Development of Water Source

The following steps were followed in developing the water source of our Dairy Farm Industrial Park:

1. Grain size distribution for different soil layers
2. Locating the aquifer and the water bearing strata
3. Design of gravel pack material
4. Determination of strainer length and position
5. Selection of strainer size
6. Yield of well

Grain Size Analysis

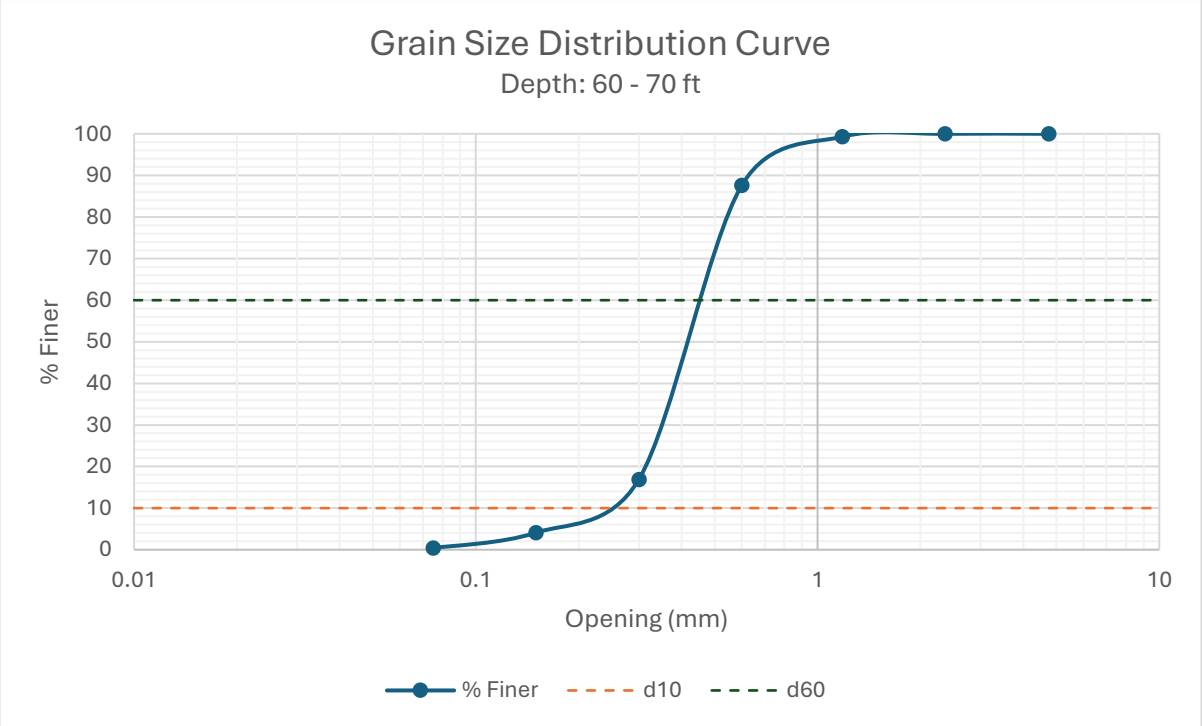
The analyses of grain size distribution were performed on spreadsheet, and their output is attached to this report. The following characteristics were determined:

- Fineness Modulus: (Cumulative % retained on standard sieve sizes) / 100
- d_{10}, d_{30}, d_{60}: Size representing 10%, 30%, and 60% finer particles on particular soil strata. Log-linear interpolation was performed (through the equation $y = m \log x + c$) to produce these values.
- Uniformity coefficient: d_{60}/d_{10}.
- MIT Classification: Percentage of fine, medium, and coarse sand were computed through log-linear interpolation.

Sieve Size Analysis: Depth 60-70 ft

Sieve No.	Opening (mm)	Can Wt (g)	Sample + Can Wt (g)	Wt of Soil (g)	Soil Retained (%)	Cumulative Retained (%)	% Finer
4	4.75	563.7	563.7	0	0.00	0.00	100.00
8	2.36	521.2	521.2	0	0.00	0.00	100.00
16	1.18	489.3	490	0.7	0.70	0.70	99.30
30	0.6	461.3	473	11.7	11.70	12.40	87.60
50	0.3	411.5	482.2	70.7	70.70	83.10	16.90
100	0.15	393.2	406	12.8	12.80	95.90	4.10
200	0.075	385.3	389	3.7	3.70	99.60	0.40
Pan		328.6	329	0.4	0.40	100.00	0.00
Total				**100**			

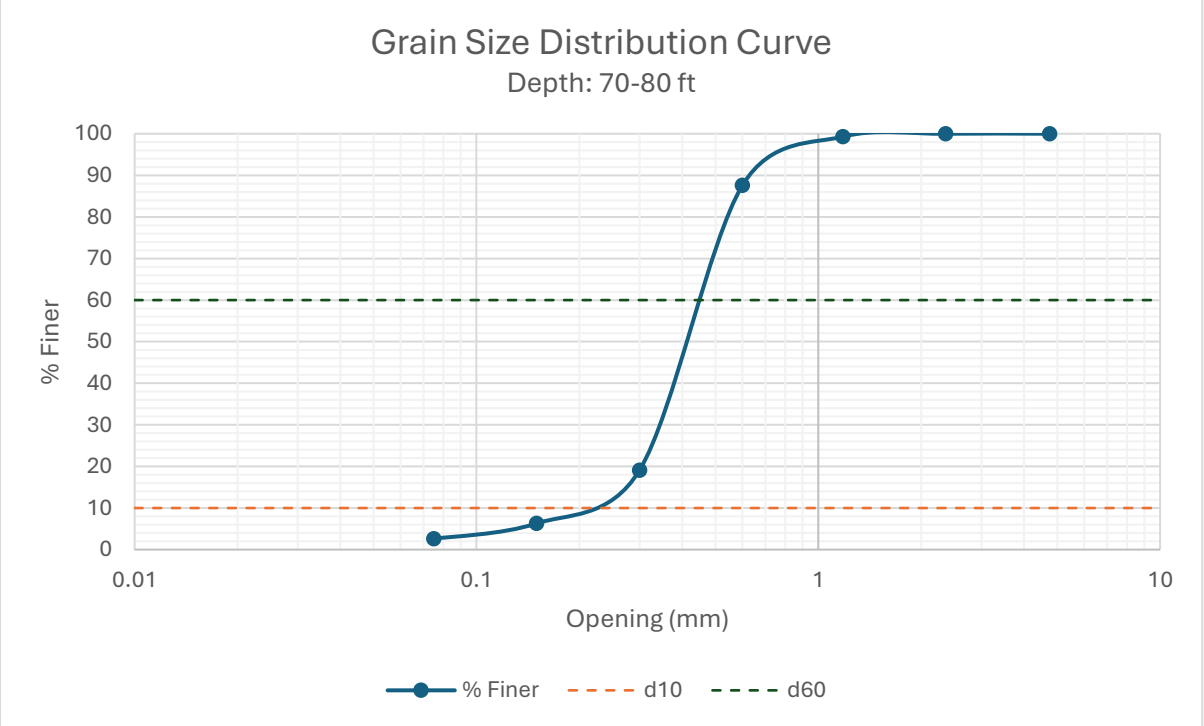
Results	d10	d30	d60	Cu	FM	% Coarse	% Medium	% Fine
Value	0.21	0.34	0.46	2.22	1.92	12.23	78.19	9.01



Sieve Size Analysis: Depth 70-80 ft

Sieve No.	Opening (mm)	Can Wt (g)	Sample + Can Wt (g)	Wt of Soil (g)	Soil Retained (%)	Cumulative Retained (%)	% Finer
4	4.75	563.7	563.7	0	0.00	0.00	100.00
8	2.36	521.2	521.2	0	0.00	0.00	100.00
16	1.18	489.3	490	0.7	0.70	0.70	99.30
30	0.6	461.3	473	11.7	11.70	12.40	87.60
50	0.3	411.5	480	68.5	68.50	80.90	19.10
100	0.15	393.2	406	12.8	12.80	93.70	6.30
200	0.075	385.3	389	3.7	3.70	97.40	2.60
Pan		328.6	331.2	2.6	2.60	100.00	0.00
Total				**100**			

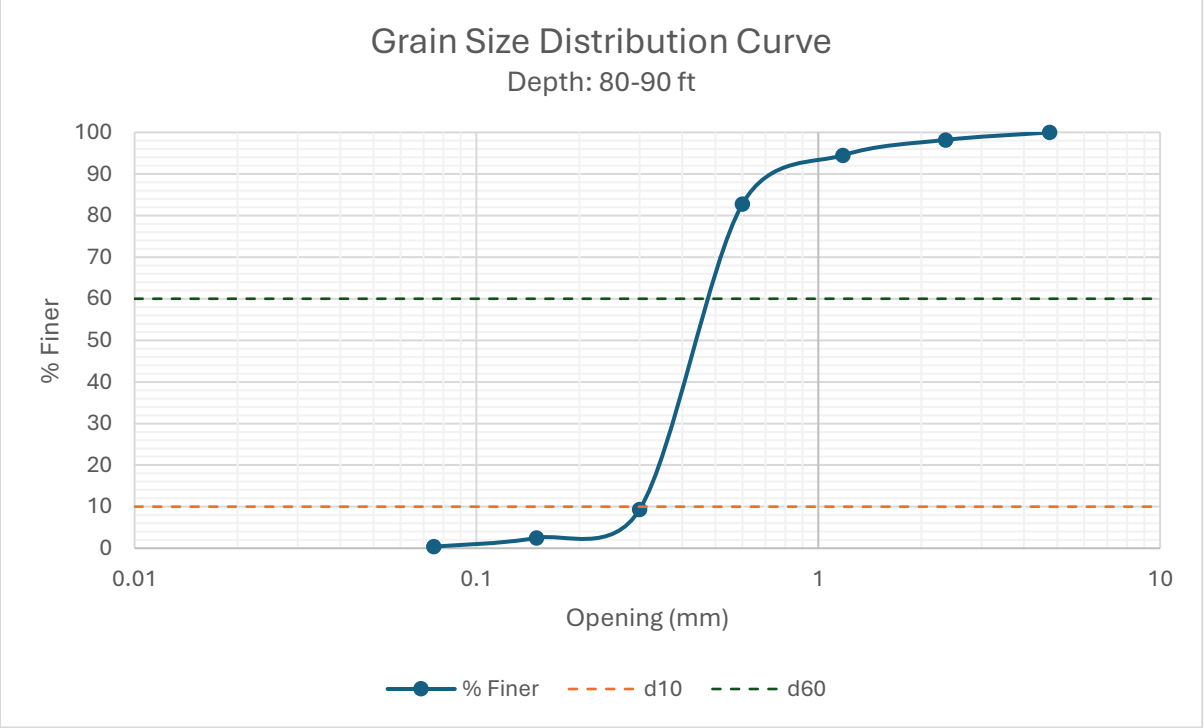
Results	d10	d30	d60	Cu	FM	% Coarse	% Medium	% Fine
Value	0.18	0.33	0.45	2.48	1.88	12.23	75.99	9.01



Sieve Size Analysis: Depth 80-90 ft

Sieve No.	Opening (mm)	Can Wt (g)	Sample + Can Wt (g)	Wt of Soil (g)	Soil Retained (%)	Cumulative Retained (%)	% Finer
4	4.75	563.7	563.7	0	0.00	0.00	100.00
8	2.36	521.2	523	1.8	1.80	1.80	98.20
16	1.18	489.3	493	3.7	3.70	5.5	94.50
30	0.6	461.3	473	11.7	11.70	17.20	82.80
50	0.3	411.5	485	73.5	73.50	90.70	9.30
100	0.15	393.2	400	6.8	6.80	97.50	2.50
200	0.075	385.3	387.4	2.1	2.10	99.60	0.40
Pan		328.6	329	0.4	0.40	100.00	0.00
Total				**100**			

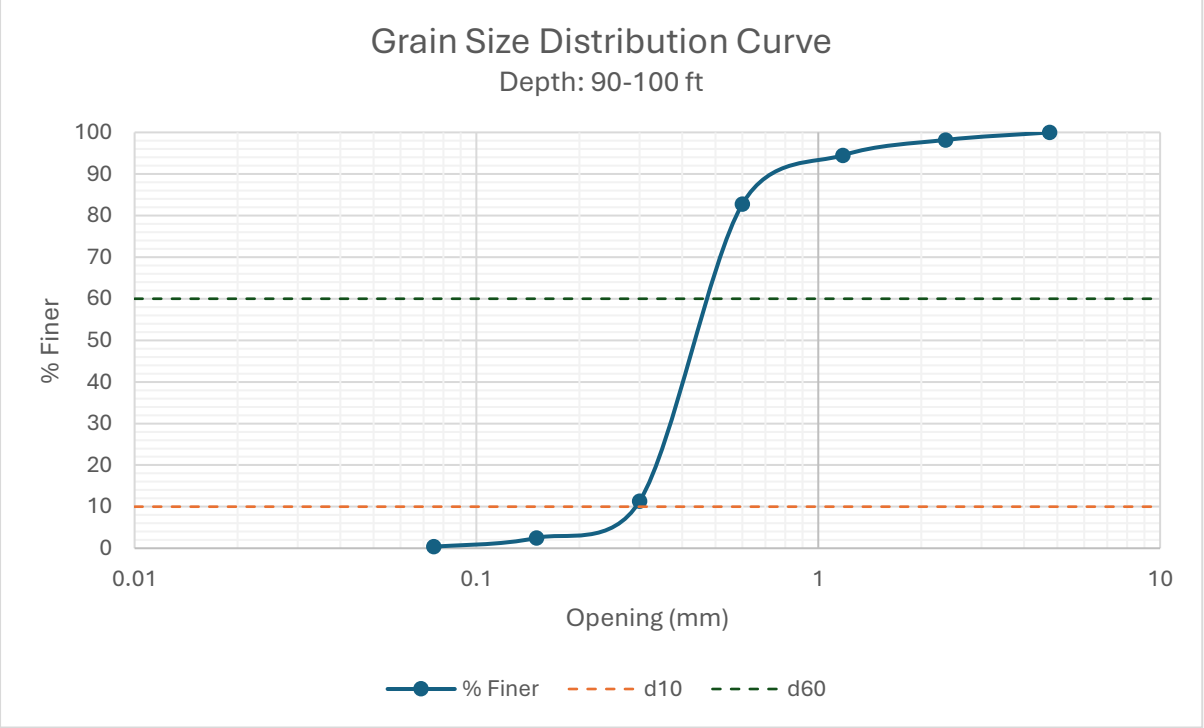
Results	d10	d30	d60	Cu	FM	% Coarse	% Medium	% Fine
Value	0.30	0.36	0.48	1.60	2.13	14.52	77.48	4.92



Sieve Size Analysis: Depth 90-100 ft

Sieve No.	Opening (mm)	Can Wt (g)	Sample + Can Wt (g)	Wt of Soil (g)	Soil Retained (%)	Cumulative Retained (%)	% Finer
4	4.75	563.7	563.7	0	0.00	0.00	100.00
8	2.36	521.2	523	1.8	1.80	1.80	98.20
16	1.18	489.3	493	3.7	3.70	5.50	94.50
30	0.6	461.3	473	11.7	11.70	17.20	82.80
50	0.3	411.5	483	71.5	71.50	88.70	11.30
100	0.15	393.2	402	8.8	8.80	97.50	2.50
200	0.075	385.3	387.4	2.1	2.10	99.60	0.40
Pan		328.6	329	0.4	0.40	100.00	0.00
Total				**100**			

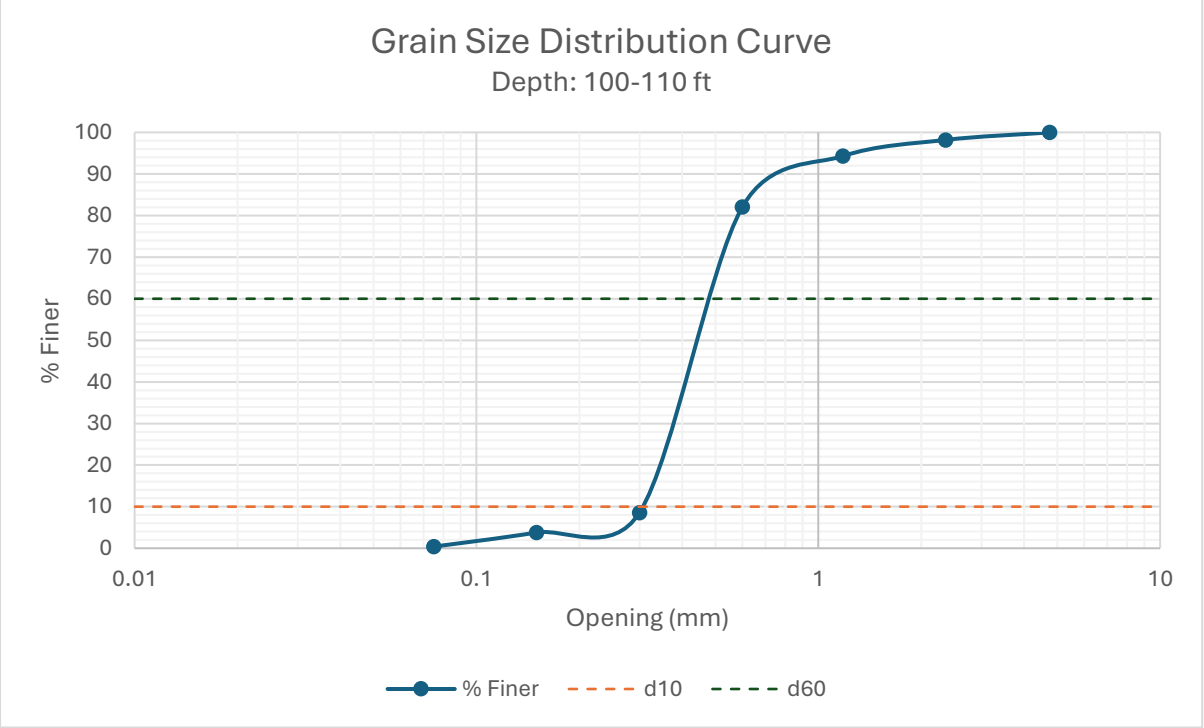
Results	d10	d30	d60	Cu	FM	% Coarse	% Medium	% Fine
Value	0.27	0.36	0.48	1.78	2.11	14.52	76.65	5.75



Sieve Size Analysis: Depth 100-110 ft

Sieve No.	Opening (mm)	Can Wt (g)	Sample + Can Wt (g)	Wt of Soil (g)	Soil Retained (%)	Cumulative Retained (%)	% Finer
4	4.75	563.7	563.7	0	0.00	0.00	100.00
8	2.36	521.2	523	1.8	1.80	1.80	98.20
16	1.18	489.3	493.2	3.9	3.90	5.70	94.30
30	0.6	461.3	473.5	12.2	12.20	17.90	82.10
50	0.3	411.5	485	73.5	73.50	91.40	8.60
100	0.15	393.2	398	4.8	4.80	96.20	3.80
200	0.075	385.3	388.7	3.4	3.40	99.60	0.40
Pan		328.6	329	0.4	0.40	100.00	0.00
Total				**100**			

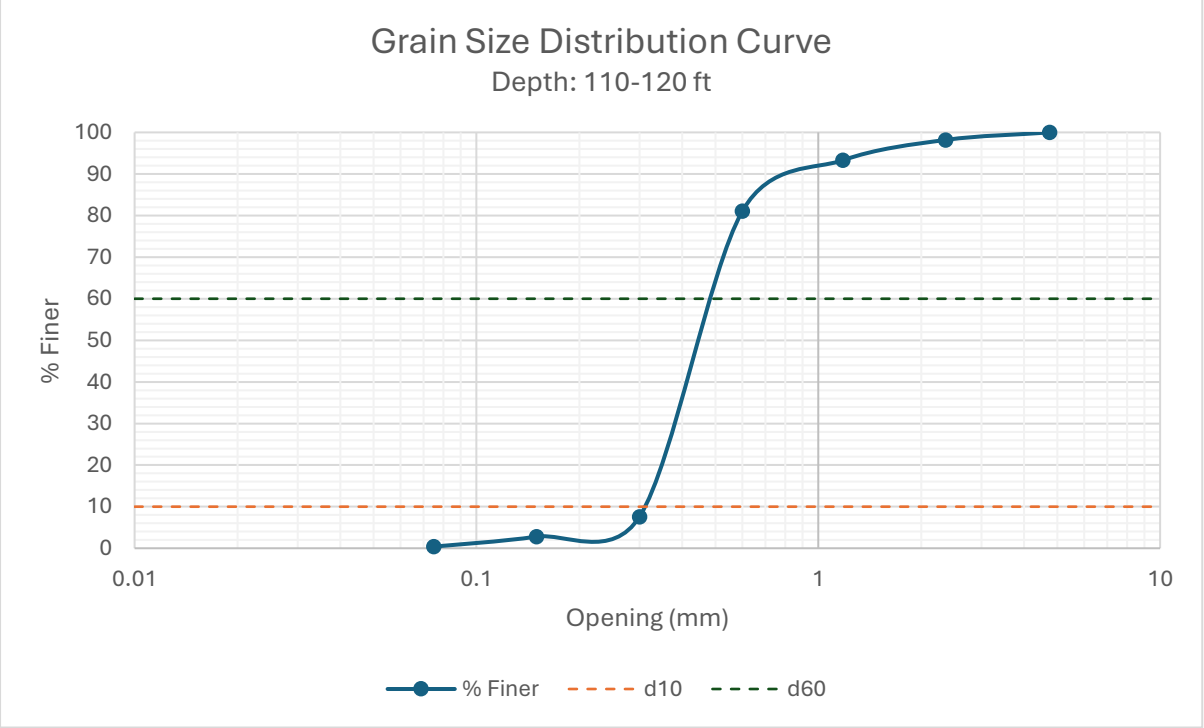
Results	d10	d30	d60	Cu	FM	% Coarse	% Medium	% Fine
Value	0.30	0.37	0.49	1.60	2.13	15.17	76.31	5.39



Sieve Size Analysis: Depth 110-120 ft

Sieve No.	Opening (mm)	Can Wt (g)	Sample + Can Wt (g)	Wt of Soil (g)	Soil Retained (%)	Cumulative Retained (%)	% Finer
4	4.75	563.7	563.7	0	0.00	0.00	100.00
8	2.36	521.2	523	1.8	1.80	1.80	98.20
16	1.18	489.3	494.2	4.9	4.90	6.70	93.30
30	0.6	461.3	473.5	12.2	12.20	18.90	81.10
50	0.3	411.5	485	73.5	73.50	92.40	7.60
100	0.15	393.2	398	4.8	4.80	97.20	2.80
200	0.075	385.3	387.7	2.4	2.40	99.60	0.40
Pan		328.6	329	0.4	0.40	100.00	0.00
Total				**100**			

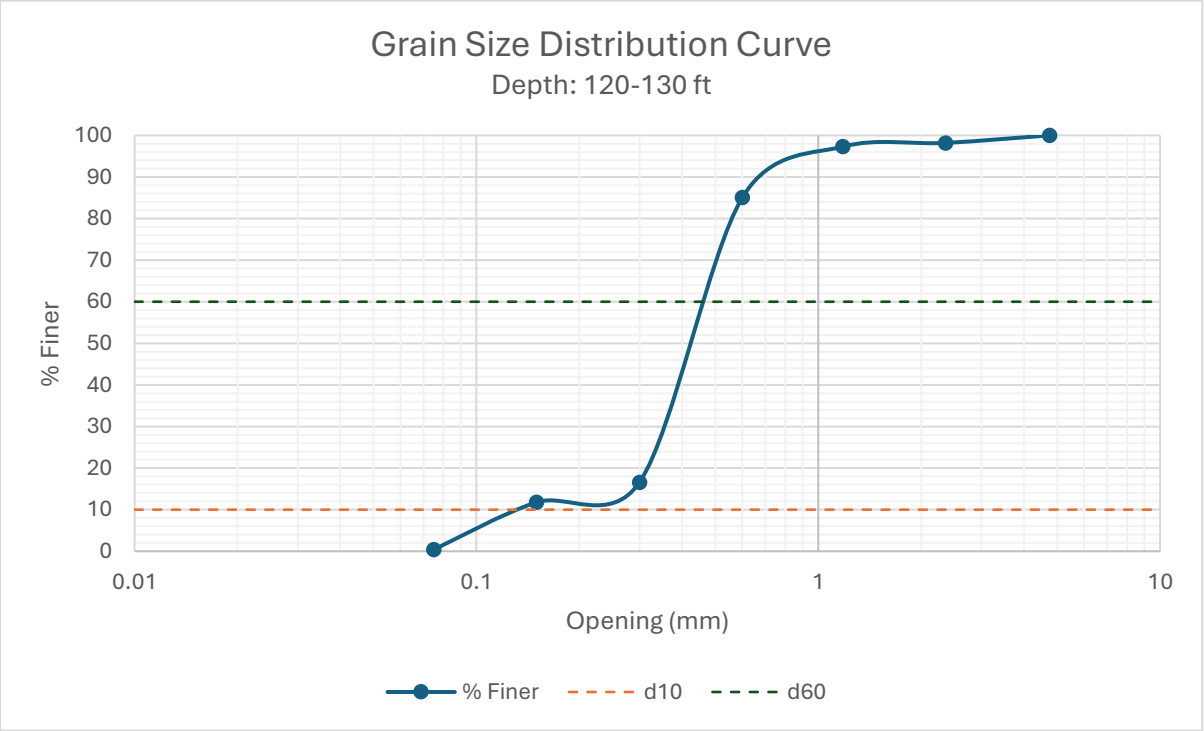
Results	d10	d30	d60	Cu	FM	% Coarse	% Medium	% Fine
Value	0.31	0.37	0.49	1.60	2.17	15.93	76.31	4.39



Sieve Size Analysis: Depth 120-130 ft

Sieve No.	Opening (mm)	Can Wt (g)	Sample + Can Wt (g)	Wt of Soil (g)	Soil Retained (%)	Cumulative Retained (%)	% Finer
4	4.75	563.7	563.7	0	0.00	0.00	100.00
8	2.36	521.2	523	1.8	1.80	1.80	98.20
16	1.18	489.3	490.2	0.9	0.90	2.70	97.30
30	0.6	461.3	473.5	12.2	12.20	14.90	85.10
50	0.3	411.5	480	68.5	68.50	83.40	16.60
100	0.15	393.2	398	4.8	4.80	88.20	11.80
200	0.075	385.3	396.7	11.4	11.40	99.60	0.40
Pan		328.6	329	0.4	0.40	100.00	0.00
Total				**100**			

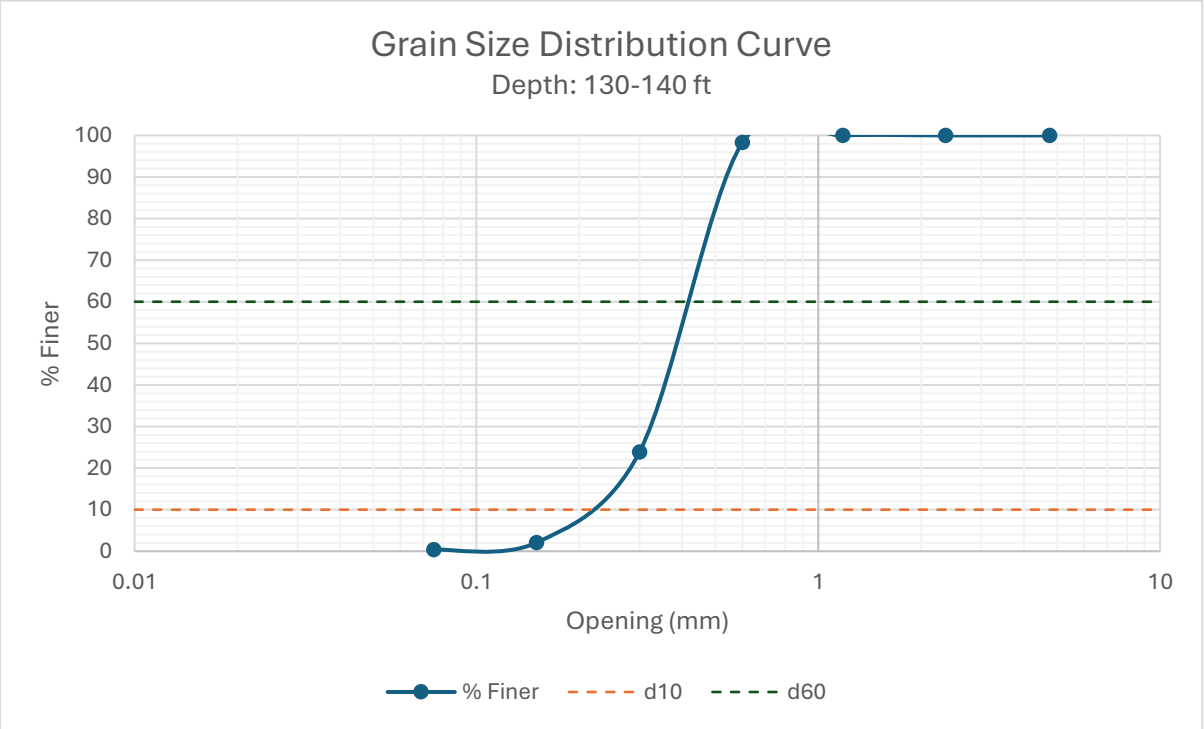
Results	d10	d30	d60	Cu	FM	% Coarse	% Medium	% Fine
Value	0.13	0.34	0.47	3.46	1.91	12.89	71.31	13.39



Sieve Size Analysis: Depth 130-140 ft

Sieve No.	Opening (mm)	Can Wt (g)	Sample + Can Wt (g)	Wt of Soil (g)	Soil Retained (%)	Cumulative Retained (%)	% Finer
4	4.75	563.7	563.7	0	0.00	0.00	100.00
8	2.36	521.2	521.2	0	0.00	0.00	100.00
16	1.18	489.3	489.3	0	0.00	0.00	100.00
30	0.6	461.3	463	1.7	1.70	1.70	98.30
50	0.3	411.5	485.9	74.4	74.40	76.10	23.90
100	0.15	393.2	415	21.8	21.80	97.90	2.10
200	0.075	385.3	387	1.7	1.70	99.60	0.40
Pan		328.6	329	0.4	0.40	100.00	0.00
Total				**100**			

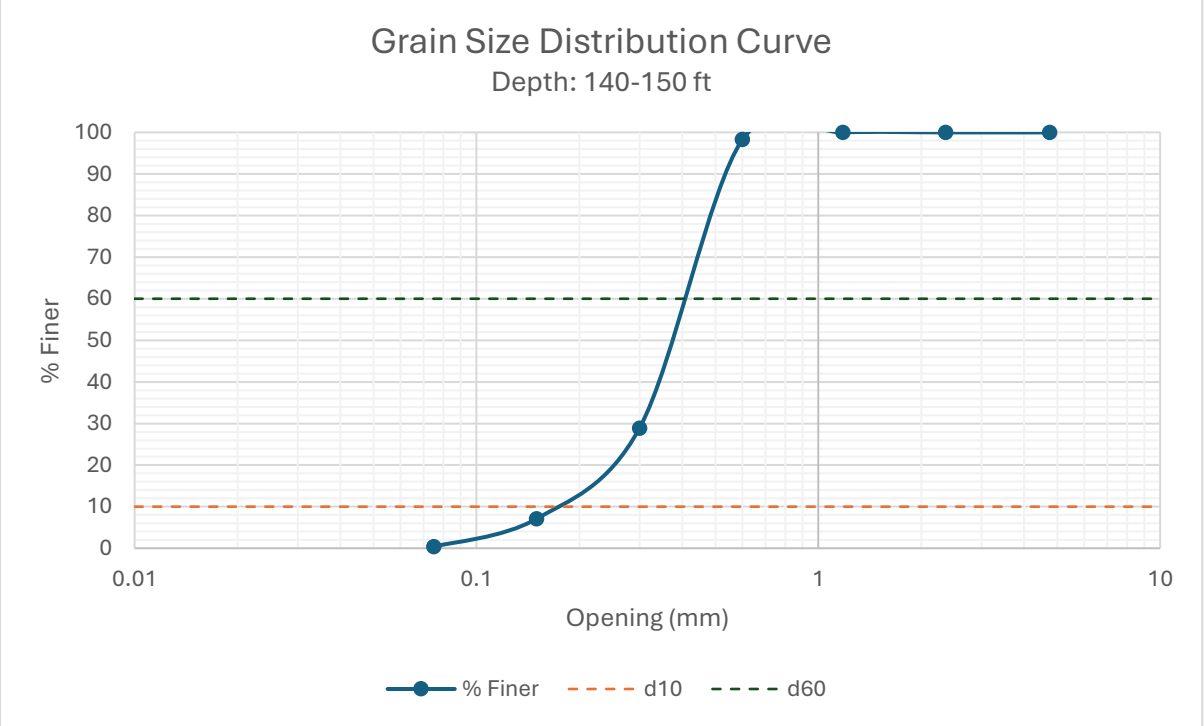
Results	d10	d30	d60	Cu	FM	% Coarse	% Medium	% Fine
Value	0.19	0.32	0.42	2.18	1.76	1.70	87.15	10.75



Sieve Size Analysis: Depth 140-150 ft

Sieve No.	Opening (mm)	Can Wt (g)	Sample + Can Wt (g)	Wt of Soil (g)	Soil Retained (%)	Cumulative Retained (%)	% Finer
4	4.75	563.7	563.7	0	0.00	0.00	100.00
8	2.36	521.2	521.2	0	0.00	0.00	100.00
16	1.18	489.3	489.3	0	0.00	0.00	100.00
30	0.6	461.3	463	1.7	1.70	1.70	98.30
50	0.3	411.5	480.9	69.4	69.40	71.10	28.90
100	0.15	393.2	415	21.8	21.80	92.90	7.10
200	0.075	385.3	392	6.7	6.70	99.60	0.40
Pan		328.6	329	0.4	0.40	100.00	0.00
Total				**100**			

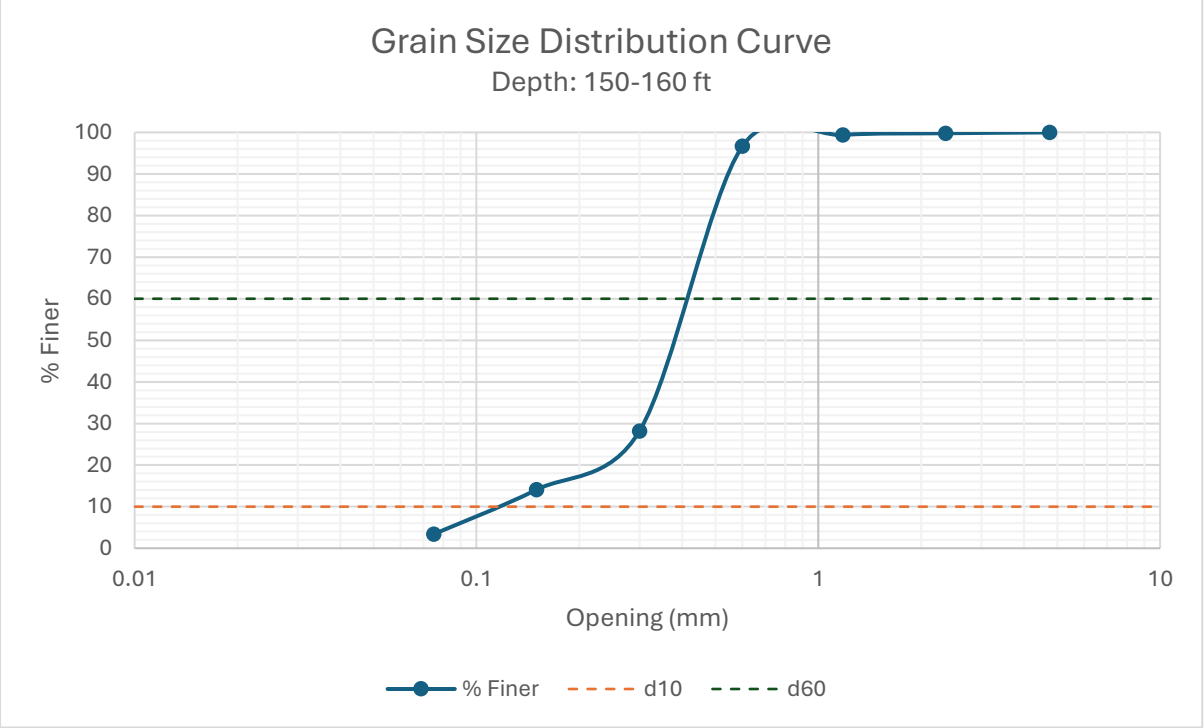
Results	d10	d30	d60	Cu	FM	% Coarse	% Medium	% Fine
Value	0.16	0.30	0.41	2.49	1.66	1.70	82.15	15.75



Sieve Size Analysis: Depth 150-160 ft

Sieve No.	Opening (mm)	Can Wt (g)	Sample + Can Wt (g)	Wt of Soil (g)	Soil Retained (%)	Cumulative Retained (%)	% Finer
4	4.75	563.7	563.7	0	0.00	0.00	100.00
8	2.36	521.2	521.4	0.2	0.20	0.20	99.80
16	1.18	489.3	489.7	0.4	0.40	0.60	99.40
30	0.6	461.3	464	2.7	2.70	3.30	96.70
50	0.3	411.5	480	68.5	68.50	71.80	28.20
100	0.15	393.2	407.3	14.1	14.10	85.90	14.10
200	0.075	385.3	396	10.7	10.70	96.60	3.40
Pan		328.6	332	3.4	3.40	100.00	0.00
Total				**100**			

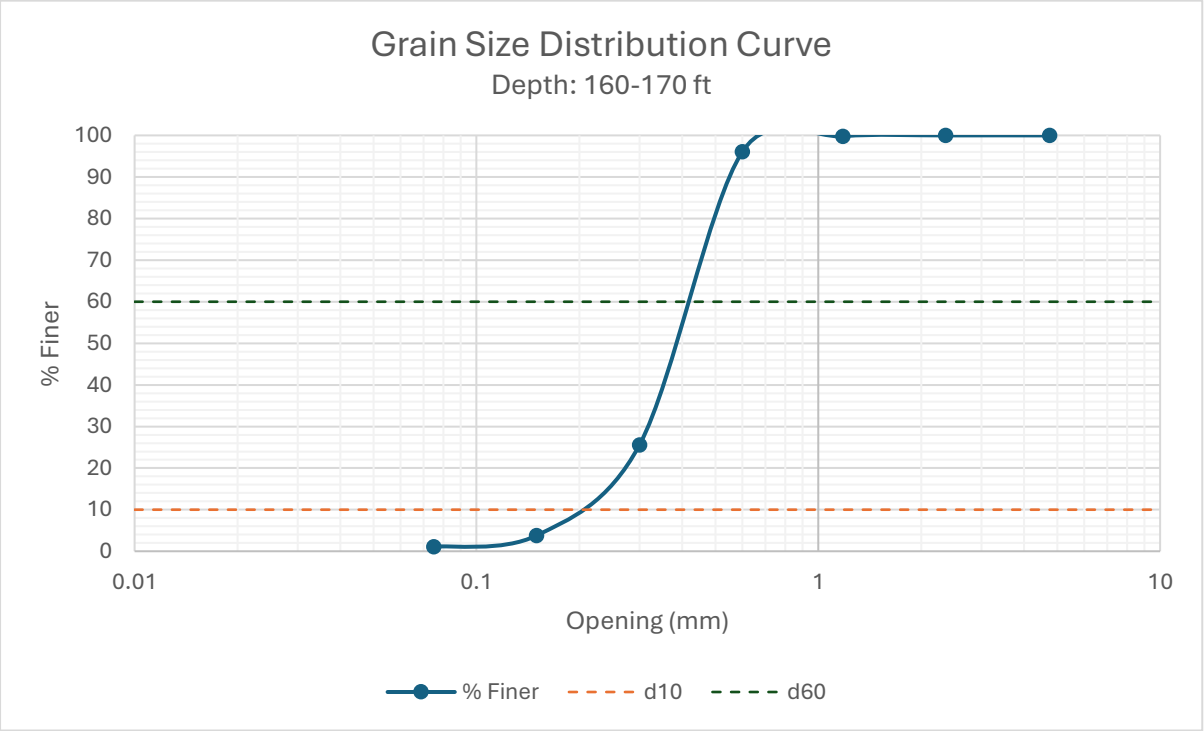
Results	d10	d30	d60	Cu	FM	% Coarse	% Medium	% Fine
Value	0.12	0.31	0.41	3.60	1.62	3.00	76.75	16.55



Sieve Size Analysis: Depth 160-170 ft

Sieve No.	Opening (mm)	Can Wt (g)	Sample + Can Wt (g)	Wt of Soil (g)	Soil Retained (%)	Cumulative Retained (%)	% Finer
4	4.75	563.7	563.7	0	0.00	0.00	100.00
8	2.36	521.2	521.2	0	0.00	0.00	100.00
16	1.18	489.3	489.5	0.2	0.20	0.20	99.80
30	0.6	461.3	465	3.7	3.70	3.90	96.10
50	0.3	411.5	482	70.5	70.50	74.40	25.60
100	0.15	393.2	415	21.8	21.80	96.20	3.80
200	0.075	385.3	388	2.7	2.70	98.90	1.10
Pan		328.6	329.7	1.1	1.10	100.00	0.00
Total				**100**			

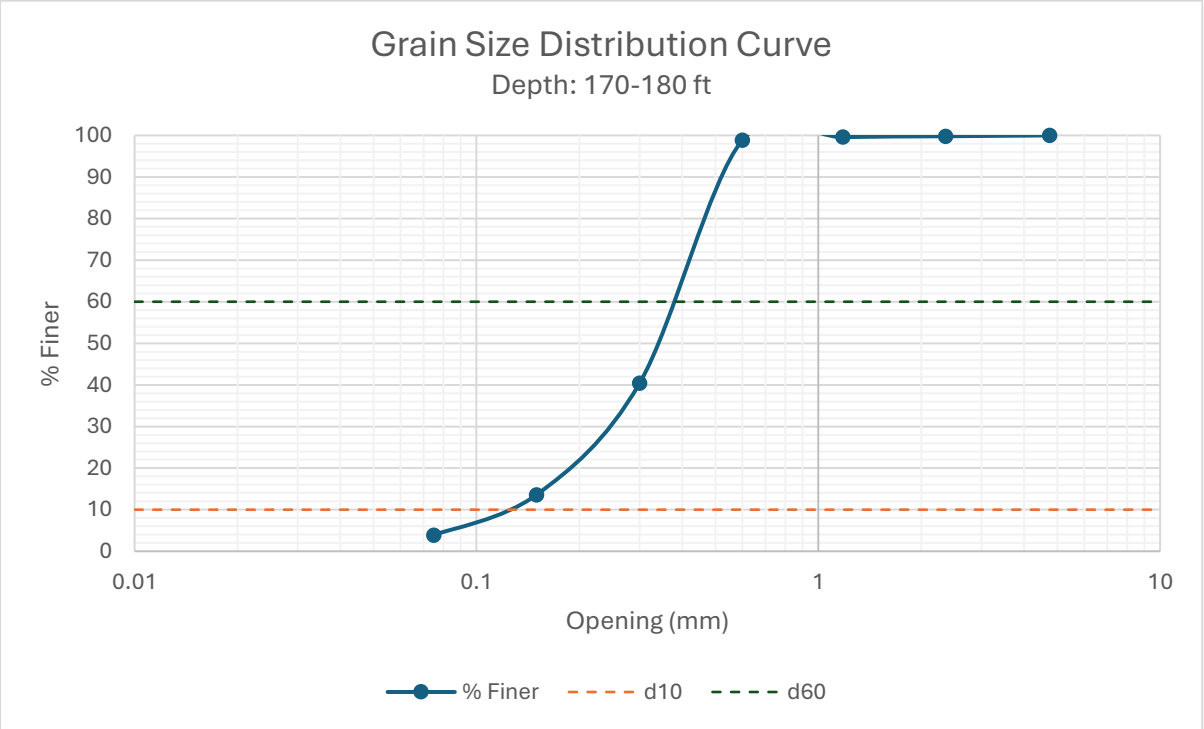
Results	d10	d30	d60	Cu	FM	% Coarse	% Medium	% Fine
Value	0.18	0.31	0.42	2.30	1.75	3.85	83.25	11.75



Sieve Size Analysis: Depth 170-180 ft

Sieve No.	Opening (mm)	Can Wt (g)	Sample + Can Wt (g)	Wt of Soil (g)	Soil Retained (%)	Cumulative Retained (%)	% Finer
4	4.75	563.7	563.7	0	0.00	0.00	100.00
8	2.36	521.2	521.4	0.2	0.20	0.20	99.80
16	1.18	489.3	489.5	0.2	0.20	0.40	99.60
30	0.6	461.3	462	0.7	0.70	1.10	98.90
50	0.3	411.5	470	58.5	58.50	59.60	40.40
100	0.15	393.2	420	26.8	26.80	86.40	13.60
200	0.075	385.3	395	9.7	9.70	96.10	3.90
Pan		328.6	332.5	3.9	3.90	100.00	0.00
Total				**100**			

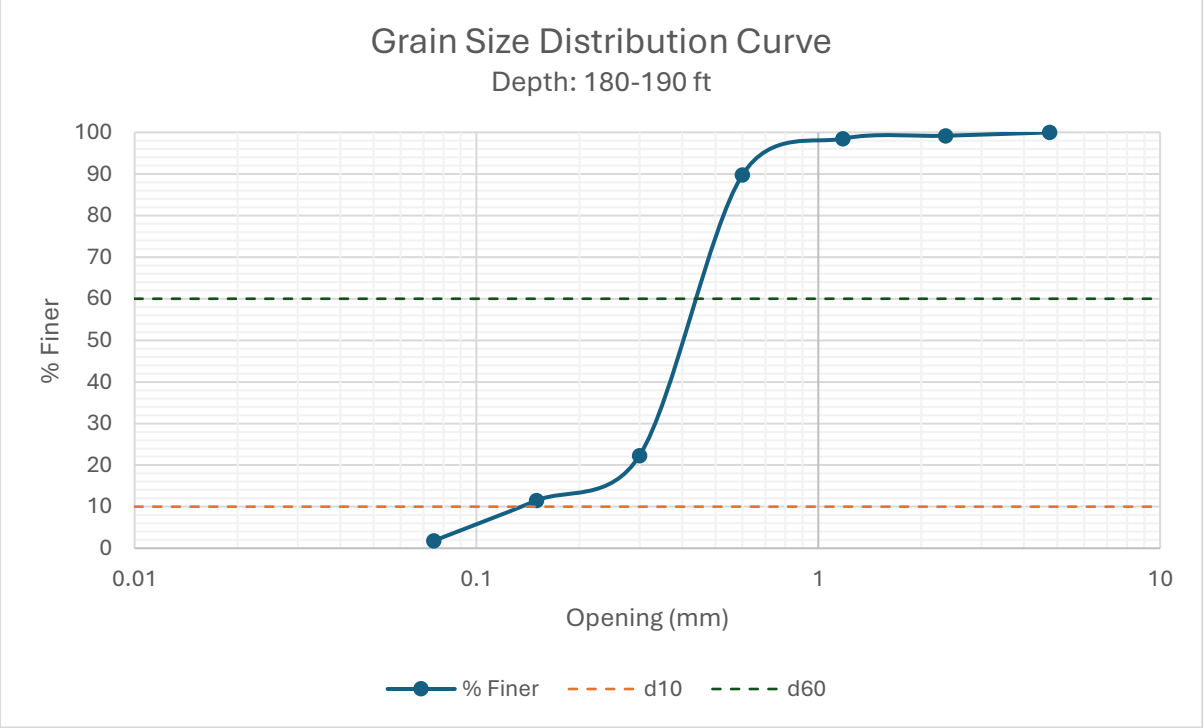
Results	d10	d30	d60	Cu	FM	% Coarse	% Medium	% Fine
Value	0.12	0.23	0.38	3.26	1.48	0.85	74.18	20.82



Sieve Size Analysis: Depth 180-190 ft

Sieve No.	Opening (mm)	Can Wt (g)	Sample + Can Wt (g)	Wt of Soil (g)	Soil Retained (%)	Cumulative Retained (%)	% Finer
4	4.75	563.7	563.7	0	0.00	0.00	100.00
8	2.36	521.2	522	0.8	0.80	0.80	99.20
16	1.18	489.3	490	0.7	0.70	1.50	98.50
30	0.6	461.3	470	8.7	8.70	10.20	89.80
50	0.3	411.5	479	67.5	67.50	77.70	22.30
100	0.15	393.2	404	10.8	10.80	88.50	11.50
200	0.075	385.3	395	9.7	9.70	98.20	1.80
Pan		328.6	330.4	1.8	1.80	100.00	0.00
Total				**100**			

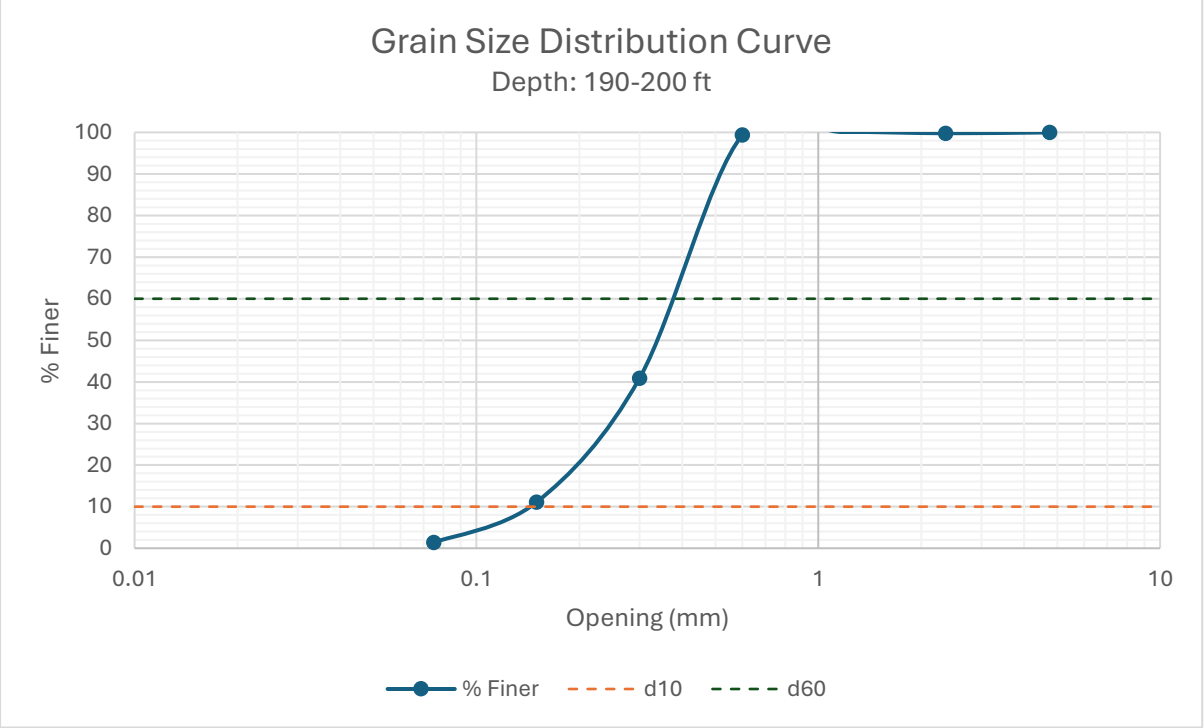
Results	d10	d30	d60	Cu	FM	% Coarse	% Medium	% Fine
Value	0.13	0.32	0.44	3.28	1.79	9.23	73.82	14.18



Sieve Size Analysis: Depth 190-200 ft

Sieve No.	Opening (mm)	Can Wt (g)	Sample + Can Wt (g)	Wt of Soil (g)	Soil Retained (%)	Cumulative Retained (%)	% Finer
4	4.75	563.7	563.7	0	0.00	0.00	100.00
8	2.36	521.2	521.4	0.2	0.20	0.20	99.80
16	1.18	489.3	489	-0.3	-0.30	-0.10	100.10
30	0.6	461.3	462	0.7	0.70	0.60	99.40
50	0.3	411.5	470	58.5	58.50	59.10	40.90
100	0.15	393.2	423	29.8	29.80	88.90	11.10
200	0.075	385.3	395	9.7	9.70	98.60	1.40
Pan		328.6	330	1.4	1.40	100.00	0.00
Total				**100**			

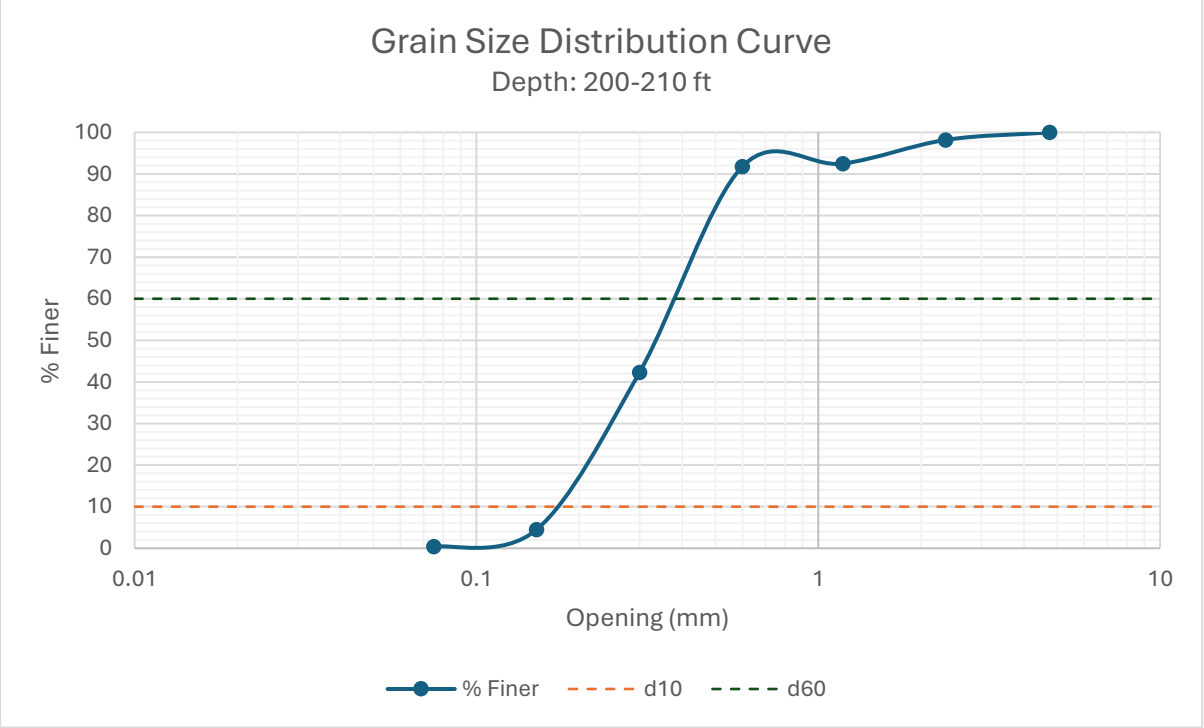
Results	d10	d30	d60	Cu	FM	% Coarse	% Medium	% Fine
Value	0.14	0.23	0.38	2.71	1.49	0.47	75.93	22.07



Sieve Size Analysis: Depth 200-210 ft

Sieve No.	Opening (mm)	Can Wt (g)	Sample + Can Wt (g)	Wt of Soil (g)	Soil Retained (%)	Cumulative Retained (%)	% Finer
4	4.75	563.7	563.7	0	0.00	0.00	100.00
8	2.36	521.2	523	1.8	1.80	1.80	98.20
16	1.18	489.3	495	5.7	5.70	7.50	92.50
30	0.6	461.3	462	0.7	0.70	8.20	91.80
50	0.3	411.5	461	49.5	49.50	57.70	42.30
100	0.15	393.2	431	37.8	37.80	95.50	4.50
200	0.075	385.3	389.4	4.1	4.10	99.60	0.40
Pan		328.6	329	0.4	0.40	100.00	0.00
Total				**100**			

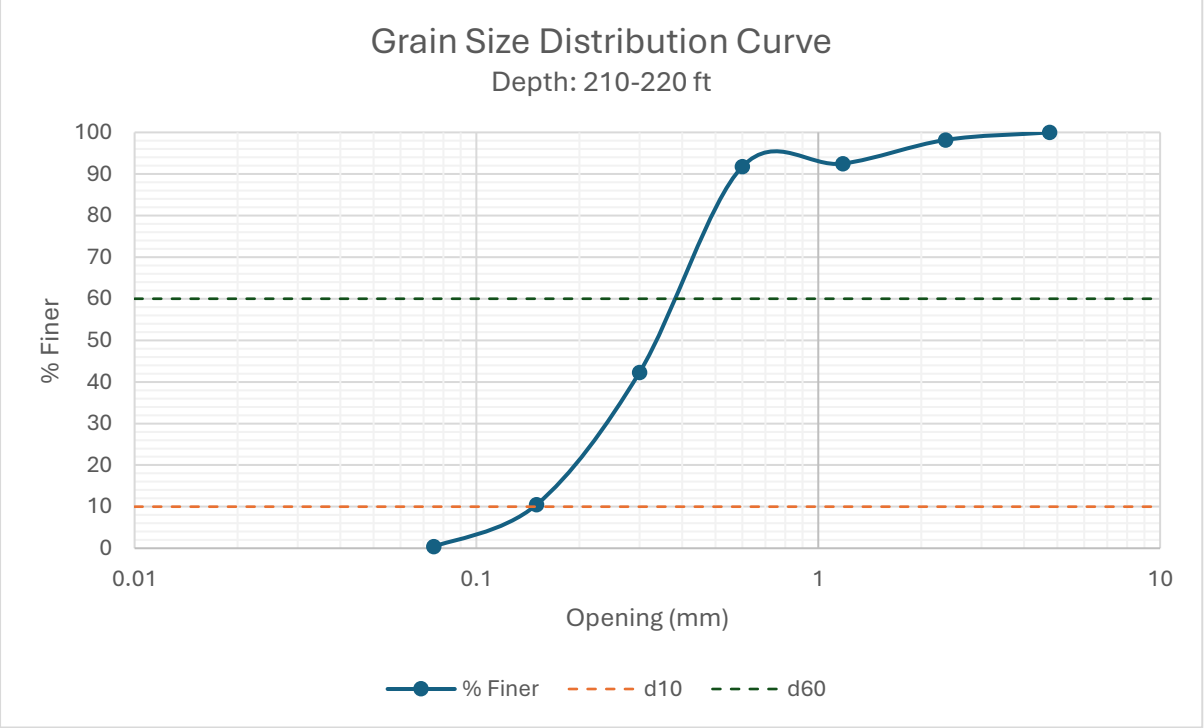
Results	d10	d30	d60	Cu	FM	% Coarse	% Medium	% Fine
Value	0.17	0.24	0.38	2.32	1.71	5.04	71.61	19.79



Sieve Size Analysis: Depth 210-220 ft

Sieve No.	Opening (mm)	Can Wt (g)	Sample + Can Wt (g)	Wt of Soil (g)	Soil Retained (%)	Cumulative Retained (%)	% Finer
4	4.75	563.7	563.7	0	0.00	0.00	100.00
8	2.36	521.2	523	1.8	1.80	1.80	98.20
16	1.18	489.3	495	5.7	5.70	7.50	92.50
30	0.6	461.3	462	0.7	0.70	8.20	91.80
50	0.3	411.5	461	49.5	49.50	57.70	42.30
100	0.15	393.2	425	31.8	31.80	89.50	10.50
200	0.075	385.3	395.4	10.1	10.10	99.60	0.40
Pan		328.6	329	0.4	0.40	100.00	0.00
Total				**100**			

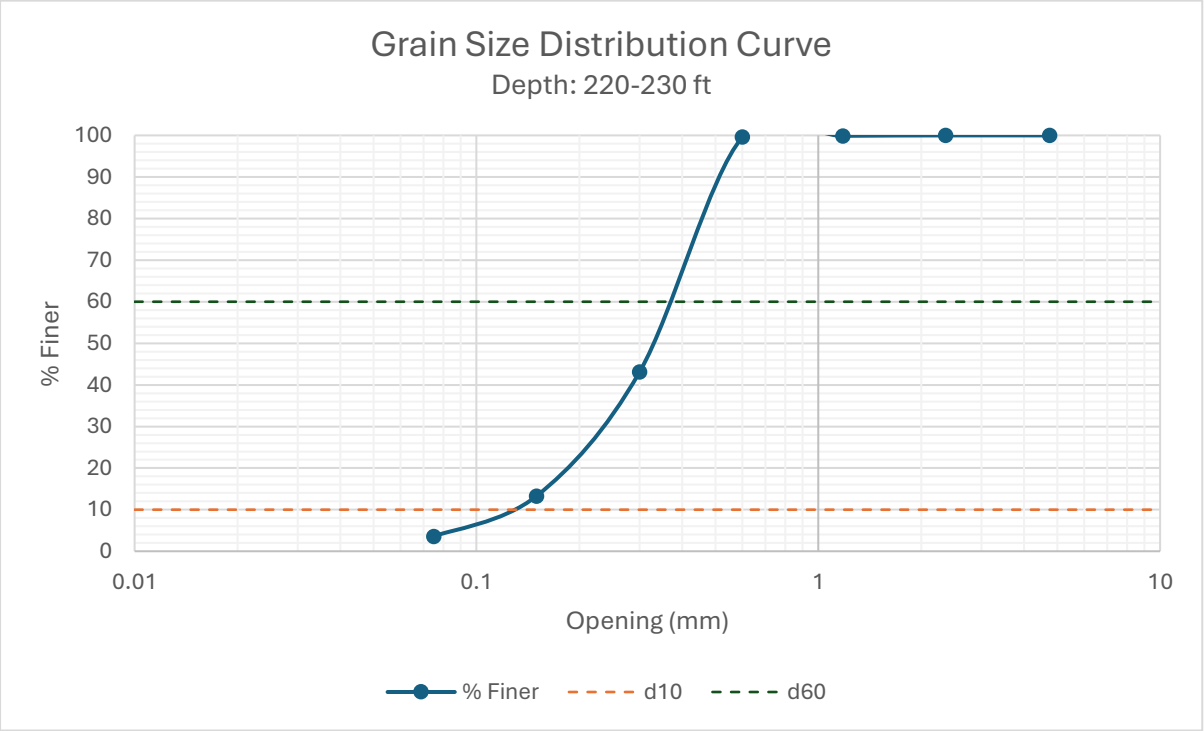
Results	d10	d30	d60	Cu	FM	% Coarse	% Medium	% Fine
Value	0.14	0.23	0.38	2.65	1.65	5.04	68.10	23.30



Sieve Size Analysis: Depth 220-230 ft

Sieve No.	Opening (mm)	Can Wt (g)	Sample + Can Wt (g)	Wt of Soil (g)	Soil Retained (%)	Cumulative Retained (%)	% Finer
4	4.75	563.7	563.7	0	0.00	0.00	100.00
8	2.36	521.2	521.2	0	0.00	0.00	100.00
16	1.18	489.3	489.4	0.1	0.10	0.10	99.90
30	0.6	461.3	461.6	0.3	0.30	0.40	99.60
50	0.3	411.5	468	56.5	56.50	56.90	43.10
100	0.15	393.2	423	29.8	29.80	86.70	13.30
200	0.075	385.3	395	9.7	9.70	96.40	3.60
Pan		328.6	332.2	3.6	3.60	100.00	0.00
Total				**100**			

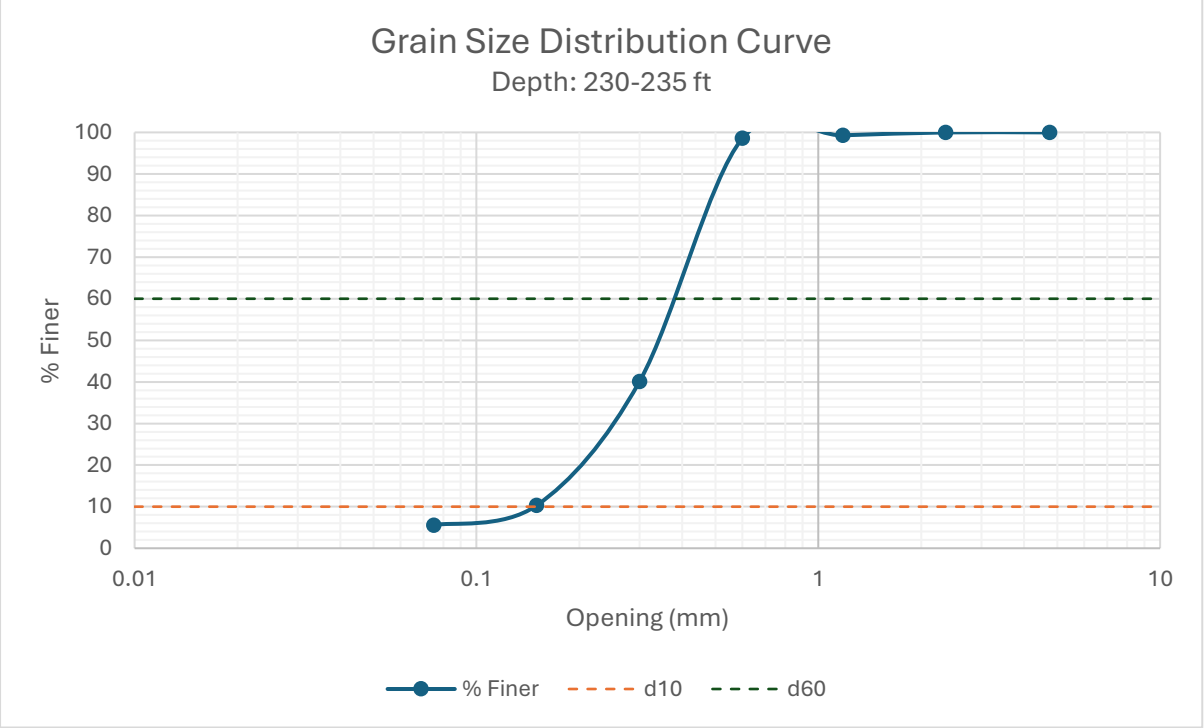
Results	d10	d30	d60	Cu	FM	% Coarse	% Medium	% Fine
Value	0.12	0.22	0.37	3.12	1.44	0.38	73.93	22.07



Sieve Size Analysis: Depth 230-235 ft

Sieve No.	Opening (mm)	Can Wt (g)	Sample + Can Wt (g)	Wt of Soil (g)	Soil Retained (%)	Cumulative Retained (%)	% Finer
4	4.75	563.7	563.7	0	0.00	0.00	100.00
8	2.36	521.2	521.2	0	0.00	0.00	100.00
16	1.18	489.3	490	0.7	0.70	0.70	99.30
30	0.6	461.3	462	0.7	0.70	1.40	98.60
50	0.3	411.5	470	58.5	58.50	59.90	40.10
100	0.15	393.2	423	29.8	29.80	89.70	10.30
200	0.075	385.3	390	4.7	4.70	94.40	5.60
Pan		328.6	334.2	5.6	5.60	100.00	0.00
Total				**100**			

Results	d10	d30	d60	Cu	FM	% Coarse	% Medium	% Fine
Value	0.14	0.24	0.38	2.65	1.52	1.23	75.93	17.07



Summary Table for Grain Size Analysis

Depth (ft)	D10	D30	D60	U=D60/D10	FM	% Coarse	% Medium	% Fine
60-70	0.21	0.34	0.46	2.22	1.92	12.23	78.19	9.01
70-80	0.18	0.33	0.45	2.48	1.88	12.23	75.99	9.01
80-90	0.30	0.36	0.48	1.60	2.13	14.52	77.48	4.92
90-100	0.27	0.36	0.48	1.78	2.11	14.52	76.65	5.75
100-110	0.30	0.37	0.49	1.60	2.13	15.17	76.31	5.39
110-120	0.31	0.37	0.49	1.60	2.17	15.93	76.31	4.39
120-130	0.13	0.34	0.47	3.46	1.91	12.89	71.31	13.39
130-140	0.19	0.32	0.42	2.18	1.76	1.70	87.15	10.75
140-150	0.16	0.30	0.41	2.49	1.66	1.70	82.15	15.75
150-160	0.12	0.31	0.41	3.60	1.62	3.00	76.75	16.55
160-170	0.18	0.31	0.42	2.30	1.75	3.85	83.25	11.75
170-180	0.12	0.23	0.38	3.26	1.48	0.85	74.18	20.82
180-190	0.13	0.32	0.44	3.28	1.79	9.23	73.82	14.18
190-200	0.14	0.23	0.38	2.71	1.49	0.47	75.93	22.07
200-210	0.17	0.24	0.38	2.32	1.71	5.04	71.61	19.79
210-220	0.14	0.23	0.38	2.65	1.65	5.04	68.10	23.30
220-230	0.12	0.22	0.37	3.12	1.44	0.38	73.93	22.07
230-235	0.14	0.24	0.38	2.65	1.52	1.23	75.93	17.07

Determination of Most Productive Aquifer

Factors considered:

Suitable aquifer depth is determined considering layers having the highest hydraulic conductivity. Following techniques are considered:

- Higher percentage of coarse sand ($\geq 5\%$) and medium sand ($\geq 70\%$).
- Greater coefficient of uniformity ($C_u, \geq 1.5$).

Aquifer depth:

Based on the considerations mentioned above, the most productive aquifer depth is determined to be 60'-130' by reviewing the summary table of grain size analysis.

Determination of Strainer Length and Position

Length of casing pipe is the summation of:

1. Static water level at present.
2. Assumed drawdown of 10'-15' while pumping.
3. Average rate of water level declination (per year) times design period.
4. Extra allowance of 10'-15'.

Assumptions:

- Static water level at present: 30 ft
- Drawdown while pumping: 15 ft
- Depletion per year: 2 ft
- Extra allowance: 15 ft
- Design period: 20 years

Length of casing pipe:

$$L_{casing} = 30' + 15' + 2' \times 20 + 15'$$

$$\therefore L_{casing} = 100'$$

Length of strainer:

- Available aquifer thickness: $130' - 100' = 30'$ [$\therefore$ 75% screening]
- Strainer length:

$$L_{strainer} = 30 \times 0.75\ ft$$

$$\Rightarrow L_{strainer} = 23\ ft$$

Design of Gravel Pack Material

Soil strata of depth 60' to 80' and 120' to 130' has d_{10} less than 0.25. Therefore, gravel packs are required.

Procedures

1. Identified the soil strata (governing layer) having the highest percentage of medium sand.
2. A multiplication factor is determined based on the layer's uniformity coefficient:
    a. If $C_u \leq 1.5$, then $M.F = 4$
    b. Else if $C_u \geq 2.5$, then $M.F = 6$
    c. Otherwise, interpolation is used.
3. On a spreadsheet, a nearly parallel curve of the governing layer's gradation curve is produced:
    a. Grain size and percent finer of the governing layer is taken.
    b. On a new column, grain size is multiplied by the $M.F$.
    c. A graph is drawn with governing layer's percent finer vs grain size and percent finer vs new grain size.
4. Through interpolation, percent finer for standard sieve sizes are computed. Then, range of percent retained is produced by adding and subtracting 4 to the calculated percent retained on each sieve.

Identification of governing layer:

The layer having the highest percent of medium sand is at 130'-140'.

Determination of multiplying factor:

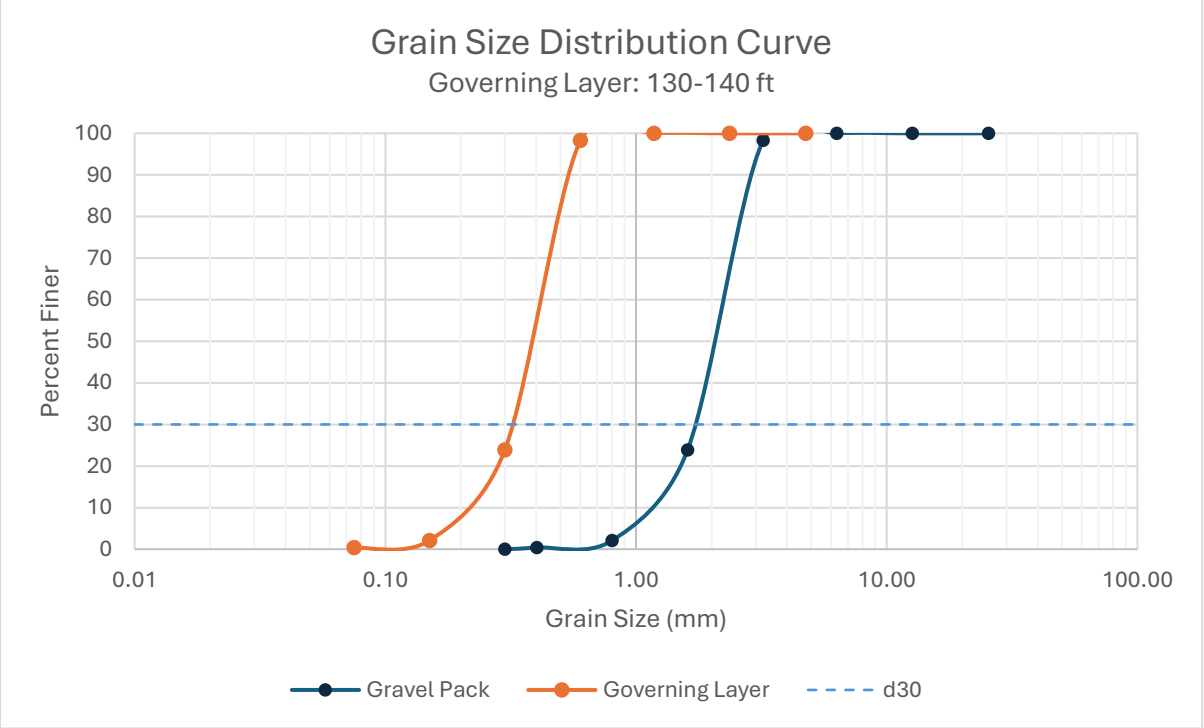
The layer has uniformity coefficient of 2.18. Therefore,

$$M.F. = 4 + \frac{6-4}{2.5-1.5} \times (2.18 - 1.5)$$

$$\therefore M.F. = 5.36$$

Data for parallel curve:

Size (mm)	New Size (mm)	% Finer
4.75	25.44	100.00
2.36	12.64	100.00
1.18	6.32	100.00
0.6	3.21	98.30
0.3	1.61	23.90
0.15	0.80	2.10
0.075	0.40	0.40
PAN	0.30	0.00



Sieve Analysis of the gravel pack material:

Sieve No.	Size (mm)	% Finer	Cumulative Retained (%)	% Retained	Range of % Retained
4	4.75	99.28	0.72	0.72	0 to 5
8	2.36	65.17	34.83	34.11	31 to 39
16	1.18	14.19	85.81	50.98	47 to 55
30	0.6	1.38	98.62	12.81	9 to 17
50	0.3	0.00	100.00	1.38	0 to 6
100	0.15	0.00	100.00	0.00	0 to 4
200	0.075	0.00	100.00	0.00	0 to 4
Total				**100.00**	

Results	d10	d60	Cu
Value	1.03	2.25	2.18 [< 2.5; OK]

Selection of Strainer Size

To ensure that 90% or more of the gravel-pack materials will be retained through strainer opening,

$$Slot = \frac{d_{10}}{25.4} \times 1000$$

$$\Rightarrow Slot = \frac{1.03}{25.4} \times 1000$$

$$\therefore Slot = 40.55$$

Hence, slot number of 40 will be used. Strainer diameter is assumed to be 6".

Yield of Well

Assumptions and previously calculated data:

- Entrance velocity, v: 0.1 fps
- Screen blockage factor, $B.F$: 0.4
- Screen opening: 20% [for 40 slot, steel]
- Length of strainer, $L_{strainer}$: 23 ft
- Diameter of strainer, D: 6"
- Pumping hour per day: 16 hr

Capacity:

- Strainer area, A:

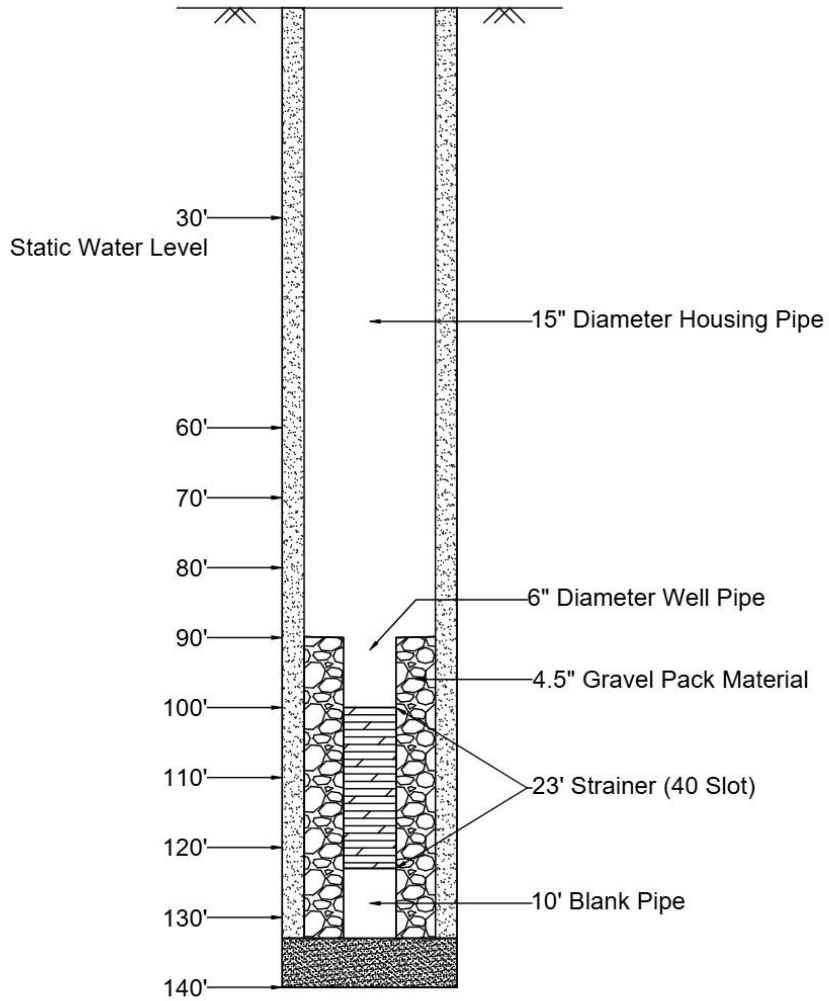
$$0.20 \times \pi D L_{strainer}$$
$$= 0.20 \times \pi \frac{6}{12} \times 23\ ft^2$$
$$= 7.23\ ft^2$$

- Yield of well:

$$Av \times B.F$$
$$= 7.23 \times 0.1 \times 0.4\ ft^3/s$$
$$= 0.29\ ft^3/s$$
$$= 29563\ lph$$
$$= 29563 \times 16\ lpd$$
$$= 473008\ lpd$$

Number of tube-wells required:

- Present water demand: 2,495,528 lpd
- Number of tube-well: $\frac{2,495,528}{473,008} = 5.28 = 6$
- Water demand: In 10 years: 3,098,491 lpd
- Number of tube-wells $\frac{3,098,491}{473,008} = 6.55 = 7$
- Water demand: In 20 Years 3,255,035 lpd
- Number of tube-wells $\frac{3,255,035}{473,008} = 6.88 = 7$
- Water demand: In 30 Years 3,417,510 lpd
- Number of tube-wells $\frac{3,417,510}{473,008} = 7.22 = 8$



TITLE **WELL PROFILE**			
PROJECT **DAIRY FARM INDUSTRIAL PARK**			
GROUP NO. **03**	SCALE **V. 1:250, H. 1:3750**	VERT. EXAGGERATION **15x**	DATE **2026-07-29**