Part 621 – Soil Potential Ratings

Subpart B – Exhibits

621.12 Analysis of Preparations and Procedures for Soil Potential Ratings

PREPARATIONS OF SOIL POTENTIAL RATINGS

Design

Prepare and design with interdisciplinary input
--agricultural uses ---------- required
--nonagricultural uses ---------- required

Prepare and design ratings for map units ---------- required

Prepare and design ratings for named
components of map units ---------- required

Follow a systematic procedure ---------- required

Procedures

Rate all soils in area for a given use ---------- required

Give size of area for which ratings are prepared, such as
town, county, state, and MLRA. ---------- optional

Follow given steps in preparation ---------- required

Have data available on soils, corrective measures,
performance, and continuing limitations ---------- required

Prepare plan for obtaining data if data are
inadequate ---------- required
Give values for P, such as magnitude of base number ---------- optional
Define soil use ---------- required
Prepare evaluation criteria ---------- required
Use regulations as rating criteria ---------- optional

Establish performance standard ---------- required
Assign limitation ratings to criteria ---------- optional
Use a worksheet ---------- required
Use sample worksheet ---------- optional
Use index numbers not dollars, and bushels. ---------- optional
Retain worksheet as documentation of procedures ---------- required
Prepare key phrases for corrective measures and
continuing limitations ---------- suggested

Presentation to Users

--Provide in maps and tables, or in map unit descriptions ---------- optional
--Use definitions of soil potential ratings ---------- required
--Use terms and definitions of rating classes ---------- required
--Provide definition of rated use ---------- required
--Identify agencies and give names of
participating local experts ---------- required
--Show corrective measures (except on maps) ---------- required
--Show continuing limitations ---------- optional/suggested
--Avoid presentation of uncoordinated ratings ---------- required
--Avoid repetition of limitation ratings for same
soil use in other tables in same report ---------- suggested
--Provide users with numerical indices ---------- optional
--Use given format of tables ---------- optional

621.13 Soil Potential Ratings for Forest Land (Beta County)

Definition:

Soils managed for maximum average yearly growth per acre (cubic feet), assuming established stands for loblolly pine if adapted, otherwise the best adapted hardwood, not fertilized or irrigated.

Yield standard:

130 cubic feet per acre average yearly growth. The yield standard of 130 cubic feet per acre per year is set on the basis of the production of a locally preferred forest land species on productive soils that are common to the area.

Evaluating Criteria:

Depth to water table (inches)
Flooding

Slope (percent)
Surface texture
Available water capacity

Cost Index:

A percentage of the value of the harvested crop rounded to the nearest whole number is used. Cost classes representing ranges of values are not used.

Performance Index:

100 (equivalent to the yield standard of 130 cubic feet per acre per year)

621.14 Soil Potential for Dwellings Without Basements

Definition:

Single-family residences; 1,400 to 1,800 square feet of living area; without basements; spread footings, slab construction, or both; life span of 50 years; and intensive use of yard for lawns, gardens, landscaping, and play areas. Ratings assume adequate waste disposal and lot sizes of one-fourth acre or less.

Evaluating Criteria:

Depth to water table (inches)
Flooding
Slope (percent)
Shrink-swell potential

Cost Index:

Index value1/	Cost classes for corrective measures and continuing limitations (dollars)2/
1	<250
2	250-500
4	500-1,000
8	1,000-2,000
12	2,000-3,000
16	3,000-4,000
20	4,000-5,000

1/ Index values in this example are arbitrarily set at 0.4 percent of the upper limit of each cost class.

2/ To be compatible with costs of corrective measures, the cost of continuing limitations is established for the 50-year life span of the dwelling.

621.15 List of Corrective Measures and Cost

This exhibit shows how local data might be summarized and made available as a ready reference for preparing soil potential ratings. Corrective measures likely to be needed can be anticipated and costs established for each. As soil potential ratings are prepared, additional measures may be identified that should be added to the list. The general technique applies to both agricultural and nonagricultural soil uses.

This example is only to illustrate a procedure. The corrective measures and costs that are shown are examples only and should not be used without modification to fit local situations.

The following list gives the corrective measures and costs for dwellings without basements. Corrective measures are those that overcome or minimize soil limitations identified in evaluating criteria. Costs are based on an arbitrary foundation area of local standards that is approximately 1,200 square feet. The costs are in excess of those for standard design where no soil limitations are identified. Index values are 1 percent of the range midpoint of estimated costs.

Corrective Measures	Cost (dollars)	Index
Drainage of footing	300-500	4
Drainage of footing and slab	600-800	7
Excavation and grading		
8-15 percent slope	100-300	2
15-30 percent slope	300-500	4
Rock Excavation and disposal (fractured limestone)		
0-8 percent slope	1,000-1,400	12
8-15 percent slope	700-900	8
Reinforced slab		
moderate shrink-swell potential	1,500-2,000	17
high shrink-swell potential	3,600-4,200	39
Area wide surface drainage (per lot)	100-200	2
Importing topsoil for garden and lawn	1,000-1,400	11

Examples of the application of cost index are:

(a) Soil on 8 to 15 percent slopes with high shrink-swell potential requires:

Reinforced slab	39
Excavation and grading	2
CM =	41

(b) Soil on 0 to 1 percent slope with high water table requires:

Areawide surface drainage	2
Drainage for footing and slab	7
CM =	9

621.16 Reserved (Worksheet for Preparing Soil Potential Ratings)

621.17 Explanation of Worksheets for Preparing Soil Potential Ratings for Forest Land (Beta County)

(a) A worksheet is prepared for each soil map unit.

(b) The yield standard (130) is adjusted to a standard performance index of 100 to provide a range of soil potential indexes from 0 to 100. Productivity of 130 cubic feet per acre (loblolly pine, site index 90) meets the standard performance index of 100, such as in the Alpha and Beta map units. Productivity of 110 cubic feet per acre (loblolly pine, site index 80) is substandard performance SPI = 110/130 x 100 (SPI = 85), and is considered a continuing limitation if corrective measures fail to overcome the yield limitation, such as in the Gamma and Sigma map units. Productivity of 152 cubic feet per acre (loblolly pine, site index 100) is performance above the yield standard, SPI = 152/130 x 100 (SPI = 117), and SPI increases, such as in the Omega map unit.

(c) Enter evaluation factors from the table of rating criteria prepared for the soil use, as in part 621, subpart B, section 621.12.

(d) Enter soil and site conditions for the map unit for each evaluation factor. Enter the degree of limitation from the table of evaluation criteria, as in part 621, subpart B, section 621.12.

(e) Enter the effects of the soil and site conditions to provide a basis for the identification of corrective measures.

(f) Enter feasible alternative measures for overcoming the effects of limiting soil or site conditions. Technical guides are useful references. Note that measures are identified wherever possible to overcome the effects of limitations in preference to leaving the problem as an unresolved continuing limitation.

(g) In this example, index values for measures and continuing limitations are a percentage of the value of the harvested crops. Whether the costs occur only one time or several times in the period between planting and harvest is considered.

(h) The factor that accounts for substandard yield of the Sigma soil is not known. The substandard yield is noted as a continuing limitation without relation to a soil factor.

(i) Index values for corrective measures (CM) and continuing limitations (CL) are summed and deducted from the performance standard index (P) to determine the soil potential index (SPI).

(j) The soil potential indexes are arrayed and the ratings are assigned as follows:

117	Very high	Omega silt loam
100	High	Beta fine sandy loam, 1 to 3 percent slopes
85	High	Alpha silt loam
78	Medium	Gamma loamy fine sand, 8 to 13 percent slopes
77	Medium	Sigma fine sandy loam, 15 to 25 percent slopes

621.18 Reserved (Worksheet for Preparing Soil Potential Ratings for Forest Land (Beta County))

621.19 Reserved (Worksheet for Preparing Soil Potential Ratings for Septic Tank Absorption Fields (Sigma County))

621.20 Reserved (Worksheet for Preparing Soil Potential Ratings for Dwellings Without Basements (Alpha County))

621.21 Explanation of Soil Potential Ratings for Maps or Reports

(a) The soil potential ratings indicate the comparative quality of each soil in the county for the specified uses. Because comparisons are made only among soils in this county, ratings for a given soil in another county may differ.

(b) Potential ratings are based on a system developed for a given county and include consideration of yield or performance levels, the difficulty or relative cost of corrective measures that can improve soil performance or yield, and any adverse social, economic, or environmental consequence that cannot be easily overcome.

(c) The ratings do not constitute recommendations for soil use. They are to assist individuals, planning commissions, and others in arriving at wise land use decisions. Treatment measures are intended as a guide to planning and are not to be applied at a specific location without onsite investigations for design and installation.

(d) The soil potential ratings used are defined as follows: (the definitions of those soil potential ratings used are inserted.)

621.22 Soil Potential Ratings for Septic Tank Absorption Fields

Soil Name and Map Symbol	Limitations and Restrictions	Soil Potential and Corrective Treatment	Continuing Limitations
1--Grenada silt loam, 0 to 2 percent slopes	Severe: percs slowly.	Medium: conventional system, alternate valve, large field, pump tank in wet season.	Monitor system for need to pump.
2--Jefferson gravelly loam, 5 to 10 percent slopes	Slight	Very high: conventional system, small field.	None.
3--Linsdale silt loam, 0 to 2 percent slopes	Severe: wetness.	High: conventional system, medium field, area-wide subsurface drainage.	Maintain drainage system.
4--Memphis silt loam, 2 to 6 percent slopes	Slight	High: conventional system, medium field.	None.
5--Memphis silt loam, 12 to 20 percent slopes	Moderate: slope.	High: conventional system, medium field, slope design.	None.
6--Memphis silt loam, 25 to 30 percent slopes	Severe: slope.	Very low: no known system.	---
7--Talbott silt loam, 8 to 12 percent slopes	Severe: percs slowly, depth to rock.	Low: mound system.	None.
8--Waverly silt loam, 0 to 2 percent slopes	Severe: wetness.	Low: mound system.	None.

621.23 Soil Potential Ratings for Cropland

Soil Name and Map Symbol	Soil Potential and Corrective Treatment	Continuing Limitations
1--Caddo silt loam, 0 to 1 percent slopes	High: drainage, high fertilization rate.	Maintenance of drainage system.
2--Gore fine sandy loam 8 to 12 percent slopes	Low: erosion control.	Maintenance of erosion control system, substandard yield.
3--Guyton silt loam	Medium: drainage, high fertilization rate	Maintenance of drainage system.
4--Guyton silt loam, frequently flooded	Very low: project-type flood control, drainage	Maintenance of drainage and flood control system.
5--Kisatchie soils, 15 to 30 percent soils	Very low: erosion control, high fertilization rate.	Maintenance of erosion control system, equipment limitations substandard yield.
6--Norwood silt loam	Very high: drainage.	Maintenance of drainage system.
7--Ruston fine sandy loam, 3 to 5 percent slopes	High: erosion control.	Maintenance of erosion control system.
8--Ruston fine sandy loam, 8 to 12 percent slopes	Low: erosion control.	Maintenance of erosion control system, substandard yield.

621.24 Soil Potential Ratings and Corrective Measures for Cropland, Pastureland, Forest Land, and Residential Land

Soil Name	Cropland	Pastureland	Forest land	Residential land
1--Caddo silt loam, 0-1 percent slopes	High: drainage.	High: drainage, scheduled grazing avoid wet conditions.	High: scheduled operations to avoid wetness.	Medium: drainage
2--Core fine sandy loam, 8 to 12	Low: erosion control.	Medium: erosion control.	Medium: scheduled operations to avoid wet conditions.	Medium: construction grading, water disposal, strengthened foundation.
3--Guyton silt loam	Medium: drainage.	Medium: drainage, scheduled grazing to avoid wet conditions.	High: scheduled operations to avoid wet conditions.	Low: drainage diversions.
4--Guyton silt loam, frequently flooded	Very low: project-type flood control.	Low: drainage, adapted water tolerant plants, scheduled grazing to avoid wet conditions.	High: scheduled operations to avoid wet conditions.	Very low: project type flood control, drainage.
5--Kisatchie soils, 15 to 30 percent slopes	Very low 1/:	Low: reduced stocking rates.	Low: erosion control during site preparation and logging.	Low: construction grading, water disposal excavate rock.
6--Norwood silt loam	Very high:	Very high:	Very high	Very high

7--Ruston fine sandy loam, 3 to 8 percent slopes	High: erosion control.	Very high:	High	Very high
8--Ruston fine sandy loam, 8 to 12 percent slopes	Low: erosion control.	Very high:	High	High: construction grading, water disposal.

1/ Soil conditions are such that treatments are generally not warranted for this use.

Soil Use: Area:

Mapping Unit:

Evaluation Factors	Soil and Site Conditions	Degree of Limitation	Effects On Use	Corrective Measures		Continuing Limitations	
				Kinds	Index	Kind	Index
				Total		Total	

Performance Standard Index	-	Measure Cost Index	-	Continuing Limitation Cost Index	=	Soil Potential Index[1/]

[1/] If performance exceeds the standard increase SPI by that amount.

Soil Use: Forest Land

Area: Beta County

Yield standard 130 ft^3 /ac/yr

Mapping Unit: Sigma fine sandy loam, 15 to 25 percent slopes

Yield estimate 110 ft^3 /ac/yr

Evaluation Factors	Soil and Site Conditions	Degree of Limitation	Effects On Use	Corrective Measures		Continuing Limitations	
				Kinds	Index	Kind	Index
Slope (percent)	15-25%	Moderate	Equipment limitation,	Safety Precautions 2/	4	None	1
			Erosion	Road design	3	Road Maintenance	
Depth to high water table (ft.)	>2'	Slight	None				
Flooding	None	Slight	None				
Available water capacity (5 ft. depth)	>8"	Slight	None				
Surface texture	Loamy	Slight	None				
						Moderate yield 3/	15
				Total	7	Total	16

2/ Special equipment not considered practical.
3/ Substandard yield not accounted for in evaluation factors. Corrective measures not known. Yield is 15% below standard.

$$\underset{\text{Performance Standard Index}}{100} - \underset{\text{Measure Cost Index}}{7} - \underset{\text{Continuing Limitation Cost Index}}{16} = \underset{\text{Soil Potential Index}^{1/}}{77}$$

1/ If performance exceeds the standard increase SPI by that amount.

Soil Use: Septic tank absorption fields Area: Sigma County

Mapping Unit: Alpha silt loam, 12 to 20 percent slopes

Evaluation Factors [2/]	Soil and Site Conditions	Degree of Limitation [2/]	Effects On Use	Corrective Measures		Continuing Limitations	
				Kinds	Index	Kind	Index
Percolation rate	45 min/in	Slight	None	Conventional system medium field [3/]	0	None	0
Water table	>6'	Slight	None				
Flooding	None	Slight	None				
Slope	12-20%	Moderate	Surface seepage	Slope design	10 [4/]	None	0
Stoniness	None	Slight	None				
Depth to rock or other impervious material	>6'	Slight	None				
				Total	10	Total	0

[2/] Local factors and ratings.
[3/] This system is the standard installation.
[4/] Index number is percent above standard installation cost.

$$\underset{\text{Performance Standard Index}}{100} - \underset{\text{Measure Cost Index}}{7} - \underset{\text{Continuing Limitation Cost Index}}{0} = \underset{\text{Soil Potential Index}^{1/}}{90}$$

[1/] If performance exceeds the standard increase SPI by that amount.

Soil Use: Dwellings without basements Area: Alpha County

Mapping Unit: Beta silt loam

Evaluation Factors [2/]	Soil and Site Conditions	Degree of Limitation [2/]	Effects On Use	Corrective Measures		Continuing Limitations	
				Kinds	Index	Kind	Index
Depth to high water table	0-2' (perched)	Severe	Wet lawns Construction Problems	Surface drainage Special drainage during construction	2 4	Maintain drainage yard use restrictions in wet seasons	1 6
Flooding	None	Slight	None				
Slope	0-1%	Slight	None	Slope design	10	None	0
Shrink-swell	Low	Slight	None				
				Total	6	Total	7

100	-	6	-	7	=	87
Performance Standard Index		Measure Cost Index		Continuing Limitation Cost Index		Soil Potential Index [1/]

[1/] If performance exceeds the standard increase SPI by that amount.