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"Wine is as old as the thirst of man, not the physical thirst which man can so easily slake with water, as his horse and his dog do, but the heaven-sent thirst for what will still our fears—that our mind be at peace; and stir our sense and sensibility—that we shall not ignore nor abuse God's good gifts—wine not the least of them."

Wine has been the nectar of the gods, a sacrament, a liquid capable of medicinal wonders, the blood of God; it has been written about in prose, praised in poetry and used by every schoolboy as an analogy of how sweet his first kiss was.

The history of the grape and wine in America can be traced back to the first settlers that set foot on this continent and described the area as being....

....so full of grapes as the very beating and surge of the sea overflowed them...I think in all the world the like abundance is not be found.

Lief the Lucky when landing on what is now Massachusetts, in A.D. 1000 found the abundance of grapes and is said to have filled the 'afterboat' with them suggesting that grapes or wine made from them was taken back to Scandinavia. The major source of domesticated wine in the 'New World' came from Mexico. Surprisingly Mexico today boasts very little wine producing grapes. Wine was first imported into Mexico by Spaniards in 1518. The great wine regions of California today are direct descendants of Mexican viticulture.

The first Indiana vineyards were planted in Vevay, Switzerland County, about 1810, six years before Indiana became a State. Jean Jacques Dufoir left his father's vineyard in Vevay, Switzerland in hopes of starting a wine colony in the United States. He established a vineyard in Kentucky using Swiss vines brought with him. After these vines were killed by phylloxera, a vine disease Dufoir moved his colony to Indiana and named it Vevay. By 1880 Indiana was producing 100,000 gallons of wine yearly. Phylloxera, which had killed much of Ohio's grapes crops, was rapidly spreading into Indiana wine centers, Vevay and Connersville. Grape production reached an all time high in 1911 when 11,000 tons were produced. Because of grape disease and prohibition (the biggest factor in the downfall of many of the U.S. vineyards), wine production has fallen until in 1954 only 900 tons were produced. There has been a limited revival of grape production in Indiana. In 1971 the Indiana Legislature enacted a law similar to Pennsylvania's new law permitting limited wineries.

One of the first to take advantage of this law was Professor William Oliver, a member of the University of Indiana Law School faculty. Prof. Oliver started his 18 acre vineyard of French Hybrids in 1966 and Oliver Winery opened in 1972.

Few of the newer wineries have been functionally or artistically designed. This is usually not only an aesthetic loss but a business loss as well. Winery operation is expensive when the functions are not properly considered. Wine is no longer a drink used only for special occasions. Many Americans are
realizing, like Europeans have known centuries, that wines compliment any meal and that an American table wine is as good and sometimes better than the average European table wine.


THE INTENT OF THIS PROJECT IS TO WORK WITH PROFESSOR WILLIAM OLIVER OF OLIVER WINERY, BLOOMINGTON, INDIANA, AND USING OTHER SOURCES AVAILABLE THROUGH READING, OBSERVING, AND PERSONAL CONTACT TO RELOCATE OLIVER WINERY KEEPING IN MIND NOT ONLY THE FUNCTIONAL ASPECT OF WINE PRODUCTION BUT AESTHETIC, ARTISTIC AND MOST IMPORTANTLY THE PHILOSOPHY OF GRAPE GROWING AND WINE PRODUCTION.
This map shows the wine producing areas in the Midwest and gives some indication of the competition factors involved. Indiana has little competition from within the state but competition comes from Ohio and California wines. Mileage circles give some indication as to how far Oliver is from other wineries. Distribution to date is to Central Indiana and Central Illinois about 100 miles East & West.
Analysis Process 1
OLIVER WINERY

CLIENT LIVES AND WORKS IN MONROE CO. AND WANTS THE NEW WINERY THERE

GOOD REGIONAL AREA POOR

IN MONROE COUNTY OUTSIDE MONROE COUNTY

TRAFFIC EXPOSURE IS A MAJOR CONCERN AND THE GREATEST TRAFFIC FLOW OCCURS BETWEEN BLOOMINGTON & INDIANAPOLIS

NORTHERN MONROE COUNTY SOUTHERN MONROE COUNTY

FROM ALL THE ARTICLES I'VE SEEN AND A LITTLE DEDUCTIVE REASONING, 2 MILE SEEMED TO BE THE MAXIMUM DISTANCE FROM A MAJOR HIGHWAY

WITHIN 2 MILE STRIP ALONG IND. 37 OUTSIDE 2 MILE STRIP ALONG IND. 37

ANY OTHER ZONE

ZONING

AGRICULTURALLY ZONED

LANDUSE

DEVELOPABLE LAND BUT NOT ALREADY DEVELOPED

DEDICATED LANDS, HISTORIC SITES, SCHOOLS, CEMETARY, RESIDENCE, ETC.

PUBLIC LANDS ARE OBVIOUSLY NOT AVAILABLE FOR PRIVATE INVESTMENT

SLOPE

0 - 20 % GREATER THAN 20 %

MACHINERY ON SLOPES GREATER THAN 20% BECOMES MORE DANGEROUS & EROSION ON EROSION PRONE SOILS GETS TO BE MORE OF A PROBLEM OVER 20% SLOPE.

WATER

SURFACE, GROUND OR CITY WATER AVAILABLE NO WATER AVAILABLE ON SITE

GREAT AMOUNTS OF WATER ARE NEEDED TO KEEP THE WINERY CLEAN & WATER MAY BE NEEDED FOR IRRIGATION

NOT SUITABLE FOR VINEYARD LOCATION
**Analysis Process 2**

**Oliver Winery**

**Soil Drainage**

<table>
<thead>
<tr>
<th>Excessively Drained</th>
<th>Well Drained</th>
<th>Poorly Drained</th>
</tr>
</thead>
</table>

**Topo Elevation**

<table>
<thead>
<tr>
<th>Ridge Tops Higher Elevations</th>
<th>Mid Elevation Sides of Hills</th>
<th>Lower Elevations</th>
</tr>
</thead>
</table>

**Slope Orientation**

<table>
<thead>
<tr>
<th>North Slope</th>
<th>South Slope</th>
<th>S</th>
</tr>
</thead>
<tbody>
<tr>
<td>East Slope</td>
<td>West Slope</td>
<td></td>
</tr>
</tbody>
</table>

**Soil Fertility**

<table>
<thead>
<tr>
<th>Very Fertile Soil, High Grain Yield 5.0 - 6.0 pH Level</th>
<th>Medium Fertility Moderate Grain Yields 40 - 70 pH Level</th>
<th>Poor Fertility Below 4.0 and Above 7.0 pH Level</th>
</tr>
</thead>
</table>

**Vegetation**

<table>
<thead>
<tr>
<th>No Forest Cover</th>
<th>Less Than 10% Forest Cover</th>
<th>More Than 10% Forest Cover</th>
</tr>
</thead>
</table>

**Microclimate**

<table>
<thead>
<tr>
<th>Areas That Have No Frost Pocket or Special Flora &amp; Fauna</th>
</tr>
</thead>
<tbody>
<tr>
<td>Areas That Have Frost Problem Frost Pockets or Sensitive Flora &amp; Fauna</td>
</tr>
</tbody>
</table>

**Accessibility**

<table>
<thead>
<tr>
<th>Existing Access Road onto Ind. 37</th>
<th>No Access onto Ind. 37</th>
</tr>
</thead>
</table>

**Ownership**

<table>
<thead>
<tr>
<th>Sites of More Than 100 Acres</th>
<th>50 - 100 Acre Sites</th>
<th>10 - 50 Acres Adjacent to Minimum 50 Acre Site</th>
<th>Less Than 10 Acre Site</th>
</tr>
</thead>
</table>

The higher the slope the more potential it has for sun, the lower an area is the greater chance of early frost settling on vines.

North slope stays cooler in spring so buds will not prematurely open. South & west slope can be used but stand the chance of getting frosted & wind blowing vines off poles.

Medium fertile soils are good grape growers without fertilizers but poor soils are used if soil nutrients are added.

The more forest cover, the more land that has to be cleared. This is an expensive and wasteful process.

Frost pockets can be engineered around at a greater cost and sensitive areas can be developed with an economic, environmental, & aesthetic loss.

A site with no existing access roads can be developed by building a long road that connects the site to an existing road. This runs into tremendous cost & time.

The fewer owners that have to be negotiated with, the more time saving and money saving the land becomes. Large sites under the same person allow for future increase with less hassle.
Total Acreage 100 acres
Vineyard Acreage 70 acres
   Vehicular circulation system throughout vineyard
   Possible water empoundment for irrigation
Winery & Residence Acreage 30 acres
   William Oliver residence
   Employee residence(s) Full time
   Grape pickers residence seasonal
   Parking, access, and vehicular & pedestrian circulation
Winery Proper
   Test plot with all variety of grapes he grows
   Access from major road
   Greenhouse
   Parking (Zoning requirements)
   Vehicular & pedestrian circulation around winery
   Tasting, restaurant, and retail sales
Production building (buildings)
   Truck unloading
   Crushing and destemming
   Presses
   Fermination
   Bottling - labeling
   Wine storage (cellars)
   Truck loading area
   Possible water empoundment for water used in wine processing
The Burns Statutes of Indiana governing the Alcoholic Beverage Laws as seen in an earlier section of this report, gives a winery the authority to produce up to 50,000 gallons per year and sell that same amount in the winery proper. In considering the future goal of Oliver Winery, Mr. William Oliver stated that one would have to stay at or under 50,000 to take advantage of the uniqueness of a small winery and publicize it as such. (Emphasis quality and uniqueness). The other option would be to produce over 500,000 gallons a year and increase sales perimeters to the entire east coast or entire country thus competing with California's dominating, quantity wineries.

Because of the "new ness" of wine making and wine drinking in the Midwest, Mr. Oliver felt that a winery making 50,000 gallons of wine annually and stressing quality and uniqueness would be the most likely to survive and succeed. Because Mr. Oliver still teaches at Indiana University he insisted that the winery be located in Monroe County. In addition he felt that maximum exposure was needed to sell not only his own wine but the winemaking profession as well, thus location on or near a major highway was a top priority. With this in mind, the study area can be quickly reduced by limiting the area to the northern half of Monroe County since the major traffic flow is between Bloomington north to Indianapolis. Then by making a value judgement about how far the winery could be from a major highway, I took the only major highway in northern Monroe County (Indiana 37) I set a boundary strip of 2 mile on either side of (Indiana 37) from Bloomington north to the Morgan-Monroe County line. Analysis to break this area down further, follows.
With the base production figure of 50,000 gallons of wine per year we can figure the amount of vineyards needed. According to Mr. Oliver, his grape varieties produce around 5 tons per acre which produces anywhere from 160-190 gallons per ton depending on the grape variety. As a rough multiplying figure I will use 175 gallons per ton at 5 tons per acre as a base figure.

875 gallons per acre

maximum 55,000 gallons

63 acres of vineyards needed

This figure would be increased because of sales of grapes to home wine makers which Mr. Oliver encourages and also because some vines will be planted as replacement vines for future use. The vineyard area would be about 70 acres when all grape needs are considered. The other 30 acres are needed for private residence and the winery proper. Future vineyard expansion will have to be considered in site location.

notes:
United States wine sales gained more than 50% between 1967-1972, from 191 million gallons to about 305 million gallons. Increased sales can be attributed to:

1. Trend around the country toward drinking lighter alcoholic beverages.

2. American travelers returning from Europe with pleasant memories of exposure to wine at mealtimes.

3. Growing popularity of pop wines made from fruits other than grapes.

In 1972 the Bank of America forecasted an increase in wine consumption in the United States to reach 400-500 million gallons by 1980. Unfortunately 75% of the nation's wines are produced in California. Establishing wineries to meet the demand has become a hot investment opportunity in the West and could become so in the Midwest if people in the Midwest would see the future need developing. Of course, wineries are not blue chip investments because they are agricultural oriented and are subject to environmental factors (early frost, too much rain, etc.) but they are a major agricultural industry of the future. Investors must be warned of heavy initial investment, (land, farm manager, general partner, broker commission, etc.) and probably as much as 80% of the investment dollar will be going into land the first year, (based on California market). There is also a 5-6 year wait for any returns on the investment. This does make many investors back down but with the Midwest a prime wine making area and with wine sales growing, there exists an opportunity for the Midwest to profit from increased wine sales.

7-1-1-22 [12-520]. Winery permits—Class “C”—Alcoholic vinous beverage permits.—A winery permit may be issued as hereinafter provided for the manufacture of alcoholic vinous beverages, as herein defined, upon verified, written application to the commission on proper form herein authorized, to be prescribed and furnished, and said application may be granted by the commission, in its discretion, subject to the restrictions of this act [7-1-1-1—7-1-1-15]. Any winery permit shall authorize the holder thereof to manufacture, but not to rectify or fortify, alcoholic vinous beverages unless the holder thereof be also a distiller and/or rectifier holding a permit to distill and/or rectify alcoholic spirituous beverages, and said winery permit shall authorize the holder thereof to place the same in containers or bottles, and transport and sell and/or deliver the same in shipment to points outside of Indiana, and to any person holding a permit to sell alcoholic vinous beverages at wholesale to, or to any person holding a winery permit hereunder. A winery permit shall not authorize the holder thereof to sell to consumers, or to wine retailers. When such alcoholic vinous beverages are being transported and/or delivered to permittee lawfully entitled to purchase the same within this state, said beverages shall be transported or delivered only in containers which are lawful under this act, and permissible under the rules and regulations of the commission: Provided, That all the traffic and transportation by any such winery shall be subject to the rules and regulations of the commission. Before any such permit shall be granted, no notice, advertisement, or hearing shall be required, and the granting thereof shall comply with such procedure and requirements as the commission may prescribe but the applicant shall pay a license fee in the sum of five hundred dollars ($500) in cash to the administrator [chairman], and shall file a surety bond in the penal sum of one thousand dollars ($1,000) payable to the state of Indiana, to be approved by the commission, conditioned that so long as he holds such permit unreclaimed, he will not violate any of the provisions of the laws of this state touching the manufacture, sale, or transportation of alcoholic vinous beverages as defined in this act, or governing or controlling the business which he is permitted to do under such permit, or any rule or regulation of the commission; and that he will account for all license fees and or taxes levied in this act on the products manufactured and or withdrawn for sale by him; and, in order to continue such permit in force, he shall make the payment of a like sum on the same day of each year thereafter, so long as such permits shall remain in force, and shall keep the said bond in full force and effect. [Acts 1935, ch. 226, § 21, p. 1056.]

Compiler’s Note. The bracketed word “chairman” was inserted since the excise administrator as created by Acts 1935, ch. 226 was abolished by Acts 1945, ch. 357, § 1 (7-2-1-1) and duties transferred to chairman of new commission by § 3 (7-2-1-6) of such act.
7-1-1-22.5 [12-520a]. Small winery permits—Definition—Sales authorized—Permit to import.—For the purpose of encouraging the development of domestic vineyards, a small winery permit may be issued upon a verified application and the payment of a license fee of two hundred and fifty dollars [$250]. A small winery permit shall be valid from July 1 to June 30 of the following year. The holder of a small winery permit may manufacture table wines, and bottle wines, and bottle table wines produced by that small winery. The holder of a small winery permit may serve complimentary samples of and sell table wines produced by it by the glass on the premises of the small winery, and sell bottles of table wines produced by it on the premises of the small winery. The holder of a small winery permit may sell on the premises of the small winery wine by the bottle or the case to holders of permits who are authorized to sell wine at retail, including but not limited to, retail stores, restaurants, clubs, and dining cars. The holder of a small winery permit may sell wine by the bottle or the case to wholesale permit holders.

For the purposes of this section “small winery” means a winery producing table wines, from grapes, other fruits or honey produced in Indiana, in an amount not to exceed fifty thousand [50,000] gallons in one [1] year; and “table wine” means a beverage made by the fermentation of grapes, grape juice, other fruits, other fruit juices, or honey without rectification or fortification, and whose alcoholic content does not exceed fourteen per cent [14%]. Provided That a holder of a small winery permit may upon an affidavit filed with the alcoholic beverage commission that grapes, grape juice, other fruits, other fruit juices, or honey produced in Indiana are not obtainable may apply for a permit to import such products.

Under this section a small winery shall be exempt from all requirements of section 24 [7-1-1-24] of this chapter. [IC 1971, 7-1-1-22.5, as added by Acts 1971, P. L. 77, § 1, p. 391.]


7-1-1-23 [12-521]. Wine wholesalers’ and wine bottlers permits—Class “C”—Alcoholic vinous beverage permits.—(a) Wine wholesalers’ permits. A wine wholesaler’s permit may be issued as hereinafter provided. Before the commission shall grant any wine wholesaler’s permit to wholesale alcoholic vinous beverages, the applicant shall file a surety bond in the penal sum of five hundred dollars [$500], payable to the state of Indiana, conditioned that he will not violate any of the provisions of any of the laws of this state touching the manufacture or transportation, or delivery, or importation, or sale, or furnishing, or gift of alcoholic beverages, as in this act [7-1-1-1—7-1-1-45] defined, and such applicant shall also pay at or prior to the time of issuing said permit as a license fee therefor the sum of five hundred dollars [$500], and the like sum on the same day of each year thereafter, so long as said permit shall remain in force. And further conditioned that he will account for all license fees levied in this act on alcoholic vinous beverages imported by him and or which he is under legal obligation to pay on account of any provision of this act. No notice and/or publication or other proceeding shall be required for the issue of said mentioned permit, except as aforesaid, that said permit shall not be issued nevertheless except in accordance with the rules and regulations of said commission if any there be applicable thereto. Said wine wholesaler’s permit may be issued to a permittee holding a beer wholesaler’s permit to sell at wholesale alcoholic malt beverages and/or a wholesaler holding a permit to sell at wholesale alcoholic spirituous beverages.
When considering the optimum slope needed for growing grapes two things must be considered. First the slope cannot be too steep to keep machinery from operating on that slope and secondly, a highly erodible soil cannot be tilled on a slope steep enough that rain will start washing the soil away. Not only will an eroded soil be hard to get machinery across, but when the topsoil starts washing away, the vine roots are exposed and the plant dies. To establish a chart of slopes from excellent to poor, I will study both the machinery slope capability chart and erosion susceptibility chart and then combine the two charts into one slope acceptability.

<table>
<thead>
<tr>
<th>Machinery Operation</th>
<th>Possibility of Development Without Erosion Occurring</th>
</tr>
</thead>
<tbody>
<tr>
<td>EXCELLENT</td>
<td>EXCELLENT- Wakeland, Stendal Haymond, Bartel soils</td>
</tr>
<tr>
<td>GOOD</td>
<td>MODERATE- Cincinnatti-Ava Crider-Weikert-Berks soils, 0-12% slope</td>
</tr>
<tr>
<td>POOR</td>
<td>POOR- Cincinnatti-Ava, Crider-Weikert-Berks soils, 12% slope Corydon-Weikert-Berks soils severe limitations on all slopes</td>
</tr>
</tbody>
</table>

SLOPE SUITABILITY FOR GRAPE PRODUCTION

EXCELLENT-

MODERATE-

SATISFACTORY-

POOR-
Water is one of the most important raw materials when it comes to operating a winery because of its use in cleaning and sanitizing the equipment and building. Water can also be an asset for aesthetic purposes when located close to the tasting rooms and restaurant. The best areas would be areas where water embayment would be possible. A watershed area or stream would be ideal but would not be necessary since 10-40 gallons per minute of water can be drawn from the deep bedrock aquifer that underlies the entire northern part of the county and could be pumped and stored in a surface pond. A city water line also runs parallel to Ind. 37 but with increasing utility prices there should be alternate water systems available.

GOOD- Watershed area, stream or existing lake or access to city water utility.
SATISFACTORY- No major watershed area, no existing surface water, no access to city water, does have access to city water.
POOR- No surface water, no ground water.

notes:

Water is also needed for irrigation in case of a dry season. Thus the embayment water must be made to the specifications.

A combination of water embayment and wells or water embayment with city water is another viable solution so that in case of a dry season with no water coming in, if waterained be embayed, the city or well water could be used. On the other hand, if city water rates are extremely high the vineyard could cut back on city water and use pond water or stored well water.
The worst enemy of grape growing is poorly drained soils. Not only does excess water choke the roots of the vines and cut grape yield, it also stunts the growth of the vine roots. In a poorly drained soil, roots may penetrate only a couple of feet or less, whereas on a deep, well-drained soil they will penetrate six feet or more. A quick and rough technique of checking subsoil drainage would be a visual test described by Ohio State University agriculture department....

*A bright, uniformly yellowish-brown or brown subsoil indicates good internal drainage. Subsoils showing slight mottling of yellow, gray and orange indicate only moderate drainage. Poorly drained subsoils are characterized by greater mottling or, in some cases, by a rather uniform dark gray color.

This visual test however should not be a substitute for test borings on the site. Once the borings are taken, the core should be checked by a soils expert or county agriculture extension agent. He can tell you if the soil will drain sufficiently enough to support grapes. It is very time consuming and expensive to alleviate poor drainage problems so it is imperative to get a well-drained site to begin with. Using the limited soil family chart of Monroe County, the drainage capacity from best drained to most poorly drained soils are....

| EXCELLENT- | Crider-Hagerstown-Fredrick soils, silt and weathered limestone offer excellent subsoil drainage. |
| GOOD-     | Corydon-Weikert-Berks soils, clay soil in weathered limestone, also shallow loamy soil in weathered limestone good subsoil drainage especially areas of underlying loam. |
| MODERATE- | Cincinnatti-Ava soils, moderately well drained silty soil with some areas of extremely impermeable subsoils. |
| POOR-     | Wakeland-Stendal-Haymond-Bartle soils, somewhat poorly drained silt and some well drained silty soils. Here again there are scattered spots of extremely impermeable subsoils. These soils are usually located in low, flat areas |

*GRAPE GROWING, Ohio State University, Bulletin No.509
In Europe it is evident that the best vineyards are located on bluffs and hillsides overlooking river valleys. The famous Bordeaux region in the Garonne River Valley, Burgundy in the Rhone Valley and Champagne in the Seine River Valley. This placement of wineries on the rolling hills overlooking scenic rivers are not for aesthetics only. On the contrary the hilltops and hillsides provide the best possible sunshine and prevailing winds into and through the valleys to carry early frost off of the hills and into the lower areas. These same winds in the spring keep the buds from opening until the last frost is over. In the area that I am studying, the elevations run from 577.0' above sea level to 923.0' above sea level. To determine the hilltops and hillsides (the best grape growing areas), I broke the elevations down into three categories. The relatively flat higher elevations, above 800.0', I considered the hilltops and gave that category an excellent rating. When the topography started to flatten again at the bottom of the slopes, 650.0', I classified these elevations, from 650-800', as hillsides and gave them a good rating. The lower elevations, below 650.0', were considered the valley floors and they are considered poor areas for growing grapes. It is unfortunate that there are no river valleys in Monroe County but there are an abundance of ridges and ravines that are suitable for growing French Hybrid grapes in the county.

**EXCELLENT** - 923.0' - 800.0' elevation
   good sun orientation and excellent wind movement to carry frost off of the grapes.

**GOOD** - 800.0' - 650.0' elevation
   good wind movement down slopes to carry frost off of grapes
   If slope is North and East oriented (see Slope Orientation sheet)
   Then the slope is even better suited

**POOR** - 650.0' - 577.0' elevation
   Frost and flood waters are more likely to occur in lower areas.
   Frost settles to lower elevations.

* Derived from slope percent*
Slope orientation becomes very important to consider in grape growing when the site is in an area that is capable of early spring thaws and warm temperatures followed by a killing frost. Indiana is notorious for this killing frost syndrome so slope orientation should be carefully considered. A North slope, even though it does not get as much sun as a South slope, is the best area for grape growing because spring sun will not warm the vine and cause it to bloom early and then get frosted. South slopes because they do get the earlier warm sun blossom earlier but can get caught by frost. A Western slope must also be avoided because the strength of some wind gusts are enough to damage the vines and blow the vines off their trellises.

Grape planting, where slope permits, would be better if the rows were planted in an East-West direction so the trellises will not shade the vines. Prevailing winds would also dry the leaves faster after a dew or rain, reducing disease problems. Remember, however, that steeper slopes rows must be planted with the contours to reduce the chance of erosion.

Good - North and East slopes
Poor - South and West slopes
As the soil fertility increases the number of vines that can be planted increases and the number of grapes per acre increases, likewise as the soil fertility decreases the soil will support less vines and grape yields will go down. While grapes produce best on more fertile soil the less fertile soils are satisfactory for growing grapes with fertilizing or other soil nutrients added.

Grapes can be grown successfully over a wide range of soil pH conditions but perform best where soil pH is between 5.0 and 6.0. a slightly acid soil

SOIL FAVORABILITY FOR GROWING GRAPES

GOOD- Crider-Hagerstown-Fredrick soil pH range 5.6-7.3 in topsoil good to moderate organic material in topsoil.

MODERATE- Wakeland-Stendal-Hoymond-Bartle soil pH range 4.5-7.3 in topsoil fair to low organic matter in topsoil.

POOR- Cincinnati-Ava soil pH range in topsoil low organic matter in topsoil.

Corydon-Weikert-Berks soil pH range 5-7.3 in topsoil low organic matter in topsoil.

notes:
The best sites for vineyard location is obviously an open field devoid of any canopy vegetation. Trees cannot be close to the vineyards because they might shade the grape in some way. In cost of initial field work and grape installation, the cleared field would also be the most profitable. A site with a canopy cover would have to be cleared for the vineyard installation which is not only a costly process (with a bulldozer with blade and root rake renting for $40-$50 per hour) but also a waste of natural resources. Some forested canopy area can be present on the site for the location of the restaurant and winery property.

Good - Little vegetation, less than 5% of total site

Poor - Forest, canopy cover on over 5% of total 100 acre site
In the case of microclimates that concern grape growing the most important one to watch for would be frost pockets. This can be caused by quite a few situations but can also be avoided with proper placement:

**Problem**
Trees on top of slope cause wind to skip top of slope allowing frost to settle on vines nearest trees.

**Solution**
A clear hill top allows wind to be pulled over crest and carry frost down slope into low areas.

**Problem**
Planting vines between tree blocks may cause wind to skip over cleared area and frost will settle on.

**Solution**
Vegetation along vineyard edges should be stepped down so air flow will reach into and blow through the vines.

Special considerations must also be made if there is any special or rare flora or fauna on the site. This would include a rare or endangered animal species or plant life that is very sensitive to change.

_do not develop these areas_
Because Indiana 37 is a minimum access highway there will need to be some effort to find a site that is close to a fence opening for an access road or locate on a smaller artery off Indiana 37, preferably one that is or can be paved with a hard surface to handle the traffic without excess dust and slipping hazard. Accessibility will be determined when the large general sites are found. Determination of access will be made by personal on-site evaluation.

Good - Fence cut, direct access to Indiana 37 or location along existing road

Poor - No access to Indiana 37
Since costs are always important in a business situation land should be acquired with as little expense as possible to allow money to be channeled into the winery itself. Since the winery has been limited to agriculturally zoned land, that should lower the cost over residentially zoned areas. The larger the tract of land available from one owner, the better since there will be less hassle in negotiating between one party than negotiating between two or more parties to buy the required acreage. Also small lots, under 10 acres, are usually prime areas for residences and the price goes up when realtors see a person shopping for home sites.

The owner of a larger site, even if partially developed, would be more willing to sell the undeveloped areas before the owner of a ten acre site would part with undeveloped acreage. 5-10 acres is not enough to hassle with in a business situation.

EXCELLENT- Sites of more than 100 acres, this allows for future expansion buying from same owner.

GOOD- Sites of 50-100 acres

SATISFACTORY- Sites of 10-50 acres if they adjoin minimum 50 acre lot

POOR- Less than 10 acres

notes:
Aging: A complex process of oxidation and esterification, resulting in the formation of a desireable aroma and bouquet and in the loss of the raw flavor and taste of the new wine.

Appetizer Wine: American equivalent to French term Aperitif. Includes Sherry, D'Or Wines, etc. used to stimulate appetite before meals.

Aroma: The perfume of wine that originates from the grapes used in making the wine, contrasted to "bouquet", the perfume of the wine itself.

Astringency: A quality of wine that causes the mouth to pucker and which is directly related to the wine's acid and tannin content.

Body: The feeling of substance in a wine. Depends on the amount of soluble solids in the wine, which distinguishes heavy and light bodied wines.

Bottles: Wines packaged in the U.S. for sale in interstate commerce may use only the following bottle sizes: Miniature: 2.3 or 4 oz.
Split 6.4 oz. (Champagne mainly).
Half pint: 8 ozs.
Tenth: 12.8 oz.
Pint: 16 oz.
Fifth: 25.6 oz (Most widely used size).
Quart: 32 oz.
Magnum: 51.2 oz. (two fifths).
Half Gallon: 64 oz.
Gallon: 128 oz.
Jeroboam: 102.4 oz. (Double Magnum)
4.9 Gallon: (Demijohn)
Foreign wines packaged in their country, for sale here, and U.S. wines sold only in the state where they are packaged, are not limited to these bottle sizes.

Bouquet: The perfume of wine, as distinguished from aroma, the perfume of the grape. Comes from slow oxidation of the alcohol in the presence of fruit acid in the wine.

Brut: Thoroughly dry, refers to Champagne and other sparkling wines to which no sweetening has been added.

Burgundy: A red table wine, heavier in body, and darker in color.

Carbonated Wines: Wines made sparkling by being charged directly with carbon dioxide gas. Production of this wine type in America is limited.

Champagne: Wine made effervescent by second fermentation in a closed container. This produces a gas (CO₂) which is trapped in the wine and escapes slowly when the bottle is opened, providing a "sparkle" to the wine.
Charmat Process: Method of producing sparkling wine by causing a second fermentation in a large-sized closed container instead of in the bottle.

Chateau: In wine, a castle or large country estate in France which gives its name to the wines produced there.

Concord: The most widely planted native American grape in the U.S. Used in the production of the popular Kosher type wines and Cold Duck.

Dry: In wines, "dry" simply indicates the absence or near absence of sweetness. A dry wine is not "sour". It simply lacks sweetness.

Fermentation: The chemical action of yeast enzymes on grape sugar, which transforms the sugar into equal parts of carbon dioxide gas and alcohol. Fermentation changes the must (the juice and pulp of grapes) into wine. If fermentation is permitted to proceed until all the grape sugar is used up, the result is a dry wine. Fermentation can be stopped by pasteurization, by additions of small amounts of sulfur dioxide and, for dessert wines, by the addition of grape brandy. Open vats are used in the fermentation of "must" into wine.

Foxiness: The unmistakable and taste characteristic of Michigan, Ohio and New York grapes. Once deplored many wines now frankly seek this foxiness.

Kosher Wines: Wines made under the supervision of a Rabbi to conform with Jewish religious practices. The Concord flavored, light-alcohol, sugar sweetened wine.

Mellow: Term for wine which is soft and ripe and well matured.

Michigan Grape Districts: They are located in the southwestern part of Michigan (Van Buren, Berrien, Kalamazoo, Allegan, Cass and Ottawa counties).

Oenology: Science of wine making. Also spelled Enology.

Port: Rich heavy bodied, sweet dessert wine.

Proof: A system of measuring the alcoholic strength of a beverage. One degree alcohol is equal to two degrees proof. Alcoholic content of spirituous beverages must be shown on the label in terms of proof; but in wine (and beer) alcoholic content is shown in per cent alcohol by volume.

Rosé Wine: A pink or rose-colored wine which has become very popular in recent years. The pink color is provided by fermenting the wine only for a short time with the grape skins (from which the color comes), yet not long enough to give the wine a deep red color.

Sauterne: White table wine, dry or slightly sweet, golden color. Only in the U.S. is there such a wine as dry Sauterne. (See Haut Sauterne). Americans buy more Sauterne than any other type of white table wine.
Sediment: Deposit that settles naturally in the casks and bottles of wine, with the passage of time.

Sherry: Appetizer wine of a nutty flavor, light to dark amber in color. Ranges dry to very sweet.

Sparkling Wines: Wines made effervescent by natural fermentation.

Table Wines: Red, Pink and white wines, usually dry, and containing from 10 to 14 per cent alcohol.

Varietal Wine: A wine named after the grape from which at least 51 per cent of the wine is made.

Vintage Wines: Wines which show the year of production on the label. Of particular importance in European wines, where one vintage can vary greatly from another. In America while there is sometimes a difference in the wines produced from year to year, the variation is small.

Wine States: Wine is produced commercially in 27 states. In California, the grape and wine industry is the major agricultural industry. The important grape and wine producing states are California, New York, Michigan, Ohio, New Jersey, Washington, Oregon, North Carolina, Georgia, Iowa, Virginia, Missouri and Arkansas.

Young Wines: Wines less than a year old.

ADDENDUM

Destemming: Simply taking the stems off of the grape so the stem will not pollute the fermenting wine. This is the first process in wine production.

Ritting: Usually associated with champagne production. It is the process of storing the bottles upside down to let the sediment settle to the neck of the bottle. As the bottles sit upside down in racks they are riddled or turned every few hours to work the sediment to the neck evenly. When all the sediment has collected, the neck of the bottle is quick frozen to harden the sediment then the cork is removed shooting the sediment out. The lost wine is replaced and the bottle re-corked.
<table>
<thead>
<tr>
<th>Low erosion soil</th>
<th>SITE 1</th>
<th>SITE 2</th>
<th>SITE 3</th>
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<tbody>
<tr>
<td>5-25% slope</td>
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<td>Surface water or potential for surface water</td>
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<td>Good soil drainage</td>
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<td>Elevation between 800'0 - 923'0</td>
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<td>Slope oriented toward North or East</td>
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<td>Fertile soil, moderate organic material in topsoil</td>
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<td>pH level around 5.0-6.0</td>
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<td>Low vegetation cover less than 15% of site</td>
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<td>No sensitive plant material</td>
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<td>Maximum exposure from Indiana 37</td>
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<td>Allows for future expansion</td>
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<td><strong>AESTHETIC</strong></td>
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