Local Agency Formation Commission of Yolo County

LAND EVALUATION AND SITE ASSESSEMENT
LESA

I. Introduction

The following Yolo County Land Evaluation and Site Assessment (LESA) Model has been designed as a potential planning tool to assist in making decisions concerning the relative significance of agricultural land resources. The model itself is rooted in concepts originally devised at the federal level, but has been customized to address the unique agricultural resource issues of Yolo County.

Background on LESA on the National Level

In 1981, the federal Resources Conservation Service (NRCS), known at the time as the Soil Conservation Service, released a new system that was designed to provide objective ratings of the agricultural suitability of land compared to demands created by nonagricultural uses of land. The rating system became known as Land Evaluation and Site Assessment, or LESA. Soon after it was designed, LESA was adopted as a procedural tool at the federal level for identifying and addressing the potential adverse effects of federal programs (e.g., funding of highway construction) on farmland protection. The Farmland Protection Policy Act of 1981 (Public Law 97-98) spells out requirements to ensure that federal programs, to the extent practical, are compatible with state, local and private programs and policies to protect farmland, and calls for the use of LESA to aid in this analysis. Typically, staff of the NRCS is involved in performing LESA scoring analyses of individual projects that involve other agencies of the federal government.

Local adaptation of LESA Models

Since its inception, the LESA approach has received substantial attention from state and local governments as well. Nationwide, over two hundred jurisdictions have developed local LESA methodologies. One of the attractive features of the LESA approach is that it is well suited to being modified to reflect regional and local conditions. Typical local uses of LESA have included assisting in decision-making concerning the siting of projects, alterations in land zoning, and sphere of influence determinations. LESA is also increasingly being utilized for farmland protection programs, such as the identification of priority areas to concentrate conservation easement efforts.

Common Features of all LESA Models

All LESA models are based upon the identification of factors that can be linked to the relative significance of agricultural land resources. Factors are classified as two types: (1) Land Evaluation factors, focusing on the inherent qualities of soil (and sometimes water) resources, utilizing information that is commonly found within modern soil surveys; and (2) Site Assessment factors, which typically deal with social, political, and geographic issues that are also considered important

measures of agricultural significance, such as parcel size and proximity to urban areas.

Within a given LESA model, each factor is provided with a definition of how it is to be measured, and a point scale assigned. Increasingly, LESA models rate each factor on a 100-point scale, with 0 points being assigned to factors with very low values, and highest value ratings attaining up to 100 points. Once all factors have been rated (scored) each factor becomes weighted to determine its relative importance to all of the other factors being used. As a simple example, there may be two Land Evaluation factors and two Site Assessment factors in a given model, three of which are each weighted at 30% of the total value, and the final factor weighted at 10% of the total value. The actual number of factors being rated is very flexible, and will depend upon local conditions. The important detail is that the sum of the percentages (weights) of each score must add up to 100%. In this way a single numeric score (e.g., 75 points out of 100 possible points) will be attained when all of the weighted factors are summed.

Development of the Draft Yolo County LESA model

The Draft Yolo County LESA model was developed utilizing the procedures outlined above. Land Evaluation factors include information on the USDA Land Capability Classification and Storie Index Ratings for soils mapped within the Yolo County Soil Survey, as well as a measure of irrigation availability derived from the Department of Conservation's Important Farmland Map for Yolo County. The Site Assessment factors include measurements of parcel size, proximity to built-up areas and the potential for urban conflict, and the zoning designations of all parcels directly adjacent to the parcel in question.

The following text provides specific instructions for the actual measurement and weighting of each of these factors that were developed following field-testing of the Model on selected parcels throughout Yolo County.

II. Required Resources and Information

The Yolo County Land Evaluation and Site Assessment (LESA) model requires a series of straightforward measurements and calculations to score a given project. Listed below are the materials that will generally be needed to make these determinations.

A. Land Evaluation calculations require:

- An accurate map of the project, such as a parcel map. Parcel map books are available for review at the Yolo County Planning Department.
- A Yolo County Important Farmland Map produced biennially by the California Department of Conservation (DOC). These maps are available upon request from DOC, and are also available for review at the Yolo County LAFCO and Farm Bureau offices.
- The Soil Survey of Yolo County, California (USDA Soil Conservation Service,1971), available for review at the Natural Resources Conservation Service, UC Davis Shields Library, etc.

- A planimeter for making acreage determinations of irregularly shaped units.
- A Land Evaluation Worksheet (included in the Appendix).

B. Site Assessment Calculations Require:

- A photocopy of the appropriate page from the Yolo County Addressing System.
- Access to current zoning maps. These are available in the Yolo County Planning Department.
- A planimeter, compass and engineer's scale.
- A Site Assessment Worksheet (included in the appendix).

Additionally, the Yolo County Planning Department has developed a County Geographic Information System (GIS) that includes considerable land resource information. The GIS has the capability to calculate many of the specific acreage figures that are needed to operate the Yolo County LESA Model, thereby simplifying the procedure for obtaining a LESA score for a given project.

III. Yolo County LESA Factor Scoring

A. Scoring of Land Evaluation Factors

The Yolo County LESA includes three Land Evaluation factors that are separately rated:

1. Land Capability Classification Rating
2. Storie Index Rating
3. Irrigated Farmland Rating

Identifying A Project's Soils

In order to utilize the Land Capability Classification and Storie Index factors in the Yolo County LESA Model, it is first necessary to identify the soils that exist on a given project and determine their relative proportions. A Land Evaluation Worksheet (included in Appendix 3) is utilized to tabulate these figures, based upon the following instructions:

1. Locate the project on the appropriate map sheet in the Soil Survey.
2. Photocopy the map sheet or trace the project boundaries and the soil series map unit polygons and symbols (see Appendix 1) from the Soil Survey of Yolo County. Clearly delineate the project boundaries. [This process is fairly easy since the parcels are usually farmed in such a way that they have a distinct outline in the aerial photo that matches the parcel outline. If it is too difficult to distinguish the project boundaries on the map, they will have to be measured, paying close attention to the map scale].
3. Use the planimeter directly on the photocopied or traced map to determine the percentage of the area represented by each soil type (each soil type will have a different map unit symbol). {Trace each map unit with the planimeter three times and then average the area measured. It is important that the

appropriate scale conversion be set on the planimeter, and that measurements be made in the unit of acres}.

4. Identify all of the soil types contained within the project and enter the corresponding map unit symbol for each of these in Column A of the Land Evaluation Worksheet.
5. Calculate the area of each soil type with the planimeter and enter the acreage figure in Column B of the Worksheet.
6. Sum Column B to get the total area of the project and enter this amount in the box at the bottom. Crosscheck the sum by calculating the total area with the planimeter. (Note: This figure should also be close to the size designated on the parcel map.)
7. Divide the area of each soil type by the total are to get the percentage of each soil type that comprises the project. Enter the percentages in Column C. they should add up to 100%.

The Land Capability Classification Rating

1. In the Guide to mapping units, following page 102 in the Soil Survey of Yolo County, identify the Land Capability Classification (LCC) designation (e.g., IV-e) for each soil type that has been identified in the project, and enter it in column D of the Land Evaluation Worksheet.
2. Table 1 provides a conversion of the Land Capability Classification to a numeric score, based upon 100 points. Determine the Land Evaluation point value for each LCC from Table 1 for each soil type. Enter these point values in Column E of the Land Evaluation Worksheet.

Table 1. Conversion of Land Capability Classification units

LCC	I	IIe	IIs,w	IIIe	IIIs,w	IVe	IVs,w	V	VI	VII	VIII
Points	100	90	80	70	60	50	40	30	20	10	0

3. Multiply the percentage of each soil type (Column C) by the LCC points (column E) and enter the results in Column F.
4. Sum the points in Column F to obtain a single LCC score for the project

The Storie Index Rating

1. As is done with the Land Capability Classification Rating, find the Storie Index Rating (SIR) for each soil type in the Guide to mapping units, following page 102 in the Soil Survey of Yolo County. Enter these numeric ratings in Column G of the Land Evaluation Worksheet.
2. Multiply the percentage of each soil type (Column C) by the SIR (Column G) and enter the value in Column H.
3. Sum the points in Column H to get a single SIR score for the project.

The Irrigated Farmland Rating

Under the Important Farmland protocols that have been created, lands that are identified as being either Prime Farmland or Farmland of Statewide Importance, must by definition have been irrigated during the previous four years (Important Farmland maps are updated every two years). In this way, the Yolo County Important Farmland Map can be utilized as an easy and straightforward way of identifying irrigated croplands.

1. Utilizing the Yolo County Important Farmland Map to locate and delineate the project.
2. Estimate if $\geq$50% or $\leq$50% of the project perimeter is bordered by irrigated farmland, denoted by the symbols P and S for Prime Farmland and Farmland of Statewide Importance, respectively. (Only Prime Farmland and Farmland of Statewide Importance are considered to be irrigated in this model).
3. Estimate the percentage of the project itself that is irrigated (the percentage of the project that is defined as Prime Farmland or Farmland of Statewide Importance), utilizing a planimeter or other method.
4. Utilizing Table 2, determine the Irrigated Farmland Rating for the project, and enter this figure on the Land Evaluation Worksheet.

Table 2. Irrigated Cropland Rating

Percentage of project that is irrigated	Score if 50% surrounded by irrigated farmland	Score if $\leq$50% surrounded by irrigated farmland
75-100	100	100
50-74	80	60
1-49	80	40
0	80	0

B. Scoring of Site Assessment Factors

The Yolo County LESA Model includes three Site Assessment Factors that are separately scored:

1. Project Size Rating
2. Separation from Urban Conflict Rating
3. County Zoning Rating

A Site Assessment Worksheet is included in the Appendix to facilitate the scoring of these factors.

The Project Size Rating

1. Utilizing the same information collected for the different soil types identified for a given project (tabulated in Column C of the Land Evaluation Worksheet), determine the total acreage in each of three subsets: Class I and II soils; Class III soils; and Class IV or lower soils as defined by USDA LCC. Enter the acreage figures for each subset in the appropriate space on the Site Assessment Worksheet.
2. Use Table 3 to assign a point score for each of the three subsets of soils that may be found to exist in a given project. Determine which subset yields the highest score. This figure is used as the Project Size Rating, and is entered in the Site Assessment Worksheet. (For example, a given project may consist of 100 total acres, 50 of which are LCC Class I and II soils, and the remaining 50 being LCC Class III soils. In this case, the Class I and II soils would yield a score of 80 points, while the Class III soils would yield a score of 60 points. The higher score is created by the Class I and II soils, and this score [80 points] is the one that is then used to define the Project Size Rating for this project).

Table 3. Project Size Scores

Class I and II		Class III		Class IV or Lower	
Acreage	Points	Acreage	Points	Acreage	Points
≥80	100	≥160	100	≥320	100
60-80	90	120-160	90	240-320	80
40-59	80	80-119	80	160-239	60
20-39	50	60-79	70	100-159	40
10-19	30	40-59	60	40-99	20
≤10	0	20-39	30	≤40	0
		10-19	10		
		≤10	0		

The Urban Separation Rating

The percentage of the area (acreage) of a project that is beyond 500 feet of groups of 5 or more residential units is used as a measure of a project's separation from urban areas and potential urban conflict.

1. Locate the appropriate quadrant(s) (i.e., N19) for the project on the Yolo County Addressing System Field Binder Master Key (see Appendix 1).
2. Obtain a photocopy of the necessary page(s) from the Yolo County Planning Department (quadrant N19 is page N19). Sometimes an inset is needed as well.

3. Draw the boundaries of the project on the map. Locate all the cluster of 5 or more residential units within 500 feet of the edges of the project. Use a compass or engineer's scale to delineate the entire project that is within 500 feet of the edges of the units.

4. Using a planimeter, calculate the ratio of the project's area that is outside of the 500-foot delineation compared to the total project area. Multiply by 100 to obtain the Urban Conflict Rating, and enter this figure in the Site Assessment Worksheet. (For example, a project with 90% of its area outside the 500-foot delineation would receive an urban conflict score of 90.) Simply stated, a high score under the Urban Separation Rating is the result of a low proportion of a site being in close proximity to residential areas.

The County Zoning Rating

1. Use the parcel map(s) to help locate the project on the county zoning maps maintained by the Yolo County Planning Department. Determine whether or not the project is zoned AP. Identify the zoning of all of the parcels that are immediately adjacent to the project. Note exactly where the zoning changes occur along the project perimeter.

2. Measure the perimeter of the project and determine the proportion of the perimeter that is immediately adjacent to AP zoned parcels.

3. Calculate the ratio of the portion of the perimeter adjacent to AP zoning to the entire perimeter.

4. Derive the County Zoning Rating from Table 4.

Table 4. County Zoning Rating Scores

Project Zoning	Perimeter Zoning	Zoning Score
Zoned AP	≥75% of perimeter zoned AP	100
Zoned AP	50-74% of perimeter zoned AP	75
Zoned AP	≤49% of perimeter zoned AP	50
not zoned AP	≥75% of perimeter zoned AP	100
not zoned AP	50-74% of perimeter zoned AP	50
not Zoned AP	≤49% of perimeter zoned AP	0

IV. Weighting of Land Evaluation and Site Assessment Factors

Each of the Land Evaluation and Site Assessment factors is rated on a separate 100-point scale. Once this rating has been completed, the factors are weighted to define their relative significance in creating a single LESA score for a given project.

Individual Factor Weights

Each of the Yolo County LESA factors has been weighted according to the following:

Land Evaluation Factors	
Land Capability Classification	20%
Storie Index	20%
Water	10%
Land Evaluation Subtotal	50%
Site Assessment Factors	
Project Size	20%
Urban Separation	15%
County Zoning	15%
Site Assessment Subtotal	50%
Total LESA Factor Weighting	100%

In the Yolo County LESA, weighting is equally divided between the Land Evaluation factors and the Site Assessment factors (each represents 50% of the total score). For a given project, each factor's previously derived score is multiplied by the assigned weighting. The summation of each of these six weighted scores yields a single LESA score for the project, based upon 100-point scale.

V. Thresholds

The Yolo county LESA Model provides scoring thresholds that can divide agricultural land resources into four basic categories. These thresholds have been based on extensive field testing of the Model in Yolo County. The grouping are the following:

≥75 Points:	Tier 1 Agricultural Resource - the very highest agricultural importance
60-74 Points	Tier 2 Agricultural Resource - high agricultural importance
40-59 Points	Tier 3 Agricultural Resource - moderate agricultural importance
≤40 Points	Tier 4 Agricultural Resource - low agricultural importance

These thresholds are best suited for analysis of broad land use designations, such as those made under sphere of influence studies. For more specific parcel by parcel studies, such as for consideration of annexations, LESA thresholds that are based upon the individual LE and SA scores may be in order. In this way, given project would need to attain minimum score under both the LE and SA scores, in addition to the cumulative score. This reduces the likelihood of the skewing of scores (e.g. project with receiving score of 60, but with LE and SA subscores of 10 and 50).

VI. Appendix

Appendix 1 - Samples of Needed Base Information for LESA Rating

1. Zoning Map Designations
2. Soil Survey Map
3. Addressing Page

Appendix 2 - Examples of completed LESA Rating Worksheets

Examples of completed LESA Rating Worksheets

1. Land Evaluation Worksheet
2. Site Assessment Worksheet
3. Combined LESA Score Sheet

Appendix 3 - Blank LESA Worksheets

1. Land Evaluation Worksheet
2. Site Assessment Worksheet
3. Combined LESA Score Sheet

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LESA MODEL LAND EVALUATION WORKSHEET

(See Yolo County LESA narrative for detailed scoring instructions)

Project Name _____

1. Land Capability Classification, and 2. Storie Index Scoring

A	B	C	D	E	F	G	H
Soil Type (map unit)	Area	% (B/total area)	LCC	LCC points	LCC Score (C*E)	SIR	SIR Score (C*G)
Total Area				LCC Score		SIR Score	

LCC Point Assignment Table

LCC	I	IIe	IIs,w	IIIe	IIIs,w	IVe	IVs,w	V	VI	VII	VIII
Points	100	90	80	70	60	50	40	30	20	10	0

3. Irrigated Farmland Scoring

Total area of project _____ (a)
Area of project that is irrigated _____ (b)
(b) / (a) x 100 = _____ % of project that is irrigated
Length of project perimeter _____ (c)
Length of perimeter adjacent to irrigated farmland _____ (d)
(d) / (c) x 100 = _____ % surrounded by irrigated farmland

See table below for appropriate Irrigated Farmland Score.

Irrigated Farmland Score _____

Percentage of project that is irrigated	Score if 50% surrounded by irrigated farmland	Score if ≤50% surrounded by irrigated farmland
75-100	100	100
50-74	80	60
1-49	80	40
0	80	0

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LESA MODEL SITE ASSESSMENT WORKSHEET

(See Yolo County LESA narrative for detailed scoring instructions)

Project Name _____

1. Project Size

	Acres	Points
Class I and II Acres	_____	_____
Class III Acres	_____	_____
Class IV or Lower Acres	_____	_____

Project Size Score _____

Project Size Scoring

Class I and II		Class III		Class IV or Lower	
Acreage	Points	Acreage	Points	Acreage	Points
≥80	100	≥160	100	≥320	100
60-80	90	120-160	90	240-320	80
40-59	80	80-119	80	160-239	60
20-39	50	60-79	70	100-159	40
10-19	30	40-59	60	40-99	20
≤10	0	20-39	30	≤40	0
		10-19	10		
		≤10	0		

2. Urban separation

(Area of project not in urban conflict) / (total area if project) X 100 = Separation from Urban Conflict Score)

(_____) / (_____) X 100 = Urban separation Score

Urban Separation Score _____

SITE ASSESSMENT WORKSHEET (continued)

Project Name _____

3. County Zoning

Is project, or portion of project zoned AP? ☐ Yes ☐ No
Total length of project perimeter _____ (a)
Length of perimeter directly adjacent to AP zoning _____ (b)
(b) / (a) X 100 = _____ % of perimeter zoned AP
See table below for appropriate zoning score.

County Zoning Score _____

County Zoning Scoring

Project Zoning	Perimeter Zoning	Zoning Score
Zoned AP	≥75% of perimeter zoned AP	100
Zoned AP	50-74% of perimeter zoned AP	75
Zoned AP	≤49% of perimeter zoned AP	50
not zoned AP	≥75% of perimeter zoned AP	100
not zoned AP	50-74% of perimeter zoned AP	50
not Zoned AP	≤ 49% of perimeter zoned AP	0

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LESA MODEL
COMBINED LAND EVALUATION AND SITE ASSESSMENT
PROJECT SCORE SHEET

	Score	X	Weight	=	Weighted Score
Land Evaluation					
Land Capability Classification	_____	X	(0.20)	=	_____
Storie Index Rating	_____	X	(0.20)	=	_____
Irrigated Farmland	_____	X	(0.10)	=	_____
Site Assessment					
Project Size	_____	X	(0.20)	=	_____
Separation from Urban Conflict	_____	X	(0.15)	=	_____
County Zoning	_____	X	(0.15)	=	_____

Sum the above weighted scores to obtain the Total LESA Score.

Total LESA Score _____