

PROJECT NUMBER : 13-019-10

PROJECT : East Susitna Well

CLIENT : City of Wasilla

Station / Location: Wasilla, Ak

Lat/Long:

Elevation:

Equipment Type: IR-825 TH-60

Drilling Method: Air Rotary

Field Crew: E&D Water Wells

Total Depth: 145.0 feet

Date: 5/10/2016

Geologist: V. Pate

Depth (Feet)	Sample Data						USCS Classification	Frozen Zone	Soil Graphic	Ground Water Data		
	Sample Type	Number	Blow Count	Sample Recovery	N-Value	Depth in (ft.)				Time	Date	Symbol
80									SUBSURFACE MATERIAL			
									Well-graded GRAVEL, with sand, little silt, wet, Water encountered at 35ft bgs (cont.)			
90									CLAY, some sand, little gravel, 90.0			
110	GRAB	S1							Well-graded GRAVEL, with sand, little silt, wet, water ~60gpm			
	GRAB	S2							S1 tarp sample			
	GRAB	S3							S2 tarp sample			
120	GRAB	S4							S3 tarp sample			
	GRAB	S5							S4 tarp sample			
	GRAB	S6							S5 tarp sample			
135									Well-graded SAND, with gravel, little silt, S6 bucket sample 135.0			
140									Poorly-graded SAND, with silt, trace gravel, 140.0			
145	GRAB	S7							S7 tarp sample 145.0			
								BOH 145	Notes: BOH at 145 ft. Water bearing zone from 110 ft to 140 ft bgs.			

A USCS LOG OF TEST HOLE 13-019-10-PW-LOG OF BORING.GPJ HDL MODIFIED.GDT 8/16/16

Figure A1

AGGREGATE/SOILS TEST REPORT

PROJECT NAME:	East Susitna Well	DATE TAKEN:	5/10/2016
PROJECT NO.:	13-019-10	DATE TESTED:	5/13/2016
CLIENT:	COW	TESTED BY:	J. Dvorak
SAMPLE NO.:	PW S-1	REVIEWED BY:	D.Simon
LOCATION:	E. Susitna Ave	DESCRIPTION:	110-115

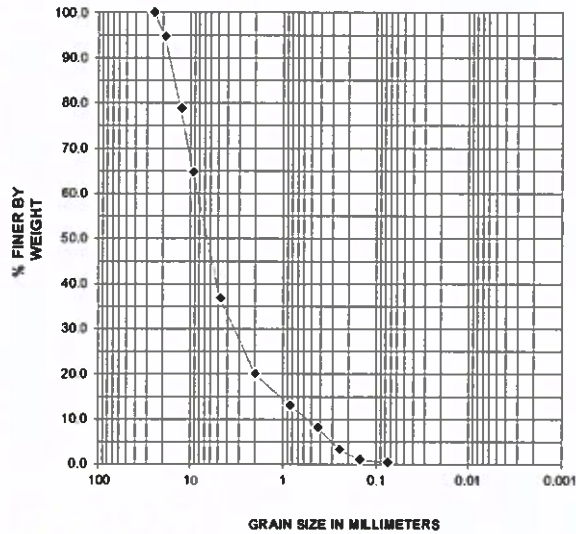
SIEVE ANALYSIS TEST

(ASTM C136 or D422)

SIEVE SIZE	DIAMETER (mm)	TOTAL % PASSING
6"	152.4	
4"	100.0	
3"	76.2	
2"	50.8	
1"	25.4	100
3/4"	19.0	95
1/2"	12.7	79
3/8"	9.5	65
# 4	4.75	37
#10	2.00	20
#20	0.85	13
#40	0.425	8
#60	0.25	3
#100	0.15	1
#200	0.075	0.3

% GRAVEL: 63.3
 % SAND: 36.4
 % FINES: 0.3
 D60= 8.70
 D30= 3.66
 D10= 0.6
 Cu= 14.5
 Cc= 2.6
 % .02 mm _____
 % Moist.: _____
 Fine Modulus: _____
 (ASTM D4318)
 Liquid Limit: _____
 Plastic Limit: _____
 Plastic Index: _____
 (ASTM C127)
 Bulk SpG= _____
 SSD SpG= _____
 Apparent SpG= _____
 % Absorption= _____

GRAIN SIZE DISTRIBUTION



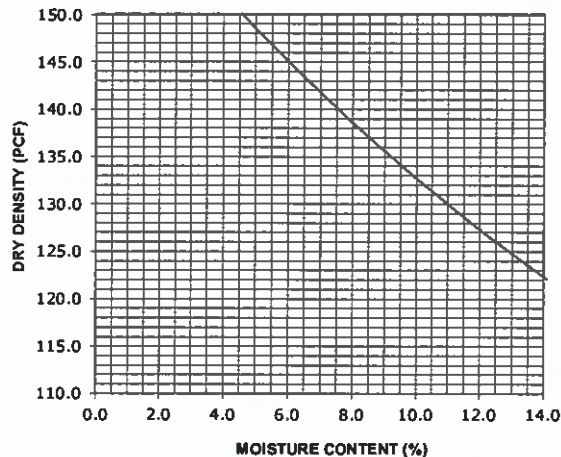
HYDROMETER TEST

(ASTM D422)

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		
2750		

(ASTM C128)
 Bulk SpG= _____
 SSD SpG= _____
 Apparent SpG= _____
 % Absorption= _____
 (ASTM D1557)
 Dry Den (U) = _____
 Dry Den (C) = _____
 M % (U) = _____
 M % (C) = _____
 SpG (assumed) = 2.70
 M-D Test Method = ASTM D1557

MOISTURE-DENSITY RELATIONSHIP



CLASSIFICATION: 0.0
 USC: 0.0
 FROST CLASS: _____
 COMMENTS: _____

AGGREGATE/SOILS TEST REPORT

PROJECT NAME:	East Susitna Well	DATE TAKEN:	5/10/2016
PROJECT NO.:	13-019-10	DATE TESTED:	5/13/2016
CLIENT:	COW	TESTED BY:	J. Dvorak
SAMPLE NO.:	PW S-3	REVIEWED BY:	D. Simon
LOCATION:	E. Susitna Ave	DESCRIPTION:	120-125

SIEVE ANALYSIS TEST

(ASTM C136 or D422)

SIEVE SIZE	DIAMETER (mm)	TOTAL % PASSING
6"	152.4	
4"	100.0	
3"	76.2	
2"	50.8	100
1"	25.4	97
3/4"	19.0	87
1/2"	12.7	69
3/8"	9.5	61
# 4	4.75	46
#10	2.00	36
#20	0.85	29
#40	0.425	18
#60	0.25	7
#100	0.15	2
#200	0.075	0.8

% GRAVEL: 53.9
 % SAND: 45.3
 % FINES: 0.8
 D60= 9.32
 D30= 1.07
 D10= 0.3
 Cu= 31.3
 Cc= 0.4

% .02 mm
 % Moist.=
 Fine Modulus=
 (ASTM D4318)
 Liquid Limit.=
 Plastic Limit.=
 Plastic Index. =
 (ASTM C127)
 Bulk SpG=
 SSD SpG=
 Apparent SpG=
 % Absorption=

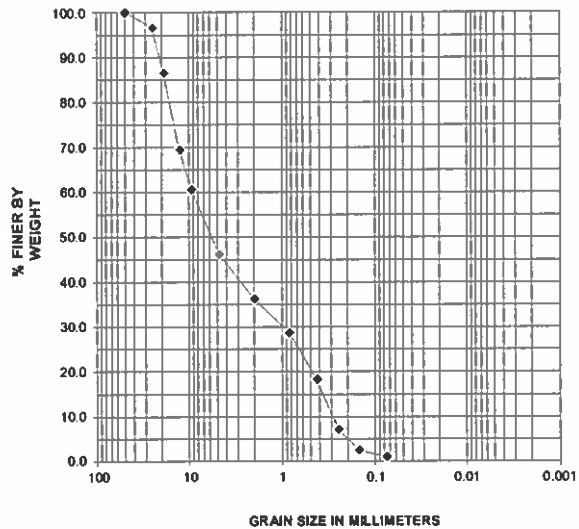
HYDROMETER TEST

(ASTM D422)

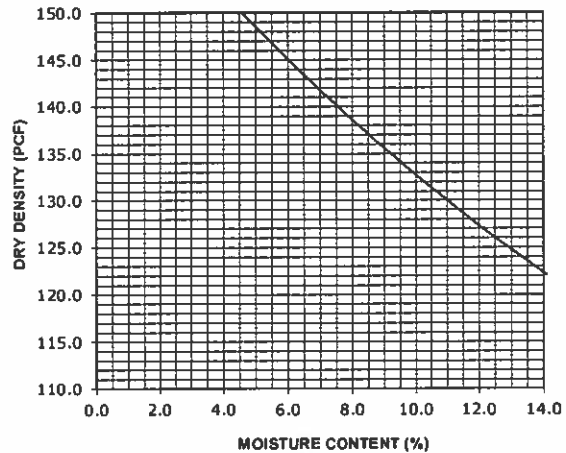
ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		
2750		

(ASTM C128)
 Bulk SpG=
 SSD SpG=
 Apparent SpG=
 % Absorption=
 (ASTM D1557)
 Dry Den (U) =
 Dry Den (C) =
 M % (U) =
 M % (C) =
 SpG (assumed) = 2.70
 M-D Test Method = ASTM D1557

GRAIN SIZE DISTRIBUTION



MOISTURE-DENSITY RELATIONSHIP



CLASSIFICATION: 0.0

USC: 0.0

FROST CLASS:

COMMENTS:

AGGREGATE/SOILS TEST REPORT

PROJECT NAME:	East Susitna Well	DATE TAKEN:	5/10/2016
PROJECT NO.:	13-019-10	DATE TESTED:	5/13/2016
CLIENT:	COW	TESTED BY:	J. Dvorak
SAMPLE NO.:	PW S-4	REVIEWED BY:	D. Simon
LOCATION:	E. Susitna Ave	DESCRIPTION:	130

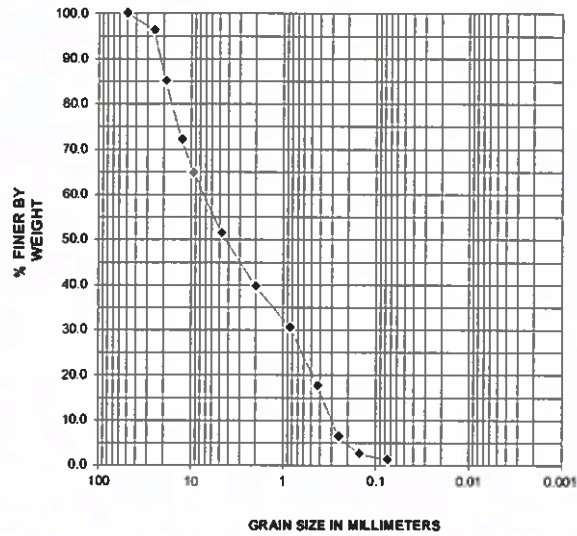
SIEVE ANALYSIS TEST

(ASTM C136 or D422)

SIEVE SIZE	DIAMETER (mm)	TOTAL % PASSING
6"	152.4	
4"	100.0	
3"	76.2	
2"	50.8	100
1"	25.4	96
3/4"	19.0	85
1/2"	12.7	72
3/8"	9.5	65
# 4	4.75	51
#10	2.00	40
#20	0.85	30
#40	0.425	18
#60	0.25	6
#100	0.15	2
#200	0.075	1.1

% GRAVEL: 48.6
% SAND: 50.2
% FINES: 1.1
D60= 7.80
D30= 0.84
D10= 0.3
Cu= 25.3
Cc= 0.3
% .02 mm
% Moist.:=
Fine Modulus:=
(ASTM D4318)
Liquid Limit:=
Plastic Limit:=
Plastic Index. =
(ASTM C127)
Bulk SpG= _____
SSD SpG= _____
Apparent SpG= _____
% Absorption= _____

GRAIN SIZE DISTRIBUTION



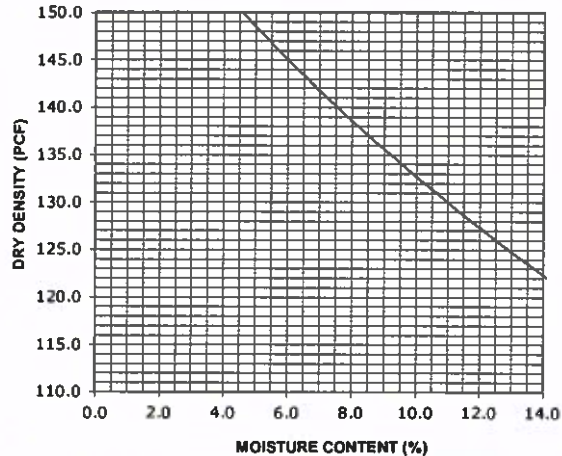
HYDROMETER TEST

(ASTM D422)

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		
2750		

(ASTM C128)
Bulk SpG= _____
SSD SpG= _____
Apparent SpG= _____
% Absorption= _____
(ASTM D1557)
Dry Den (U) = _____
Dry Den (C) = _____
M % (U) = _____
M % (C) = _____
SpG (assumed) = 2.70
M-D Test Method = ASTM D1557

MOISTURE-DENSITY RELATIONSHIP



CLASSIFICATION: 0.0
USC: 0.0
FROST CLASS: _____
COMMENTS: _____

AGGREGATE/SOILS TEST REPORT

PROJECT NAME:	East Susitna Well	DATE TAKEN:	5/10/2016
PROJECT NO.:	13-019-10	DATE TESTED:	5/13/2016
CLIENT:	COW	TESTED BY:	J. Dvorak
SAMPLE NO.:	PW S-5	REVIEWED BY:	D. Simon
LOCATION:	E. Susitna Ave	DESCRIPTION:	130-135

SIEVE ANALYSIS TEST

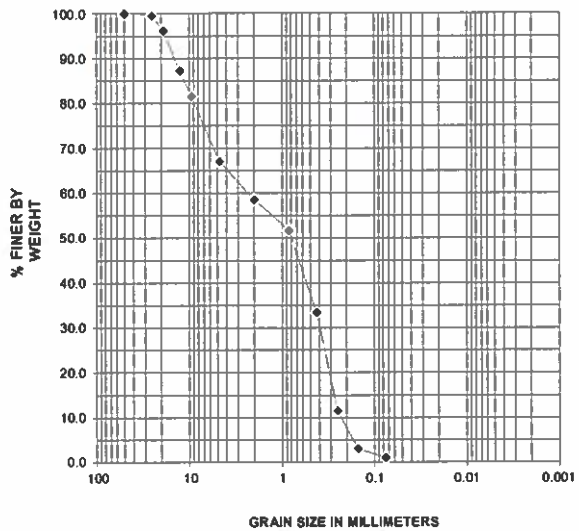
(ASTM C136 or D422)

SIEVE SIZE	DIAMETER (mm)	TOTAL % PASSING
6"	152.4	
4"	100.0	
3"	76.2	
2"	50.8	100
1"	25.4	99
3/4"	19.0	96
1/2"	12.7	87
3/8"	9.5	81
# 4	4.75	67
#10	2.00	58
#20	0.85	52
#40	0.425	33
#60	0.25	11
#100	0.15	3
#200	0.075	0.9

% GRAVEL: 33.1
% SAND: 66.0
% FINES: 0.9
D60= 2.50
D30= 0.40
D10= 0.2
Cu= 10.7
Cc= 0.3

% .02 mm
% Moist.:
Fine Modulus:
(ASTM D4318)
Liquid Limit.:
Plastic Limit.:
Plastic Index.:
(ASTM C127)
Bulk SpG=:
SSD SpG=:
Apparent SpG=:
% Absorption=

GRAIN SIZE DISTRIBUTION



HYDROMETER TEST

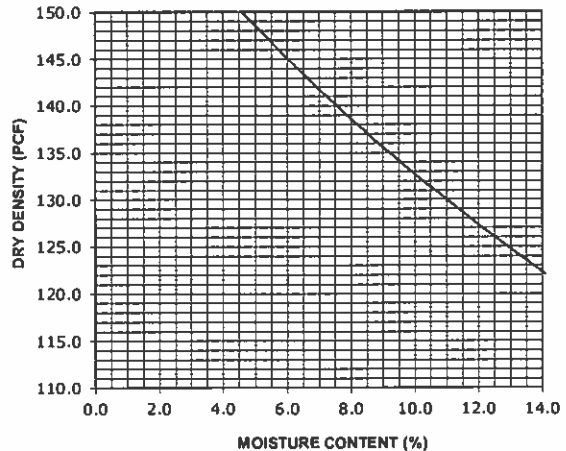
(ASTM D422)

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		
2750		

(ASTM C128)
Bulk SpG=:
SSD SpG=:
Apparent SpG=:
% Absorption=

(ASTM D1557)
Dry Den (U) =
Dry Den (C) =
M % (U) =
M % (C) =
SpG (assumed) = 2.70
M-D Test Method = ASTM D1557

MOISTURE-DENSITY RELATIONSHIP



CLASSIFICATION: 0.0
 USC: 0.0
 FROST CLASS:
 COMMENTS:

AGGREGATE/SOILS TEST REPORT

PROJECT NAME:	East Susitna Well	DATE TAKEN:	5/10/2016
PROJECT NO.:	13-019-10	DATE TESTED:	5/13/2016
CLIENT:	COW	TESTED BY:	J. Dvorak
SAMPLE NO.:	PW S-6	REVIEWED BY:	D. Simon
LOCATION:	E. Susitna Ave	DESCRIPTION:	135-140

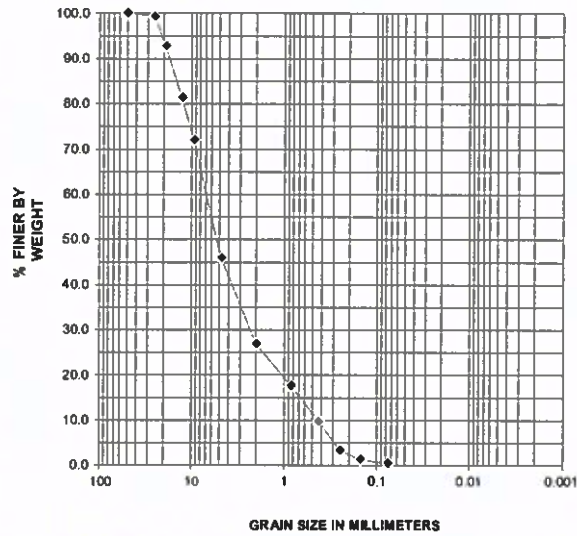
SIEVE ANALYSIS TEST

(ASTM C136 or D422)

SIEVE SIZE	DIAMETER (mm)	TOTAL % PASSING
6"	152.4	
4"	100.0	
3"	76.2	
2"	50.8	100
1"	25.4	99
3/4"	19.0	93
1/2"	12.7	81
3/8"	9.5	72
# 4	4.75	46
#10	2.00	27
#20	0.85	17
#40	0.425	10
#60	0.25	3
#100	0.15	1
#200	0.075	0.3

% GRAVEL: 54.2
 % SAND: 45.4
 % FINES: 0.3
 D60= 7.33
 D30= 2.48
 D10= 0.4
 Cu= 16.7
 Cc= 1.9
 % .02 mm
 % Moist.:
 Fine Modulus:
 (ASTM D4318)
 Liquid Limit:
 Plastic Limit:
 Plastic Index, =
 (ASTM C127)
 Bulk SpG=
 SSD SpG=
 Apparent SpG=
 % Absorption=

GRAIN SIZE DISTRIBUTION



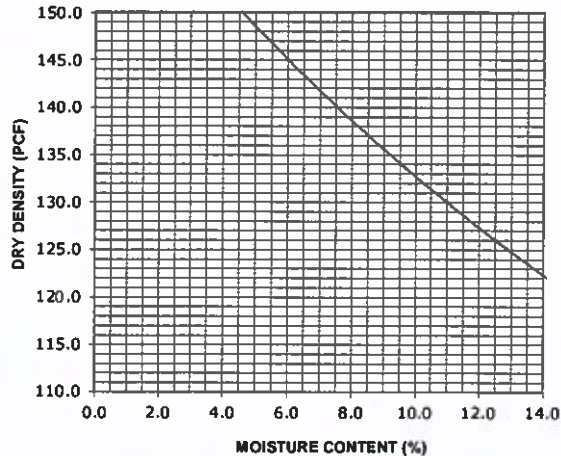
HYDROMETER TEST

(ASTM D422)

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		
2750		

(ASTM C128)
 Bulk SpG=
 SSD SpG=
 Apparent SpG=
 % Absorption=
 (ASTM D1557)
 Dry Den (U) =
 Dry Den (C) =
 M % (U) =
 M % (C) =
 SpG (assumed) = 2.70
 M-D Test Method = ASTM D1557

MOISTURE-DENSITY RELATIONSHIP



CLASSIFICATION: 0.0
 USC: 0.0
 FROST CLASS:
 COMMENTS:

AGGREGATE/SOILS TEST REPORT

PROJECT NAME:	East Susitna Well	DATE TAKEN:	4/1/2016
PROJECT NO.:	13-019-10	DATE TESTED:	4/4/2016
CLIENT:	COW	TESTED BY:	J. Dvorak
SAMPLE NO.:	MW S-1	REVIEWED BY:	V. Pate
LOCATION:	E. Susitna Ave	DESCRIPTION:	120'

SIEVE ANALYSIS TEST

(ASTM C136 or D422)

SIEVE SIZE	DIAMETER (mm)	TOTAL % PASSING
6"	152.4	
4"	100.0	
3"	76.2	
2"	50.8	100
1"	25.4	98
3/4"	19.0	93
1/2"	12.7	73
3/8"	9.5	61
# 4	4.75	39
#10	2.00	25
#20	0.85	16
#40	0.425	8
#60	0.25	2
#100	0.15	1
#200	0.075	0.2

% GRAVEL: 60.6
% SAND: 39.2
% FINES: 0.2
D60= 9.23
D30= 2.95
D10= 0.5
Cu= 17.1
Cc= 1.8

% .02 mm
% Moist.=
Fine Modulus=
(ASTM D4318)
Liquid Limit.=
Plastic Limit.=
Plastic Index. =
(ASTM C127)
Bulk SpG=
SSD SpG=
Apparent SpG=
% Absorption=

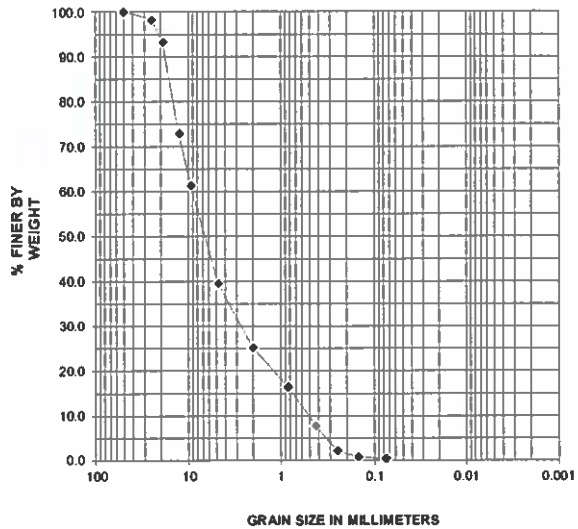
HYDROMETER TEST

(ASTM D422)

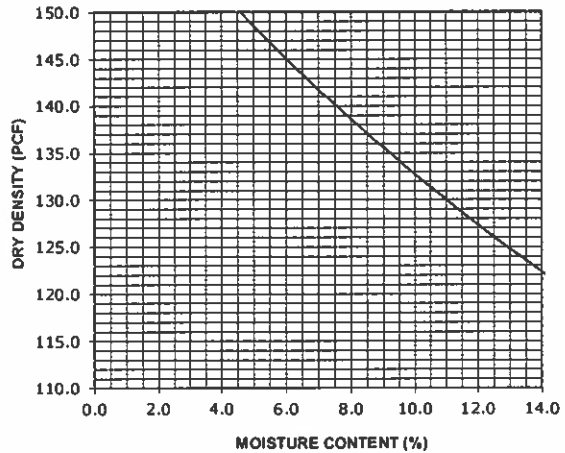
ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		
2750		

(ASTM C128)
Bulk SpG=
SSD SpG=
Apparent SpG=
% Absorption=
(ASTM D1557)
Dry Den (U) =
Dry Den (C) =
M % (U) =
M % (C) =
SpG (assumed) = 2.70
M-D Test Method = ASTM D1557

GRAIN SIZE DISTRIBUTION



MOISTURE-DENSITY RELATIONSHIP



CLASSIFICATION: 0.0
USC: 0.0
FROST CLASS:
COMMENTS:

AGGREGATE/SOILS TEST REPORT

PROJECT NAME:	East Susitna Well	DATE TAKEN:	4/1/2016
PROJECT NO.:	13-019-10	DATE TESTED:	4/4/2016
CLIENT:	COW	TESTED BY:	J. Dvorak
SAMPLE NO.:	MW S-2	REVIEWED BY:	V. Pate
LOCATION:	E. Susitna Ave	DESCRIPTION:	125

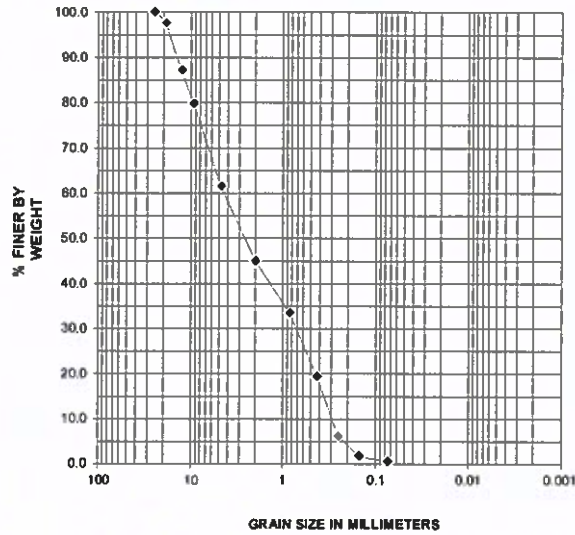
SIEVE ANALYSIS TEST

(ASTM C136 or D422)

SIEVE SIZE	DIAMETER (mm)	TOTAL % PASSING
6"	152.4	
4"	100.0	
3"	76.2	
2"	50.8	
1"	25.4	100
3/4"	19.0	98
1/2"	12.7	87
3/8"	9.5	80
# 4	4.75	61
#10	2.00	45
#20	0.85	33
#40	0.425	19
#60	0.25	6
#100	0.15	2
#200	0.075	0.5

% GRAVEL: 38.6
 % SAND: 60.9
 % FINES: 0.5
 D60= 4.52
 D30= 0.75
 D10= 0.3
 Cu= 15.0
 Cc= 0.4
 % .02 mm _____
 % Moist.: _____
 Fine Modulus: _____
 (ASTM D4318)
 Liquid Limit= _____
 Plastic Limit= _____
 Plastic Index = _____
 (ASTM C127)
 Bulk SpG= _____
 SSD SpG= _____
 Apparent SpG= _____
 % Absorption= _____

GRAIN SIZE DISTRIBUTION



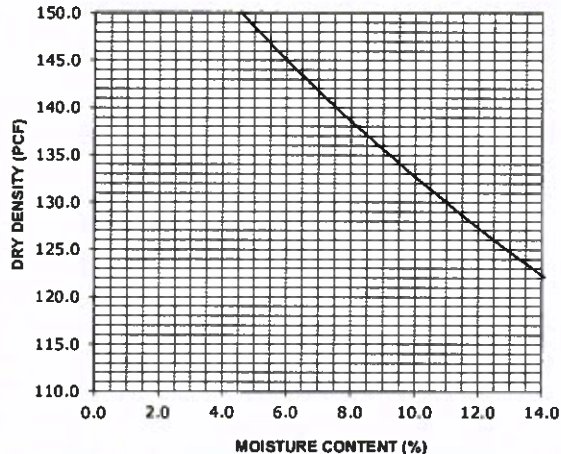
HYDROMETER TEST

(ASTM D422)

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		
2750		

(ASTM C128)
 Bulk SpG= _____
 SSD SpG= _____
 Apparent SpG= _____
 % Absorption= _____
 (ASTM D1557)
 Dry Den (U) = _____
 Dry Den (C) = _____
 M % (U) = _____
 M % (C) = _____
 SpG (assumed) = 2.70
 M-D Test Method = ASTM D1557

MOISTURE-DENSITY RELATIONSHIP



CLASSIFICATION: 0.0
 USC: 0.0
 FROST CLASS: _____
 COMMENTS: _____

AGGREGATE/SOILS TEST REPORT

PROJECT NAME:	East Susitna Well	DATE TAKEN:	4/1/2016
PROJECT NO.:	13-019-10	DATE TESTED:	4/4/2016
CLIENT:	COW	TESTED BY:	J. Dvorak
SAMPLE NO.:	MW S-3	REVIEWED BY:	V. Pate
LOCATION:	E. Susitna Ave	DESCRIPTION:	130

SIEVE ANALYSIS TEST

(ASTM C136 or D422)

SIEVE SIZE	DIAMETER (mm)	TOTAL % PASSING
6"	152.4	
4"	100.0	
3"	76.2	
2"	50.8	
1"	25.4	100
3/4"	19.0	96
1/2"	12.7	85
3/8"	9.5	78
# 4	4.75	65
#10	2.00	53
#20	0.85	43
#40	0.425	26
#60	0.25	8
#100	0.15	2
#200	0.075	0.7

% GRAVEL: 35.5
% SAND: 63.8
% FINES: 0.7
D60= 3.64
D30= 0.52
D10= 0.3
Cu= 13.3
Cc= 0.3

% .02 mm
% Moist.=
Fine Modulus=
(ASTM D4318)
Liquid Limit.=
Plastic Limit.=
Plastic Index.=
(ASTM C127)
Bulk SpG=
SSD SpG=
Apparent SpG=
% Absorption=

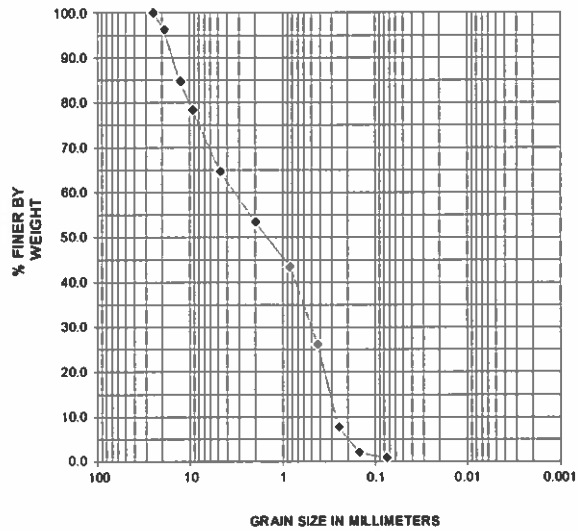
HYDROMETER TEST

(ASTM D422)

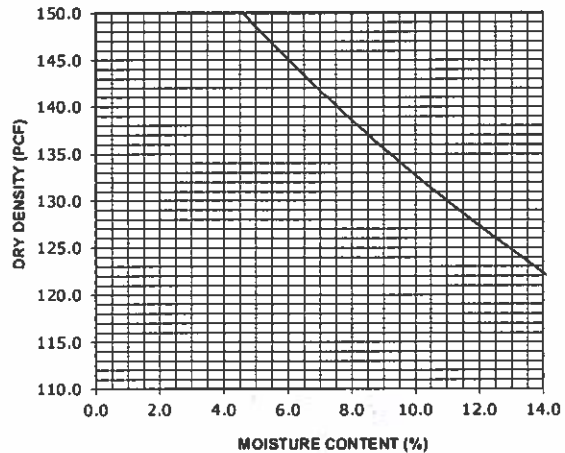
ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		
2750		

(ASTM C128)
Bulk SpG=
SSD SpG=
Apparent SpG=
% Absorption=
(ASTM D1557)
Dry Den (U) =
Dry Den (C) =
M % (U) =
M % (C) =
SpG (assumed) = 2.70
M-D Test Method = ASTM D1557

GRAIN SIZE DISTRIBUTION



MOISTURE-DENSITY RELATIONSHIP



CLASSIFICATION: 0.0
USC: 0.0
FROST CLASS:
COMMENTS: