

**Memorandum**

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**To** Rowan Percheron LLC

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**From** David Weymann, P.E.

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**Date** February 2023

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**Reference** Percheron Data Center Project, Morrow County, Oregon

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**Subject** Soils Analysis

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**INTRODUCTION**

Environmental Resources Management, Inc. (ERM) prepared this soils analysis for Rowan Percheron, LLC (Rowan or Applicant). Rowan proposes to develop a data center on the Project Parcel (Project Parcel or Project). The Project Parcel includes approximately 275 acres of vacant land on one parcel owned by Threemile Canyon Farms. The Project is adjacent to Portland General Electric's (PGE) Carty Generating Station, approximately 10 miles southwest of Boardman on Tower Road, Morrow County (County), Oregon. The Project Footprint will be up to approximately 190 acres of the Project Parcel. This memorandum summarizes the soil classifications for the 275-acre Project Parcel. Figure 1 shows the Project Parcel, the Project Footprint, and site soils.

**SOIL TYPES**

Applicant evaluated the soil types within the Project Parcel and the Project Footprint. Applicant then classified the soils under the Natural Resource Conservation Service (NRCS) Land Capability Classification System (LCCS).

Attachment A provides the NRCS Soil Survey Report for the Project Parcel. Table 1 lists the soil types and farmland designations for the non-irrigated lands of the Project Parcel.

**Table 1: Soil Types**

| Mapping Unit Symbol | Soil Mapping Unit  | NRCS Capability Class <sup>(1)</sup> | Project Parcel |     | Project Footprint |     | Farmland Designation (Project Parcel) <sup>(2, 3)</sup> |
|---------------------|--|--------------------------------------|----------------|-----|-------------------|-----|---|
|                     |  |                                      | Acres          | %   | Acres             | %   |   |
| 26B                 | Koehler loamy fine sand, 2 to 5 percent slopes             | 7e                                   | 109.2          | 40  | 107.8             | 57  | Not prime farmland                                      |
| 26C                 | Koehler loamy fine sand, 5 to 12 percent slopes            | 7e                                   | 8.1            | 3   | 8.1               | 4   | Not prime farmland                                      |
| 58B                 | Taunton fine sandy loam, 2 to 5 percent slopes             | 6e                                   | 33.8           | 12  | 33.8              | 18  | Not prime farmland                                      |
| 40C                 | Quincy loamy fine sand, 2 to 12 percent slopes             | 7e                                   | 38.4           | 14  | 7.3               | 4   | Not prime farmland                                      |
| 58C                 | Taunton fine sandy loam, 5 to 12 percent slopes            | 6e                                   | 23.9           | 9   | 23.7              | 12  | Farmland of state-wide importance                       |
| 53A                 | Royal silt loam, 0 to 3 percent slopes                     | 6e                                   | 4.5            | 2   | —                 | —   | Not prime farmland                                      |
| 55B                 | Sagehill fine sandy loam, hummocky, 2 to 5 percent slopes  | 4e                                   | 33.9           | 12  | 9.5               | 5   | Not prime farmland                                      |
| 55C                 | Sagehill fine sandy loam, hummocky, 5 to 12 percent slopes | 4e                                   | 22.3           | 8   | —                 | —   | Farmland of state-wide importance                       |
| <b>TOTALS</b>       |  |                                      | 274.1          | 100 | <b>190.2</b>      | 100 |   |

**Notes:**<sup>(1)</sup> NRCS class: Non-irrigated<sup>(2)</sup> Soil Survey Farmland Designation, 7 Code of Federal Regulations (CFR) Part 657  
<https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx><sup>(3)</sup> None of the Project Parcel is irrigated

— =Not present within Project Footprint

In total, the Project Parcel is comprised of approximately 57 percent Class 7 soil, 23 percent Class 6 soil, and 20 percent Class 4 soil. Within the Project Parcel, the Project Footprint is comprised of about 65 percent Class 7 soil, 30 percent Class 6 soil, and 5 percent Class 4 soil. The Project Footprint is sited within the Project Parcel to minimize impact to Class 4 soils, which are predominately located near the existing wetlands that will be avoided.

## HIGH-VALUE, PRIME AND STATE-WIDE IMPORTANCE FARMLAND

ERM also evaluated whether the Project Parcel and Project Footprint are comprised of any high-value, prime, or farmland of state-wide importance. The Project Parcel, while predominately Class 7 soil, has Class 6 and some Class 4 soils adjacent to or intermingled with the Class 7 soil and the County, therefore, inventoried the Project Parcel as “agricultural land” under Oregon Administrative Rules (OAR) 660-033-0020(1).<sup>1</sup>

The Project Parcel is not irrigated and contains no Class 1 or 2 soils. It is not, therefore, considered “high-value farmland” under OAR 660-033-0030(8).<sup>2</sup> In addition, the NRCS Morrow County Soil Survey Report (Attachment A) identifies farmland as prime or not prime based on its soil characteristics and irrigation status. The Project Parcel is not irrigated and none of the Project Parcel is designated as prime farmland based on the NRCS LCCS (Table 1).<sup>3</sup>

The NRCS Morrow County Soil Survey Report also identifies about 17 percent of the Project Parcel as “farmland of state-wide importance,” with Class 6e soils comprising about 9 percent and Class 4e soils comprising about 8 percent of the farmland of importance. The Project Footprint would impact no Class 4e farmland of statewide importance. Of the Class 6e soil impacted within the Project Footprint, the soils are considered nonarable soil and not suitable for cultivation notwithstanding its classification of “important.” Overall, the underlying soil characteristics within the Project Parcel

<sup>1</sup> OAR 660-033-0020 provides the definition of “agricultural land”:

- (1)(a) "Agricultural Land" as defined in Goal 3 includes:
- (A) Lands classified by the U.S. NRCS as predominantly Class I-IV soils in Western Oregon and I-VI soils in Eastern Oregon.
  - (B) Land in other soil classes that is suitable for farm use, as defined in Oregon Revised Statutes (ORS) 215.203(2)(a), taking into consideration soil fertility; suitability for grazing; climatic conditions; existing and future availability of water for farm irrigation purposes; existing land use patterns; technological and energy inputs required; and accepted farming practices.
  - (C) Land that is necessary to permit farm practices to be undertaken on adjacent or nearby agricultural lands.
- (b) Land in Capability Classes other than I-IV/I-VI that is adjacent to or intermingled with lands in capability classes I-IV/I-VI within a farm unit, shall be inventoried as agricultural lands even though this land may not be cropped or grazed.

<sup>2</sup> OAR 660-033-0020 also provides the definition of “high value farmland”

- (8)(a) "High-Value Farmland" means land in a tract composed predominantly of soils that are:
- (A) Irrigated and classified prime, unique, Class I or II; or
  - (B) Not irrigated and classified prime, unique, Class I or II.
- (b) In addition to that land described in subsection (a) of this section, high-value farmland, if outside the Willamette Valley, includes tracts growing specified perennials as demonstrated by the most recent aerial photography of the Agricultural Stabilization and Conservation Service of the U.S. Department of Agriculture taken prior to November 4, 1993. "Specified perennials" means perennials grown for market or research purposes including, but not limited to, nursery stock, berries, fruits, nuts, Christmas trees, or vineyards, but not including seed crops, hay, pasture or alfalfa;

\*\*\* [applies to land in Willamette Valley]

\*\*\* [applies to land west of the Coast Range summit]

\*\*\* [applies to land west of Highway 101]

<sup>3</sup> 7 CFR Part 657 includes regulations for the Department of Agriculture and defines “prime” farmlands. Prime farmland is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops, and is available for these uses. The states define farmlands of state-wide importance based on the soil properties and information on specific high-value food and fiber crops that are grown in a particular area.

demonstrate that the land, while considered agricultural, has low agricultural productivity with high risk for erosion, and other severe or very severe limitations.

ORS 195.300(10) also provides definitions of “high value farmland” for purposes of [ORS 195.301 \(Legislative Findings\)](#) and [195.305 \(Compensation for restriction of use of real property due to land use regulation\)](#) to [195.336 \(Compensation and Conservation Fund\)](#) (Measure 49). The Department of Land Conservation and Development’s siting standards for wind and energy facilities specifically reference ORS 195.300 when defining “high value farmland,” although the statutory definitions have not been directly incorporated into any Goal 3 agricultural lands framework. Nonetheless for completeness, ERM evaluated the Project Parcel against the definitions in ORS 195.300(10). ORS 195.300(10) includes the “high value farmland” definition from OAR 660-033-0020(8) and expands upon it.<sup>4</sup> By application of law, the Project Parcel contains “high-value farmland” within the meaning of ORS 195.300(10)(f) because portions of the Project Parcel are within the Columbia Valley American Viticultural Area (AVA). In total, the Project Footprint may impact up to 49.8 acres of land located within the Columbia Valley AVA.

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<sup>4</sup> ORS 195.300 provides:

(10) “High-value farmland” means:

(a) High-value farmland as described in ORS 215.710 that is land in an exclusive farm use zone or a mixed farm and forest zone, except that the dates specified in ORS 215.710 (2), (4) and (6) are December 6, 2007.

\* \* \*

(c) Land that is in an exclusive farm-use zone or a mixed farm and forest zone and that on June 28, 2007, is:

(A) Within the place of use for a permit, certificate or decree for the use of water for irrigation issued by the Water Resources Department;

(B) Within the boundaries of a district, as defined in ORS 540.505; or

(C) Within the boundaries of a diking district formed under ORS Chapter 551.

\* \* \*

(f) Land that is in an exclusive farm-use zone and that is no more than 3,000 feet above mean sea level, with an aspect between 67.5 and 292.5 degrees and a slope between zero and 15 percent, and that is located within:

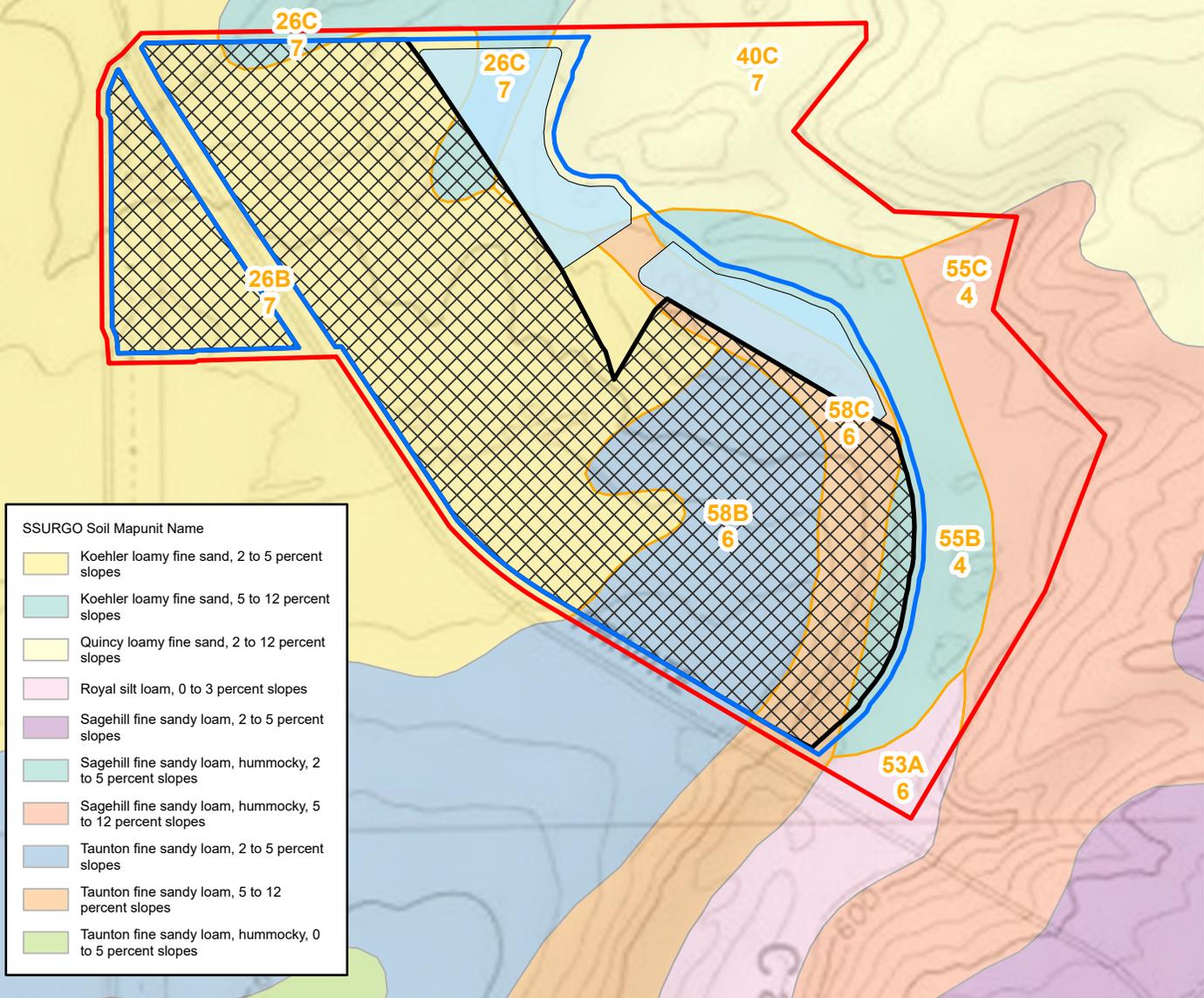
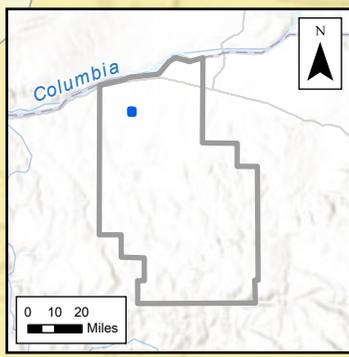
\* \* \*

(C) The portion of the Columbia Valley viticultural area as described in 27 CFR 9.74 that is within the State of Oregon.

**FIGURE 1 SOILS CLASSIFICATION**

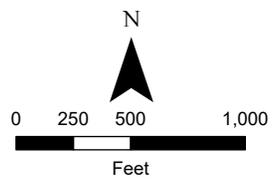
M:\US\Projects\Percheron\Green Data\0640978 Percheron Threemile Canyon\Maps\Percheron Data Center Figures\_20230508\_gb.aprx\Figure 1-SO\_REVISED\_05/15/2023\_SCALE: 1:10,000 when printed at 8.5x11

Drawn By: matt bowen



| SSURGO Soil Mapunit Name |  |
|--------------------------|--|
|                          | Koehler loamy fine sand, 2 to 5 percent slopes             |
|                          | Koehler loamy fine sand, 5 to 12 percent slopes            |
|                          | Quincy loamy fine sand, 2 to 12 percent slopes             |
|                          | Royal silt loam, 0 to 3 percent slopes                     |
|                          | Sagehill fine sandy loam, 2 to 5 percent slopes            |
|                          | Sagehill fine sandy loam, hummocky, 2 to 5 percent slopes  |
|                          | Sagehill fine sandy loam, hummocky, 5 to 12 percent slopes |
|                          | Taunton fine sandy loam, 2 to 5 percent slopes             |
|                          | Taunton fine sandy loam, 5 to 12 percent slopes            |
|                          | Taunton fine sandy loam, hummocky, 0 to 5 percent slopes   |

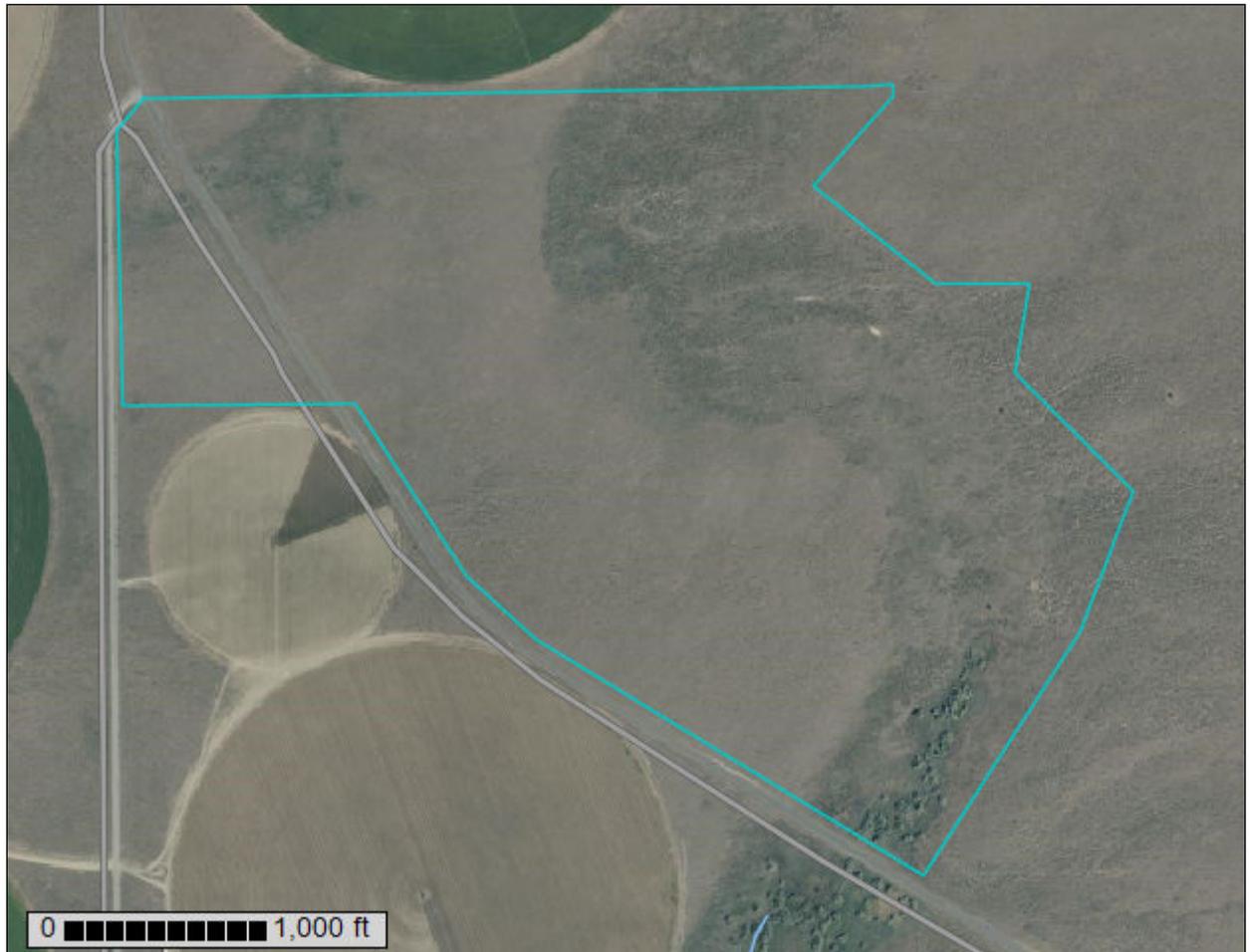
- Proposed Data Center Buildings and Electrical Infrastructure
  - Pond
  - Project Footprint
  - Project Parcel
- Project Soils**
- NRCS Map Unit
  - Land Capability Classification (Non-Irrigated)



**Figure 1**  
**Soil Classifications**  
 Percheron Data Center  
 Rowan Percheron, LLC  
 Morrow County, Oregon

**ATTACHMENT A MORROW COUNTY SOIL SURVEY REPORT**

# Custom Soil Resource Report for Morrow County Area, Oregon



# Preface

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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 (<https://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](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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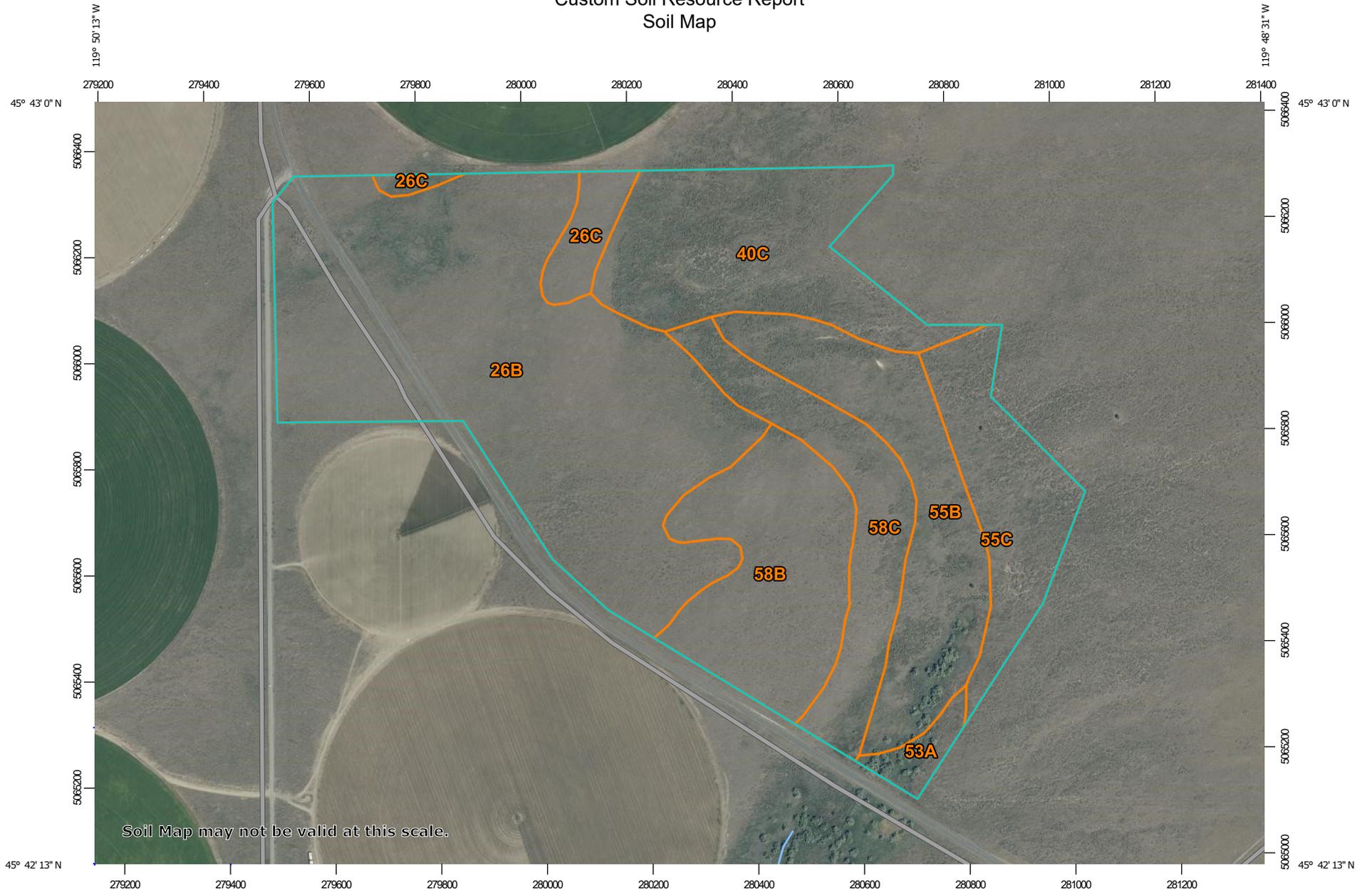
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# Soil Map

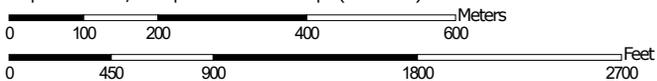
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The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

# Custom Soil Resource Report Soil Map



Map Scale: 1:10,100 if printed on A landscape (11" x 8.5") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

### MAP LEGEND

**Area of Interest (AOI)**

 Area of Interest (AOI)

**Soils**

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

**Special Point Features**

-  Blowout
-  Borrow Pit
-  Clay Spot
-  Closed Depression
-  Gravel Pit
-  Gravelly Spot
-  Landfill
-  Lava Flow
-  Marsh or swamp
-  Mine or Quarry
-  Miscellaneous Water
-  Perennial Water
-  Rock Outcrop
-  Saline Spot
-  Sandy Spot
-  Severely Eroded Spot
-  Sinkhole
-  Slide or Slip
-  Sodic Spot

-  Spoil Area
-  Stony Spot
-  Very Stony Spot
-  Wet Spot
-  Other
-  Special Line Features

**Water Features**

 Streams and Canals

**Transportation**

-  Rails
-  Interstate Highways
-  US Routes
-  Major Roads
-  Local Roads

**Background**

 Aerial Photography

### MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

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

Source of Map: Natural Resources Conservation Service  
 Web Soil Survey URL:  
 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: Morrow County Area, Oregon  
 Survey Area Data: Version 9, Sep 14, 2022

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

Date(s) aerial images were photographed: Jun 3, 2020—Jun 26, 2020

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

| Map Unit Symbol                    | Map Unit Name  | Acres in AOI | Percent of AOI |
|------------------------------------|--|--------------|----------------|
| 26B                                | Koehler loamy fine sand, 2 to 5 percent slopes             | 106.9        | 40.0%          |
| 26C                                | Koehler loamy fine sand, 5 to 12 percent slopes            | 7.0          | 2.6%           |
| 40C                                | Quincy loamy fine sand, 2 to 12 percent slopes             | 37.0         | 13.9%          |
| 53A                                | Royal silt loam, 0 to 3 percent slopes                     | 3.8          | 1.4%           |
| 55B                                | Sagehill fine sandy loam, hummocky, 2 to 5 percent slopes  | 33.9         | 12.7%          |
| 55C                                | Sagehill fine sandy loam, hummocky, 5 to 12 percent slopes | 22.1         | 8.3%           |
| 58B                                | Taunton fine sandy loam, 2 to 5 percent slopes             | 32.9         | 12.3%          |
| 58C                                | Taunton fine sandy loam, 5 to 12 percent slopes            | 23.5         | 8.8%           |
| <b>Totals for Area of Interest</b> |  | <b>267.2</b> | <b>100.0%</b>  |

## 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

## Custom Soil Resource Report

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.

## Morrow County Area, Oregon

### 26B—Koehler loamy fine sand, 2 to 5 percent slopes

#### Map Unit Setting

*National map unit symbol:* 21sj  
*Elevation:* 400 to 800 feet  
*Mean annual precipitation:* 7 to 8 inches  
*Mean annual air temperature:* 52 to 54 degrees F  
*Frost-free period:* 150 to 200 days  
*Farmland classification:* Not prime farmland

#### Map Unit Composition

*Koehler and similar soils:* 75 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

#### Description of Koehler

##### Setting

*Landform:* Strath terraces  
*Landform position (three-dimensional):* Tread  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear  
*Parent material:* Eolian sands over cemented alluvium

##### Typical profile

*H1 - 0 to 4 inches:* loamy fine sand  
*H2 - 4 to 24 inches:* loamy fine sand  
*H3 - 24 to 28 inches:* extremely gravelly loamy fine sand  
*H4 - 28 to 38 inches:* cemented material

##### Properties and qualities

*Slope:* 2 to 5 percent  
*Depth to restrictive feature:* 20 to 40 inches to duripan  
*Drainage class:* Somewhat excessively drained  
*Capacity of the most limiting layer to transmit water (Ksat):* Very low to moderately low (0.00 to 0.06 in/hr)  
*Depth to water table:* More than 80 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Calcium carbonate, maximum content:* 15 percent  
*Maximum salinity:* Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)  
*Available water supply, 0 to 60 inches:* Very low (about 2.4 inches)

##### Interpretive groups

*Land capability classification (irrigated):* 4e  
*Land capability classification (nonirrigated):* 7e  
*Hydrologic Soil Group:* A  
*Ecological site:* R007XY012OR - Sandy 8-10 PZ  
*Hydric soil rating:* No

## 26C—Koehler loamy fine sand, 5 to 12 percent slopes

### Map Unit Setting

*National map unit symbol:* 21sk  
*Elevation:* 400 to 800 feet  
*Mean annual precipitation:* 7 to 8 inches  
*Mean annual air temperature:* 52 to 54 degrees F  
*Frost-free period:* 150 to 200 days  
*Farmland classification:* Not prime farmland

### Map Unit Composition

*Koehler and similar soils:* 75 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Koehler

#### Setting

*Landform:* Strath terraces  
*Landform position (three-dimensional):* Riser  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear  
*Parent material:* Eolian sands over cemented alluvium

#### Typical profile

*H1 - 0 to 4 inches:* loamy fine sand  
*H2 - 4 to 24 inches:* loamy fine sand  
*H3 - 24 to 28 inches:* extremely gravelly loamy fine sand  
*H4 - 28 to 38 inches:* cemented material

#### Properties and qualities

*Slope:* 5 to 12 percent  
*Depth to restrictive feature:* 20 to 40 inches to duripan  
*Drainage class:* Somewhat excessively drained  
*Capacity of the most limiting layer to transmit water (Ksat):* Very low to moderately low (0.00 to 0.06 in/hr)  
*Depth to water table:* More than 80 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Calcium carbonate, maximum content:* 15 percent  
*Maximum salinity:* Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)  
*Available water supply, 0 to 60 inches:* Very low (about 2.4 inches)

#### Interpretive groups

*Land capability classification (irrigated):* 4e  
*Land capability classification (nonirrigated):* 7e  
*Hydrologic Soil Group:* A  
*Ecological site:* R007XY012OR - Sandy 8-10 PZ  
*Hydric soil rating:* No

## 40C—Quincy loamy fine sand, 2 to 12 percent slopes

### Map Unit Setting

*National map unit symbol:* 21t8  
*Elevation:* 250 to 700 feet  
*Mean annual precipitation:* 7 to 8 inches  
*Mean annual air temperature:* 52 to 54 degrees F  
*Frost-free period:* 160 to 200 days  
*Farmland classification:* Not prime farmland

### Map Unit Composition

*Quincy and similar soils:* 85 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Quincy

#### Setting

*Landform:* Strath terraces  
*Landform position (three-dimensional):* Tread  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear  
*Parent material:* Eolian sands

#### Typical profile

*H1 - 0 to 6 inches:* loamy fine sand  
*H2 - 6 to 60 inches:* loamy fine sand

#### Properties and qualities

*Slope:* 2 to 12 percent  
*Depth to restrictive feature:* More than 80 inches  
*Drainage class:* Excessively drained  
*Capacity of the most limiting layer to transmit water (Ksat):* High to very high (5.95 to 19.98 in/hr)  
*Depth to water table:* More than 80 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Calcium carbonate, maximum content:* 3 percent  
*Maximum salinity:* Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)  
*Available water supply, 0 to 60 inches:* Low (about 6.0 inches)

#### Interpretive groups

*Land capability classification (irrigated):* 4e  
*Land capability classification (nonirrigated):* 7e  
*Hydrologic Soil Group:* A  
*Ecological site:* R007XY012OR - Sandy 8-10 PZ  
*Hydric soil rating:* No

## 53A—Royal silt loam, 0 to 3 percent slopes

### Map Unit Setting

*National map unit symbol:* 21v3  
*Elevation:* 300 to 800 feet  
*Mean annual precipitation:* 7 to 8 inches  
*Mean annual air temperature:* 52 to 54 degrees F  
*Frost-free period:* 150 to 200 days  
*Farmland classification:* Prime farmland if irrigated

### Map Unit Composition

*Royal and similar soils:* 85 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Royal

#### Setting

*Landform:* Flood plains  
*Landform position (three-dimensional):* Tread  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear  
*Parent material:* Alluvium and glaciofluvial deposits reworked by wind

#### Typical profile

*H1 - 0 to 6 inches:* silt loam  
*H2 - 6 to 14 inches:* fine sandy loam  
*H3 - 14 to 60 inches:* stratified fine sandy loam to very fine sandy loam

#### Properties and qualities

*Slope:* 0 to 3 percent  
*Depth to restrictive feature:* More than 80 inches  
*Drainage class:* Well drained  
*Capacity of the most limiting layer to transmit water (Ksat):* High (1.98 to 5.95 in/hr)  
*Depth to water table:* More than 80 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Calcium carbonate, maximum content:* 10 percent  
*Maximum salinity:* Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)  
*Available water supply, 0 to 60 inches:* Moderate (about 7.2 inches)

#### Interpretive groups

*Land capability classification (irrigated):* 2s  
*Land capability classification (nonirrigated):* 6e  
*Hydrologic Soil Group:* A  
*Ecological site:* R007XY013OR - Sandy Loam 8-10 PZ  
*Hydric soil rating:* No

## 55B—Sagehill fine sandy loam, hummocky, 2 to 5 percent slopes

### Map Unit Setting

*National map unit symbol:* 21v7  
*Elevation:* 510 to 1,200 feet  
*Mean annual precipitation:* 8 to 9 inches  
*Mean annual air temperature:* 49 to 53 degrees F  
*Frost-free period:* 150 to 200 days  
*Farmland classification:* Prime farmland if irrigated

### Map Unit Composition

*Sagehill, hummocky, and similar soils:* 85 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Sagehill, Hummocky

#### Setting

*Landform:* Strath terraces  
*Landform position (three-dimensional):* Tread  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear  
*Parent material:* Sandy eolian deposits and loess over lacustrine deposits

#### Typical profile

*H1 - 0 to 5 inches:* fine sandy loam  
*H2 - 5 to 28 inches:* fine sandy loam  
*H3 - 28 to 60 inches:* stratified fine sandy loam to very fine sandy loam to silt loam

#### Properties and qualities

*Slope:* 2 to 5 percent  
*Depth to restrictive feature:* More than 80 inches  
*Drainage class:* Well drained  
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.57 to 1.98 in/hr)  
*Depth to water table:* More than 80 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Calcium carbonate, maximum content:* 35 percent  
*Maximum salinity:* Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)  
*Available water supply, 0 to 60 inches:* High (about 11.4 inches)

#### Interpretive groups

*Land capability classification (irrigated):* 2e  
*Land capability classification (nonirrigated):* 4e  
*Hydrologic Soil Group:* B  
*Ecological site:* R007XY013OR - Sandy Loam 8-10 PZ  
*Hydric soil rating:* No

## 55C—Sagehill fine sandy loam, hummocky, 5 to 12 percent slopes

### Map Unit Setting

*National map unit symbol:* 21v8

*Elevation:* 510 to 1,200 feet

*Mean annual precipitation:* 8 to 9 inches

*Mean annual air temperature:* 49 to 53 degrees F

*Frost-free period:* 150 to 200 days

*Farmland classification:* Farmland of statewide importance

### Map Unit Composition

*Sagehill, hummocky, and similar soils:* 90 percent

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

### Description of Sagehill, Hummocky

#### Setting

*Landform:* Strath terraces

*Landform position (three-dimensional):* Riser

*Down-slope shape:* Linear

*Across-slope shape:* Linear

*Parent material:* Sandy eolian deposits and loess over lacustrine deposits

#### Typical profile

*H1 - 0 to 5 inches:* fine sandy loam

*H2 - 5 to 28 inches:* fine sandy loam

*H3 - 28 to 60 inches:* stratified fine sandy loam to very fine sandy loam to silt loam

#### Properties and qualities

*Slope:* 5 to 12 percent

*Depth to restrictive feature:* More than 80 inches

*Drainage class:* Well drained

*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high  
(0.57 to 1.98 in/hr)

*Depth to water table:* More than 80 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Calcium carbonate, maximum content:* 35 percent

*Maximum salinity:* Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

*Available water supply, 0 to 60 inches:* High (about 11.4 inches)

#### Interpretive groups

*Land capability classification (irrigated):* 3e

*Land capability classification (nonirrigated):* 4e

*Hydrologic Soil Group:* B

*Ecological site:* R007XY013OR - Sandy Loam 8-10 PZ

*Hydric soil rating:* No

## 58B—Taunton fine sandy loam, 2 to 5 percent slopes

### Map Unit Setting

*National map unit symbol:* 21vd  
*Elevation:* 700 to 1,000 feet  
*Mean annual precipitation:* 8 to 9 inches  
*Mean annual air temperature:* 49 to 52 degrees F  
*Frost-free period:* 150 to 180 days  
*Farmland classification:* Prime farmland if irrigated

### Map Unit Composition

*Taunton and similar soils:* 85 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Taunton

#### Setting

*Landform:* Strath terraces  
*Landform position (three-dimensional):* Tread  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear  
*Parent material:* Eolian sands over strongly cemented alluvium

#### Typical profile

*H1 - 0 to 5 inches:* fine sandy loam  
*H2 - 5 to 15 inches:* fine sandy loam  
*H3 - 15 to 32 inches:* fine sandy loam  
*H4 - 32 to 36 inches:* cemented material

#### Properties and qualities

*Slope:* 2 to 5 percent  
*Depth to restrictive feature:* 20 to 40 inches to duripan  
*Drainage class:* Well drained  
*Capacity of the most limiting layer to transmit water (Ksat):* Very low to moderately low (0.00 to 0.06 in/hr)  
*Depth to water table:* More than 80 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Calcium carbonate, maximum content:* 25 percent  
*Maximum salinity:* Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)  
*Available water supply, 0 to 60 inches:* Low (about 5.2 inches)

#### Interpretive groups

*Land capability classification (irrigated):* 4e  
*Land capability classification (nonirrigated):* 6e  
*Hydrologic Soil Group:* C  
*Ecological site:* R007XY013OR - Sandy Loam 8-10 PZ  
*Hydric soil rating:* No

## 58C—Taunton fine sandy loam, 5 to 12 percent slopes

### Map Unit Setting

*National map unit symbol:* 21vf

*Elevation:* 700 to 1,000 feet

*Mean annual precipitation:* 8 to 9 inches

*Mean annual air temperature:* 49 to 52 degrees F

*Frost-free period:* 150 to 180 days

*Farmland classification:* Farmland of statewide importance

### Map Unit Composition

*Taunton and similar soils:* 85 percent

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

### Description of Taunton

#### Setting

*Landform:* Strath terraces

*Landform position (three-dimensional):* Riser

*Down-slope shape:* Linear

*Across-slope shape:* Linear

*Parent material:* Eolian sands over strongly cemented alluvium

#### Typical profile

*H1 - 0 to 5 inches:* fine sandy loam

*H2 - 5 to 15 inches:* fine sandy loam

*H3 - 15 to 32 inches:* fine sandy loam

*H4 - 32 to 36 inches:* cemented material

#### Properties and qualities

*Slope:* 5 to 12 percent

*Depth to restrictive feature:* 20 to 40 inches to duripan

*Drainage class:* Well drained

*Capacity of the most limiting layer to transmit water (Ksat):* Very low to moderately low (0.00 to 0.06 in/hr)

*Depth to water table:* More than 80 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Calcium carbonate, maximum content:* 25 percent

*Maximum salinity:* Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

*Available water supply, 0 to 60 inches:* Low (about 5.2 inches)

#### Interpretive groups

*Land capability classification (irrigated):* 4e

*Land capability classification (nonirrigated):* 6e

*Hydrologic Soil Group:* C

*Ecological site:* R007XY013OR - Sandy Loam 8-10 PZ

*Hydric soil rating:* No

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