Submittal Document II.I. USDA NRCS Soil Resources Report
Custom Soil Resource Report for
Lapeer County, Michigan
Approximate Mining Boundary
Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (http://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the
individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.
Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.
The soil surveys that comprise your AOI were mapped at 1:15,800.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Lapeer County, Michigan
Survey Area Data: Version 11, Sep 17, 2014

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Sep 18, 2011—Mar 21, 2012

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.
# Map Unit Legend

Lapeer County, Michigan (MI087)

<table>
<thead>
<tr>
<th>Map Unit Symbol</th>
<th>Map Unit Name</th>
<th>Acres in AOI</th>
<th>Percent of AOI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ad</td>
<td>Adrian muck</td>
<td>13.5</td>
<td>1.8%</td>
</tr>
<tr>
<td>BrD</td>
<td>Boyer loamy sand, 12 to 18 percent slopes</td>
<td>18.5</td>
<td>2.5%</td>
</tr>
<tr>
<td>BrE</td>
<td>Boyer loamy sand, 18 to 25 percent slopes</td>
<td>96.0</td>
<td>12.9%</td>
</tr>
<tr>
<td>BrF</td>
<td>Boyer loamy sand, 25 to 50 percent slopes</td>
<td>193.1</td>
<td>25.9%</td>
</tr>
<tr>
<td>BsB</td>
<td>Boyer sandy loam, 1 to 6 percent slopes</td>
<td>20.7</td>
<td>2.8%</td>
</tr>
<tr>
<td>BsC</td>
<td>Boyer sandy loam, 6 to 12 percent slopes</td>
<td>40.4</td>
<td>5.4%</td>
</tr>
<tr>
<td>Cc</td>
<td>Carlisle muck</td>
<td>7.6</td>
<td>1.0%</td>
</tr>
<tr>
<td>Co</td>
<td>Colwood loam</td>
<td>3.1</td>
<td>0.4%</td>
</tr>
<tr>
<td>CvB</td>
<td>Conover loam, 2 to 6 percent slopes</td>
<td>0.3</td>
<td>0.0%</td>
</tr>
<tr>
<td>Ed</td>
<td>Edwards muck</td>
<td>8.7</td>
<td>1.2%</td>
</tr>
<tr>
<td>FaA</td>
<td>Fabius-Wasepi sandy loams, 0 to 2 percent slopes</td>
<td>1.4</td>
<td>0.2%</td>
</tr>
<tr>
<td>Gr</td>
<td>Gravel pits</td>
<td>2.4</td>
<td>0.3%</td>
</tr>
<tr>
<td>Ho</td>
<td>Houghton muck</td>
<td>2.1</td>
<td>0.3%</td>
</tr>
<tr>
<td>KbB</td>
<td>Kibbie loam, 2 to 6 percent slopes</td>
<td>9.2</td>
<td>1.2%</td>
</tr>
<tr>
<td>LaB</td>
<td>Lapeer sandy loam, 2 to 6 percent slopes</td>
<td>43.4</td>
<td>5.8%</td>
</tr>
<tr>
<td>LaC</td>
<td>Lapeer sandy loam, 6 to 12 percent slopes</td>
<td>80.8</td>
<td>10.8%</td>
</tr>
<tr>
<td>LaC2</td>
<td>Lapeer sandy loam, 6 to 12 percent slopes, moderately eroded</td>
<td>13.4</td>
<td>1.8%</td>
</tr>
<tr>
<td>LaD2</td>
<td>Lapeer sandy loam, 12 to 18 percent slopes, moderately eroded</td>
<td>59.3</td>
<td>8.0%</td>
</tr>
<tr>
<td>LaE2</td>
<td>Lapeer sandy loam, 18 to 25 percent slopes, moderately eroded</td>
<td>42.8</td>
<td>5.8%</td>
</tr>
<tr>
<td>LaF</td>
<td>Lapeer sandy loam, 25 to 60 percent slopes</td>
<td>32.8</td>
<td>4.4%</td>
</tr>
<tr>
<td>LoA</td>
<td>Locke sandy loam, 0 to 2 percent slopes</td>
<td>3.0</td>
<td>0.4%</td>
</tr>
<tr>
<td>MoB</td>
<td>Miami loam, 2 to 6 percent slopes</td>
<td>7.2</td>
<td>1.0%</td>
</tr>
<tr>
<td>MoB2</td>
<td>Miami loam, 2 to 6 percent slopes, moderately eroded</td>
<td>1.6</td>
<td>0.2%</td>
</tr>
</tbody>
</table>
Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic
classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a soil series. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into soil phases. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A complex consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An association is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An undifferentiated group is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include miscellaneous areas. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.
Lapeer County, Michigan

Ad—Adrian muck

Map Unit Setting
- National map unit symbol: 6frg
- Elevation: 780 to 1,040 feet
- Mean annual precipitation: 31 to 32 inches
- Mean annual air temperature: 47 to 48 degrees F
- Frost-free period: 108 to 178 days
- Farmland classification: Not prime farmland

Map Unit Composition
- Adrian and similar soils: 100 percent
  - Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Adrian

Setting
- Landform: Depressions on lake plains, depressions on drainageways
- Landform position (three-dimensional): Dip
- Down-slope shape: Linear
- Across-slope shape: Linear
- Parent material: Herbaceous organic material over sandy glaciofluvial deposits

Typical profile
- Oa1 - 0 to 12 inches: muck
- Oa2 - 12 to 30 inches: muck
- 2Cg - 30 to 80 inches: sand

Properties and qualities
- Slope: 0 to 2 percent
- Depth to restrictive feature: More than 80 inches
- Natural drainage class: Very poorly drained
- Runoff class: Negligible
- Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 6.00 in/hr)
- Depth to water table: About 0 inches
- Frequency of flooding: None
- Frequency of ponding: Frequent
- Available water storage in profile: Very high (about 13.8 inches)

Interpretive groups
- Land capability classification (irrigated): None specified
- Land capability classification (nonirrigated): 5w
- Hydrologic Soil Group: A/D

BrD—Boyer loamy sand, 12 to 18 percent slopes

Map Unit Setting
- National map unit symbol: 2t6l5
Custom Soil Resource Report

**Elevation:** 700 to 1,250 feet
**Mean annual precipitation:** 32 to 40 inches
**Mean annual air temperature:** 46 to 50 degrees F
**Frost-free period:** 120 to 180 days
**Farmland classification:** Not prime farmland

**Map Unit Composition**
- **Boyer and similar soils:** 85 percent
- **Minor components:** 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

**Description of Boyer**

**Setting**
- **Landform:** Moraines, stream terraces
- **Landform position (two-dimensional):** Backslope
- **Landform position (three-dimensional):** Side slope, riser
- **Down-slope shape:** Linear
- **Across-slope shape:** Linear, convex
- **Parent material:** Loamy outwash and/or sandy outwash over sandy and gravelly outwash

**Typical profile**
- **Ap - 0 to 8 inches:** loamy sand
- **E - 8 to 16 inches:** loamy sand
- **Bt - 16 to 30 inches:** sandy loam
- **2C - 30 to 79 inches:** stratified coarse sand to gravelly sand to very gravelly sand

**Properties and qualities**
- **Slope:** 12 to 18 percent
- **Depth to restrictive feature:** 20 to 40 inches to strongly contrasting textural stratification
- **Natural drainage class:** Well drained
- **Runoff class:** Low
- **Capacity of the most limiting layer to transmit water (Ksat):** Moderately high to high (0.60 to 6.00 in/hr)
- **Depth to water table:** More than 80 inches
- **Frequency of flooding:** None
- **Frequency of ponding:** None
- **Calcium carbonate, maximum in profile:** 40 percent
- **Salinity, maximum in profile:** Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
- **Available water storage in profile:** Low (about 3.1 inches)

**Interpretive groups**
- **Land capability classification (irrigated):** None specified
- **Land capability classification (nonirrigated):** 4e
- **Hydrologic Soil Group:** A

**Minor Components**

**Oshtemo**
- **Percent of map unit:** 9 percent
- **Landform:** Stream terraces, moraines
- **Landform position (two-dimensional):** Backslope
- **Landform position (three-dimensional):** Side slope, riser
- **Down-slope shape:** Linear
- **Across-slope shape:** Convex, linear
Spinks

Percent of map unit: 6 percent
Landform: Stream terraces, moraines
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope, riser
Down-slope shape: Linear
Across-slope shape: Convex, linear

BrE—Boyer loamy sand, 18 to 25 percent slopes

Map Unit Setting

National map unit symbol: 2t6l6
Elevation: 800 to 1,100 feet
Mean annual precipitation: 32 to 36 inches
Mean annual air temperature: 46 to 48 degrees F
Frost-free period: 140 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

Boyer and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Boyer

Setting

Landform: Stream terraces, moraines
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope, riser
Down-slope shape: Linear
Across-slope shape: Convex, linear
Parent material: Loamy outwash and/or sandy outwash over sandy and gravelly outwash

Typical profile

A - 0 to 7 inches: loamy sand
E - 7 to 15 inches: loamy sand
Bt - 15 to 28 inches: sandy loam
2C - 28 to 79 inches: stratified coarse sand to gravelly sand to very gravelly sand

Properties and qualities

Slope: 18 to 25 percent
Depth to restrictive feature: 20 to 40 inches to strongly contrasting textural stratification
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 40 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Low (about 3.1 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: A

Minor Components
Spinks
Percent of map unit: 9 percent
Landform: Moraines, stream terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope, riser
Down-slope shape: Linear
Across-slope shape: Linear, convex

Oshtemo
Percent of map unit: 6 percent
Landform: Moraines, stream terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope, riser
Down-slope shape: Linear
Across-slope shape: Linear, convex

BrF—Boyer loamy sand, 25 to 50 percent slopes

Map Unit Setting
National map unit symbol: 2t6l7
Elevation: 800 to 1,100 feet
Mean annual precipitation: 32 to 36 inches
Mean annual air temperature: 46 to 48 degrees F
Frost-free period: 140 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition
Boyer and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Boyer
Setting
Landform: Stream terraces, moraines
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope, riser
Down-slope shape: Linear
Across-slope shape: Convex, linear
**Parent material:** Loamy outwash and/or sandy outwash over sandy and gravelly outwash

**Typical profile**
- **A** - 0 to 7 inches: loamy sand
- **E** - 7 to 15 inches: loamy sand
- **Bt** - 15 to 28 inches: sandy loam
- **2C** - 28 to 79 inches: stratified coarse sand to gravelly sand to very gravelly sand

**Properties and qualities**
- **Slope:** 25 to 50 percent
- **Depth to restrictive feature:** 20 to 40 inches to strongly contrasting textural stratification
- **Natural drainage class:** Well drained
- **Runoff class:** Medium
- **Capacity of the most limiting layer to transmit water (Ksat):** Moderately high to high (0.60 to 6.00 in/hr)
- **Depth to water table:** More than 80 inches
- **Frequency of flooding:** None
- **Frequency of ponding:** None
- **Calcium carbonate, maximum in profile:** 40 percent
- **Salinity, maximum in profile:** Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
- **Available water storage in profile:** Low (about 3.1 inches)

**Interpretive groups**
- **Land capability classification (irrigated):** None specified
- **Land capability classification (nonirrigated):** 7e
- **Hydrologic Soil Group:** A

**Minor Components**

**Spinks**
- **Percent of map unit:** 9 percent
- **Landform:** Moraines, stream terraces
- **Landform position (two-dimensional):** Backslope
- **Landform position (three-dimensional):** Side slope, riser
- **Down-slope shape:** Linear
- **Across-slope shape:** Linear, convex

**Oshtemo**
- **Percent of map unit:** 6 percent
- **Landform:** Stream terraces, moraines
- **Landform position (two-dimensional):** Backslope
- **Landform position (three-dimensional):** Side slope, riser
- **Down-slope shape:** Linear
- **Across-slope shape:** Convex, linear

**BsB—Boyer sandy loam, 1 to 6 percent slopes**

**Map Unit Setting**
- **National map unit symbol:** 2t6l9
Elevation: 700 to 1,250 feet
Mean annual precipitation: 32 to 40 inches
Mean annual air temperature: 46 to 50 degrees F
Frost-free period: 120 to 180 days
Farmland classification: Farmland of local importance

Map Unit Composition
Boyer and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Boyer

Setting
Landform: Stream terraces, moraines
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope, tread
Down-slope shape: Linear
Across-slope shape: Convex, linear
Parent material: Loamy outwash and/or sandy outwash over sandy and gravelly outwash

Typical profile
Ap - 0 to 9 inches: sandy loam
E - 9 to 17 inches: sandy loam
Bt - 17 to 30 inches: sandy loam
2C - 30 to 79 inches: stratified coarse sand to gravelly sand to very gravelly sand

Properties and qualities
Slope: 1 to 6 percent
Depth to restrictive feature: 20 to 40 inches to strongly contrasting textural stratification
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 40 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Low (about 3.4 inches)

Interpretive groups
Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: A

Minor Components
Oshtemo
Percent of map unit: 9 percent
Landform: Stream terraces, moraines
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope, tread
Down-slope shape: Linear
Across-slope shape: Convex, linear
Bronson

Percent of map unit: 6 percent
Landform: Moraines, stream terraces
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Side slope, tread
Down-slope shape: Linear
Across-slope shape: Concave

BsC—Boyer sandy loam, 6 to 12 percent slopes

Map Unit Setting

National map unit symbol: 2t6l8
Elevation: 700 to 1,250 feet
Mean annual precipitation: 32 to 40 inches
Mean annual air temperature: 46 to 50 degrees F
Frost-free period: 120 to 180 days
Farmland classification: Farmland of local importance

Map Unit Composition

Boyer and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the map unit.

Description of Boyer

Setting

Landform: Moraines, stream terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope, riser
Down-slope shape: Linear
Across-slope shape: Linear, convex
Parent material: Loamy outwash and/or sandy outwash over sandy and gravelly outwash

Typical profile

Ap - 0 to 9 inches: sandy loam
E - 9 to 17 inches: sandy loam
Bt - 17 to 30 inches: sandy loam
2C - 30 to 79 inches: stratified coarse sand to gravelly sand to very gravelly sand

Properties and qualities

Slope: 6 to 12 percent
Depth to restrictive feature: 20 to 40 inches to strongly contrasting textural stratification
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
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Frequency of ponding: None
Calcium carbonate, maximum in profile: 40 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Low (about 3.1 inches)

Interpretive groups
   Land capability classification (irrigated): 3e
   Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: A

Minor Components

Oshtemo
   Percent of map unit: 9 percent
   Landform: Moraines, stream terraces
   Landform position (two-dimensional): Backslope
   Landform position (three-dimensional): Side slope, riser
   Down-slope shape: Linear
   Across-slope shape: Linear, convex

Spinks
   Percent of map unit: 6 percent
   Landform: Stream terraces, moraines
   Landform position (two-dimensional): Backslope
   Landform position (three-dimensional): Side slope, riser
   Down-slope shape: Linear
   Across-slope shape: Convex, linear

Cc—Carlisle muck

Map Unit Setting
   National map unit symbol: 6fsm
   Elevation: 750 to 1,130 feet
   Mean annual precipitation: 31 to 32 inches
   Mean annual air temperature: 47 to 48 degrees F
   Frost-free period: 108 to 178 days
   Farmland classification: Not prime farmland

Map Unit Composition
   Carlisle and similar soils: 100 percent
   Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Carlisle

Setting
   Landform: Depressions on moraines, depressions on till plains, depressions on outwash plains
   Landform position (three-dimensional): Dip
   Down-slope shape: Linear
   Across-slope shape: Linear
   Parent material: Herbaceous organic material and/or woody organic material
Typical profile
- Oa1 - 0 to 14 inches: muck
- Oa2 - 14 to 28 inches: muck
- Oa3 - 28 to 80 inches: muck

Properties and qualities
- Slope: 0 to 1 percent
- Depth to restrictive feature: More than 80 inches
- Natural drainage class: Very poorly drained
- Runoff class: Negligible
- Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 6.00 in/hr)
- Depth to water table: About 0 inches
- Frequency of flooding: None
- Frequency of ponding: Frequent
- Available water storage in profile: Very high (about 23.9 inches)

Interpretive groups
- Land capability classification (irrigated): None specified
- Land capability classification (nonirrigated): 5w
- Hydrologic Soil Group: A/D

Co—Colwood loam

Map Unit Setting
- National map unit symbol: 6fsx
- Elevation: 760 to 1,130 feet
- Mean annual precipitation: 31 to 32 inches
- Mean annual air temperature: 47 to 48 degrees F
- Frost-free period: 108 to 178 days
- Farmland classification: Prime farmland if drained

Map Unit Composition
- Colwood and similar soils: 100 percent
- Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Colwood

Setting
- Landform: Outwash plains, lake plains
- Landform position (three-dimensional): Talf
- Down-slope shape: Linear
- Across-slope shape: Linear
- Parent material: Loamy glaciolacustrine deposits and/or glaciofluvial deposits

Typical profile
- Ap - 0 to 9 inches: loam
- A - 9 to 11 inches: loam
- Bg - 11 to 18 inches: loam
- Btg - 18 to 32 inches: silty clay loam
- 2Cg1 - 32 to 39 inches: stratified silt to fine sand to silt loam
- 3Cg2 - 39 to 80 inches: stratified silt to fine sand to very fine sand
Properties and qualities
- **Slope**: 0 to 1 percent
- **Depth to restrictive feature**: More than 80 inches
- **Natural drainage class**: Poorly drained
- **Runoff class**: Negligible
- **Capacity of the most limiting layer to transmit water (Ksat)**: Moderately high to high (0.20 to 6.00 in/hr)
- **Depth to water table**: About 0 inches
- **Frequency of flooding**: None
- **Frequency of ponding**: Frequent
- **Calcium carbonate, maximum in profile**: 35 percent
- **Available water storage in profile**: Very high (about 12.1 inches)

Interpretive groups
- **Land capability classification (irrigated)**: None specified
- **Land capability classification (nonirrigated)**: 2w
- **Hydrologic Soil Group**: C/D

CvB—Conover loam, 2 to 6 percent slopes

**Map Unit Setting**
- **National map unit symbol**: 6fsz
- **Elevation**: 760 to 1,170 feet
- **Mean annual precipitation**: 31 to 32 inches
- **Mean annual air temperature**: 47 to 48 degrees F
- **Frost-free period**: 108 to 178 days
- **Farmland classification**: Prime farmland if drained

**Map Unit Composition**
- **Conover and similar soils**: 95 percent
- **Minor components**: 5 percent

*Estimates are based on observations, descriptions, and transects of the map unit.*

**Description of Conover**

**Setting**
- **Landform**: Knolls on till plains
- **Landform position (three-dimensional)**: Rise
- **Down-slope shape**: Linear
- **Across-slope shape**: Convex
- **Parent material**: Loamy till

**Typical profile**
- **Ap - 0 to 8 inches**: loam
- **E - 8 to 11 inches**: loam
- **Bt1 - 11 to 14 inches**: clay loam
- **Bt2 - 14 to 28 inches**: clay loam
- **C - 28 to 80 inches**: loam

**Properties and qualities**
- **Slope**: 2 to 6 percent
- **Depth to restrictive feature**: More than 80 inches
Natural drainage class: Somewhat poorly drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 2.00 in/hr)
Depth to water table: About 6 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 30 percent
Available water storage in profile: High (about 10.9 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C/D

Minor Components
Brookston
Percent of map unit: 5 percent
Landform: Drainageways on till plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Linear

Ed—Edwards muck

Map Unit Setting
National map unit symbol: 6ft4
Elevation: 760 to 1,080 feet
Mean annual precipitation: 31 to 32 inches
Mean annual air temperature: 47 to 48 degrees F
Frost-free period: 108 to 178 days
Farmland classification: Not prime farmland

Map Unit Composition
Edwards and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the map unit.

Description of Edwards
Setting
Landform: Swamps on lake plains, depressions on moraines
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Herbaceous organic material over marl

Typical profile
Oa1 - 0 to 18 inches: muck
Oa2 - 18 to 30 inches: muck
Lma - 30 to 80 inches: marly material

Properties and qualities
Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 2.00 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Calcium carbonate, maximum in profile: 90 percent
Available water storage in profile: Very high (about 18.3 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: B/D

FaA—Fabius-Wasepi sandy loams, 0 to 2 percent slopes

Map Unit Setting
National map unit symbol: 6ft5
Elevation: 750 to 1,130 feet
Mean annual precipitation: 31 to 32 inches
Mean annual air temperature: 47 to 48 degrees F
Frost-free period: 108 to 178 days
Farmland classification: Farmland of local importance

Map Unit Composition
Fabius and similar soils: 50 percent
Wasepi and similar soils: 45 percent
Minor components: 5 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Fabius
Setting
Landform: Lake plains, outwash plains
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Loamy over sandy and gravelly glaciofluvial deposits

Typical profile
Ap - 0 to 7 inches: sandy loam
Eg - 7 to 10 inches: sandy loam
Bt1 - 10 to 12 inches: sandy loam
Bt2 - 12 to 18 inches: sandy clay loam
2C - 18 to 80 inches: stratified coarse sand to gravelly sand
Properties and qualities
- **Slope**: 0 to 2 percent
- **Depth to restrictive feature**: More than 80 inches
- **Natural drainage class**: Somewhat poorly drained
- **Runoff class**: Very low
- **Capacity of the most limiting layer to transmit water (Ksat)**: Moderately high to high (0.20 to 2.60 in/hr)
- **Depth to water table**: About 6 inches
- **Frequency of flooding**: None
- **Frequency of ponding**: None
- **Calcium carbonate, maximum in profile**: 25 percent
- **Available water storage in profile**: Low (about 3.5 inches)

Interpretive groups
- **Land capability classification (irrigated)**: None specified
- **Land capability classification (nonirrigated)**: 3w
- **Hydrologic Soil Group**: B/D

Description of Wasepi

Setting
- **Landform**: Drainageways on outwash plains
- **Landform position (three-dimensional)**: Rise
- **Down-slope shape**: Linear
- **Across-slope shape**: Convex
- **Parent material**: Loamy over sandy and gravelly glaciofluvial deposits

Typical profile
- **Ap - 0 to 7 inches**: loamy sand
- **E - 7 to 11 inches**: loamy sand
- **Bt - 11 to 14 inches**: sandy loam
- **Btg - 14 to 24 inches**: sandy loam
- **BCg - 24 to 32 inches**: sandy loam
- **2Cg - 32 to 80 inches**: gravelly sand

Properties and qualities
- **Slope**: 0 to 2 percent
- **Depth to restrictive feature**: More than 80 inches
- **Natural drainage class**: Somewhat poorly drained
- **Runoff class**: Very low
- **Capacity of the most limiting layer to transmit water (Ksat)**: Moderately high to high (0.20 to 6.00 in/hr)
- **Depth to water table**: About 12 to 24 inches
- **Frequency of flooding**: None
- **Frequency of ponding**: None
- **Calcium carbonate, maximum in profile**: 25 percent
- **Available water storage in profile**: Low (about 4.1 inches)

Interpretive groups
- **Land capability classification (irrigated)**: None specified
- **Land capability classification (nonirrigated)**: 3s
- **Hydrologic Soil Group**: B/D

Minor Components

Gilford
- **Percent of map unit**: 5 percent
Landform: Drainageways on outwash plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear

Gr—Gravel pits

Map Unit Setting
National map unit symbol: 6ftg
Elevation: 760 to 1,150 feet
Mean annual precipitation: 31 to 32 inches
Mean annual air temperature: 47 to 48 degrees F
Frost-free period: 108 to 178 days
Farmland classification: Not prime farmland

Map Unit Composition
Gravel pits: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Gravel Pits
Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s

Ho—Houghton muck

Map Unit Setting
National map unit symbol: 6ftk
Elevation: 750 to 1,130 feet
Mean annual precipitation: 31 to 32 inches
Mean annual air temperature: 47 to 48 degrees F
Frost-free period: 108 to 178 days
Farmland classification: Not prime farmland

Map Unit Composition
Houghton and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Houghton
Setting
Landform: Depressions on moraines, depressions on outwash plains, swamps on till plains
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Herbaceous organic material

Typical profile
Oa1 - 0 to 10 inches: muck
Oa2 - 10 to 27 inches: mucky peat
Oa3 - 27 to 80 inches: peat

Properties and qualities
Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 6.00 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Available water storage in profile: Very high (about 23.9 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: A/D

Minor Components
Timakwa
Percent of map unit: 3 percent
Landform: Lakebeds (relict) on till plains
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Linear

Edwards
Percent of map unit: 2 percent
Landform: Lakebeds (relict) on till plains
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Linear

KbB—Kibbie loam, 2 to 6 percent slopes

Map Unit Setting
National map unit symbol: 6ftq
Elevation: 750 to 1,090 feet
Mean annual precipitation: 31 to 32 inches
Mean annual air temperature: 47 to 48 degrees F
Frost-free period: 108 to 178 days
Farmland classification: Prime farmland if drained

Map Unit Composition
   *Kibbie and similar soils:* 95 percent
   *Minor components:* 5 percent
   Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kibbie

Setting
   *Landform:* Knolls on lake plains, knolls on outwash plains
   *Landform position (three-dimensional):* Rise
   *Down-slope shape:* Linear
   *Across-slope shape:* Convex
   *Parent material:* Silty and loamy glaciofluvial deposits and/or glaciolacustrine deposits

Typical profile
   *Ap - 0 to 7 inches:* loam
   *E - 7 to 11 inches:* loam
   *Btg1 - 11 to 19 inches:* silt loam
   *Btg2 - 19 to 34 inches:* silty clay loam
   *C - 34 to 80 inches:* stratified silt to very fine sand to fine sand

Properties and qualities
   *Slope:* 2 to 6 percent
   *Depth to restrictive feature:* More than 80 inches
   *Natural drainage class:* Somewhat poorly drained
   *Runoff class:* Low
   *Capacity of the most limiting layer to transmit water (Ksat):* Moderately high (0.20 to 0.60 in/hr)
   *Depth to water table:* About 6 inches
   *Frequency of flooding:* None
   *Frequency of ponding:* None
   *Calcium carbonate, maximum in profile:* 35 percent
   *Available water storage in profile:* Very high (about 12.3 inches)

Interpretive groups
   *Land capability classification (irrigated):* None specified
   *Land capability classification (nonirrigated):* 2e
   *Hydrologic Soil Group:* C/D

Minor Components

Colwood
   *Percent of map unit:* 3 percent
   *Landform:* Drainageways on lake plains
   *Landform position (three-dimensional):* Talf
   *Down-slope shape:* Linear
   *Across-slope shape:* Linear

Tuscola
   *Percent of map unit:* 2 percent
   *Landform:* Knolls on lake plains
   *Landform position (three-dimensional):* Rise
   *Down-slope shape:* Linear
   *Across-slope shape:* Convex
LaB—Lapeer sandy loam, 2 to 6 percent slopes

Map Unit Setting

National map unit symbol: 6fts
Elevation: 800 to 1,150 feet
Mean annual precipitation: 31 to 32 inches
Mean annual air temperature: 47 to 48 degrees F
Frost-free period: 108 to 178 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Lapeer and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lapeer

Setting

Landform: Till plains, knolls on moraines
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Loamy till

Typical profile

Ap - 0 to 8 inches: sandy loam
E - 8 to 16 inches: sandy loam
BE - 16 to 22 inches: sandy loam
Bt1 - 22 to 28 inches: sandy clay loam
Bt2 - 28 to 36 inches: loam
C - 36 to 80 inches: sandy loam

Properties and qualities

Slope: 2 to 6 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
(0.20 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 35 percent
Available water storage in profile: Moderate (about 8.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Minor Components

Locke
Percent of map unit: 3 percent
Landform: Drainageways on moraines
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Convex

Barry
Percent of map unit: 2 percent
Landform: Drainageways on moraines
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear

LaC—Lapeer sandy loam, 6 to 12 percent slopes

Map Unit Setting
National map unit symbol: 6ftv
Elevation: 800 to 1,130 feet
Mean annual precipitation: 31 to 32 inches
Mean annual air temperature: 47 to 48 degrees F
Frost-free period: 108 to 178 days
Farmland classification: Farmland of local importance

Map Unit Composition
Lapeer and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lapeer

Setting
Landform: Moraines
Landform position (two-dimensional): Toeslope, footslope, backslope, shoulder, summit
Landform position (three-dimensional): Crest, base slope, side slope, nose slope, head slope, interfluve
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Loamy till

Typical profile
Ap - 0 to 8 inches: sandy loam
E - 8 to 16 inches: sandy loam
BE - 16 to 22 inches: sandy loam
Bt1 - 22 to 28 inches: sandy clay loam
Bt2 - 28 to 36 inches: loam
C - 36 to 80 inches: sandy loam
Properties and qualities

Slope: 6 to 12 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 35 percent
Available water storage in profile: Moderate (about 8.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B

LaC2—Lapeer sandy loam, 6 to 12 percent slopes, moderately eroded

Map Unit Setting

National map unit symbol: 6ftw
Elevation: 790 to 1,150 feet
Mean annual precipitation: 31 to 32 inches
Mean annual air temperature: 47 to 48 degrees F
Frost-free period: 108 to 178 days
Farmland classification: Farmland of local importance

Map Unit Composition

Lapeer, moderately eroded, and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lapeer, Moderately Eroded

Setting

Landform: Moraines
Landform position (two-dimensional): Toeslope, footslope, backslope, shoulder, summit
Landform position (three-dimensional): Crest, base slope, side slope, nose slope, head slope, interfluve
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Loamy till

Typical profile

Ap - 0 to 4 inches: sandy loam
E - 4 to 16 inches: sandy loam
BE - 16 to 22 inches: sandy loam
Bt1 - 22 to 28 inches: sandy clay loam
Bt2 - 28 to 36 inches: loam
C - 36 to 80 inches: sandy loam
Properties and qualities

Slope: 6 to 12 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 35 percent
Available water storage in profile: Moderate (about 8.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B

LaD2—Lapeer sandy loam, 12 to 18 percent slopes, moderately eroded

Map Unit Setting

National map unit symbol: 6fty
Elevation: 810 to 1,130 feet
Mean annual precipitation: 31 to 32 inches
Mean annual air temperature: 47 to 48 degrees F
Frost-free period: 108 to 178 days
Farmland classification: Farmland of local importance

Map Unit Composition

Lapeer, moderately eroded, and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lapeer, Moderately Eroded

Setting

Landform: Moraines
Landform position (two-dimensional): Toeslope, footslope, backslope, shoulder, summit
Landform position (three-dimensional): Crest, base slope, side slope, nose slope, head slope, interfluve
Down-slope shape: Linear, convex
Across-slope shape: Convex, concave
Parent material: Loamy till

Typical profile

Ap - 0 to 4 inches: sandy loam
E - 4 to 16 inches: sandy loam
BE - 16 to 22 inches: sandy loam
Bt1 - 22 to 28 inches: sandy clay loam
Bt2 - 28 to 36 inches: loam
C - 36 to 80 inches: sandy loam
Properties and qualities

Slope: 12 to 18 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
(0.20 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 35 percent
Available water storage in profile: Moderate (about 8.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B

LaE2—Lapeer sandy loam, 18 to 25 percent slopes, moderately eroded

Map Unit Setting

National map unit symbol: 6fv0
Elevation: 810 to 1,150 feet
Mean annual precipitation: 31 to 32 inches
Mean annual air temperature: 47 to 48 degrees F
Frost-free period: 108 to 178 days
Farmland classification: Not prime farmland

Map Unit Composition

Lapeer, moderately eroded, and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lapeer, Moderately Eroded

Setting

Landform: Moraines
Landform position (two-dimensional): Toeslope, footslope, backslope, shoulder, summit
Landform position (three-dimensional): Crest, base slope, side slope, nose slope, head slope, interfluve
Down-slope shape: Linear, convex
Across-slope shape: Convex, concave
Parent material: Loamy till

Typical profile

Ap - 0 to 4 inches: sandy loam
E - 4 to 16 inches: sandy loam
BE - 16 to 22 inches: sandy loam
Bt1 - 22 to 28 inches: sandy clay loam
Bt2 - 28 to 36 inches: loam
C - 36 to 80 inches: sandy loam
Properties and qualities

Slope: 18 to 25 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 35 percent
Available water storage in profile: Moderate (about 8.3 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: B

LaF—Lapeer sandy loam, 25 to 60 percent slopes

Map Unit Setting
National map unit symbol: 6fv2
Elevation: 800 to 1,120 feet
Mean annual precipitation: 31 to 32 inches
Mean annual air temperature: 47 to 48 degrees F
Frost-free period: 108 to 178 days
Farmland classification: Not prime farmland

Map Unit Composition
Lapeer and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lapeer

Setting
Landform: Moraines
Landform position (two-dimensional): Toeslope, footslope, backslope, shoulder, summit
Landform position (three-dimensional): Crest, base slope, side slope, nose slope, head slope, interfluve
Down-slope shape: Linear, convex
Across-slope shape: Convex, concave
Parent material: Loamy till

Typical profile
Ap - 0 to 8 inches: sandy loam
E - 8 to 16 inches: sandy loam
BE - 16 to 22 inches: sandy loam
Bt1 - 22 to 28 inches: sandy clay loam
Bt2 - 28 to 36 inches: loam
C - 36 to 80 inches: sandy loam
Properties and qualities
Slope: 25 to 60 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 35 percent
Available water storage in profile: Moderate (about 8.3 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B

LoA—Locke sandy loam, 0 to 2 percent slopes

Map Unit Setting
National map unit symbol: 6fv5
Elevation: 780 to 1,100 feet
Mean annual precipitation: 31 to 32 inches
Mean annual air temperature: 47 to 48 degrees F
Frost-free period: 108 to 178 days
Farmland classification: Prime farmland if drained

Map Unit Composition
Locke and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the map unit.

Description of Locke

Setting
Landform: Knolls on till plains, moraines
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Loamy till

Typical profile
Ap - 0 to 8 inches: sandy loam
E - 8 to 12 inches: sandy loam
Bt1 - 12 to 18 inches: sandy loam
Bt2 - 18 to 29 inches: sandy clay loam
Cg - 29 to 80 inches: sandy loam

Properties and qualities
Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
(0.20 to 6.00 in/hr)
Depth to water table: About 6 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 35 percent
Available water storage in profile: Moderate (about 7.6 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: B/D

Minor Components
Barry
Percent of map unit: 5 percent
Landform: Drainageways on till plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear

MoB—Miami loam, 2 to 6 percent slopes

Map Unit Setting
National map unit symbol: 6fwh
Elevation: 760 to 1,180 feet
Mean annual precipitation: 31 to 32 inches
Mean annual air temperature: 47 to 48 degrees F
Frost-free period: 108 to 178 days
Farmland classification: All areas are prime farmland

Map Unit Composition
Miami and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Miami
Setting
Landform: Knolls on moraines, till plains
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Loamy till

Typical profile
Ap - 0 to 8 inches: loam
E - 8 to 12 inches: loam
Properties and qualities
- **Slope:** 2 to 6 percent
- **Depth to restrictive feature:** More than 80 inches
- **Natural drainage class:** Well drained
- **Runoff class:** Medium
- **Capacity of the most limiting layer to transmit water (Ksat):** Moderately high (0.20 to 0.60 in/hr)
- **Depth to water table:** More than 80 inches
- **Frequency of flooding:** None
- **Frequency of ponding:** None
- **Calcium carbonate, maximum in profile:** 35 percent
- **Available water storage in profile:** High (about 10.4 inches)

Interpretive groups
- **Land capability classification (irrigated):** None specified
- **Land capability classification (nonirrigated):** 2e
- **Hydrologic Soil Group:** C

Minor Components
- **Conover**
  - **Percent of map unit:** 5 percent
  - **Landform:** Swales on moraines
  - **Landform position (three-dimensional):** Rise
  - **Down-slope shape:** Linear
  - **Across-slope shape:** Convex

- **Celina**
  - **Percent of map unit:** 5 percent
  - **Landform:** Swales on moraines
  - **Landform position (three-dimensional):** Rise
  - **Down-slope shape:** Linear
  - **Across-slope shape:** Convex

MoB2—Miami loam, 2 to 6 percent slopes, moderately eroded

Map Unit Setting
- **National map unit symbol:** 6fwj
- **Elevation:** 770 to 1,140 feet
- **Mean annual precipitation:** 31 to 32 inches
- **Mean annual air temperature:** 47 to 48 degrees F
- **Frost-free period:** 108 to 178 days
- **Farmland classification:** All areas are prime farmland

Map Unit Composition
- **Miami, moderately eroded, and similar soils:** 100 percent
- **Estimates are based on observations, descriptions, and transects of the mapunit.**
Description of Miami, Moderately Eroded

Setting

Landform: Knolls on moraines, till plains
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Loamy till

Typical profile

Ap - 0 to 6 inches: loam
Bt1 - 6 to 29 inches: clay loam
Bt2 - 29 to 36 inches: clay loam
C - 36 to 80 inches: loam

Properties and qualities

Slope: 2 to 6 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 35 percent
Available water storage in profile: High (about 10.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C

MoC2—Miami loam, 6 to 12 percent slopes, moderately eroded

Map Unit Setting

National map unit symbol: 6fwl
Elevation: 760 to 1,200 feet
Mean annual precipitation: 31 to 32 inches
Mean annual air temperature: 47 to 48 degrees F
Frost-free period: 108 to 178 days
Farmland classification: Farmland of local importance

Map Unit Composition

Miami, moderately eroded, and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Miami, Moderately Eroded

Setting

Landform: Moraines
Landform position (two-dimensional): Toeslope, footslope, backslope, shoulder, summit
Landform position (three-dimensional): Crest, base slope, side slope, nose slope, head slope, interfluve
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Loamy till

Typical profile
Ap - 0 to 6 inches: loam
Bt1 - 6 to 29 inches: clay loam
Bt2 - 29 to 36 inches: clay loam
C - 36 to 80 inches: loam

Properties and qualities
Slope: 6 to 12 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 35 percent
Available water storage in profile: High (about 10.1 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C

MoD2—Miami loam, 12 to 18 percent slopes, moderately eroded

Map Unit Setting
National map unit symbol: 6fwn
Elevation: 760 to 1,180 feet
Mean annual precipitation: 31 to 32 inches
Mean annual air temperature: 47 to 48 degrees F
Frost-free period: 108 to 178 days
Farmland classification: Farmland of local importance

Map Unit Composition
Miami, moderately eroded, and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Miami, Moderately Eroded

Setting
Landform: Moraines
Landform position (two-dimensional): Toeslope, footslope, backslope, shoulder, summit
Landform position (three-dimensional): Crest, base slope, side slope, nose slope, head slope, interfluve
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Loamy till

Typical profile
Ap - 0 to 5 inches: loam
Bt1 - 5 to 29 inches: clay loam
Bt2 - 29 to 36 inches: clay loam
C - 36 to 80 inches: loam

Properties and qualities
Slope: 12 to 18 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 35 percent
Available water storage in profile: High (about 10.1 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C

MoF—Miami loam, 25 to 60 percent slopes

Map Unit Setting
National map unit symbol: 6fwr
Elevation: 760 to 1,170 feet
Mean annual precipitation: 31 to 32 inches
Mean annual air temperature: 47 to 48 degrees F
Frost-free period: 108 to 178 days
Farmland classification: Not prime farmland

Map Unit Composition
Miami and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Miami
Setting
Landform: Moraines
Landform position (two-dimensional): Toeslope, footslope, backslope, shoulder, summit
Landform position (three-dimensional): Crest, base slope, side slope, nose slope, head slope, interfluve
Down-slope shape: Linear, convex
Across-slope shape: Convex, concave
Parent material: Loamy till

Typical profile
Ap - 0 to 8 inches: loam
E - 8 to 12 inches: loam
Bt1 - 12 to 29 inches: clay loam
Bt2 - 29 to 36 inches: clay loam
C - 36 to 80 inches: loam

Properties and qualities
Slope: 25 to 50 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 35 percent
Available water storage in profile: High (about 10.4 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: C

MpD3—Miami clay loam, 12 to 18 percent slopes, severely eroded

Map Unit Setting
National map unit symbol: 6fwv
Elevation: 770 to 1,190 feet
Mean annual precipitation: 31 to 32 inches
Mean annual air temperature: 47 to 48 degrees F
Frost-free period: 108 to 178 days
Farmland classification: Farmland of local importance

Map Unit Composition
Miami, severely eroded, and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the map unit.

Description of Miami, Severely Eroded
Setting
Landform: Moraines
Landform position (two-dimensional): Toeslope, footslope, backslope, shoulder, summit
Landform position (three-dimensional): Crest, base slope, side slope, nose slope, head slope, interfluve
Down-slope shape: Linear, convex
Across-slope shape: Convex, concave
Parent material: Loamy till

Typical profile
- Bt1 - 0 to 17 inches: clay loam
- Bt2 - 17 to 24 inches: clay loam
- C - 24 to 80 inches: loam

Properties and qualities
- Slope: 12 to 18 percent
- Depth to restrictive feature: More than 80 inches
- Natural drainage class: Well drained
- Runoff class: High
- Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
- Depth to water table: More than 80 inches
- Frequency of flooding: None
- Frequency of ponding: None
- Calcium carbonate, maximum in profile: 35 percent
- Available water storage in profile: High (about 9.9 inches)

Interpretive groups
- Land capability classification (irrigated): None specified
- Land capability classification (nonirrigated): 4e
- Hydrologic Soil Group: C

MpE3—Miami clay loam, 18 to 25 percent slopes, severely eroded

Map Unit Setting
- National map unit symbol: 6fww
- Elevation: 780 to 1,170 feet
- Mean annual precipitation: 31 to 32 inches
- Mean annual air temperature: 47 to 48 degrees F
- Frost-free period: 108 to 178 days
- Farmland classification: Not prime farmland

Map Unit Composition
- Miami, severely eroded, and similar soils: 100 percent
- Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Miami, Severely Eroded

Setting
- Landform: Moraines
- Landform position (two-dimensional): Toeslope, footslope, backslope, shoulder, summit
- Landform position (three-dimensional): Crest, base slope, side slope, nose slope, head slope, interfluve
- Down-slope shape: Linear, convex
- Across-slope shape: Convex, concave
- Parent material: Loamy till
Typical profile
   *Bt1 - 0 to 17 inches:* clay loam
   *Bt2 - 17 to 24 inches:* clay loam
   *C - 24 to 80 inches:* loam

Properties and qualities
   *Slope:* 18 to 25 percent
   *Depth to restrictive feature:* More than 80 inches
   *Natural drainage class:* Well drained
   *Runoff class:* High
   *Capacity of the most limiting layer to transmit water (Ksat):* Moderately high (0.20 to 0.60 in/hr)
   *Depth to water table:* More than 80 inches
   *Frequency of flooding:* None
   *Frequency of ponding:* None
   *Calcium carbonate, maximum in profile:* 35 percent
   *Available water storage in profile:* High (about 9.9 inches)

Interpretive groups
   *Land capability classification (irrigated):* None specified
   *Land capability classification (nonirrigated):* 6e
   *Hydrologic Soil Group:* C

W—Water

Map Unit Setting
   *National map unit symbol:* sh4q
   *Elevation:* 750 to 1,160 feet
   *Mean annual precipitation:* 31 to 32 inches
   *Mean annual air temperature:* 47 to 48 degrees F
   *Frost-free period:* 108 to 178 days
   *Farmland classification:* Not prime farmland

Map Unit Composition
   *Water:* 100 percent
   *Estimates are based on observations, descriptions, and transects of the mapunit.
References


