NATURAL AND ENVIRONMENTAL CONDITIONS

Introduction

This chapter of the *Profile* Lexington section is intended to provide the City of Lexington with underlying environmental data and any potential concerns for future planning and decision-making. The information contained in this section is important because it develops key concepts and policies with "*The Lex-Plan 2013*" and especially the *Achieve* Lexington section.

This chapter will review the different natural and environmental issues that provide opportunities and constraints upon future development for Lexington. The following constraints are reviewed in this section:

Soil Associations
Floodplain
Wellhead Protection Program

Each of these issues has some impact on potential future development for Lexington. Most of the issues are related directly to soils found within the extraterritorial jurisdiction. These issues, as well as others, are reviewed and analyzed to determine the best possible types and locations for future development.

Soil Associations

The soils in and around Lexington are classified into five soil groups, or associations, each with a broad range of characteristics. The Generalized Soils Association Map (see Figure 21) displays this simplified version of what soils exist within Lexington's extraterritorial jurisdiction. The U.S. Department of Agriculture, Natural Resources Conservation Service conducted the field soils survey and developed the boundaries of the soil types found on Figure 21. The five soil associations found in the Lexington area are the Cozad-Hord, Wood River-Rusco-Cozad, Gosper-Cozad-Silver Creek, Lex-Lawet-Gibbon, and Gothenburg-Platte. The report that describes and explains soil limitations was published by the United States Department of Agriculture, Soil Conservation Service, in cooperation with the University of Nebraska Conservation Survey Division.

SILTY SOILS ON STREAM TERRACES AND FOOT SLOPES

COZAD-HORD ASSOCIATION
(Lime Green in Figure 21)

Along the northern most portion of Lexington's Corporate Limits, as well as the northern third of the extraterritorial jurisdiction are comprised of the Cozad-Hord Association. Individual soils are generally described as, "deep, nearly level to gently sloping, well drained, silty soils on stream terraces and foot slopes." Farms in this association are some of the most intensively farmed throughout Dawson County.

Development limitations for Cozad soils are primarily related to slopes when greater than seven percent. Bearing capacity for foundations has moderate limitations when slopes are less than 15 percent. Hord Soils contain slight limitations for septic tanks, moderate permeability rates for sewage lagoons and moderate bearing capacity for foundations due to frost actions.

WOOD RIVER-RUSCO-COZAD ASSOCIATION
(Combined into Lime Green area in Figure 21)

The soils of Wood River-Rusco-Cozad intermingle with Cozad-Hord Association on the northern third of the extraterritorial jurisdiction of Lexington. Therefore, Figure 21 shows one solid lime green section that represents both associations. Wood River-Rusco-Cozad Association are described as "deep, nearly level, moderately well drained, silty soils on stream terraces."

LOAMY AND SILTY SOILS ON STREAM TERRACES

GOSPER-COZAD-SILVER CREEK ASSOCIATION
(Teal area in Figure 21)

Nearly the entire area within Lexington's corporate limits, as well as the central third of the two-mile planning jurisdiction, is included in the Gosper-Cozad-Silver Creek Association. Soils of this Association are described as "deep, nearly level, somewhat poorly drained to well drained, silty and loamy soils on the stream terraces."

Limitations for dwellings with or without basements are stated as moderate due to shrink-swell potential and seasonal high water table at a depth of four to five feet for Gosper soils. The soil composition comprises the majority of Lexington's developed residential neighborhoods. Dwelling limitations for Cozad Soils are moderate for slightly sloping lands and severe where slopes are greater than 15 percent. Silver Creek Soils are concentrated south of the Highway 30 corridor and have severe limitations for dwellings due to high shrink-swell potential, frost action and seasonal high water table at a depth of two to five feet.

Sewage lagoons are impacted by severe limitations for seasonal high water table at two to five feet depths in Silver Creek soil. Gosper soil also has severe limitations for sewage lagoons due to seepage below four feet depths and water table depths of four to five feet. Cozad soil is rated severe due to moderate permeability and water table depths of three to four feet on seasonal basis.

LOAMY, SILTY, AND SANDY SOILS ON BOTTOM LAND

LEX-LAWET-GIBBON ASSOCIATION
(Darker Blue surrounding Platte River in Figure 21)

Lands within the extraterritorial jurisdiction, along either side of the Platte River, are comprised the Lex-Lawet-Gibbon Association. This Association is generally described as "deep and moderately deep over sand and gravel, nearly level, somewhat poorly drained and poorly drained, loamy and silty soils on bottom land."

All of these Associations of Lex, Lawet, and Gibbon are severely limited for development of dwellings, septic tanks, and absorption fields and sewage lagoons.

GOTHENBURG-PLATTE ASSOCIATION
(Light Blue within Platte River in Figure 21)

The bottom lands of the Platte River, along the southern portion of Lexington's planning jurisdiction, are associated with the Gothenburg-Platte Association. Ground water is from six inches to five feet below the surface. River bottom soils, such as these, understandably have severe limitations for development.

Sewer lagoons, septic tanks and absorption fields and foundations of buildings are severely impacted by soils conditions in this Association.

Legend

- Corporate Limits
- 2 Mile Extraterritorial Jurisdiction
- Cozad-Hord and Wood River-Rusco-Cozad
- Gosper-Cozad-Silver Creek
- Gothenburng-Platte
- Lex-Lawet-Gibbon

Figure 21: Generalized Soils Association, Lexington

City of Lexington

Dawson County, Nebraska

Generalized Soils Association

N

0 2,125 4,250 8,500 Feet

Created By: SMS
Date: April 2013
Software: ArcGIS 10
File: 100999

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"The Lex-Plan 2013"

For more detailed information can be found on individual parcels of land. The previous map, Figure 21, is meant to give a broad understanding of the general soil capabilities. Contacting an expert to test the soil is highly recommended. As shown in Figure 23, it displays that the extraterritorial jurisdiction may have very different soil types near one another. Again, it is recommended to contact United States Department of Agriculture's (USDA's) National Resources Conservation Service (NRCS) for more details and limitations on acquiring land and land uses for. The decisions made on behalf of Lexington should be made with the most current and accurate information available. Figure 22 details the large legend of Lexington soils.

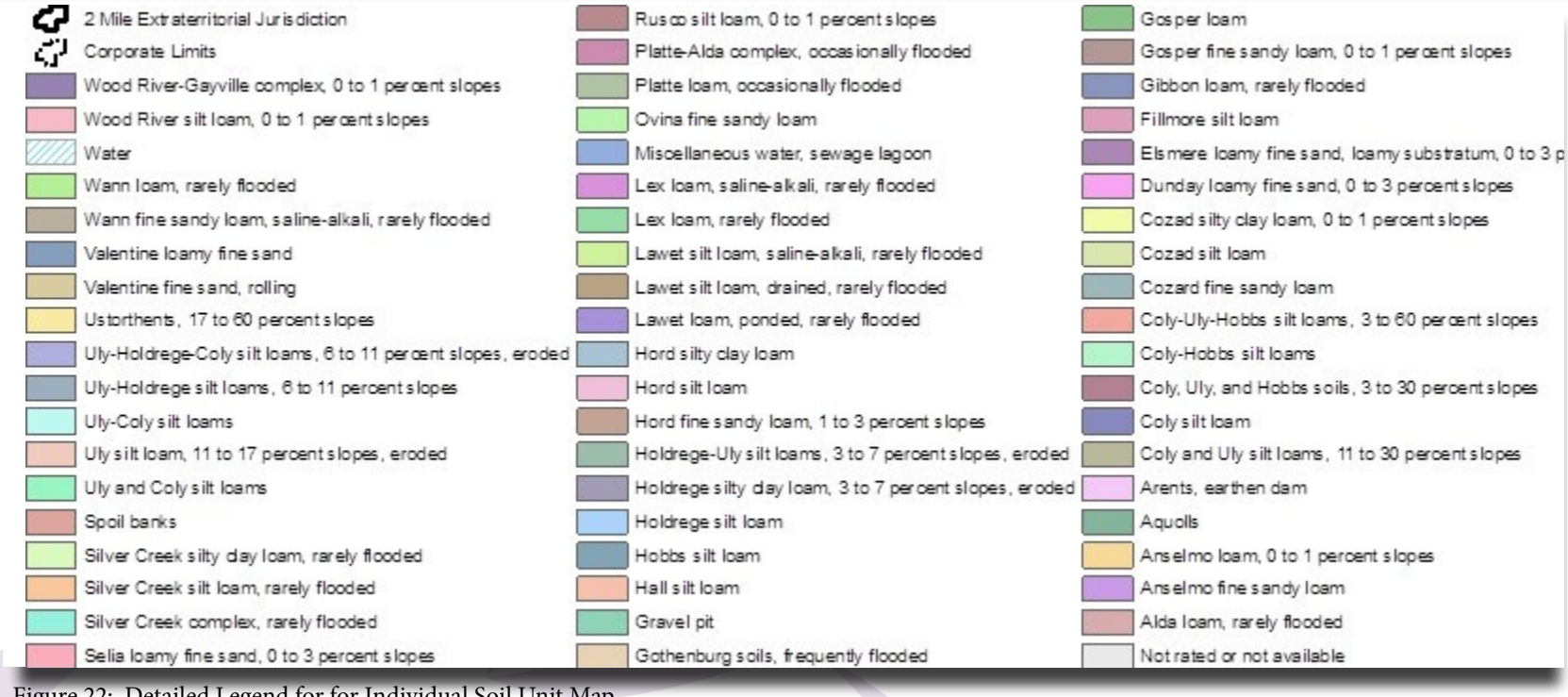

Figure 22: Detailed Legend for for Individual Soil Unit Map

Figure 23: Individual Soil Unit, Lexington

City of Lexington
Dawson County, Nebraska
Soils Unit Map Name

N

0 2,500 5,000 10,000 Feet

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Date: April 2013
Software: ArcGIS 10
File: 100999

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Floodplain

The topography and terrain of Lexington and the two mile extraterritorial jurisdiction are varied. The natural landscape has been formed by wind and water erosion and deposits creating areas of nearly level lands on stream terraces. The slope within Lexington's corporate limits is generally nearly level and rests just above the Platte River bottom lands. Lands slope from developed areas of Lexington south easterly carrying stormwater runoff to Spring Creek and other drainage ways prior to converging with the Platte River.

In May of 1984, the U.S. Department of Housing and Urban Development, Federal Insurance Administration commissioned the "Flood Insurance Study" for the City of Lexington "to investigate the existence and severity of flood hazards." The study consists of detailed engineering graphics, tables and text. The City of Lexington should refer to this study for official hydraulic analysis.

The study outlined the floodplain management applications to guide future land uses and floodplain ordinance, which regulates building in areas declared as the 100-Year Flood Hazard Zone. Floodway, 100 year flood event, and 500 year flood event are shown in Environmental Constraints (Figure 24).

No flood protection structures exist or are planned. As Lexington continues to grow, future development within the floodway and floodplain should be discouraged and only allowed through strict adherence to the local flood plain regulations.

The citizen's protection against natural hazards is the responsibility of the local government and its officials. The effect of high water or flooding can be lessened by planning open space within the designated flood plain, continued maintenance of the floodway, and through the application of design standards to reduce water runoff.

Surface drainage and streams account for a small percentage of the water resources in the Lexington extraterritorial jurisdiction. The City of Lexington relies upon the Platte River to recharge the underground aquifer which supplies water to 14 municipal wells located throughout the community.

The underground water supply for Lexington is part of an abundant aquifer which flows across the majority of Nebraska. Since World War II, a large increase in irrigation practices throughout the Nebraska has drastically lowered the water table. However, the depth to the water table in Dawson County and the Lexington has not significantly changed. The average depth of Lexington's municipal wells vary from 60 to 350 feet. Private agricultural and domestic wells average from 140 to 160 feet in depth in the uplands and from 15 to 30 feet deep in the Platte River Valley. The surface water in drainage ways and depression seeps into the aquifer to recharge it. Thus, the surface and ground water are part of one interactive system which cannot be separated.

Securing the quality of drinking water from private wells in the rural areas of Lexington's extraterritorial jurisdiction is very important. A minimum lot size of three acres is recommended for residences in agriculturally zoned areas. This standard generally ensures that adjacent households do not contaminate each other's drinking water.

Lot sizes less than three acres would locate rural residences close to one another. Rural dwellings typically have septic tanks and possibly leach fields. If located too close to each other, contamination might occur.

Wellhead Protection Program

The Nebraska Department of Environmental Quality (NDEQ) regulates groundwater quality and quantity. To assist local municipalities with protecting their drinking water supply, the NDEQ developed the Nebraska Wellhead Protection (WHP) Program. The Nebraska Wellhead Protection Areas are shown on Figure 24.

The Wellhead Protection (WHP) Program provides the following in accordance with federal laws:

1. Duties of the governmental entities and utility districts
2. Determines protection area
3. Identifies contamination sources
4. Develop a contaminant source management program
5. Develop an alternative drinking water plan
6. Review contaminated sources in future wellhead areas
7. Involve the public

The approaches of Nebraska's Wellhead Protection (WHP) Program are to:

Prevent the location of new contamination sources in wellhead protection areas through planning.

Minimize the hazard of existing sources through management.

Provide early warning of existing contamination through ground water monitoring.

The Wellhead Protection Area is a region with restrictive land use regulations to prevent potential contaminants from locating in the sensitive area. The boundaries are delineated by a time of travel cylindrical displacement calculation. The boundary is mapped by the Nebraska Department of Environmental Quality (NEDQ) so communities can apply zoning regulations to the district. The City of Lexington plans to regulate the wellhead districts with a specific wellhead protection zone.

Legend

- Corporate Limits
- 2-Mile Extraterritorial Jurisdiction
- *Floodway
- *100-Year Floodplain
- *0.2% Annual Chance Floodplain (500-Year)
- Wellhead Protection Areas

FIRM Panel Number
31047C0475C
31047C0450C
31047C0435C
31047C0650C
31047C0625C
31047C0442C
31047C0444C
31047C0464C

*The100-Year Floodplain areas shown on this map are a generalized representation of the Floodplain boundaries shown on the following FIRM panels in the 31047C series:

The FIRM Panels listed to the left are specific to the City of Lexington / D awson County, Nebraska and were officially adopted as of 5/3/2011, and must be referred to for interpretation of Floodplain areas.

Figure 24: Environmental Constraints, Lexington

City of Lexington

Dawson County, Nebraska

Environmental Constraints Map

N

0 2,300 4,600 9,200 Feet

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Date: April 2013
Software: ArcGIS 10
File: 100999

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