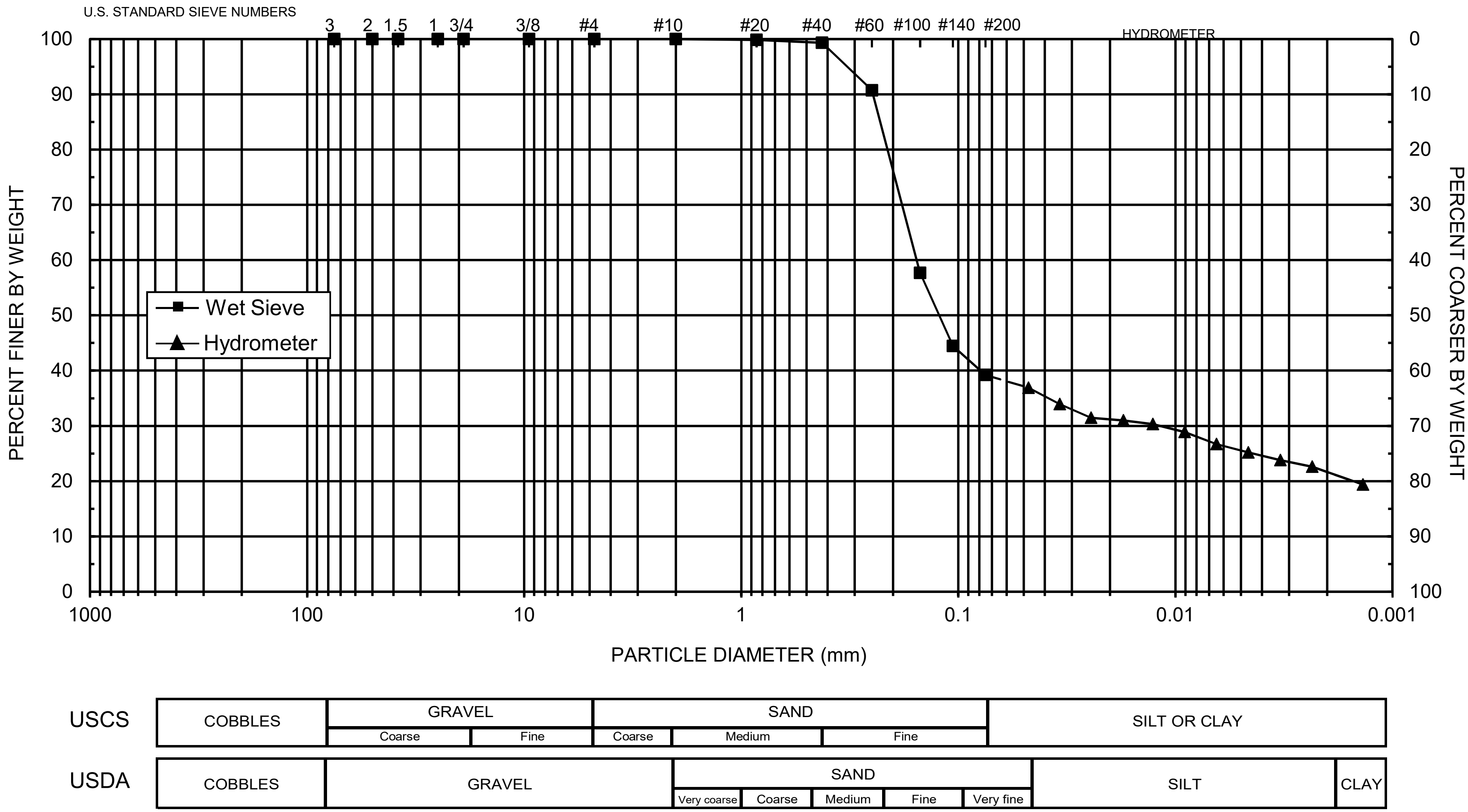
Initial Wt. (g)*:* 79.25
Total Sample Wt. (g)*:* 516.23
Wt. Passing #10 (g)*:* 516.11

Date	Time (min)	Temp (°C)	R (g/L)	R_L (g/L)	R_{corr} (g/L)	H_m (cm)	D (mm)	P (%)	% Finer
24-Feb-26	1	19.30	34.20	5.60	28.6	11	0.0475	37	36.9
	2	19.30	31.90	5.60	26.3	12	0.0342	34	33.9
	4	19.30	30.00	5.60	24.4	12	0.0245	31	31.5
	8	19.30	29.60	5.60	24.0	12	0.0174	31	31.0
	15	19.30	29.10	5.60	23.5	12	0.0127	30	30.3
	30	19.30	28.00	5.60	22.4	13	0.0091	29	28.9
	60	19.30	26.30	5.60	20.7	13	0.0065	27	26.7
	120	19.30	25.10	5.60	19.5	13	0.0046	25	25.2
	240	19.40	24.00	5.57	18.4	13	0.0033	24	23.8
	477	20.00	22.90	5.37	17.5	13	0.0023	23	22.6
25-Feb-26	1444	20.00	20.40	5.37	15.0	14	0.0014	19	19.4

Comments:

* Dispersion device: mechanically operated stirring device

Laboratory analysis by: J. Tafoya
Data entered by: J. Tafoya
Checked by: T. Morgan



d_{10} = **NA**	d_{30} = **0.012**	d_{50} = **0.12**	d_{60} = **0.16**	C_u = **NA**	C_c = **NA**

SAMPLE NUMBER	DATE RECEIVED	USCS CLASSIFICATION	USDA CLASSIFICATION
Ranch Loam	**2/11/26**	**Classification by ASTM 2487 requires Atterberg test**	**NA**

Daniel B. Stephens & Associates, Inc.

Daniel B. Stephens & Associates, Inc.

Particle Size Analysis
Sieve Data (#10 Split)

Job Name:	EAEST(2-26)	*Initial Dry Weight of Sample (g):*	699.86
Job Number:	DB26.1048.00	*Weight Passing #10 (g):*	696.63
Sample Number:	Ranch Loam Clay Mix	*Weight Retained #10 (g):*	3.23
Project Name:	NMED AML	*Weight of -10 Sub-Sample (g):*	70.13
Date Received:	2/11/26	*Calculated Weight of Sieve Sample (g):*	70.46
Test Date:	27-Feb-26		

Test Fraction	Sieve Number	Diameter (mm)	Wt. Retained	Cum Wt. Retained	Wt. Passing	% Passing
+10						
	3"	75	0.00	0.00	699.86	100.0
	2"	50	0.00	0.00	699.86	100.0
	1.5"	38.1	0.00	0.00	699.86	100.0
	1"	25	0.00	0.00	699.86	100.0
	3/4"	19.0	0.00	0.00	699.86	100.0
	3/8"	9.5	0.00	0.00	699.86	100.0
	4	4.75	1.41	1.41	698.45	99.8
	10	2.00	1.82	3.23	696.63	99.5
-10			(Based on calculated sieve wt.)			
	20	0.85	0.11	0.44	70.02	99.4
	40	0.425	0.65	1.09	69.37	98.5
	60	0.250	5.51	6.60	63.86	90.6
	100	0.150	20.08	26.68	43.78	62.1
	140	0.106	9.45	36.13	34.33	48.7
	200	0.075	3.72	39.85	30.61	43.4
	dry pan		0.24	40.09	30.37	
	wet pan			30.37	0.00	

d_{10} (mm):	NA	d_{50} (mm):	0.11
d_{16} (mm):	NA	d_{60} (mm):	0.14
d_{30} (mm):	0.0066	d_{84} (mm):	0.22

Median Particle Diameter --d_{50} (mm): 0.11

Uniformity Coefficient, Cu --[d_{60}/d_{10}] (mm): NA

Coefficient of Curvature, Cc --[$(d_{30})^2/(d_{10} * d_{60})$] (mm): NA

Mean Particle Diameter --[$(d_{16}+d_{50}+d_{84})/3$] (mm): NA

USCS Soil Classification: Classification by ASTM 2487 requires Atterberg test

USDA Soil Classification: NA

Laboratory analysis by: N Dolan/N. Dolan

Data entered by: N Dolan

Checked by: T Morgan

Daniel B. Stephens & Associates, Inc.

Particle Size Analysis
Hydrometer Data

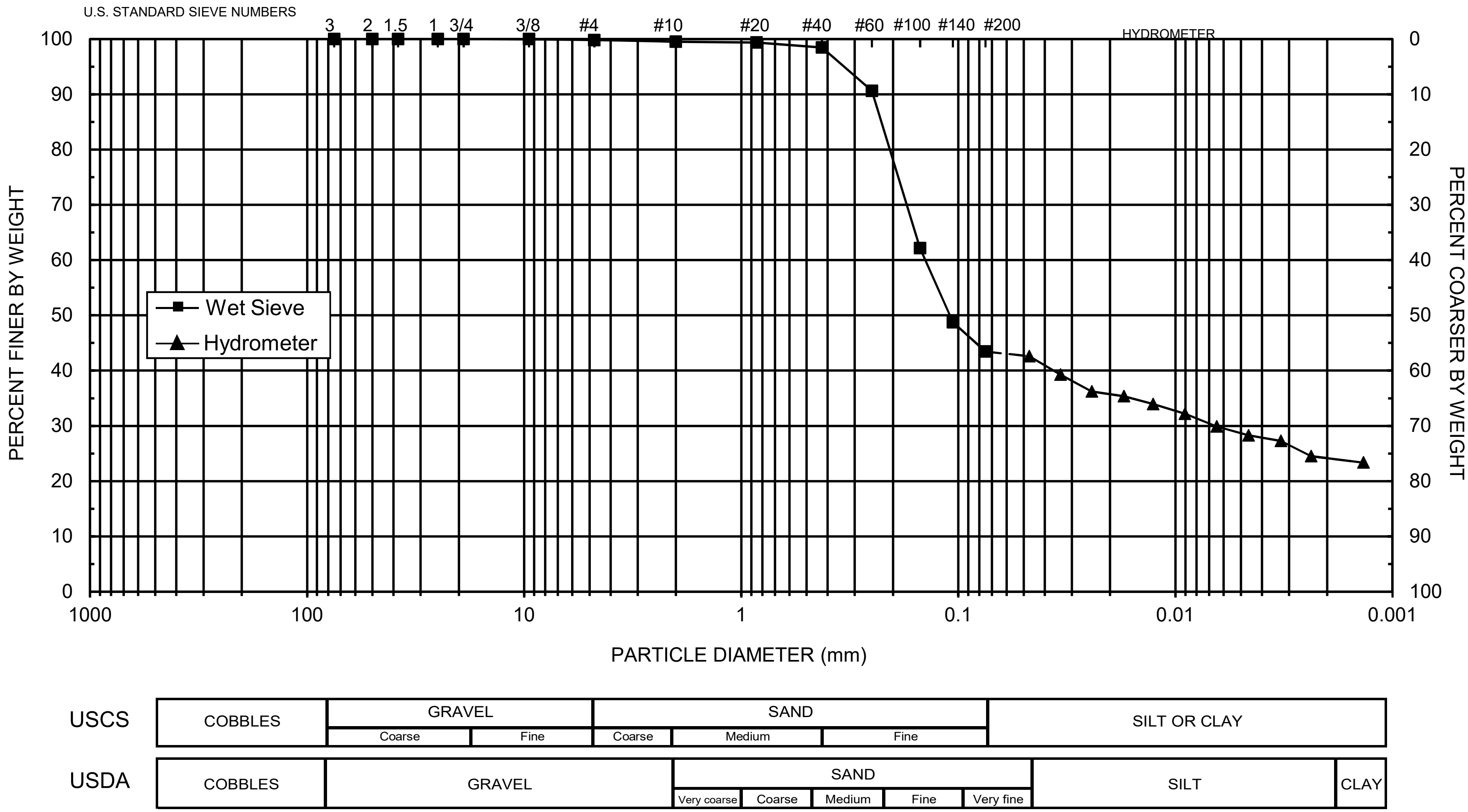
Job Name:	EAEST(2-26)	*Type of Water Used:*	DISTILLED
Job Number:	DB26.1048.00	*Reaction with* H_2O_2:	MODERATE
Sample Number:	Ranch Loam Clay Mix	*Dispersant*:*	$(NaPO_3)_6$
Project Name:	NMED AML	*Measured particle density:*	2.57
Date Received:	2/11/26	*Initial Wt.* (g):	70.13
Test Date:	24-Feb-26	*Total Sample Wt.* (g):	699.86
Start Time:	8:48	*Wt. Passing #10* (g):	696.63

Date	Time (min)	Temp (°C)	R (g/L)	R_L (g/L)	R_{corr} (g/L)	H_m (cm)	D (mm)	P (%)	% Finer
24-Feb-26	1	19.40	35.00	5.57	29.4	11	0.0471	43	42.6
	2	19.40	32.70	5.57	27.1	12	0.0339	39	39.3
	4	19.40	30.60	5.57	25.0	12	0.0243	36	36.2
	8	19.40	30.00	5.57	24.4	12	0.0173	36	35.4
	15	19.40	29.00	5.57	23.4	12	0.0127	34	33.9
	30	19.40	27.80	5.57	22.2	13	0.0090	32	32.2
	60	19.40	26.20	5.57	20.6	13	0.0065	30	29.9
	120	19.40	25.10	5.57	19.5	13	0.0046	28	28.3
	240	19.40	24.40	5.57	18.8	13	0.0033	27	27.3
	469	20.00	22.30	5.37	16.9	13	0.0024	25	24.5
25-Feb-26	1432	20.00	21.50	5.37	16.1	14	0.0014	23	23.3

Comments:

* Dispersion device: mechanically operated stirring device

Laboratory analysis by: J. Tafoya
Data entered by: J. Tafoya
Checked by: T. Morgan



d_{10} = **NA**	d_{30} = **0.0066**	d_{50} = **0.11**	d_{60} = **0.14**	C_u = **NA**	C_c = **NA**

SAMPLE NUMBER	DATE RECEIVED	USCS CLASSIFICATION	USDA CLASSIFICATION
Ranch Loam Clay Mix	**2/11/26**	**Classification by ASTM 2487 requires Atterberg test**	**NA**

Daniel B. Stephens & Associates, Inc.

Daniel B. Stephens & Associates, Inc.

Particle Size Analysis
Sieve Data (#10 Split)

Job Name:	EAEST(2-26)	*Initial Dry Weight of Sample (g):*	367.03
Job Number:	DB26.1048.00	*Weight Passing #10 (g):*	366.94
Sample Number:	Schmitt Loam	*Weight Retained #10 (g):*	0.09
Project Name:	NMED AML	*Weight of -10 Sub-Sample (g):*	76.94
Date Received:	2/11/26	*Calculated Weight of Sieve Sample (g):*	76.96
Test Date:	19-Feb-26		

Test Fraction	Sieve Number	Diameter (mm)	Wt. Retained	Cum Wt. Retained	Wt. Passing	% Passing
+10						
	3"	75	0.00	0.00	367.03	100.0
	2"	50	0.00	0.00	367.03	100.0
	1.5"	38.1	0.00	0.00	367.03	100.0
	1"	25	0.00	0.00	367.03	100.0
	3/4"	19.0	0.00	0.00	367.03	100.0
	3/8"	9.5	0.00	0.00	367.03	100.0
	4	4.75	0.00	0.00	367.03	100.0
	10	2.00	0.09	0.09	366.94	100.0
-10			(Based on calculated sieve wt.)			
	20	0.85	1.33	1.35	75.61	98.2
	40	0.425	3.86	5.21	71.75	93.2
	60	0.250	6.61	11.82	65.14	84.6
	100	0.150	12.47	24.29	52.67	68.4
	140	0.106	8.40	32.69	44.27	57.5
	200	0.075	5.32	38.01	38.95	50.6
	dry pan		0.28	38.29	38.67	
	wet pan			38.67	0.00	

d_{10} (mm):	NA	d_{50} (mm):	0.065
d_{16} (mm):	NA	d_{60} (mm):	0.11
d_{30} (mm):	0.0054	d_{84} (mm):	0.24

Median Particle Diameter --d_{50} (mm): 0.065

Uniformity Coefficient, Cu --$[d_{60}/d_{10}]$ (mm): NA

Coefficient of Curvature, Cc --$[(d_{30})^2/(d_{10}*d_{60})]$ (mm): NA

Mean Particle Diameter --$[(d_{16}+d_{50}+d_{84})/3]$ (mm): NA

USCS Soil Classification: Classification by ASTM 2487 requires Atterberg test

USDA Soil Classification: NA

Laboratory analysis by: N. Dolan

Data entered by: N. Dolan

Checked by: T. Morgan

Particle Size Analysis
Hydrometer Data

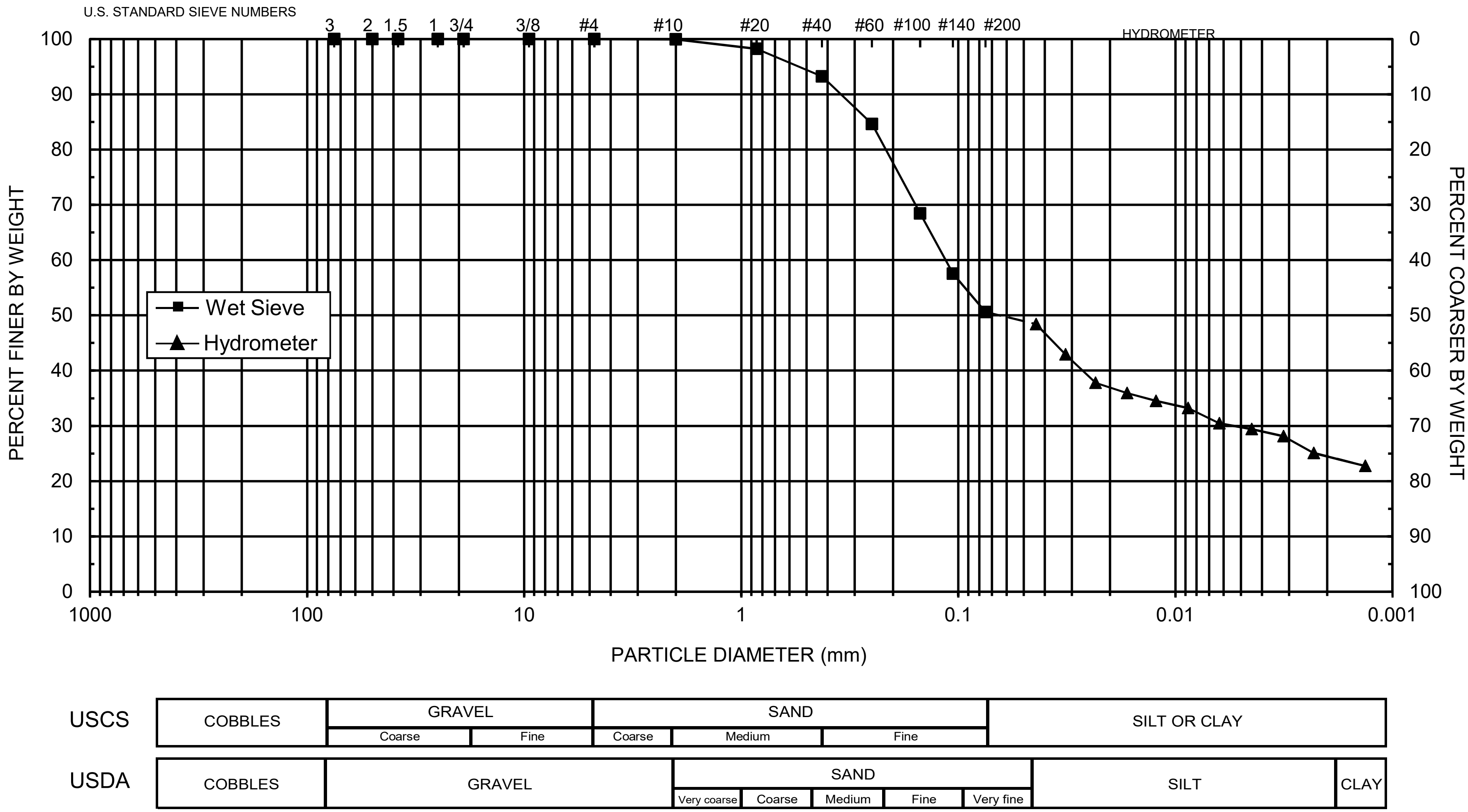
Job Name:	EAEST(2-26)	*Type of Water Used:*	DISTILLED
Job Number:	DB26.1048.00	*Reaction with* H_2O_2:	MODERATE
Sample Number:	Schmitt Loam	*Dispersant*:*	$(NaPO_3)_6$
Project Name:	NMED AML	*Measured particle density:*	2.61
Date Received:	2/11/26	*Initial Wt.* (g):	76.94
Test Date:	24-Feb-26	*Total Sample Wt.* (g):	367.03
Start Time:	8:42	*Wt. Passing #10* (g):	366.94

Date	Time (min)	Temp (°C)	R (g/L)	R_L (g/L)	R_{corr} (g/L)	H_m (cm)	D (mm)	P (%)	% Finer
24-Feb-26	1	19.30	42.50	5.60	36.9	10	0.0439	48	48.4
	2	19.30	38.30	5.60	32.7	11	0.0321	43	42.9
	4	19.30	34.40	5.60	28.8	11	0.0234	38	37.8
	8	19.30	33.00	5.60	27.4	12	0.0167	36	36.0
	15	19.30	31.90	5.60	26.3	12	0.0123	35	34.5
	30	19.30	30.90	5.60	25.3	12	0.0087	33	33.2
	60	19.30	28.80	5.60	23.2	12	0.0063	30	30.4
	120	19.30	28.00	5.60	22.4	13	0.0045	29	29.4
	240	19.40	27.00	5.57	21.4	13	0.0032	28	28.1
	470	20.00	24.50	5.37	19.1	13	0.0023	25	25.1
25-Feb-26	1435	20.00	22.70	5.37	17.3	13	0.0013	23	22.7

Comments:

* Dispersion device: mechanically operated stirring device

Laboratory analysis by: J. Tafoya
Data entered by: J. Tafoya
Checked by: T. Morgan



d_{10} = **NA**	d_{30} = **0.0054**	d_{50} = **0.065**	d_{60} = **0.11**	C_u = **NA**	C_c = **NA**

SAMPLE NUMBER	DATE RECEIVED	USCS CLASSIFICATION	USDA CLASSIFICATION
Schmitt Loam	**2/11/26**	**Classification by ASTM 2487 requires Atterberg test**	**NA**

Daniel B. Stephens & Associates, Inc.

Particle Size Analysis
Sieve Data (#10 Split)

Job Name: EAEST(2-26)
Job Number: DB26.1048.00
Sample Number: Schmitt Loam Clay Mix
Project Name: NMED AML
Date Received: 2/11/26

Test Date: 20-Feb-26

Initial Dry Weight of Sample (g): 584.02
Weight Passing #10 (g): 581.38
Weight Retained #10 (g): 2.64
Weight of -10 Sub-Sample (g): 64.90
Calculated Weight of Sieve Sample (g): 65.19

Test Fraction	Sieve Number	Diameter (mm)	Wt. Retained	Cum Wt. Retained	Wt. Passing	% Passing
+10						
	3"	75	0.00	0.00	584.02	100.0
	2"	50	0.00	0.00	584.02	100.0
	1.5"	38.1	0.00	0.00	584.02	100.0
	1"	25	0.00	0.00	584.02	100.0
	3/4"	19.0	0.00	0.00	584.02	100.0
	3/8"	9.5	0.00	0.00	584.02	100.0
	4	4.75	0.70	0.70	583.32	99.9
	10	2.00	1.94	2.64	581.38	99.5
-10			(Based on calculated sieve wt.)			
	20	0.85	0.70	0.99	64.20	98.5
	40	0.425	2.88	3.87	61.32	94.1
	60	0.250	7.50	11.37	53.82	82.6
	100	0.150	17.30	28.67	36.52	56.0
	140	0.106	10.25	38.92	26.27	40.3
	200	0.075	4.94	43.86	21.33	32.7
	dry pan		0.32	44.18	21.01	
	wet pan			21.01	0.00	

d_{10} (mm): NA
d_{16} (mm): NA
d_{30} (mm): 0.041
d_{50} (mm): 0.13
d_{60} (mm): 0.16
d_{84} (mm): 0.27

Median Particle Diameter --d_{50} (mm): 0.13
Uniformity Coefficient, Cu --[d_{60}/d_{10}] (mm): NA
Coefficient of Curvature, Cc --[$(d_{30})^2/(d_{10} * d_{60})$] (mm): NA
Mean Particle Diameter --[$(d_{16}+d_{50}+d_{84})/3$] (mm): NA

USCS Soil Classification: Classification by ASTM 2487 requires Atterberg test
USDA Soil Classification: NA

Laboratory analysis by: N. Dolan
Data entered by: N. Dolan
Checked by: T. Morgan

Daniel B. Stephens & Associates, Inc.

Particle Size Analysis
Hydrometer Data

Job Name: EAEST(2-26)
Job Number: DB26.1048.00
Sample Number: Schmitt Loam Clay Mix
Project Name: NMED AML
Date Received: 2/11/26

Test Date: 24-Feb-26
Start Time: 8:36

Type of Water Used: DISTILLED
Reaction with H_2O_2: MODERATE
Dispersant:* $(NaPO_3)_6$
Measured particle density: 2.57

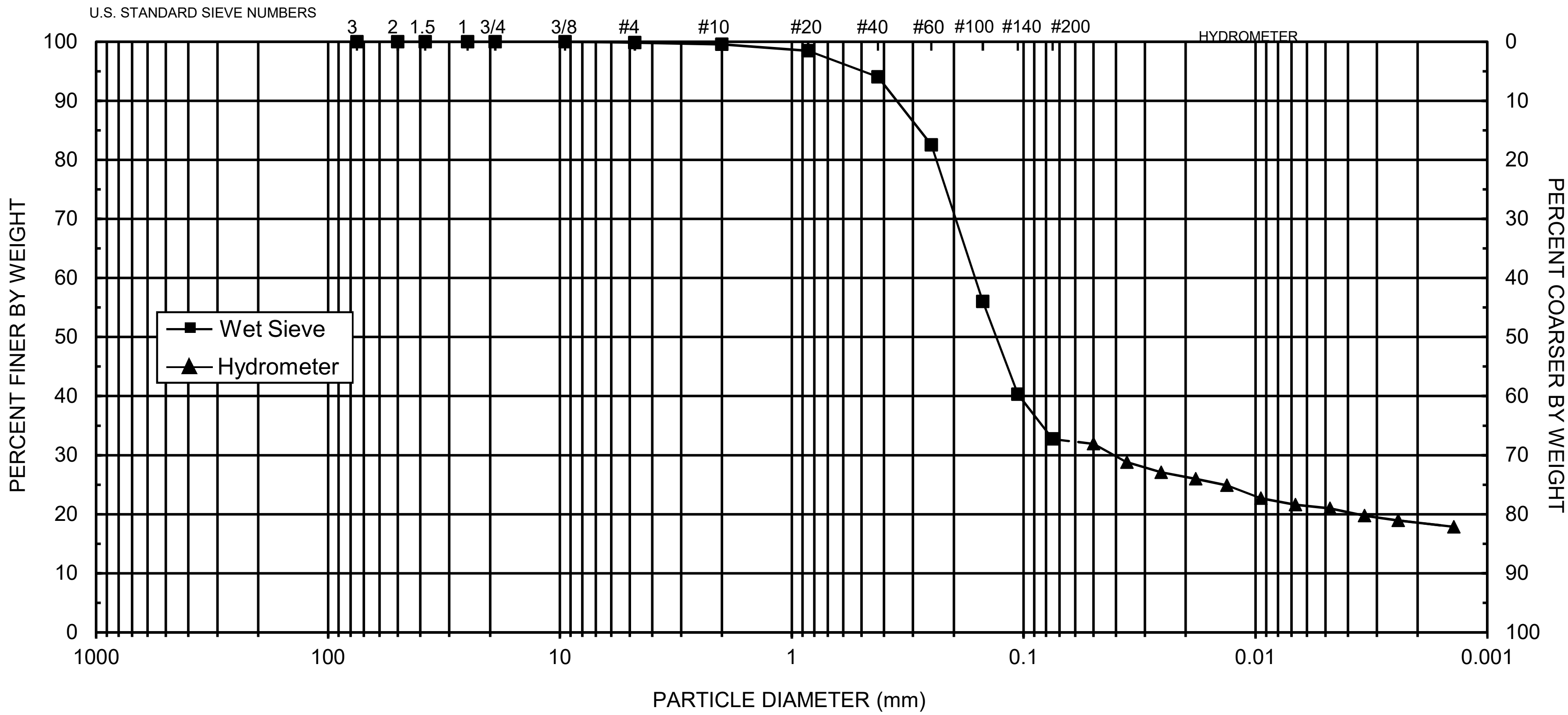
Initial Wt. (g): 64.90
Total Sample Wt. (g): 584.02
Wt. Passing #10 (g): 581.38

Date	Time (min)	Temp (°C)	R (g/L)	R_L (g/L)	R_{corr} (g/L)	H_m (cm)	D (mm)	P (%)	% Finer
24-Feb-26	1	19.40	26.00	5.57	20.4	13	0.0500	32	31.9
	2	19.40	24.00	5.57	18.4	13	0.0358	29	28.8
	4	19.40	22.90	5.57	17.3	13	0.0255	27	27.1
	8	19.40	22.20	5.57	16.6	13	0.0181	26	26.0
	15	19.40	21.50	5.57	15.9	14	0.0133	25	24.9
	30	19.40	20.10	5.57	14.5	14	0.0095	23	22.7
	60	19.40	19.40	5.57	13.8	14	0.0067	22	21.6
	120	19.40	19.00	5.57	13.4	14	0.0048	21	21.0
	240	19.40	18.20	5.57	12.6	14	0.0034	20	19.7
	474	20.00	17.50	5.37	12.1	14	0.0024	19	18.9
25-Feb-26	1439	20.00	16.80	5.37	11.4	14	0.0014	18	17.8

Comments:

* Dispersion device: mechanically operated stirring device

Laboratory analysis by: J. Tafoya
Data entered by: J. Tafoya
Checked by: T. Morgan



USCS	COBBLES	GRAVEL		SAND			SILT OR CLAY
		Coarse	Fine	Coarse	Medium	Fine	

USDA	COBBLES	GRAVEL	SAND					SILT	CLAY
			Very coarse	Coarse	Medium	Fine	Very fine		

d_{10} = **NA**	d_{30} = **0.041**	d_{50} = **0.13**	d_{60} = **0.16**	C_u = **NA**	C_c = **NA**

SAMPLE NUMBER	DATE RECEIVED	USCS CLASSIFICATION	USDA CLASSIFICATION
Schmitt Loam Clay Mix	**2/11/26**	**Classification by ASTM 2487 requires Atterberg test**	**NA**

Daniel B. Stephens & Associates, Inc.

Laboratory Tests and Methods

Tests and Methods

Dry Bulk Density:	ASTM D7263
Moisture Content:	ASTM D7263, ASTM D2216
Calculated Porosity:	ASTM D7263
Saturated Hydraulic Conductivity:	
Constant Head: (Rigid Wall)	ASTM D2434
Falling Head: (Rigid Wall)	ASTM D5856M; Klute, A. and C. Dirkson. 1986. Hydraulic Conductivity and Diffusivity: Laboratory Methods.Chp. 28, pp. 700-703, in A. Klute (ed.), Methods of Soil Analysis, Part 1, American Society of Agronomy, Madison, WI
Hanging Column Method:	ASTM D6836 (modified apparatus)
Pressure Plate Method:	ASTM D6836
Water Potential (Dewpoint Potentiometer) Method:	ASTM D6836
Relative Humidity (Box) Method:	Campbell, G. and G. Gee. 1986. Water Potential: Miscellaneous Methods. Chp. 25, pp. 631-632, in A. Klute (ed.), Methods of Soil Analysis. Part 1. American Society of Agronomy, Madison, WI; Karathanasis & Hajek. 1982. Quantitative Evaluation of Water Adsorption on Soil Clays. SSA Journal 46:1321-1325
Moisture Retention Characteristics & Calculated Unsaturated Hydraulic Conductivity:	ASTM D6836; van Genuchten, M.T. 1980. A closed-form equation for predicting the hydraulic conductivity of unsaturated soils. SSSAJ 44:892-898; van Genuchten, M.T., F.J. Leij, and S.R. Yates. 1991. The RETC code for quantifying the hydraulic functions of unsaturated soils. Robert S. Kerr Environmental Research Laboratory, Office of Research and Development, U.S. Environmental Protection Agency, Ada, Oklahoma. EPA/600/2091/065. December 1991
Specific Gravity Fine:	ASTM D854
Particle Size Analysis:	ASTM D7928, ASTM D6913
USCS (ASTM) Classification:	ASTM D6913, ASTM D4318, ASTM D2487
USDA Classification:	ASTM D7928, ASTM D6913, USDA Soil Textural Triangle
Standard Proctor Compaction:	ASTM D698

DBS&A
a Geo-Logic Company

DBS&A Soil Testing and Research Laboratory
Chain of Custody

For Report: Name/Address/Phone/Email:
Colleen Rust
EA Engineering, Science, and Technology, Inc., PBC
320 Gold Ave SW, Ste 1300
Albuquerque, NM 87102
M: 505-321-4515
Email: crust@eaest.com

For Invoice: Name/Address/Phone/Email (or same as report):
Email invoices to dallasap@eaest.com and cc' Colleen Rust crust@eaest.com and Bernie Bockisch bbockisch@eaest.com

Project Name and/or P.O. No.:

Project Contact Name, Phone, Email:

Date	Sample Identification	Number of Containers	Type of Container	As Received Gravimetric Moisture Content	Initial Soil Properties: Density, Moisture, Porosity	Saturated Hydraulic Conductivity ☐ Rigid Wall or ☐ Flexible Wall	Hydraulic Properties Package ☐ Flexible Wall Ksat or ☒ Rigid Wall Ksat	Particle Size Analysis ☐ Sieve Only or ☒ Include Hydrometer	Proctor Compaction ☒ Standard or ☐ Modified	Specific Gravity ☒ Fines < and/or ☐ Coarse	Atterberg Limits							Remarks
2-6-2026	Ranch-Loam	1	Bucket		X	X	X	X	X	X								Rushed
2-6-2026	Ranch-Loam-Clay-Mix	1	Bucket		X	X	X	X	X	X								Rushed, needs to be mixed by lab
2-10-2026	Schmitt-Loam	1	Bucket		X	X	X	X	X	X								Rushed
2-10-2026	Schmitt-Loam-Clay-Mix	1	Bucket		X	X	X	X	X	X								Rushed, needs to be mixed by lab

Relinquished By: (Signature) [signature] Date 2/11/2026

Received By: (Signature) [signature] Date 2/11/26

Page 1 of 1