

Chapter 6—Natural Features Inventory and Development Constraints

Introduction

An understanding of possible constraints to development, both natural and man-made, are important to consider as policy decisions are made by the city and investment decisions are made by the public and private sectors. Use of this information can prepare the city to use resources most effectively in the long term.

Development constraints within the City of Union include natural features such as floodplains, wetlands, and hydric soils as well as man made constraints such as the Dayton International Airport. These elements are considered constraints on development due to regulations impacting use of that land for development or possibly containing parameters that would contribute to inefficient use of resources. Figures 6.1, 6.2, and 6.3, and 6.4 outline in a graphic form the following summary of development constraints.

Floodplain Areas

Floodplain areas within Union are focused along the Stillwater River. The 100 year floodplain has been mapped based on the Flood Insurance Rate Maps (FIRM) maps for the City of Union, but the actual elevations have not been determined by FEMA above the Englewood dam. However, the top of the dam is at the elevation of 892.0 feet above sea level. The overflow spillway elevation at the Englewood dam is 876.0 feet above sea level. Land within the floodplain includes large parcels within approximately ½ mile of the river.

Development within the floodplain has certain restrictions. The 100 year floodplain elevation is 846 feet above sea level. The inundation elevation for the floodplain is 876 feet above sea level. No livable structures can be built below the 876 foot elevation line. Only barns and sheds can be built below the 876 foot elevation line, while no structures can be built below 846 foot elevation line. Any structure to be built below the 876 foot elevation line must receive approval and permit from the Miami Conservancy District. These restrictions minimize development opportunities and or make development more costly.

Floodplain Land Use Breakdowns

The Stillwater River floodplain has a total area of 1,281.3 acres within the City of Union. There are several land uses found within the floodplain. They are agricultural, sand and gravel mining, multi-family residential, public recreation, and single family. Table 6.1 shows breakdowns of the total land area for each land use within the floodplain, as well as the total percentage of each land use that is found within the floodplain.

Table 6.1 shows that the largest land use occurring within the floodplain is agricultural lands. A total of 28.3 percent of the agricultural lands within the City of Union are within the floodplain. Within the agricultural lands, there is the water treatment facility that totals 241.0 acres. The 241.0 acres is calculated as part of the 705.9 acres of agricultural lands. The 241 acres of land for the water treatment facility is used by the water treatment facility and the waste water treatment facility. The water treatment facility is considered an agricultural land use, however it is important to show the boundary of this facility. Figures 2.1, 6.1, and 9.1 show where the water treatment facility land is found.

The sand and gravel mining operation is almost entirely within the floodplain. One tenth of a percent of the sand and gravel mining operation occurs outside of the floodplain. Less than one tenth of an acre of multi-family residential land uses is within the floodplain. Public recreation land uses make up 130.9 acres within the floodplain, accounting for 59.4 percent of the total public recreational lands within the City of Union. The

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future land use plan suggests expanding the recreational opportunities within the floodplain. 3.7 percent of the single family residential development falls within the floodplain of the Stillwater River.

Source: National Flood Insurance Program, Flood Insurance Rate Map (FIRM) for Montgomery County, Miami Conservancy District, and the FIRM map of the City of Union, Ohio

**Table 6.1
Land Use Area Breakdown Within Floodplain Area**

Land Use	Total Area (SF)	Acres	Area Within Floodplain (SF)	Acres	Percent in Floodplain
Agricultural	71,611,632.5	1,644.0	30,748,744.6	705.9	28.3%
Commercial	1,497,740.7	34.4	0.0	0.0	0.0%
Industrial	2,232,051.5	51.2	0.0	0.0	0.0%
Sand and Gravel Mining	17,758,765.4	407.7	17,748,333.3	407.4	99.9%
Multi-Family	6,594,814.9	151.4	455.4	0.0	0.0%
Office	12,068.7	0.3	0.0	0.0	0.0%
Public/Institutional/Civic	1,907,061.5	43.8	0.0	0.0	0.0%
Private Recreation	1,106,158.4	25.4	0.0	0.0	0.0%
Public Recreation	9,602,711.3	220.4	5,701,651.3	130.9	59.4%
Single Family*	44,151,723.7	1,013.6	1,612,993.8	37.0	3.7%
Water and Waste Water Treatment Facility**			10,495,830.1	241.0	100.0%
Floodplain	55,812,178.4	1,281.3	55,812,178.4	1,281.3	
Total City of Union Land	156,474,728.6	3,592.2	55,812,178.4	1,281.3	35.7%

* No single family dwelling units are built below the 876 foot elevation line.
 ** Water Treatment Facility is calculated as an Agricultural Land Use.

Soils

Soils that are considered constraints to development are those that are very poorly drained under natural conditions. These are characterized as hydric soils. The hydric soils within the City of Union include Brookston silty clay loam, Westland silty clay loam, and Millsdale silty clay loam. Much of the existing hydric soils are located within areas previously developed, however, some areas of hydric soils are located on vacant land. The hydric soil areas in Union are noted on Figure 6.1.

Hydric soils limit development by increasing construction costs due to the requirement to remove bad soil and replace with suitable fill material. Other limitations that may increase construction costs include a seasonal high water table (unless drained), high shrink-swell capacity, high frost-action, and low strength-bearing qualities.

Source: U.S. Agricultural Service Soils Map for Montgomery County

Wetlands Areas

Wetlands are areas of land that meet several criteria including the existence of certain vegetation, certain soil types, and may contain water. According to the National Wetland Inventory (NWI) data, there are some small wetland areas within the City of Union. The cross referencing of NWI data with the Department of

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Agriculture Soils Maps for Montgomery County produce sites that have a 90% chance of being wetlands, without field verification. These potential wetland sites are noted on Figure 6.1.

Wetland areas impact development by limiting or prohibiting development, depending on the amount and quality of wetlands on site. Wetland regulations will decrease the available land for development, add time required for development permitting and add costs to comply with regulations. The regulatory parameters differ based on the size of the wetland.

- If less than 0.1 acre of wetlands are impacted, then no mitigation is required and permitting is straightforward.
- If wetland areas are between 0.1 and 0.5 acres, mitigation and a Nationwide Permit through the Army Corps of Engineers, plus a 401 Water Quality Certification through the Ohio EPA, would be required. This also requires a wetland delineation report.
- Wetlands greater than 0.5 acre require an individual permit through the Corp of Engineers (with associated input from local, state, and federal agencies, plus an alternatives analysis for non-isolated wetlands), a 401 Water Quality Certification (which includes a stormwater pollution prevention plan if the site is greater than 5 acres), and other technical data sheets and wetland delineation report, etc.
Source: National Wetland Inventory

Dayton International Airport

The existing airport and activity near the airport impact Union both from the air and on the ground. On the ground, truck traffic associated with shipping and distribution operations use Dog Leg Road to access the west side of the airport, from U.S. 40 (National Road). Heavy trucks require bigger roads, are noisy and are not compatible with residential development.

Airplanes approaching or leaving the airport are noisy throughout the day, which impacts residents both indoors and outdoors. Areas within the 65 decibel noise line, (DNL) which is considered "normally unacceptable" by the Department of Housing and Urban Development (HUD) are also within the city boundaries of Union. HUD recommends reducing the indoor decibel levels to 45 (DNL) in areas that are 65 (DNL) or higher. Implementing such noise reduction measures in construction will increase construction costs because of increased wall and window thickness and or additional insulation in the roof.

Proposed Dayton International Airport Expansion

The Dayton International Airport has prepared a long term master plan for expansion. Phase three of the proposed airport expansion includes adding a third runway that is parallel and north of the two existing runways. This proposal requires acquisition of additional land by the airport to accommodate the runway, taxiways and approach/clear zones. The potential impacts on the City of Union include land acquisition, noise from aircraft and vehicular traffic associated with the increased air traffic at the airport. Although this is a long term project, consideration of these impacts should be incorporated into long range planning for the city.

- **Airplane Noise-** The 65 DNL for the existing airport runways and the proposed runway are outlined on Figure 6.3. Industrial and non-residential uses are more suitable in these areas due to aircraft noise disturbing residential activities. HUD recommends that if residential development is proposed within the 65 DNL, interior noise levels should be reduced to 45 DNL, especially in bedrooms. Construction techniques, such as increasing the thickness of walls, increasing the thickness of window glass or adding double panes, and adding additional insulation between the ceiling or roof can achieve the noise reduction. These can add to the construction cost and decrease the affordability of homes built in these

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areas. It is important to note that these are guidelines as established by HUD. Each community may adopt specific requirements that are more or less stringent.

- **Proposed Runway Expansions-** A third parallel runway is proposed north of the existing two runways. This runway would require acquisition of lands north and west of land currently controlled by the airport. Some of the areas proposed to be acquired for this runway are also within the City of Union. Figure 6.3 outlines land proposed to be acquired by the airport.

Source: Dayton International Airport Master Plan (web version accessed through the City of Dayton website)

Summary

In general, development constraints within the City of Union are organized by geographic location as follows:

Constraints east of the Stillwater River

- Impacts from the floodplain of the Stillwater River.
- Impacts from aircraft noise.
- Land acquisition by the airport.
- Impacts from traffic associated with the airport.

Constraints west of the Stillwater River

- Impacts from the floodplain of the Stillwater River.