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SOIL FEASIBILITY EVALUATION

FOR

WATER GAP WELLNESS - TREATMENT CENTER

Smithfield Township, Monroe County, Pennsylvania

Isett Project No.: 01072123.000-01-03SEWSG

Date: August 1, 2023

1.0 INTRODUCTION

Barry Isett and Associates, Inc. (Isett) was retained to evaluate soils in connection with the proposed treatment center at the Water Gap Wellness property. Located near the southwest corner of Cherry Valley Road and Totts Gap Road with an area of 33.74 acres on the west side of Totts Gap Road in Smithfield Township, Monroe County, Pennsylvania. The purpose of this evaluation was to assess the general feasibility of the soils to support both onlot sewage disposal and stormwater infiltration.

The subject site is currently a portion of a golf course; however no sewage is currently generated on the subject site. It is estimated from 25 PA Code Chapter 73.17(b) that the proposed treatment center will generate approximately 8,100 gallons per day of sewage effluent. This flow estimate assumes the treatment center will have 60 beds at 125 gallons per room and 60 employees at 10 gallons per employee.

2.0 TESTING

On July 17, 2023, thirteen (13) backhoe excavations (TP-1 through TP-13) were prepared to evaluate soil profiles. The morphologic characteristics of the soils (i.e. horizon thickness, color, texture, structure, consistence, coarse fragment content, etc.) were documented by Isett's qualified soil scientist. Limiting conditions, such as depth to bedrock, low permeability zones and special geologic features were noted, if present. The locations of these excavations are depicted on the attached test location plan.

According to the USDA/NRCS Custom Soil Resource Report for Monroe County, Pennsylvania, the soils within the study areas are mapped as Wyoming gravelly sandy loam. Given the soil characteristic encountered, Isett confirmed the on-site soils to be representative of the Wyoming series, including taxadjuncts.

Wyoming series consists of very deep, somewhat excessively drained soil formed in gravelly, water-sorted material derived from red and gray sandstone, siltstone, and shale. Solum thickness typically ranges from 18 to 35 inches. Depth to bedrock is typically 10 feet or more.

Isett found the soil characteristics to be fairly consistent throughout the study area. Topsoil generally consisted of dark brown silt loam to sandy loam with granular structure and friable consistence. Subsoil materials were brown to light brown, gravelly to very gravelly, loam to sandy loam with friable consistence. The substratum ranged from brown extremely gravelly sandy loam with single grain structure and very friable consistence to reddish brown silt loam with massive structure and firm consistence.

Redoximorphic features were observed at depths starting at 15 inches bgs to 60 inches bgs. No competent bedrock or open voids were observed within any of the excavations. Detailed soil profile descriptions of four soil profiles are attached showing the general soil conditions for each drainage class encountered.

3.0 FEASIBILITY

New land development projects must go through sewage facilities planning. Sewage facilities planning requires that suitable soils are available for conventional onlot sewage disposal; alternate shallow limiting zone systems do not qualify for sewage facilities planning purposes. For a project of this nature, soils must be identified for primary and replacement disposal systems. Conventional in-ground onlot sewage disposal systems require a minimum of 60 inches of suitable soil above an observed limiting zone (LZ). Conventional elevated sand mound (ESM) and spray irrigation systems require a minimum of 20 inches of suitable soil above any observed LZ. At-grade beds with conventional treatment require a minimum 48 inches of suitable soil above any observed LZ.

Table 1. Limiting Zone Depths/Conditions

Test Location	Limiting Zone Depth	Limiting Zone Condition	Suitability for Onlot Septic
TP-1	N/A	Not Encountered	N/A*
TP-2	N/A	Not Encountered	N/A*
TP-3	60"	Redox	N/A*
TP-4	52"	Redox	At-Grade Bed
TP-5	N/A	Not Encountered	Conventional in-ground
TP-6	32"	Redox	Conventional ESM
TP-7	20"	Redox	Conventional ESM
TP-8	28"	Redox	Conventional ESM
TP-9	34"	Redox	Conventional ESM
TP-10	20"	Redox	Conventional ESM
TP-11	15"	Redox	Unsuitable
TP-12	55"	Redox	At-Grade Bed
TP-13	N/A	Not Encountered	Conventional in-ground

*Evaluated for feasibility for stormwater infiltration.

Based on our review of these preliminary excavations, we do not anticipate difficulty sitting elevated systems to serve as primary and replacement area for the proposed peak sewage flows of 8,100 GPD, previously described.

Suitability for onlot septic use will ultimately require formal testing with Smithfield Township and the Pennsylvania Department of Environmental Protection (PA DEP). Additional text excavations will be required. The size of the proposed absorption areas will be determined based on the anticipated peak

daily flow and the percolation rate of the soil encountered during formal testing with the appropriate agencies.

4.0 CONCLUSIONS

Onlot Sewage Disposal

Isett has determined the morphologic characteristics of the soils to be representative of the Wyoming series, including taxadjuncts. Isett observed limiting conditions starting at depths ranging from 15 to 60 inches bgs, which are suitable for elevated systems. Siting systems (primary and replacement) to support the proposed treatment center (8,100 GPD) should be feasible assuming satisfactory percolation rates. Formal testing, coordinated with the appropriate agencies, will be required as the project moves forward.

Sewage facilities planning requires demonstrating suitable soils are available for conventional onlot sewage disposal. However, the use of drip irrigation, an alternate technology, could be explored following planning approval. Drip irrigation is a subsurface system that could be utilized to continue the use of the existing golf course, if desired.

Stormwater Infiltration Evaluation

Isett has also determined that the morphologic characteristics of the soils in the vicinity of TP-1 through TP-3 are generally consistent with the soil characteristics prescribed in Appendix C (p.6) of the BMP Manual. Additional infiltration testing will be required to confirm the permeability of the soils are within the range of rates preferred by the reviewing agencies. If the infiltration testing reveals rates exceeding those preferred by reviewing agencies, soil amendments can be utilized to slow the infiltration rates until rates preferred by reviewing agencies are achieved.

5.0 RECOMMENDATIONS

Preliminary septic soil testing has identified potential areas generally suitable to serve the proposed flows generated from the proposed treatment center. However, formal testing will be required with the appropriate agencies. Below is a list of the recommended next steps.

1. Submit a PA DEP sewage facilities planning module application mailer describing the project and project sewage flows.
2. Schedule a pre-application technical meeting with the appropriate PA DEP staff to review the proposed project. This meeting will allow the DEP to voice any project concerns and identify the required testing/permitting procedures that are likely.
3. Conduct formal soil testing with PA DEP and the Smithfield Township Sewage Enforcement Officer to delineate the required primary and replacement absorption areas.
4. Given the proposed sewage flows, it is likely that a hydrogeologic study will be required for sewage facilities planning purposes. The need for a hydrogeologic study will be identified when PA DEP responds to the sewage facilities planning module application mailer. If a hydrogeologic study is required, the scope of the requested study will be established between the consultant and the PA DEP's hydrogeologist.
5. Compile the information from all the necessary studies outlined in the PA DEP's planning mailer response into the appropriate sewage planning module. The module will need approval by the Township, County and PA DEP. The County and Township each have 60

days to complete their reviews, which are not concurrent. The PA DEP may take up to 120 days to complete their review and may request an additional 60-day extension, if they desire. These reviews will take place after the necessary studies identified in the sewage facilities planning module application mailer have been conducted and a complete sewage planning module has been submitted.

7.0 DISCLAIMER

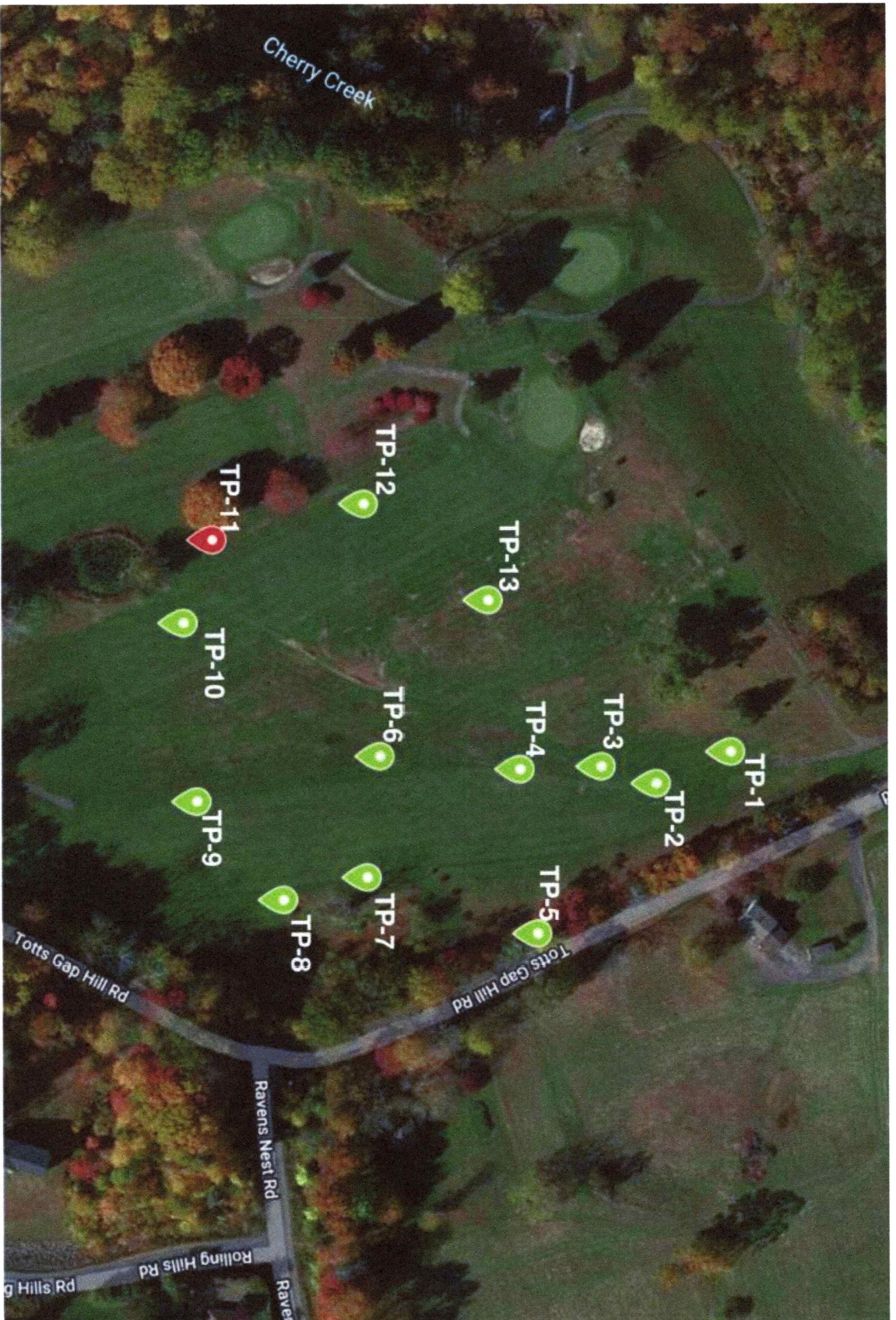
The findings in this report are based on conditions readily visible and recorded at the time of this evaluation. Observations and findings are limited to the locations in which this evaluation was conducted. Isett has used its experience and professional judgment in rendering the conclusions in this report.

Report prepared by:

Philip R. Schiebel

Philip Schiebel, SEO
Staff Environmental Scientist
(PA SEO No. 03975)

Attachments



Test Location Plan
 Water Gap Wellness – Treatment Center
 Smithfield Township, Monroe County, Pennsylvania



Not to Scale

Soil Log # TP-1

Limiting Zone: Not Encountered

Condition: N/A

Lat/Long: 40.97746, -75.15744

Horizon	Depth	Color	Texture		Grade	Structure		Consistence	Redox Features	Boundary (Dist/Topo)
			C.F.	Class		Size	Type			
Ap	0-12	10YR 3/3	---	sl	1	fi	gr	fr	---	a/s
Bw1	12-27	7.5YR 4/4	---	sl	1	fi	sbk	fr	---	g/w
Bw2	27-50	7.5YR 4/6	---	gr	1	med	sbk	fr	---	g/w
C	50-79	10YR 4/3	---	vgr	1	fi	sbk	fr	---	---
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Qualified Soil Scientist: Philip R. Schiebel, SEO (PA SEO No. 03975)

Soil Series: Wyoming

Drainage Class
Well Drained

Coarse Fragments (C.F.)
15-35%
gr – gravelly
ch – channery
cb – cobbly
fl – flaggy
st – stony
35-65%
vgr – very gravelly
vch – very channery
vcb – very cobbly
vfl – very flaggy
vst – very stony
>65%
exgr – extremely gravelly
exch – extremely channery
excb – extremely cobbly
exfl – extremely flaggy
exst – extremely stony

Textural Class
cs – coarse sand
s – sand
fs – fine sand
ls – loamy sand
sl – sandy loam
l – loam
sil – silt loam
si – silt
scl – sandy clay loam
cl – clay loam
sicl – silty clay loam
sc – sandy clay
sic – silty clay
c – clay

Structure
Size
fi – fine
med – medium
co – coarse
Type
sg – single grain
gr – granular
pl – platy
pr – prismatic
cm – columnar
abk – angular blocky
sbk – subangular blocky
m – massive
Consistence
l – loose
vfr – very friable
fr – friable
fi – firm
vfi – very firm
exfi – extremely firm

Redox Features
Abundance
f – few <2%
c – common 2-20%
m – many >20%
Redox Features
Contrast
f – faint
d – distinct
p – prominent
Boundary
Distinctness
a – abrupt <1" thick
c – clear 1-2.5"
g – gradual 2.5-5"
d – diffuse >5"
Topography
s – smooth
w – wavy
i – irregular
b – broken

Grade
sfl – structureless
wk – weak
mod – moderate
strg – strong

Soil Log # TP-6

Limiting Zone: 32"

Condition: Redox

Lat/Long: 40.97638, -75.15742

Horizon	Depth	Color	Texture		Grade	Structure		Consistence	Redox Features	Boundary (Dist/Topo)
			C.F.	Class		Size	Type			
Ap	0-10	10YR 3/3	---	sil	1	fi	gr	fr	---	a/s
Bw1	10-21	7.5YR 5/4	gr	sl	1	med	sbk	fr	---	g/w
Bw2	21-32	7.5YR 6/4	vgr	sl	1	fi	sbk	fr	---	g/w
C	32-62	5YR 5/4	---	sil	0	---	m	fi	c/d	---
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---	---	---	---	---	---	---	---	---	---	---

Qualified Soil Scientist: Philipp R. Schiebel, SEO (PA SEO No. 03975)

Soil Series: Wyoming Taxadjunct

Drainage Class Moderately Well Drained

Coarse Fragments (C.F.) 15-35%

Textural Class cs – coarse sand

Structure Size fi – fine

Redox Features Abundance f – few <2%

gr – gravelly
ch – channery
cb – cobbly
fl – flaggy
st – stony

s – sand
fs – fine sand
ls – loamy sand
sl – sandy loam
l – loam

med – medium
co – coarse
Type sg – single grain
gr – granular
pl – platy

c – common 2-20%
m – many >20%
Redox Features Contrast f – faint
d – distinct
p – prominent

vgr – very gravelly
vch – very channery
vcb – very cobbly
vfl – very flaggy
vst – very stony

sil – silt
scl – sandy clay loam
cl – clay loam
sicl – silty clay loam
sc – sandy clay
sic – silty clay
c – clay

pr – prismatic
cm – columnar
abk – angular blocky
sbk – subangular blocky
m – massive

a – abrupt <1" thick
c – clear 1-2.5"
g – gradual 2.5-5"
d – diffuse >5"

>65%
exgr – extremely gravelly
exch – extremely channery
excb – extremely cobbly
exfl – extremely flaggy
exst – extremely stony

Structure Grade
stl – structureless
wk – weak
mod – moderate
strg – strong

l – loose
vfr – very friable
fr – friable
fi – firm
vfi – very firm
exfi – extremely firm

s – smooth
w – wavy
i – irregular
b – broken

Structure Consistence
l – loose
vfr – very friable
fr – friable
fi – firm
vfi – very firm
exfi – extremely firm

Structure Consistence
l – loose
vfr – very friable
fr – friable
fi – firm
vfi – very firm
exfi – extremely firm

Structure Consistence
l – loose
vfr – very friable
fr – friable
fi – firm
vfi – very firm
exfi – extremely firm

Structure Consistence
l – loose
vfr – very friable
fr – friable
fi – firm
vfi – very firm
exfi – extremely firm

Structure Consistence
l – loose
vfr – very friable
fr – friable
fi – firm
vfi – very firm
exfi – extremely firm

Structure Consistence
l – loose
vfr – very friable
fr – friable
fi – firm
vfi – very firm
exfi – extremely firm

Structure Consistence
l – loose
vfr – very friable
fr – friable
fi – firm
vfi – very firm
exfi – extremely firm

Structure Consistence
l – loose
vfr – very friable
fr – friable
fi – firm
vfi – very firm
exfi – extremely firm

Structure Consistence
l – loose
vfr – very friable
fr – friable
fi – firm
vfi – very firm
exfi – extremely firm

Structure Consistence
l – loose
vfr – very friable
fr – friable
fi – firm
vfi – very firm
exfi – extremely firm

Structure Consistence
l – loose
vfr – very friable
fr – friable
fi – firm
vfi – very firm
exfi – extremely firm

Structure Consistence
l – loose
vfr – very friable
fr – friable
fi – firm
vfi – very firm
exfi – extremely firm

Soil Log # TP-11

Limiting Zone: 15"

Condition: Redox

Lat/Long: 40.97582, -75.15829

Horizon	Depth	Color	Texture		Grade	Structure		Consistence	Redox Features	Boundary (Dist/Topo)
			C.F.	Class		Size	Type			
Ap	0-10	10YR 3/3	---	sil	1	fi	gr	fr	---	a/s
Bw1	15-28	7.5YR 4/4	gr	sl	1	med	sbk	fr	m/p	g/w
Bw2	28-40	7.5YR 4/4	vgr	sl	1	fi	sbk	fr	c/d	g/w
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Qualified Soil Scientist: Philip R. Schiebel, SEO (PA SEO No. 03975)

Soil Series: Wyoming Taxadjunct

Drainage Class
Somewhat poorly drained

Coarse Fragments (C.F.)
15-35%

Textural Class
cs – coarse sand

Structure
Size

Redox Features
Abundance

- gr – gravelly
- ch – channery
- cb – cobbly
- fl – flaggy
- st – stony
- 35-65%
- vgr – very gravelly
- vch – very channery
- vcb – very cobbly
- vfl – very flaggy
- vst – very stony
- >65%
- exgr – extremely gravelly
- exch – extremely channery
- excb – extremely cobbly
- exfl – extremely flaggy
- exst – extremely stony
- cs – coarse sand
- s – sand
- fs – fine sand
- ls – loamy sand
- sl – sandy loam
- l – loam
- sil – silt loam
- si – silt
- scl – sandy clay loam
- cl – clay loam
- sicl – silty clay loam
- sc – sandy clay
- sic – silty clay
- c – clay
- Structure
- Grade
- sl – structureless
- wk – weak
- mod – moderate
- strg – strong
- fi – fine
- med – medium
- co – coarse
- Type
- sg – single grain
- gr – granular
- pl – platy
- pr – prismatic
- cm – columnar
- abk – angular blocky
- sbk – subangular blocky
- m – massive
- Consistence
- l – loose
- vfr – very friable
- fr – friable
- fi – firm
- vfi – very firm
- exfi – extremely firm
- f – faint
- d – distinct
- p – prominent
- Boundary
- Distinctness
- a – abrupt <1" thick
- c – clear 1-2.5"
- g – gradual 2.5-5"
- d – diffuse >5"
- Topography
- s – smooth
- w – wavy
- i – irregular
- b – broken

Soil Log # TP-13

Limiting Zone: Not Encountered

Condition: N/A

Lat/Long: 40.97671, -75.15806

Horizon	Depth	Color	Texture		Grade	Structure		Consistence	Redox Features	Boundary (Dist/Topo)
			C.F.	Class		Size	Type			
Ap	0-8	10YR 3/3	---	I	1	fi	gr	fr	---	a/s
Bw1	8-20	7.5YR 4/4	gr	I	1	fi	sbk	fr	---	g/w
Bw2	20-30	7.5YR 4/4	gr	sl	2	med	sbk	fr	---	g/w
C	30-60	10YR 4/3	exgr	sl	0	---	sg	vfr	---	---
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Qualified Soil Scientist: Philip R. Schiebel, SEO (PA SEO No. 03975)

Soil Series: Wyoming

Drainage Class
Well Drained

Coarse Fragments (C.F.)
15-35%

Textural Class
cs – coarse sand

Structure
Size

Redox Features
Abundance

- gr – gravelly
- ch – channery
- cb – cobbly
- fl – flaggy
- st – stony
- 35-65%
- vgr – Very gravelly
- vch – very channery
- vcb – very cobbly
- vfl – very flaggy
- vst – very stony
- >65%
- exgr – extremely gravelly
- exch – extremely channery
- excb – extremely cobbly
- exfl – extremely flaggy
- exst – extremely stony
- cs – coarse sand
- s – sand
- fs – fine sand
- ls – loamy sand
- sl – sandy loam
- l – loam
- sil – silt loam
- si – silt
- scl – sandy clay loam
- cl – clay loam
- sicl – silty clay loam
- sc – sandy clay
- sic – silty clay
- c – clay
- Structure
- Grade
- stl – structureless
- wk – weak
- mod – moderate
- strg – strong
- fi – fine
- med – medium
- co – coarse
- Type
- sg – single grain
- gr – granular
- pl – platy
- pr – prismatic
- cm – columnar
- abk – angular blocky
- sbk – subangular blocky
- m – massive
- Consistence
- l – loose
- vfr – very friable
- fr – friable
- fi – firm
- vfr – very firm
- exfi – extremely firm
- f – faint
- d – distinct
- p – prominent
- Boundary
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- a – abrupt <1" thick
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- g – gradual 2.5-5"
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- Topography
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