GROUND WATER POLLUTION POTENTIAL OF CLARK COUNTY, OHIO

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GROUND WATER POLLUTION POTENTIAL REPORT NO. 38

OHIO DEPARTMENT OF NATURAL RESOURCES

DIVISION OF WATER

GROUND WATER RESOURCES SECTION

MARCH, 1995

ABSTRACT

A ground water pollution potential map of Clark County has been prepared using the DRASTIC mapping process. The DRASTIC system consists of two major elements: the designation of mappable units, termed hydrogeologic settings, and the superposition of a relative rating system for pollution potential.

Hydrogeologic settings form the basis of the system and incorporate the major hydrogeologic factors that affect and control ground water movement and occurrence including depth to water, net recharge, aquifer media, soil media, topography, impact of the vadose zone media, and hydraulic conductivity of the aquifer. These factors, which form the acronym DRASTIC, are incorporated into a relative ranking scheme that uses a combination of weights and ratings to produce a numerical value called the ground water pollution potential index. Hydrogeologic settings are combined with the pollution potential indexes to create units that can be graphically displayed on a map.

Clark County lies within the Glaciated Central Hydrogeologic Region. The county is covered by variable thicknesses of glacial till, lacustrine deposits, kames outwash, and alluvial deposits. These unconsolidated deposits are underlain by limestone, shale, and shaley limestone bedrock. Ground water yields are dependent on the type of aquifer and vary greatly throughout the county. Pollution potential indexes are relatively low to moderate in areas of till or lacustrine cover over bedrock. Buried valleys containing sand and gravel aquifers, and areas covered by outwash have moderate to high vulnerabilities to contamination.

Ground water pollution potential analysis in Clark County resulted in a map with symbols and colors which illustrate areas of varying ground water contamination vulnerability. Nine hydrogeologic settings were identified in Clark County with computed ground water pollution potential indexes ranging from 72 to 205.

The ground water pollution potential mapping program optimizes the use of existing data to rank areas with respect to relative vulnerability to contamination. The ground water pollution potential map of Clark County has been prepared to assist planners, managers, and local officials in evaluating the potential for contamination from various sources of pollution. This information can be used to help direct resources and land use activities to appropriate areas, or to assist in protection, monitoring, and clean-up efforts.

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ACKNOWLEDGEMENTS

The preparation of the Clark County Ground Water Pollution Potential report and map involved the contribution and work of a number of individuals in the Division of Water. Grateful acknowledgement is given to the following individuals for their technical review and map production, text authorship, report editing and preparation:

Map preparation and review:	Mike Angle Wayne Jones Chrissy Straub Lydia Cumming Steve Heink
Map print production and review:	J. Gerrie McCall David Orr Mike Angle
Report production and review:	Mike Angle Wayne Jones
Report editing:	Michael Hallfrisch Mike Angle J. Gerrie McCall
Desktop publishing and report design:	David Orr

The Division of Water sincerely appreciates the financial support of the Clark County Regional Planning Commission for the printing of the Clark County Ground Water Pollution Potential Map and Report.

INTRODUCTION

The need for protection and management of ground water resources in Ohio has been clearly recognized. About 42 percent of Ohio citizens rely on ground water for drinking and household use from both municipal and private wells. Industry and agriculture also utilize significant quantities of ground water for processing and irrigation. In Ohio, approximately 700,000 rural households depend on private wells; over 6,500 of these wells exist in Clark County.

The characteristics of the many aquifer systems in the state make ground water highly vulnerable to contamination. Measures to protect ground water from contamination usually cost less and create less impact on ground water users than clean-up of a polluted aquifer. Based on these concerns for protection of the resource, staff of the Division of Water conducted a review of various mapping strategies useful for identifying vulnerable aquifer areas. They placed particular emphasis on reviewing mapping systems that would assist in state and local protection and management programs. Based on these factors and the quantity and quality of available data on ground water resources, the DRASTIC mapping process (Aller et al., 1987) was selected for application in the program.

Considerable interest in the mapping program followed successful production of a demonstration county map and led to the inclusion of the program as a recommended initiative in the Ohio Ground Water Protection and Management Strategy (Ohio EPA, 1986). Based on this recommendation, the Ohio General Assembly funded the mapping program. A dedicated mapping unit has been established in the Division of Water, Water Resources Section to implement the ground water pollution potential mapping program on a county-wide basis in Ohio.

The purpose of this report and map is to aid in the protection of our ground water resources. This protection can be enhanced by understanding and implementing the results of this study which utilizes the DRASTIC system of evaluating an area's potential for ground water pollution. The mapping program identifies areas that are more or less vulnerable to contamination and displays this information graphically on maps. The system was not designed or intended to replace site-specific investigations, but rather to be used as a planning and management tool. The map and report can be combined with other information to assist in prioritizing local resources and in making land use decisions.

APPLICATIONS OF POLLUTION POTENTIAL MAPS

The pollution potential mapping program offers a wide variety of applications in many counties. The ground water pollution potential map of Clark County has been prepared to assist planners, managers, and state and local officials in evaluating the relative vulnerability of areas to ground water contamination from various sources of pollution. This information can be used to help direct resources and land use activities to appropriate areas, or to assist in protection, monitoring, and clean-up efforts.

An important application of the pollution potential maps for many areas will be assisting in county land use planning and resource expenditures related to solid waste disposal. A county may use the map to help identify areas that are more or less suitable for disposal activities. Once these areas have been identified, a county can collect more site-specific information and combine this with other local factors to determine site suitability.

Pollution potential maps may also be applied successfully where non-point source contamination is a concern. Non-point source contamination occurs where land use activities over large areas impact water quality. Maps providing information on relative vulnerability can be used to guide the selection and implementation of appropriate best management practices in different areas. Best management practices should be chosen based upon consideration of the chemical and physical processes that occur from the practice, and the effect these processes may have in areas of moderate to high vulnerability to contamination. For example, the use of agricultural best management practices that limit the infiltration of nitrates, or promote dentrification above the water table, would be beneficial to implement in areas of relatively high vulnerability to contamination.

A pollution potential map can also assist in developing ground water protection strategies. By identifying areas more vulnerable to contamination, officials can direct resources to areas where special attention or protection efforts might be warranted. This information can be utilized effectively at the local level for integration into land use decisions and as an educational tool to promote public awareness of ground water resources. Pollution potential maps may also be used to prioritize ground water monitoring and/or contamination clean-up efforts. Areas that are identified as being vulnerable to contamination may benefit from increased ground water monitoring for pollutants or from additional efforts to clean up an aquifer.

Other beneficial uses of the pollution potential maps will be recognized by individuals in the county who are familiar with specific land use and management problems. Planning commissions and zoning boards can use these maps to help make informed decisions about the development of areas within their jurisdiction. Developments proposed to occur within sensitive ground water areas may be required to show how ground water will be protected.

Regardless of the application, emphasis must be placed on the fact that the system is not designed to replace a site-specific investigation. The strength of the system lies in its ability to make a "first-cut approximation" by identifying areas that are vulnerable to contamination. Any potential applications of the system should also recognize the assumptions inherent in the system.

SUMMARY OF THE DRASTIC MAPPING PROCESS

The system chosen for implementation of a ground water pollution potential mapping program in Ohio, DRASTIC, was developed by the National Water Well Association for the United States Environmental Protection Agency. A detailed discussion of this system can be found in Aller et al. (1987).

The DRASTIC mapping system allows the pollution potential of any area to be evaluated systematically using existing information. Vulnerability to contamination is a combination of hydrogeologic factors, anthropogenic influences, and sources of contamination in any given area. The DRASTIC system focuses only on those hydrogeologic factors which influence ground water pollution potential. The system consists of two major elements: the designation of mappable units, termed hydrogeologic settings, and the superposition of a relative rating system to determine pollution potential.

The application of DRASTIC to an area requires the recognition of a set of assumptions made in the development of the system. DRASTIC evaluates the pollution potential of an area, assuming a contaminant with the mobility of water introduced at the surface and flushed into the ground water by precipitation. Most important, DRASTIC cannot be applied to areas smaller than 100 acres in size and is not intended or designed to replace site-specific investigations.

Hydrogeologic Settings and Factors

To facilitate the designation of mappable units, the DRASTIC system used the framework of an existing classification system developed by Heath (1984), which divides the United States into 15 ground water regions based on the factors in a ground water system that affect occurrence and availability.

Within each major hydrogeologic region, smaller units representing specific hydrogeologic settings are identified. Hydrogeologic settings form the basis of the system and represent a composite description of the major geologic and hydrogeologic factors that control ground water movement into, through, and out of an area. A hydrogeologic setting represents a mappable unit with common hydrogeologic characteristics and, as a consequence, common vulnerability to contamination (Aller et al., 1987).

Figure 1 illustrates the format and description of a typical hydrogeologic setting found within Clark County. Inherent within each hydrogeologic setting are the physical characteristics which affect the ground water pollution potential. These characteristics or factors identified during the development of the DRASTIC system include:

D - Depth to Water

R - Net Recharge

A - Aquifer Media

S - Soil Media

T - Topography

I - Impact of the Vadose Zone Media

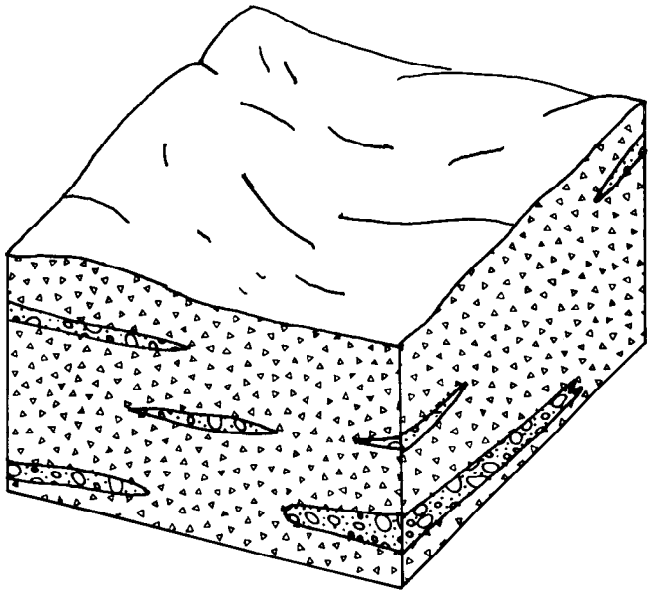
C - Conductivity (Hydraulic) of the Aquifer

These factors incorporate concepts and mechanisms such as attenuation, retardation, and time or distance of travel of a contaminant with respect to the physical characteristics of the hydrogeologic setting. Broad consideration of these factors and mechanisms coupled with existing conditions in a setting provide a basis for determination of the area's relative vulnerability to contamination.

Depth to water is considered to be the depth from the ground surface to the water table in unconfined aquifer conditions or the depth to the top of the aquifer under confined aquifer conditions. The depth to water determines the distance a contaminant would have to travel before reaching the aquifer. The greater the distance the contaminant has to travel, the greater the opportunity for attenuation to occur or restriction of movement by relatively impermeable layers.

Net recharge is the total amount of water reaching the land surface that infiltrates into the aquifer measured in inches per year. Recharge water is available to transport a contaminant from the surface into the aquifer and also affects the quantity of water available for dilution and dispersion of a contaminant. Factors to be included in the determination of net recharge include contributions due to infiltration of precipitation, in addition to infiltration from rivers, streams and lakes, irrigation, and artificial recharge.

Aquifer media represents consolidated or unconsolidated rock material capable of yielding sufficient quantities of water for use. Aquifer media accounts for the various physical characteristics of the rock that provide mechanisms of attenuation, retardation, and flow pathways that affect a contaminant reaching and moving through an aquifer.



7Af Sand and Gravel Interbedded in Glacial Till

This hydrogeologic setting is characterized by low to moderate relief and sand and gravel deposits interbedded in glacial till. The till is composed primarily of clay with varying amounts of unsorted silt, sand, and gravel. The sand and gravel may be relatively thin and discontinuous, lens-shaped bodies, or thick layers which cover a large area. The thick units are usually confined to common horizons within the till. Ground water occurs in both the till and the sand and gravel; however, the sand and gravel serves as the principal aquifer. Recharge to the sand and gravel is primarily due to infiltration of precipitation through the till. Depth to water is highly variable, but on average ranges from 30 to 50 feet. Soils are typically described as clay loams.

Figure 1. Format and description of the hydrogeologic setting - 7Af Sand and Gravel Interbedded in Glacial Till.

Soil media refers to the upper six feet of the unsaturated zone that is characterized by significant biological activity. The type of soil media influences the amount of recharge that can move through the soil column due to variations in soil permeability. Various soil types also have the ability to attenuate or retard a contaminant as it moves throughout the soil profile. Soil media is based on textural classifications of soils and considers relative thicknesses and attenuation characteristics of each profile within the soil.

Topography refers to the slope of the land expressed as percent slope. The slope of an area affects the likelihood that a contaminant will run off or be ponded and ultimately infiltrate into the subsurface. Topography also affects soil development and often can be used to help determine the direction and gradient of ground water flow under water table conditions.

The impact of the vadose zone media refers to the attenuation and retardation processes that can occur as a contaminant moves through the unsaturated zone above the aquifer. The vadose zone represents that area below the soil horizon and above the aquifer that is unsaturated or discontinuously saturated. Various attenuation, travel time, and distance mechanisms related to the types of geologic materials present can affect the movement of contaminants in the vadose zone. Where an aquifer is unconfined, the vadose zone media represents the materials below the soil horizon and above the water table. Under confined aquifer conditions, the vadose zone is simply referred to as a confining layer. The presence of the confining layer in the unsaturated zone has a significant impact on the pollution potential of the ground water in an area.

Hydraulic conductivity of an aquifer is a measure of the ability of the aquifer to transmit water, and is also related to ground water velocity and gradient. Hydraulic conductivity is dependent upon the amount and interconnectivity of void spaces and fractures within a consolidated or unconsolidated rock unit. Higher hydraulic conductivity typically corresponds to higher vulnerability to contamination. Hydraulic conductivity considers the capability for a contaminant that reaches an aquifer to be transported throughout that aquifer over time.

Weighting and Rating System

DRASTIC uses a numerical weighting and rating system that is combined with the DRASTIC factors to calculate a ground water pollution potential index or relative measure of vulnerability to contamination. The DRASTIC factors are weighted from 1 to 5 according to their relative importance to each other with regard to contamination potential (Table 1). Each factor is then divided into ranges or media types and assigned a rating from 1 to 10 based on their significance to pollution potential (Tables 2-8). The rating for each factor is selected based on available information and professional judgement. The selected rating for each factor is multiplied by the assigned weight for each factor. These numbers are summed to calculate the DRASTIC or pollution potential index.

Once a DRASTIC index has been calculated, it is possible to identify areas that are more likely to be susceptible to ground water contamination relative to other areas. The higher the DRASTIC index, the greater the vulnerability to contamination. The index generated provides only a relative evaluation tool and is not designed to produce absolute answers or to represent units of vulnerability. Pollution potential indexes of various settings should be compared to each other only with consideration of the factors that were evaluated in determining the vulnerability of the area.

Pesticide DRASTIC

A special version of DRASTIC was developed to be used where the application of pesticides is a concern. The weights assigned to the DRASTIC factors were changed to reflect the processes that affect pesticide movement into the subsurface with particular emphasis on soils. Where other agricultural practices, such as the application of fertilizers, are a concern, general DRASTIC should be used to evaluate relative vulnerability to contamination. The process for calculating the Pesticide DRASTIC index is identical to the process used for calculating the general DRASTIC index. However, general DRASTIC and Pesticide DRASTIC numbers should not be compared because the conceptual basis in factor weighting and evaluation differs significantly. Table 1 lists the weights used for general and pesticide DRASTIC.

TABLE 1. ASSIGNED WEIGHTS FOR DRASTIC FEATURES

Feature	General DRASTIC Weight	Pesticide DRASTIC Weight
Depth to Water	5	5
Net Recharge	4	4
Aquifer Media	3	3
Soil Media	2	5
Topography	1	3
Impact of the Vadose Zone Media	5	4
Hydraulic Conductivity of the Aquifer	3	2

TABLE 2. RANGES AND RATINGS FOR DEPTH TO WATER

DEPTH TO WATER (FEET)	
Range	Rating
0-5	10
5-15	9
15-30	7
30-50	5
50-75	3
75-100	2
100+	1
Weight: 5	Pesticide Weight: 5

TABLE 3. RANGES AND RATINGS FOR NET RECHARGE

NET RECHARGE (INCHES)	
Range	Rating
0-2	1
2-4	3
4-7	6
7-10	8
10+	9
Weight: 4	Pesticide Weight: 4

TABLE 4. RANGES AND RATINGS FOR AQUIFER MEDIA

AQUIFER MEDIA		
Range	Rating	Typical Rating
Massive Shale	1-3	2
Metamorphic / Igneous	2-5	3
Weathered Metamorphic / Igneous	3-5	4
Glacial Till	4-6	5
Bedded Sandstone, Limestone and Shale Sequences	5-9	6
Massive Sandstone	4-9	6
Massive Limestone	4-9	6
Sand and Gravel	4-9	8
Basalt	2-10	9
Karst Limestone	9-10	10
Weight: 3	Pesticide Weight: 3	

TABLE 5. RANGES AND RATINGS FOR SOIL MEDIA

SOIL MEDIA	
Range	Rating
Thin or Absent	10
Gravel	10
Sand	9
Peat	8
Shrinking and / or Aggregated Clay	7
Sandy Loam	6
Loam	5
Silty Loam	4
Clay Loam	3
Muck	2
Nonshrinking and Nonaggregated Clay	1
Weight: 2	Pesticide Weight: 5

TABLE 6. RANGES AND RATINGS FOR TOPOGRAPHY

TOPOGRAPHY (PERCENT SLOPE)	
Range	Rating
0-2	10
2-6	9
6-12	5
12-18	3
18+	1
Weight: 1	Pesticide Weight: 3

TABLE 7. RANGES AND RATINGS FOR IMPACT OF THE VADOSE ZONE MEDIA

IMPACT OF THE VADOSE ZONE MEDIA		
Range	Rating	Typical Rating
Confining Layer	1	1
Silt/Clay	2-6	3
Shale	2-5	3
LImestone	2-7	6
Sandstone	4-8	6
Bedded Limestone, Sandstone, Shale	4-8	6
Sand and Gravel with significant Silt and Clay	4-8	6
Metamorphic/Igneous	2-8	4
Sand and Gravel	6-9	8
Basalt	2-10	9
Karst Limestone	8-10	10
Weight: 5	Pesticide Weight: 4	

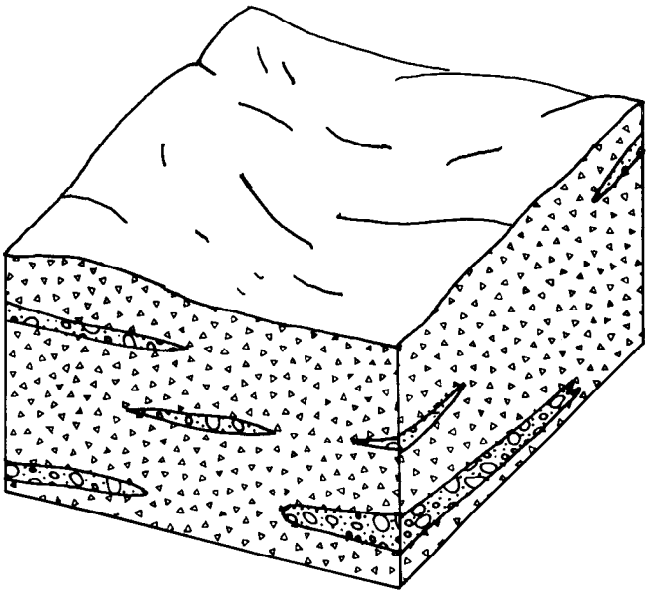
TABLE 8. RANGES AND RATINGS FOR HYDRAULIC CONDUCTIVITY

HYDRAULIC CONDUCTIVITY (GPD/FT^2)	
Range	Rating
1-100	1
100-300	2
300-700	4
700-1000	6
1000-2000	8
2000+	10
Weight: 3	Pesticide Weight: 2

Integration of Hydrogeologic Settings and DRASTIC Factors

Figure 2 illustrates the hydrogeologic setting 7Af, Sand and Gravel Interbedded in Glacial Till, identified in mapping Clark County, and the pollution potential index calculated for the setting. Based on selected ratings for this setting, the pollution potential index is calculated to be 119. This numerical value has no intrinsic meaning, but can be readily compared to a value obtained for other settings in the county. DRASTIC indexes for typical hydrogeologic settings and values across the United States range from 65 to 223. The diversity of hydrogeologic conditions in Clark County produces settings with a wide range of vulnerability to ground water contamination. Calculated pollution potential indexes for the nine settings identified in the county range from 72 to 205.

Hydrogeologic settings identified in an area are combined with the pollution potential indexes to create units that can be graphically displayed on maps. Pollution potential analysis in Clark County resulted in a map with symbols and colors that illustrate areas of ground water vulnerability. The map describing the ground water pollution potential of Clark County is included with this report.



SETTING Af1		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	NUMBER
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand & Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		DRASTIC	INDEX	125

Figure 2. Description of the hydrogeologic setting - 7Af Sand and Gravel Interbedded in Glacial Till.

INTERPRETATION AND USE OF A GROUND WATER POLLUTION POTENTIAL MAP

The application of the DRASTIC system to evaluate an area's vulnerability to contamination produces hydrogeologic settings with corresponding pollution potential indexes. The higher the pollution potential index, the greater the susceptibility to contamination. This numeric value determined for one area can be compared to the pollution potential index calculated for another area.

The map accompanying this report displays both the hydrogeologic settings identified in the county and the associated pollution potential indexes calculated in those hydrogeologic settings. The symbols on the map represent the following information:

7Af1 - defines the hydrogeologic region and setting
125 - defines the relative pollution potential

Here the first number (7) refers to the major hydrogeologic region and the upper and lower case letters (Af) refer to a specific hydrogeologic setting. The following number (1) references a certain set of DRASTIC parameters that are unique to this setting and are described in the corresponding setting chart. The second number (125) is the calculated pollution potential index for this unique setting. The charts for each setting provide a reference to show how the pollution potential index was derived.

The maps are color-coded using ranges depicted on the map legend. The color codes used are part of a national color-coding scheme developed to assist the user in gaining a general insight into the vulnerability of the ground water in the area. The color codes were chosen to represent the colors of the spectrum, with warm colors (red, orange, and yellow) representing areas of higher vulnerability (higher pollution potential indexes), and cool colors (greens, blues, and violet) representing areas of lower vulnerability to contamination.

The map also includes information on the locations of selected observation wells. Available information on these observation wells is referenced in Appendix A, Description of the Logic in Factor Selection. Large man-made features such as landfills, quarries, or strip mines have also been marked on the map for reference.

GENERAL INFORMATION ABOUT CLARK COUNTY

Clark County occupies an area of approximately 402 square miles in southwestern Ohio. The county is divided into 10 townships and is bounded on the north by Champaign County, on the east by Madison County, on the west by Miami and Montgomery Counties, and on the south by Greene County. The County Seat is Springfield. According to the census, the population of Clark County in 1990 was 147,548 (U. S. Dept. of Commerce, 1990).

Physiography

Clark County lies within the Till Plains section of the Central Lowlands physiographic province (Fenneman, 1938). The topography of the county is characterized by level to gently rolling terrain dissected by modern drainages. The surficial features of the county are predominantly glacial in origin with the exception of bedrock outcrops throughout the county. The maximum relief in the county is approximately 488 feet.

Climate

The thirty-year (l96l-l990) annual average temperature for the region including Clark County, as recorded in Springfield, is 49.5 degrees Fahrenheit (U.S. Department of Commerce, 1992). January, the coldest month, has a thirty-year monthly average of 24.3 degrees Fahrenheit. July is the warmest month with a thirty-year monthly average of 72.2 degrees Fahrenheit (Table 9).

The precipitation for Clark County has been recorded at one station in New Carlisile, and two stations in Springfield. One of the Springfield stations is northwest of town at the new waterworks; the other is south of town at the waste water treatment plant. The thirty-year (1961-1960) average annual precipitation at New Carlisile is 38.87 inches. Precipitation for the same thirty year period averages 38.31 inches at the Springfield waterworks, and 39.83 inches at the waste water treatment plant (U.S. Department of Commerce, 1992). The wettest month is typically May, and the driest month is February in Springfield and January in New Carlisle (Table 9).

Figure 3. Location of Clark County, Ohio

Table 9. Monthly 30 Year Average for Precipitation and Temperature (United States Department of Commerce. 1992)

Month	Precipitation (inches)			Temperature (degrees Fahrenheit)
	New Carlisle	Springfiled waste water treatment plant	Springfiled New water works	Springfiled
January	2.16	2.12	2.07	24.3
February	2.23	2.02	1.95	27.0
March	3.31	3.38	3.18	38.2
April	3.63	3.74	3.48	48.4
May	4.07	4.30	4.31	59.4
June	3.99	3.99	3.85	68.3
July	4.12	4.05	4.16	72.2
August	3.79	4.06	3.70	70.1
September	2.98	3.26	3.04	63.4
October	2.61	2.69	2.56	51.4
November	3.13	3.33	3.19	41.1
December	2.85	2.89	2.82	30.4
Annual	**38.87**	**39.83**	**38.31**	**49.5**

Modern Drainage

Clark County lies mainly within the Great Miami and Little Miami River Basins. Some small areas along the eastern boundary are included in the Scioto River Basin (Ohio Department of Natural Resources, 1985). Major sub-basins of the Great Miami River Basin in Clark County include the Upper Mad River Basin (Walker, 1960a), the Miami River Basin (Middle Portion), and the Lower Mad River Basin (Walker, 1960b). The Major sub-basins of the Scioto River Basin include the Deer Creek Basin (Schmidt, 1961), and the Upper Paint Creek Basin (Schmidt, 1962). Figure 4 is a generalized map of Clark County showing the modern drainage system and accompanying basins.

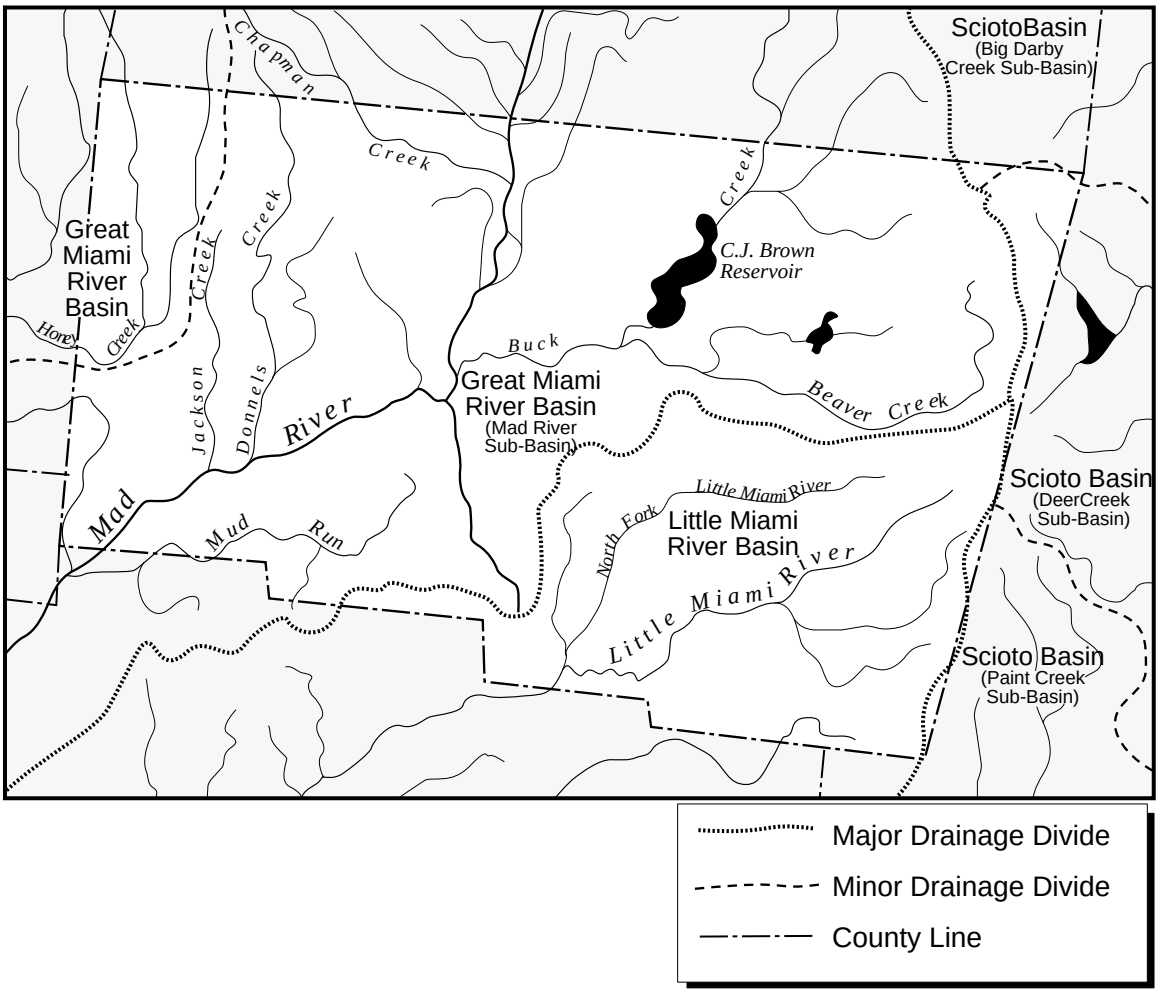


Figure 4. Generalized Modern Drainage (Modified from Ohio Department of Natural Resources, Division of Water, 1985)

Part of the middle portion of the Miami River Basin drains the northwestern corner of Clark County. This portion of the Miami River Basin is drained by southerly flowing Honey Creek and its East and West Forks and associated tributaries (Figure 4).

The Mad River Basin is drained by the Mad River and its tributaries. This basin, which is part of the larger Great Miami River Basin, occupies the central two-thirds of the county.

The Mad River is the largest river in the county. The average daily discharge for a gauging station at Eagle City from 1966 to 1993 was 315 cubic feet per second. Another gauging station three miles west of Springfield reported an average daily discharge of 541 cubic feet per second from 1974 to 1993 (U.S. Geological Survey, 1994). The largest tributaries to the Mad River in Clark County include Buck Creek, Mud Run, Jackson Creek, Donnels Creek, and Chapman Creek (Figure 4).

The Little Miami River Basin makes up the southeastern third of the county and is drained by the southwesterly flowing Little Miami River and its tributaries. A minute portion of the Scioto River Basin is present in the extreme northeastern part of Clark County and also down the length of the eastern boundary of the county. Surficial drainages that are part of this basin are limited to small intermittent tributaries to Deer Creek towards the north and Paint Creek to the south.

Ancestral Drainage and Bedrock Topography

Pre-glacial (Teays Stage) drainage in Clark County was to the north and west (Stout et al., 1943) (Figure 5a). The Teays River flowed in a northwesterly direction across the northeastern third of the county. Teays Stage drainage was blocked by advancing glaciers during the Pre-Illinoian glacial period. The blockage of the Teays Stage drainage resulted in the formation of a new southwesterly flowing drainage pattern. This new drainage pattern is referred to as Deep Stage drainage (Figure 5b).

During the Illinoian and Wisconsinan glacial periods, many geomorpho-logical changes resulted in subsequent changes in drainage patterns in Clark County. Glacial drift of varying thicknesses was deposited over the remnants of the ancestral drainage patterns. The bedrock topography of Clark County is depicted in maps by Stout et al. (1943); Norris et al. (1952); Cummins (1959); Risser and Swinford (1991a,b,c); Vormelker (1991); Risser and Swinford (1992); Shrake and Swinford (1993a,b); Swinford and Shrake (1993a,b,c,d); Vormelker et al. (1993); Vormelker, Swinford, and Shrake (1993); Brockman and Swinford (1994); and Swinford, Dumouchelle, and Brockman (1994). These maps show the configuration of the buried valley system for Clark County.

Glacial Geology

During the Pleistocene Epoch, multiple episodes of glaciation occurred in North America. Evidence for glaciation during the Wisconsinan , Illinoian, and pre-Illinoian (Kansan) stages, in order from the most to the least recent, exists in southwestern Ohio. Surficial glacial drift was deposited during the Wisconsinan stage throughout Clark County (Norris et al., 1952). Drift was deposited in the form of ice-laid (ground moraines, end moraines) and water-laid deposits (outwash, kames, and valley trains).

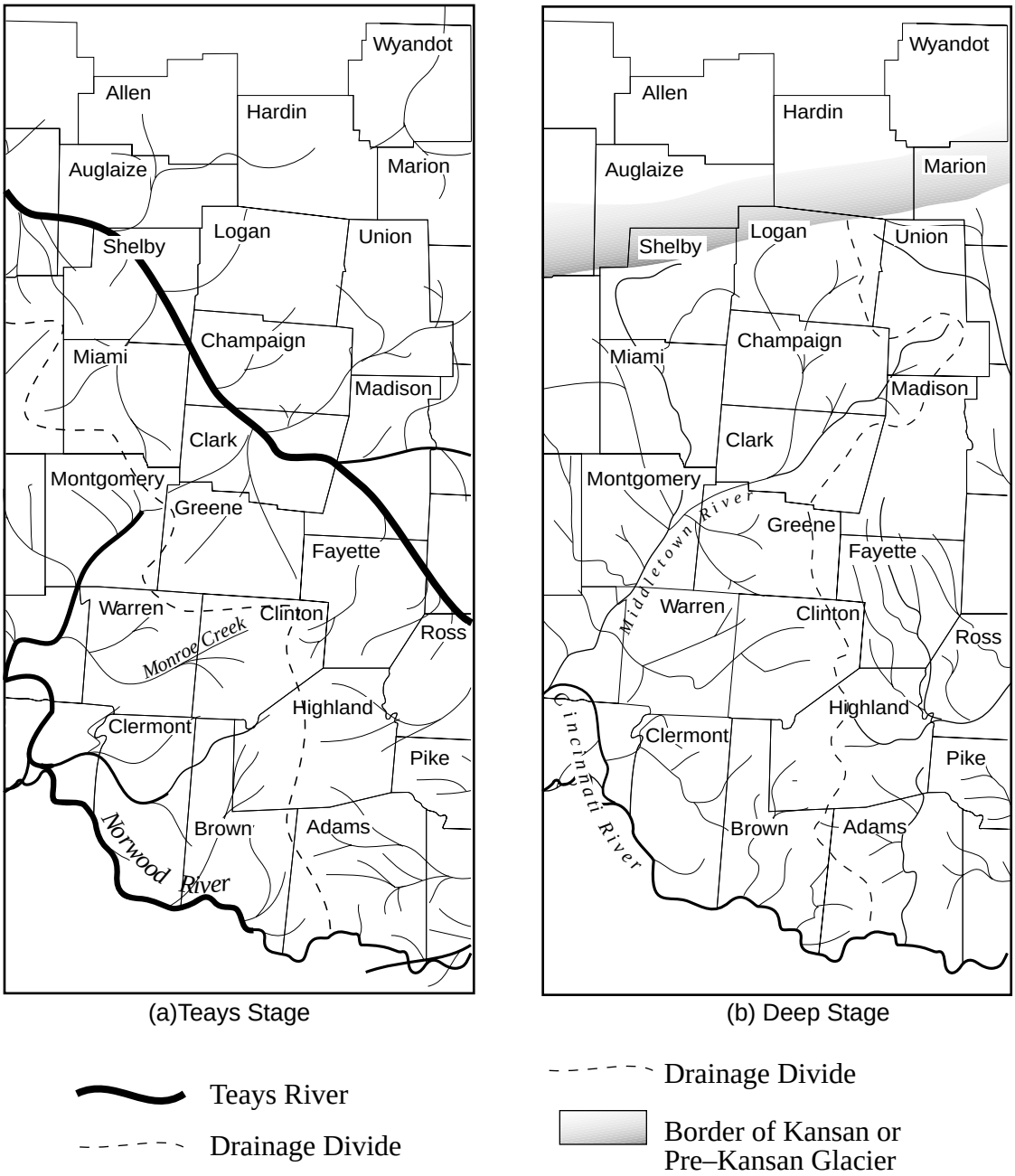


Figure 5. Teays and Deep Stage drainage in southwestern Ohio
(Modified from Stout et al., 1943)

Drift deposits range in thickness from 0 to over 400 feet in Clark County. The thickest deposits of drift are typically located beneath end moraines or over pre-glacial valleys that have been filled by glacial materials. The thickest deposit of drift can be found in the eastern section of the county, to the northeast of the village of Plattsburg. At this location, an end moraine overlies a buried valley, and the drift, composed of sand and gravel lenses interbedded with till, is over 400 feet thick.

As the Wisconsinan ice sheet advanced southward, it was split into two lobes by highlands in Logan County near Bellefontaine. The Miami lobe advanced west of the highlands and the Scioto lobe advanced east. These lobes affected the west and east sides of Clark County, respectively. The mid-section of the county falls into an interlobate area between the two lobes; however, the interlobate area was influenced more by the Miami lobe than the Scioto lobe.

Portions of nine end moraines are present in Clark County (Brown, 1948). End moraines are belts of undulating topography, composed of till, and are generally higher than the adjoining land. Till is predominantly unsorted, unconsolidated, and unstratified material composed of a heterogeneous mixture of clay, silt, sand, pebbles, and coarser rocks. End moraines are described as forming along the margins of an ice sheet where it has stopped moving or started to retreat.

There are several types of deposits which separate the end moraines of Clark County. Most of the surficial deposits are till plains or ground moraine. These are extensive flat surfaces of relatively low relief composed of till deposited intermittently by ice as it advanced over bedrock or previous glacial deposits. Till thicknesses are much less than in the end moraine areas. Also, there are outwash deposits in Clark County consisting of well sorted, highly stratified, usually cross-bedded sand and gravel. Meltwater streams flowing in front of the glacier were the mechanism for depositing this sand and gravel. Finally, there are kames, which are high, steep hummocks composed of bedded and cross- bedded sand and gravel containing channel structures deposited by water flowing through channels, tubes, or cavities in or under the melting ice sheet (Goldthwait et al., 1961).

A brief description of the glacial surface features of Clark County proceeding roughly from east to west starts with the Brighton Moraine (Brown, 1948), which is part of the Bloomingburg Moraine of Leverett (1902). It represents a minor halt associated with the west side of the Scioto lobe of ice and it contains a high concentration of boulders. This north-south trending Brighton Moraine becomes masked within the complex of the Cable Moraine to the north which extends south into Clark County from Champaign County. The Cable Moraine complex covers the northeastern corner of Clark County. The Cable Moraine complex is comprised of the Brighton, Plattsburg, South Charleston, and Thorp Moraines (Brown, 1948). These north-south trending moraines, which converge into the Cable Moraine complex, represent advances and retreats of the Scioto ice lobe.

The South Charleston Till Plain includes the whole southeastern corner of Clark County (Brown, 1948). It lies to the west of the Brighton Moraine. A narrow northward extension of this till plain separates the Brighton Moraine from the Plattsburg Moraine to the west. The Plattsburg Moraine is discontinuous within

Clark County and extends north from South Charleston through Plattsburgh north to Beaver Creek. It is a marked ridge-like structure with over sixty feet of relief in places. Plattsburg is on the western edge of the moraine and South Vienna is on the north crest of this moraine. This moraine becomes less discernable in the Cable Moraine complex north of South Vienna. Proceding westward, the next ridge-like feature is the South Charleston Moraine which divides the South Charleston Till Plain into east and west halves. This moraine runs from the southern border of Clark County north to Beaver Creek, passing through South Charleston and Lisbon. Even though the relief is low, the ridge can be continuously followed throughout its entire length and becomes a prominent feature at Lisbon with a relief of 40 feet above the surrounding plain. The western half of the South Charleston Till Plain has more features upon it than the eastern half, and does not stand out as a broad flat plain as does the eastern half. The next moraine west is an unnamed moraine running north from London Road up Wildman Road towards the town of Dolly Varden. However, it never quite reaches the town as it is cut off by Little Miami River Outwash. This moraine is separated from the South Charleston Moraine by Little Miami River Outwash and by part of the South Charleston Till Plain. West of this moraine is a continuation of the South Charleston Till Plain.

The Xenia Moraine enters Clark County from the south, just east of the village of Clifton and extends east to immediately west of the village of Selma. This moraine indicates from its position that part of the Scioto ice lobe was spreading out into the area between the Miami lobe to the west and the main portion of the Scioto lobe to the east. It reaches north to the outwash deposits in the Little Miami Valley (Brown, 1948).

The Thorp Moraine is the westernmost moraine associated with the Scioto lobe in Clark County (Brown, 1948). It may be a northern extension of the Xenia Moraine, and runs from the valley of the Little Miami and associated outwash deposits on the south to the village of Harmony on the north. Little Miami Valley outwash and remnants of the South Charleston Till Plain separate this moraine from the the unnamed moraine to the east. The northern end of this moraine can be traced into the Cable Moraine complex.

Proceding westward, the next north-south trending moraine is the Pitchin Moraine (Brown, 1948). It starts at the Little Miami River Valley and extends to the Beaver Creek Valley on the north. It is breached midway by an outwash deposit associated with the Miami ice lobe and is separated from the Thorp Moraine by the last vestige of the South Charleston Till Plain. The Pitchin Moraine is the easternmost moraine associated with the Miami ice lobe. It is bounded on the west by the Clifton outwash deposits and the Yellow Springs Till Plain, which occupies the majority of Green Township and the northeast corner of Mad River Township.

West of the Pitchin Moraine is the Springfield Moraine (Brown, 1948), separated from the Pitchin by the Yellow Springs Till Plain and the Clifton outwash. This moraine consists of an extremely large area of moraine material north of the city of Springfield from the northern city limits all the way to the Clark-Champaign County line. It then extends southward through the city of Springfield and south to Beatty, and from Spring Grove Park south to within a mile of the Springfield-Green

township line. South of Enon are several patches of moraine that probably represent the southwestern continuation of the Springfield Moraine (Brown, 1948). North and west of the Springfield Moraine is the North Hampton Till Plain. It occupies most of German Township, the east half of Pike Township, and the north half of Bethel Township, and it extends into Champaign County. The south half of Bethel Township, west half of Bethel Township, and all of Mad River Township are all covered by outwash deposits.

The west half of Pike Township is covered by the Boulder Belt Moraine (Brown, 1948), or the Farmersville Moraine (Goldthwait et al., 1961) as it is also called. It parallels the East Fork of Honey Creek and contains a remarkable concentration of boulders. The majority of the boulders are composed of igneous, crystalline, and metamorphic rocks brought down from Canada by the glacier. There are also a small number of sandstone boulders, but boulders composed of the local rock types, i.e., dolomite or limestone, are absent.

About three miles south of Enon there is a series of kames that are included within the Springfield Moraine (Brown, 1948). From just north of the village of New Carlisle, then south to the Greene County line, the western third of Bethel Township is covered with outwash deposits. These deposits include a series of kames extending south from National Pike to Dayton Springfield Road. The southern portion of Mad River Township is mostly outwash with some minor end moraines on the northwest side of Mud Run. One exception is an area of end moraine surrounding Oak Grove on the south side of Mud Run. Surrounding these moraines is outwash, which includes the above mentioned kames near New Carlisle (Norris et al., 1952).

Bedrock Geology

In Clark County, the bedrock units consist of Ordovician-age interbedded shales and shaley limestones overlain by Silurian-age limestones, shales, and dolomites (Table 10). Clark County is situated on the eastern flank of the Cincinnati Arch (Norris and Fidler, 1973). As such, the bedrock dips to the southeast approximately fifteen feet per mile (Feulner, 1959). The bedrock geology of Clark County has been mapped at a scale of 1:24,000 by the Ohio Division of Geological Survey (Pavey and Swinford, 1994; Schumacher and Slucher, 1994; Shrake, 1994a, b, c, d; Shrake and Slucher, 1994a,b; Swinford, 1991, 1992a, b, 1994; Swinford and Pavey, 1994; Swinford and Slucher, 1994; and Swinford and Shrake, 1994). The geology along the northern border of Clark County is depicted on the Bellefontaine and Piqua 30x60 minute quadrangles (scale 1:100,000) (Swinford, in press; Schumacher, 1993). Exposures of bedrock are sparse throughout the county because of the mantle of glacial drift.

The Upper Ordovician-age (Cincinnatian) rocks in Clark County consist of blue-gray to greenish-gray, calcareous shale interbedded with thin limestones. These rocks are generally fossiliferous, except for the beds immediately below the contact with the Lower Silurian (Alexandrian) rocks (Norris et al., l952, and Orton, 1873). Because of the lack of abundant outcrop and core data in Clark County, the

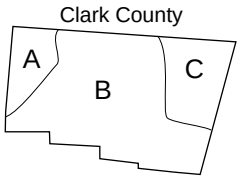
Ordovician-age rocks were classified as undifferentiated. Intermittent exposures of Ordovician-age rocks are present along the Mad River Valley in the southwestern part of the county. Generally, these rocks are covered by glacial drift and subcrop along the bottom of the main buried valley system in Clark County (Norris et al., 1952, and Sheets and Yost, 1994).

The contact between the Ordovician undifferentiated and the overlying Silurian-age sub-Lockport Formation and/or Brassfield Formation is an unconformity, which indicates a period of weathering and erosion or lack of deposition during this time interval in southwestern Ohio. The uppermost Ordovician and lowermost Silurian rocks are missing at this contact as indicated by biostratigraphic studies (Schumacher, 1993).

The stratigraphic nomenclature used for the Silurian-age rocks varies throughout the county. This variation is shown in Table 10 and its accompanying key map.

The stratigraphy in columns A and C of Table 10 correlates to the area north and west of Clark County as described by Schumacher (1993) and Swinford (in press). In central Clark County, (area B), the stratigraphy of Foerste (1935) was adopted (Table 10, column B) because the Osgood and Massie Shales are present and were able to be mapped (Shrake, personal communication). In the eastern (area C) and western (area A) portions of Clark County, the term sub-Lockport undifferentiated is used because the Osgood Shale and Massie Shale have pinched out or are not recognizable. Thus, the stratigraphic units of Foerste (1935) cannot be discerned in areas A and C, and the stratigraphy of Janssens (1977) was adopted for these areas (Schumacher, 1993, and Swinford, in press).

Table 10. Generalized Bedrock Stratigraphy of Clark County (Shrake, personal communication, 1995)



SYSTEM	SERIES	FORMATIONS		
		Map Area: A	Map Area: B	Map Area: C
SILURIAN	Cayugan	Salina Undifferentiated	Tymochtee Dolomite	Salina Undifferentiated Tymochtee Dolomite
		Greenfield Dolomite	Greenfield Dolomite	Greenfield Dolomite
	?			
	Niagaran	Lockport Dolomite	Cedarville Dolomite	Lockport Dolomite
			Springfield Dolomite	
			Euphemia Dolomite	
	?			
	Alexandrian	Sub Lockport Undifferentiated	Massie Shale Laurel Limestone Osgood Shale	Sub Lockport Undifferentiated
			Dayton Limestone	
			Brassfield Limestone	
ORDOVICIAN	Cincinnatian	Undifferentiated Ordovician	Undifferentiated Ordovician	Undifferentiated Ordovician

The Lower Silurian (Alexandrian) Brassfield Limestone is exposed along Mud Run in Mad River Township. The lower part of the unit is massively bedded and sandy in places with the upper part having thin, uneven beds that contain an abundance of crinoid fossils (Norris et al., 1952). Overlying the Brassfield is the Dayton Limestone, a thin, evenly bedded, dense limestone (Norris et al., 1952). This unit is the uppermost Lower Silurian (Alexandrian) unit, and is rarely exposed in Clark County. Above the Dayton Limestone is the Osgood Clay (shale) of Foerste (1935), a unit composed of gray shale grading upward to shaley limestone at its top. This unit is the lowermost unit of the Middle Silurian (Niagaran). The next stratigraphic units are the Laurel Limestone, a dense, thin-bedded limestone, above which lies the Massie Clay (shale) of Foerste (1935) a dense, calcareous, clayey shale. Overlying the Massie Clay (shale), in ascending order, are the Euphemia Dolomite, which is massive and porous, the Springfield Dolomite, which is thin-bedded, more argillaceous, and dense, and, finally, the Cedarville Dolomite, which is massive and very porous (Foerste, 1935, and Norris et al., 1952).

The Cedarville Dolomite is the top unit of the Middle Silurian (Niagaran) in this area. The contact between the Cedarville Dolomite and the basal Upper Silurian (Cayugan) unit, the Greenfield Dolomite, is marked by the change from blue-gray, very porous dolomite (Cedarville) to microcrystalline- to fine-grained, laminated, light-brown dolomite (Greenfield) (Shrake, personal communication, 1994). Overlying the Greenfield Dolomite is the Tymochtee Dolomite. This unit is light to dark-grayish brown, very argillaceous, silty, and frequently contains shaley, black partings. In portions of the county where it becomes difficult to identify the Greenfield and Tymochtee, Jannsens (1977) recommends using the term *undifferentiated Salina*.

Hydrogeology

Ground water in Clark County is obtained from both glacial (unconsolidated) and bedrock (consolidated) aquifers. The glacial aquifers are extremely variable, ranging from thin, discontinuous lenses of sand and gravel interbedded with till to thick sequences of outwash sand and gravel. Yields from the sand and gravel deposits depend upon their thickness, permeability, and whether they are hydraulically connected with overlying streams. Sand and gravel aquifers are particularly variable within buried valleys.

The highest-yielding aquifers in the county are the thick outwash deposits within the Mad River Valley. These deposits are capable of producing yields in excess of 1,000 gallons per minute (gpm) to properly constructed, large diameter wells (Norris et al., 1952 and Schmidt, 1982). Yields from sands and gravels along the margins and in tributary valleys of the Mad River Valley typically range from 500 to 1,000 gpm (Norris et al., 1952 and Schmidt, 1982). These areas include Buck Creek northeast of Springfield and the large outwash and kame areas south of New Carlisle. Test drilling may be necessary in these areas to better determine the higher-yielding zones (Schmidt, 1982).

Properly constructed wells yielding up to 100 gpm may be completed in many of the end moraine and some ground moraine areas in the county (Norris et al., 1952 and Schmidt, 1982). Test drilling may be necessary to delineate these higher-yielding deposits (Norris et al., 1952). Typical yields of 25 gpm, which are adequate

for domestic and farming purposes, are obtainable from the unconsolidated deposits in much of central Clark County (Norris et al., 1952).

Yields obtained from drilling in the buried valleys associated with the Teays River and its tributaries generally range from 3 to 10 gpm (Norris et al., 1952 and Schmidt, 1982). These valleys are usually filled with fine-grained glacial till and lacustrine (lake) deposits. Wells are commonly completed in fine-grained sands or silty-sands typically referred to by drillers as "quicksand" or "heaving sand." Successfully completing a well in these deposits is difficult. Yields are low and the lifespan of these wells is short (Norris et al., 1952). Similar low yields are found in some of the deeper valleys in the southwestern corner of the county (Schmidt, 1982). These valleys contain predominantly till and lack surface streams.

Yields from the carbonate bedrock units are also quite variable. Yields tend to increase toward the northeastern corner of the county. In this portion of the county, carbonates from the Niagaran and Cayugan Series are encountered (Norris and Fidler, 1973). These rocks tend to contain slightly more solutioning and fracturing and fewer shale zones. Typical yields for domestic purposes range from 5 to 15 gpm (Norris et al., 1952 and Schmidt, 1982). Deep, large diameter wells constructed in these units may yield up to 300 gpm (Schmidt, 1982). In central Clark County, wells not encountering adequate supplies from the unconsolidated (glacial) aquifers are extended into the carbonate bedrock. These rocks tend to be from the middle to lower Niagaran Series. Yields for domestic wells range from 5 to 15 gpm with maximum yields of up to 100 gpm (Norris et al., 1952 and Schmidt, 1982). In the southwestern part of the county wells are completed in the Alexandrian Series carbonates and shales. These units tend to contain more shale and finer-grained limestones, and are less solutioned (Norris and Fidler, 1973). Typical yields from wells developed in these units range from 5 to 10 gpm and yields seldom exceed 15 gpm (Norris et al., 1952 and Schmidt, 1982). Wells developed in these rocks are only suitable for fulfilling domestic needs.

Wells developed in the interbedded Ordovician shales and limestones typically yield 1 to 3 gpm and rarely exceed 5 gpm (Norris et al., 1952 and Schmidt, 1982). They tend to produce meager yields and are marginal for fulfilling even domestic needs. Reports of "dry holes" from drillers are not uncommon. The available water is generally derived from the uppermost 5 to 10 foot zone of weathered shale. Wells are then extended deeper to take advantage of additional wellbore storage.

REFERENCES

Aller, L., T. Bennet, J.H. Lehr, R.J. Petty and G. Hackett, 1987. DRASTIC: A standardized system for evaluating ground water pollution potential using hydrogeologic settings. U.S. Environmental Protection Agency EPA/600/2-87-035, 622 pp.

Alvord, Burdick and Howson, 1952. Report on test wells, Springfield, Ohio. Consultant's report, Chicago, Illinois, 14 pp.

Brockman, C.S., and E.M. Swinford, 1994. Reconnaissance bedrock topography of the New Carlisle Quadrangle. Ohio Department of Natural Resources, Division of Geological Survey, Open-file Map BT-B5H1.

Brown, D.M., 1948. The Pleistocene geology of Clark County, Ohio. Unpublished M.S. thesis, The Ohio State University, Columbus, Ohio, 73 pp.

Clinch, J.M., 1991. Bedrock topography mapping of southwest Ohio: Procedures, results, and a few speculations on the Teays problem. Ohio Journal of Science, Vol. 91, No. 2, April Program Abstracts, p. 35.

Cummins, J.W., 1959. Probable surface of bedrock underlying the glaciated area in Ohio. Ohio Department of Natural Resources, Division of Water, Ohio Water Plan Inventory, Report No. 10, map with text.

Driscoll, F.G., 1986. Groundwater and wells. Johnson Filtration Systems, St. Paul, Minn., 1089 pp.

Eagon, H.B., 1972. Report of investigation, ground water levels in the Forest Hills area near Springfield, Clark County. Ohio Department of Natural Resources, Division of Water, Report of Ground Water Investigation, 10 pp.

Fenneman, N.M., 1938. Phisiography of the eastern United States. New York, McGraw-Hill Publishing Co., 714 pp.

Fetter, C.W., 1980. Applied hydrogeology. Charles E. Merrill Publishing Co., Columbus, Ohio, 488 pp.

Feulner, A.J., 1959. Ground-water resources of Champaign County, Ohio. Unpublished M.S. thesis, The Ohio State Univ., Columbus, Ohio.

Foerste, A.F., 1935. Correlation of the Silurian formations in southwestern Ohio, southeastern Indiana, Kentucky, and western Tennessee. Bulletin of the Science Laboratories of Denison Univ., v. 30, pp 119-205.

Freeze, R.A. and J. A. Cherry, 1979. Groundwater. Englewood Cliffs, New Jersey, Prentice-Hall Inc., 604 pp.

Goldthwait, R.P., G.W. White, and J.L. Forsyth, 1961. Glacial map of Ohio. U.S. Geological Survey, Misc. Geological Investigations Map I-316.

Hartzell, G.W. and R. J. Kostelnick, 1983. Ground water investigation in the Crystal Lakes Area, Bethel Township, Clark County, 5 pp.

Heath, R. C., 1984. Ground water regions of the United States. United States Geological Survey, Water Supply Paper 2242, 78 pp.

Janssens, A., 1977. Silurian rocks in the subsurface of northwestern Ohio. Ohio Department of Natural Resources, Division of Geological Survey, Report of Investigations No. 100, 96 pp.

Kaser, P. , 1962. Ground-water levels in the vicinity of Eagle City, Clark County, Ohio. Ohio Department of Natural Resources, Division of Water, Report to the Ohio Water Commission, 82 pp.

Leverett, F., 1902. Glacial formations and drainage features of the Erie and Ohio Basins. Unites States Geological Survey, Monograph XLI, 802 pp.

Miller, K.E. and D.D. Waters, 1993. Information about the soils of Clark County, Ohio. Ohio Department of Natural Resources, Division of Soil and Water, Interim report for the new Soil Survey of Clark County, in progress, 20 pp.

Norris, S.E., W.P. Cross, R.P. Goldthwait, and E.E. Sanderson, 1952. The Water Resources of Clark County, Ohio. Ohio Department of Natural Resources, Division of Water, Bulletin 22, 82 pp.

_____, and A.M. Spieker, 1966. Ground-water resources of the Dayton area, Ohio. U.S. Dept. of the Interior, Geological Survey, Water-Supply Paper 1808, 167 p., 9 plates.

_____, and R.E. Fidler, 1973. Availability of water from limestone and dolomite aquifers in southwest Ohio and the relation of water quality to the regional flow system. U.S. Geological Survey Water-Resources Investigations 17-73, 42 pp.

Ohio Dept. of Natural Resources, 1985. Principal streams and their drainage areas. Division of Water, 1 map.

Ohio Environmental Protection Agency, 1986. Ohio ground water protection and management strategy, 67 pp.

Orton, E., 1873. Geology of Clarke [sic] County. Report of the Geological Survey of Ohio, V. 1, Part I. Geology, pp 450-480.

Pavey, R.R. and E.M. Swinford, 1994. Reconnaissance bedrock geology of the South Charleston Quadrangle. Ohio Department of Natural Resources, Division of Geological Survey, Open-file Map BG-B4G6.

Pettyjohn, W. A. and R. Henning, 1979. Preliminary estimate of ground-water recharge rates, related stream flow and water quality in Ohio. Water Resources Center, The Ohio State University, 323 pp.

Risser, M. and E. M. Swinford, 1991a. Preliminary bedrock topography map of the Thackery Quadrangle. Ohio Department of Natural Resources, Division of Geological Survey, Open-file Map BT-C4A8.

_____ and _____, 1991b. Preliminary bedrock topography map of the Urbana East Quadrangle. Ohio Department of Natural Resources, Division of Geological Survey, Open-file Map BT-C4A6.

_____ and _____, 1991c. Preliminary bedrock topography map of the Urbana West Quadrangle. Ohio Department of Natural Resources, Division of Geological Survey. Open-file Map BT-C4A7.

_____and _____, 1992. Preliminary bedrock topography map of the Mechanicsburg Quadrangle. Ohio Department of Natural Resources, Division of Geological Survey, Open-file Map BT-C4A5.

Schaefer, P. and W. C. Walton, 1956. New Ground Water Supply in the Eagle City Area for the City of Springfield, Ohio. Consultant's report, 54 pp.

Schmidt, J.J., 1982. Ground water resources of Clark County. Ohio Dept. of Natural Resources, Division of Water, Columbus, 1 map.

Schmidt, J.J., 1961. Deer Creek Basin underground water resources. Ohio Department Of Natural Resources, Division of Water, Ohio Water Plan Inventory, File Index M-7, 1 map.

Schmidt, J.J., 1962. Upper Paint Creek Basin underground water resources. Ohio Department of Natural Resources, Division of Water, Ohio Water Plan Inventory, File Index M-13 and 14, 1 map.

Schumacher, G.A., 1993. Regional bedrock geology of the Ohio portion of the Piqua, Ohio-Indiana 30 x 60 minute quadrangle. Ohio Department of Natural Resources, Division of Geological Survey, Map No. 6, map with text.

_____, and E.R. Slucher, 1994. Reconnaissance bedrock geology of the Christiansburg Quadrangle. Ohio Department of Natural Resources, Division of Geological Survey, Open-file Map BG-C5A1.

Sheets, R.A. and W.P. Yost, 1994. Ground-water contribution from the Silurian/Devonian carbonate aquifer to the Mad River Valley, southwestern Ohio. Ohio Journal of Science, Vol. 94, No. 5, pp. 138-146.

Shrake, D.L., 1994a. Reconnaissance bedrock geology of the Clifton Quadrangle: Ohio. Ohio Department of Natural Resources, Division of Geological Survey, Open-file Map BG-B4G7.

_____, 1994b. Reconnaissance bedrock geology of the Donnelsville Quadrangle. Ohio Department of Natural Resources, Division of Geological Survey, Open-file Map BG-B4H8.

_____, 1994c. Reconnaissance bedrock geology of the Springfield Quadrangle. Ohio Department of Natural Resources, Division of Geological Survey, Open-file Map BG-B4H7.

_____, 1994d. Reconnaissance bedrock geology of the Yellow Springs Quadrangle. Ohio Department of Natural Resources, Division of Geological Survey, Open-file Map BG-B4G8.

_____ and E.R. Slucher, 1994a. Reconnaissance bedrock geology of the Florence Quadrangle. Ohio Department of Natural Resources, Division of Geological Survey, Open-file Map BG-B4G5.

_____ and _____, 1994b. Reconnaissance bedrock geology of the New Moorefield Quadrangle. Ohio Department of Natural Resources, Division of Geological Survey, Open-file Map BG-B4H6.

_____, and E.M. Swinford, 1993a. Reconnaissance bedrock topography of the Clifton Quadrangle. Ohio Department of Natural Resources, Division of Geological Survey, Open-file Map BT-B4G7.

_____, and _____, 1993b. Reconnaissance bedrock topography of the Yellow Springs Quadrangle. Ohio Department of Natural Resources, Division of Geological Survey, Open-file Map BT-B4G8.

Stout, W.E., K. Ver Steeg, and G.F. Lamb, 1943. Geology of water in Ohio. Ohio Department of Natural Resources, Division of Geological Survey, Bulletin 44, 694 pp.

Struble, R.A. , 1987. Sand and gravel resources of Clark County, Ohio. Ohio Department of Natural Resources, Division of Geological Survey, Report of Investigations, No. 137, map with text.

Swinford, E. M., in press. Regional bedrock geology of the Bellefontaine, Ohio, 30x60 minute quadrangle. Ohio Department of Natural Resources, Division of Geological Survey, Map No. 8, map with text.

_____, 1991a. Reconnaissance bedrock geology of the Thackery Quadrangle. Ohio Department of Natural Resources, Division of Geological Survey, Open-file Map BG-C4A8.

_____, 1991b. Reconnaissance bedrock topography of the Thackery Quadrangle. Ohio Department of Natural Resources, Division of Geological Survey, Open-file Map BT-C4A8.

_____, 1991c. Reconnaissance bedrock topography of the Urbana West Quadrangle. Ohio Department of Natural Resources, Division of Geological Survey, Open-file Map BT-C4A7.

_____, 1992d. Reconnaissance bedrock geology of the Mechanicburg Quadrangle. Ohio Department of Natural Resources, Division of Geological Survey, Open-file Map BG-C4A5.

_____, 1992e. Reconnaissance bedrock geology of the Urbana West Quadrangle. Ohio Department of Natural Resources, Division of Geological Survey, Open-file Map BG-C4A7.

_____, 1992f. Reconnaissance bedrock topography of the Mechanicburg Quadrangle. Ohio Department of Natural Resources, Division of Geological Survey, Open-file Map BT-C4A5.

_____, 1994g. Reconnaissance bedrock geology of the Fairborn Quadrangle. Ohio Department of Natural Resources, Division of Geological Survey, Open-file Map BG-B5G1.

_____, D.H. Dumouchelle, and C.S. Brockman, 1994. Reconnaissance bedroock topography of the Fairborn Quadrangle. Ohio Department of Natural Resources, Division of Geological Survey, Open-file Map BT-B5G1.

_____, and R.R. Pavey, 1994. Bedrock geology of the New Carlisle Quadrangle. Ohio Department of Natural Resources, Division of Geological Survey, Open-file Map BG-BSH1.

_____, and D.L. Shrake, 1993a. Reconnaissance bedrock topography of the Donnelsville Quadrangle. Ohio Department of Natural Resources, Division of Geological Survey, Open-file Map BT-B4H8.

_____, and _____, 1993b. Reconnaissance bedrock topography of the New Moorefield Quadrangle. Ohio Department of Natural Resources, Division of Geological Survey, Open-file Map BT-B4H6.

_____, and _____, 1993c. Reconnaissance bedrock topography of the South Charleston Quadrangle. Ohio Department of Natural Resources, Division of Geological Survey, Open-file Map BT-B4G6.

_____, and _____, 1993d. Reconnaissance bedrock topography of the Springfield Quadrangle. Ohio Department of Natural Resources, Division of Geological Survey, Open-file Map BT-B4H7.

_____, and _____, 1994. Reconnaissance bedrock geology of the Vienna Quadrangle. Ohio Department of Natural Resources, Division of Geological Survey, Open-file Map BG-B4H5.

_____, and Slucher, 1994. Reconaissance bedrock geology of the Urbana East Quadrangle. Ohio Department of Natural Resources, Division of Geological Survey, Open-file Map BG-C4A6.

U.S. Dept. of Commerce, 1990. Ohio population by governmental unit. Bureau of Census, Current Population Reports.

U.S. Dept of Commerce, 1992. Monthly station normals of temperature, precipitation, and heating and cooling degree days, 1961-1990. National Oceanic and Atmospheric Administration, Climatography of the United States No. 81.

U.S. Geological Survey, 1994. Water resources data for Ohio, water year 1993, Volume 1, Ohio River Basin Excluding Project Data. U.S. Geological Survey, Water Resources Division, 300 pp.

Vormelker, J.D., 1991. Reconnaissance Bedrock Topography of the Christiansburg Quadrangle. Ohio Department of Natural Resources, Division of Geological Survey, Open-file Map BT-C5A1.

_____, D.L. Shrake, and E.R. Slucher, 1993. Reconnaissance bedrock topography of the Florence Quadrangle. Ohio Department of Natural Resources, Division of Geological Survey, Open-file Map BT-B4G5.

_____, E.M. Swinford, and D.L. Shrake, 1993. Reconnaissance bedrock topography of the Vienna Quadrangle. Ohio Department of Natural Resources, Division of Geological Survey, Open-file Map BT-B4H5.

Walker, A.C., 1985. Ground-water investigation in the vicinity of Forest Hills, Clark County. Ohio Department of Natural Resources, Division of Water, miscellaneous report, 4 pp.

Walker, A.C., 1960a. Upper Mad River Basin underground water resources. Ohio Department of Natural Resources, Division of Water, Ohio Water Plan Inventory, File Index H-3, 1 map.

Walker, A.C., 1960b (reprinted 1978). Miami River Basin (part of middle portion) and Lower Mad River Basin underground water resources. Ohio Department of Natural Resources, Division of Water, Ohio Water Plan Inventory, File Index H-4 and H-5, 1 map.

Walker, A.C., 1960c. Upper Little Miami River Basin underground water resources. Ohio Department of Natural Resources, Division of Water, Ohio Water Plan Inventory, File Index K-1, 1 map.

Walton, W.C. and G.D. Scudder, 1960. Ground-water resources of the valley-train deposits in the Fairborn area, Ohio. Ohio Department of Natural Resources, Division of Water, Technical Report No. 3, 57 pp.

UNPUBLISHED DATA

Ohio Department of Natural Resources, Division of Soil and Water Conservation, Ohio Capability Analysis Program. Land use and land cover data.

Ohio Department of Natural Resources, Division of Water, Water Resources Section. Unpublished water well log reports for Clark County.

APPENDIX A

DESCRIPTION OF THE LOGIC IN FACTOR SELECTION

Depth to Water

The depth to water was evaluated primarily using information from water well log records on file at the Ohio Department of Natural Resources, Division of Water, Water Resources Section (WRS). Approximately 6,500 water well log records are on file for Clark County. Almost 4,500 of these well logs were field located. Static water levels and information on the depth to saturated zones were taken from the well log records. The Water Resources of Clark County (Norris et al., 1952) and the Ground Water Resources of Clark County (Schmidt, 1982) helped to provide generalized depth to water information. Topographic and geomorphic trends were utilized in areas where other data sources were lacking.

Depths of 5 to 15 feet (DRASTIC value = (9)) and 15 to 30 feet (7) were typical of areas in both smaller stream valleys and areas paralleling the floodplains in larger stream valleys. Outwash and stream terraces commonly had depths of 15 to 30 feet (7). Depths of 15 to 30 feet were also common in many areas of low to moderate relief, including ground moraine (till plain), outwash plains, and areas where bedrock was relatively close to the ground surface.

Depths of 30 to 50 feet (5) were common in end moraines, in portions of buried valleys lacking streams, along the margins of buried valleys, and in kame areas. Depths of 30 to 50 feet were typical in areas where thicker ground moraine was overlying limestone bedrock.

Depths of 50 to 75 feet (3) were generally limited to upland areas and areas with high relief, particularly ridges. These areas included portions of end moraines, bedrock highs, areas where end moraines were superimposed over buried valleys, and portions of the Teays Valley which do not contain modern streams.

Net Recharge

Recharge is the precipitation that reaches or recharges the aquifer after evapotranspiration and runoff. This factor was evaluated using many criteria, including depth to water, topography (slope), surface drainage, soil type, vadose zone material, and annual precipitation. The general estimates of recharge provided by Pettyjohn and Henning (1979) proved to be helpful throughout the county.

Values of 7 to 10 inches per year (8) and greater than 10 inches per year (9) of recharge were assigned to areas with highly permeable soils (e.g., sandy loams), highly permeable vadose materials (e.g., outwash), shallow depths to water, close proximity to streams, and flat-lying terrain. Areas commonly include floodplains and terraces flanking modern streams. These areas of high recharge were found primarily within the Mad River Valley and along Buck Creek. The values for recharge in these areas agree with values reported by Walton and Scudder (1960) for the Fairborn area in Greene County. Norris and Spieker (1966), in their extensive report on ground water resources in the Dayton area, estimated an average recharge value of 12 inches per year for the Mad River and Great Miami River valleys. Norris et al. (1952) inferred high infiltration and recharge rates for the main trunk of the Mad River, particularly in the Springfield area. Sheets and Yost (1994) report recharge rates from 10 to 21 inches per year for the outwash deposits flanking the Mad River in Clark County and Champaign County.

Values of 4 to 7 inches per year (6) were utilized in areas with moderate depth to water, flat to rolling topography, and clay loam or silt loam soils. Vadose materials include moderate thicknesses of till, fine alluvium, areas with dirty, poorly-sorted, and finer outwash (including most kames), and limestone bedrock. Ground moraine (till plain), some areas of end moraines, kames, and areas where limestone is moderately close to the ground surface were given this recharge rate of 4 to 7 inches per year (6). These values agree with those of Sheets and Yost (1994) who reported a range of recharge of 4 to 6 inches per year for areas with till overlying limestone in Champaign County.

Values of 2 to 4 inches per year (3) were selected for areas with greater depths to water, clay loam soils, and moderate to steep topography. Vadose zone materials consist primarily of thick, predominantly unweathered, till. These values for recharge were typically used for steeper, prominent end moraines, areas where end moraines are superimposed over buried valleys, and portions of the Teays Valley which do not have overlying, modern streams.

Aquifer Media

Aquifer characteristics and geographic distributions were determined using multiple sources. Well log records on file at the WRS, the report on water resources by Norris et al. (1952), and the map on ground water resources by Schmidt (1982) were extremely useful in characterizing the aquifers. Information on bedrock topography was valuable in delineating buried valleys and areas of shallow bedrock. This information included the maps of Stout et al. (1943); Norris et al. (1952); Cummins (1959); Risser and Swinford (1991a,b,c); Vormelker (1991); Clinch (1991); Risser and Swinford (1992); Shrake and Swinford (1993a,b); Swinford and Shrake (1993a,b,c,d); Vormelker and Shrake (1993); Vormelker, Swinford, and Shrake (1993); Brockman and Swinford (1994); and Swinford, DuMochelle, and Brockman (1994). Information on the bedrock geology of Clark County included the 1:24,000 scale maps of Pavey and Swinford (1994); Scumacher and Slucher (1994); Shrake (1994a,b,c,d); Shrake and Slucher (1994a,b); Swinford (1991a; 1992a,b; 1994); Swinford and Pavey (1994); Swinford and Slucher (1994); and Swinford and Shrake (1994) and the 1:100,000 scale maps of Schumacher (1993) and Swinford (in press). Other information on bedrock included Foerste (1935); Feulner (1959); Norris and Fidler (1973); and Sheets and Yost (1994). Information on the glacial deposits included the reports of Brown (1948); Alvord et al. (1952); Schaefer and Walton (1956); Goldthwait et al. (1961); Kaser (1962); Norris and Spieker (1966); Eagon (1972); Hartzell and Kostelnick (1983); Walker (1985); and Struble (1987).

Outwash sand and gravel associated with the main trunk of the Mad River Valley were assigned aquifer ratings of (9) because of the well-sorted nature, stratification, and coarseness of these deposits. Sand and gravel deposits along the margins of the larger valleys, in tributary buried valleys, and in kame and outwash areas were given ratings of (6), (7), or (8), depending upon their physical characteristics. Sand and gravel lenses interbedded with till in end moraine and ground moraine areas were given values of (6) or (7).

The Silurian limestone and dolomite bedrock aquifers throughout Clark County were assigned a rating of (6). The interbedded Ordovician limestone and shale was limited to extreme southwestern Clark County and given a rating of (3) because of the overall low permeability of these rocks.

Soil Media

Digitized maps of soil texture based on the DRASTIC (Aller et al., 1987) evaluation of each soil type were obtained from the Ohio Department of Natural Resources, Division of Real Estate and Land Management (REALM), Resource Analysis Section (formerly Ohio Capabilities Analysis Program (OCAP)). Information for these maps was obtained from the Soil Survey of Clark County which is currently in progress (Miller and Waters, 1993). Table 11 lists the soil types encountered in Clark County and gives information on the soils' parent material or setting and the corresponding DRASTIC index.

Table 11. Clark County Soils

Soil Name	Parent Material or Setting	DRASTIC Rating	Soil Media
Adrian	kettles, bogs	8	peat
Carlisle	kettles, bogs	8	peat
Casco	outwash, kames	6	sandy loam
Celina	till	3	clay loam
Crosby	till	3	clay loam
Donnellsville	colluvium, slopes	5	loam
Drummer	outwash, terraces	5	loam
Eldean	outwash, kames	6	sandy loam
Genesee	alluvium, floodplain	4	silt loam
Kokomo	till, depression	3	clay loam
Linwood	kettles, bogs	8	peat
Lippincott	outwash, kanes	6	sandy loam
Miamian	till	3	clay loam
Millsdale	till over limestone	7	shrink/swell clay
Milton	till over limestone	7	shrink/swell clay
Ockley	alluvium, terrace	4	silt loam
Patton	lacustrime	3	clay loam
Rudolph	limestone	10	thin or absent
Rodman	outwash, kames	10	gravel
Ross	alluvium, floodplain	4	silt loam
Rush	terrace	5	loam
Savona	terrace	5	loam
Sloan	terrace	5	loam
Strawn	till	3	clay loam
Thackery	terrace	5	loam
Tremont	terrace	5	loam
Walkill	kettles, bogs	8	peat
Warsaw	outwash, terraces	5	loam
Waupecan	outwash, terraces	5	loam
Waynetown	outwash, terraces	5	loam
Westland	outwash, kames	6	sandy loam

Topography

Topography was evaluated by determining the percentage of slope obtained from the U.S.G.S. 7-1/2 minute quadrangle (topographic) maps.

Impact of the Vadose Zone Media

Vadose zone media were evaluated using multiple sources of information. Well log records on file at the WRS, the report on water resources by Norris et al. (1952), and the map on ground water resources by Schmidt (1982) were extremely useful in characterizing vadose materials. Information on bedrock topography was valuable in delineating buried valleys and areas of shallow bedrock. This information included the maps of Stout et al. (1943); Norris et al. (1952); Cummins (1959); Risser and Swinford (1991a,b,c); Vormelker (1991); Clinch (1991); Risser and Swinford (1992); Shrake and Swinford (1993a,b); Swinford and Shrake (1993a,b,c,d); Vormelker and Shrake (1993); Vormelker, Swinford, and Shrake (1993); Brockman and Swinford (1994); and Swinford, DuMochelle, and Brockman (1994). Information on the bedrock geology of Clark County included the 1:24,000 scale maps of Pavey and Swinford (1994); Scumacher and Slucher (1994); Shrake (1994a,b,c,d); Shrake and Slucher (1994a,b); Swinford (1991; 1992a,b; 1994); Swinford and Pavey (1994); Swinford and Slucher (1994); and Swinford and Shrake (1994) and the 1:100,000 scale maps of Schumacher (1993) and Swinford (in press). Other information on bedrock included Foerste (1935); Feulner (1959); Norris and Fidler (1973); and Sheets and Yost (1994). Information on the glacial deposits included the reports of Brown (1948); Alvord et al. (1952); Schaefer and Walton (1956); Goldthwait et al. (1961); Kaser (1962); Norris and Spieker (1966); Eagon (1972); Hartzell and Kostelnick (1983); Walker (1985); and Struble (1987).

Till was selected as the vadose zone material in most of the areas of ground moraine and end moraine. Till was also utilized in the buried valley setting for valleys which lack significant outwash deposits and for valleys which do not contain modern streams with floodplains. Till was typically given a DRASTIC rating of (4). For exceptionally thick sequences of till where the majority of the till is unweathered, non-fractured, and extremely compacted, a rating of (3) was applied.

In many areas, well logs or the reports of Norris et al. (1952), Schmidt (1982), and Struble (1987) showed appreciable sand and gravel layers interbedded with till. In these areas, sand and gravel with significant silt and clay was selected and the vadose material and ratings of (5), (6), or (7) were used. In floodplain areas the alluvium was rated as sand and gravel with significant silt and clay and ratings of (5) and (6) were utilized. In areas with abundant outwash deposits or kames, including many buried valleys, sand and gravel with significant silt and clay was selected and ratings of (6), (7), and (8) were applied.

Limestone was selected as the vadose zone material for some limited areas with extremely shallow bedrock along the Miami County border in western Clark County. A rating of (6) was applied to these areas.

Hydraulic Conductivity

Very little published hydraulic conductivity data exist for Clark County. The studies of Norris et al. (1952), Alvord et al. (1952), Schaefer and Walton (1956), Kaser (1962), Norris and Spieker (1966), Norris and Fidler (1973), Eagon (1972), and Sheets and Yost (1994) provided some useful information and values for hydraulic conductivities. Textbook tables (Freeze and Cherry, 1979; Fetter, 1980; and Driscoll, 1986) were useful in obtaining estimated values for a variety of aquifer materials.

Values for hydraulic conductivity roughly followed the aquifer ratings, i.e., the more highly-rated aquifers have higher hydraulic conductivities. For the sand and gravel aquifers, the hydraulic conductivity is a function of coarseness, stratification, sorting, and cleanliness (absence of fines). For sand and gravel lenses interbedded with till, hydraulic conductivity ratings of 100-300 gallons per day per square foot (gpd/ft^2) (2), 300-700 gpd/ft^2 (4), and 700 to 1,000 gpd/ft^2 (6) were selected. In outwash, kame, and many buried valley areas containing thick outwash, hydraulic conductivity ratings of 700 to 1,000 gpd/ft^2 (6), 1,000 to 2,000 gpd/ft^2 (8), and over 2,000 gpd/ft^2 (10) were used.

Values for hydraulic conductivity also varied for the bedrock aquifers. For the limestone and dolomite aquifers, values of 100 to 300 gpd/ft^2 (2), 300 to 700 gpd/ft^2 (4), and 700 to 1,000 gpd/ft^2 (6) were selected. These various values reflected the stratigraphy and nature of the particular carbonate units, the amount of solutioning, and most importantly, the degree of fracturing. Yields from completed wells, particularly larger diameter wells, and drillers' logs were carefully checked. Limestones underlying or bordering both modern stream valleys and buried valleys tend to be more highly fractured. Limestones close to the ground surface with shallow depths to water also tend to be more highly weathered and fractured.

The interbedded Ordovician limestones and shales in extreme southwestern Clark County were given a rating of 1 to 100 gpd/ft^2 (1) due to their very low permeability and overall poor aquifer characteristics.

APPENDIX B

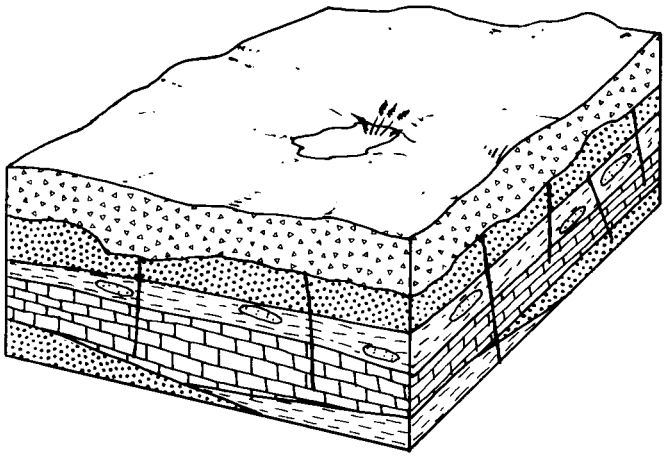
DESCRIPTION OF HYDROGEOLOGIC SETTINGS AND CHARTS

Ground water pollution potential mapping in Clark County resulted in the identification of nine hydrogeologic settings within the Glaciated Central Region. The list of these settings, the range of pollution potential index calculations, and the number of index calculations for each setting are provided in Table 12. Computed pollution potential indexes for Clark County range from 72 to 205.

The following information provides a description of each hydrogeologic setting identified in the county, a block diagram illustrating the characteristics of the setting, and a listing of the charts for each unique combination of pollution potential indexes calculated for each setting. The charts provide information on how the ground water pollution potential index was derived and are a quick and easy reference for the accompanying ground water pollution potential map. A complete discussion of the rating and evaluation of each factor in the hydrogeologic settings is provided in Appendix A, Description of the Logic in Factor Selection.

TABLE 12. HYDROGEOLOGIC SETTINGS MAPPED IN CLARK COUNTY, OHIO.

Hydrogeologic Settings	Range of GWPP Indexes	Number of Index Calculations
7Aa - Glacial Till Over Bedded Sedimentary Rock	117	1
7Ac - Glacial Till Over Solution Limestone	88-157	68
7Af - Sand & Gravel Interbedded in Glacial Till	93-154	43
7Ba - Outwash	118-180	16
7Bc - Outwash Over Limestone	126-169	16
7D - Buried Valley	72-205	235
7Ec - Alluvium Over Sedimentary Rock	134-170	19
7Ed - Alluvium Over Glacial Till	134-157	5
7Ee - Alluvium Over Outwash	158-182	7

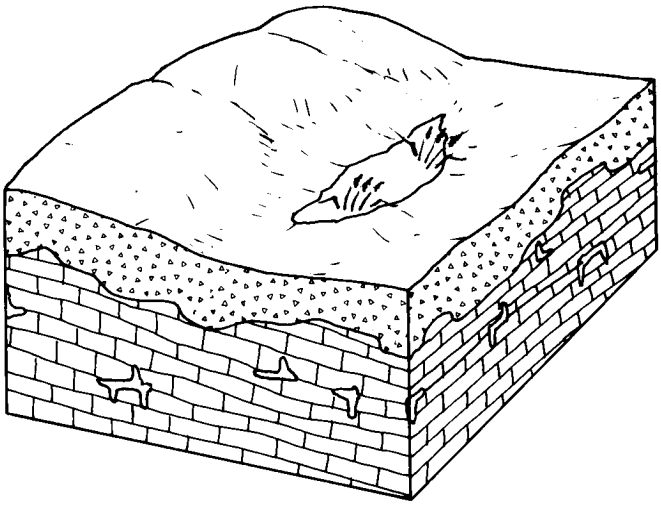


7Aa Till Over Bedded Sedimentary Rock

This hydrogeologic setting is characterized by moderate relief and flat-lying, fractured sedimentary rock. The underlying bedrock consists of thick sequences of Ordovician shale interbedded with thin layers of limestone. These sedimentary rock units are covered by varying thicknesses of glacial till. The till layer consists of unsorted deposits of interbedded clay, silt, and sand. Although ground water occurs in both the glacial deposits and the fractured bedrock, bedrock is the principal aquifer. The main source of recharge to the bedrock aquifer is from the overlying glacial till. This recharge is low to moderate due to the impermeable nature of the till and soils. Soils are clay loam. Depth to water varies, depending on glacial till thickness, but is between 5–15 feet.

The GWPP index value for the hydrogeologic setting of Till Over Bedded Sedimentary Rock is 117 for the one setting found in Clark county.

Setting: 7Aa1			**GENERAL**	
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	4-7	4	6	24
Aquifer Media	Limestone/Shale	3	3	9
Soil Media	Clay Loam	2	3	6
Topography	6-12%	1	5	5
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	1-100	3	1	3
		GWPP	INDEX	117



7Ac Glacial Till Over Limestone

This hydrogeologic setting is characterized by flat and rolling topography and limestone bedrock covered by varying thicknesses of glacial till. The till consists primarily of clay with varying amounts of silt, sand, and gravel. Sand and gravel lenses within the till are numerous but are too thin to constitute an aquifer. The limestone bedrock serves as the aquifer in this setting. Ground water occurs in fractures and solution channels within the formation. The limestone is in direct hydraulic connection with the glacial till and precipitation infiltrating through the till serves as a source of recharge for the underlying limestone. Depth to water is extremely variable, depending in part on the thickness of the glacial till. Soils are typically clay loam and depth to water generally ranges from 20 to 50 feet.

The GWPP index values for the hydrogeologic setting of Glacial Till Over Limestone range from 88 to 157 with the total number of GWPP index calculations equaling 68.

Setting: 7Ac1		**GENERAL**		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Limestone	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	125

Setting: 7Ac2		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Limestone	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	2-6%	1	9	9
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	100-300	3	2	6
		GWPP	INDEX	118

Setting: 7Ac3		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Limestone	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	2-6%	1	9	9
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	114

Setting: 7Ac4		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Limestone	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	6-12%	1	5	5
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	100-300	3	2	6
		GWPP	INDEX	114

Setting: 7Ac5		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Limestone	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	2-6%	1	9	9
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	124

Setting: 7Ac6		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Limestone	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	6-12%	1	5	5
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	110

Setting: 7Ac7		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Limestone	3	6	18
Soil Media	Sandy Loam	2	6	12
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	136

Setting: 7Ac8		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	4-7	4	6	24
Aquifer Media	Limestone	3	6	18
Soil Media	Sand	2	9	18
Topography	6-12%	1	5	5
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	153

Setting: 7Ac9		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Limestone	3	6	18
Soil Media	Silt Loam	2	4	8
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	138

Setting: 7Ac10		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	7	35
Net Recharge	2-4	4	3	12
Aquifer Media	Limestone	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	18%+	1	1	1
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	115

Setting: 7Ac11		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Limestone	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	131

Setting: 7Ac12		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Limestone	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	12-18%	1	3	3
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	134

Setting: 7Ac13		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Limestone	3	6	18
Soil Media	Soil	2	3	6
Topography	12-18%	1	3	3
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	124

Setting: 7Ac14		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Limestone	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	6-12%	1	5	5
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	136

Setting: 7Ac15		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Limestone	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	136

Setting: 7Ac16		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Limestone	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	12-18%	1	3	3
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	119

Setting: 7Ac17		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Limestone	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	2-6%	1	9	9
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	135

Setting: 7Ac18		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Limestone	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	141

Setting: 7Ac19		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Limestone	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	6-12%	1	5	5
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	126

Setting: 7Ac20		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	4-7	4	6	24
Aquifer Media	Limestone	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	151

Setting: 7Ac21		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Limestone	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	126

Setting: 7Ac22		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Limestone	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	5	5
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	121

Setting: 7Ac23		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Limestone	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	2-6%	1	9	9
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	125

Setting: 7Ac24		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	4-7	4	6	24
Aquifer Media	Limestone	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	146

Setting: 7Ac25		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Limestone	3	6	18
Soil Media	Silt Loam	2	4	8
Topography	2-6%	1	9	9
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	700-1000	3	4	12
		GWPP	INDEX	131

Setting: 7Ac26		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Limestone	3	6	18
Soil Media	Sandy Loam	2	6	12
Topography	12-18%	1	3	3
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	125

Setting: 7Ac27		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Limestone	3	6	18
Soil Media	Sandy Loam	2	6	12
Topography	18%+	1	1	1
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	123

Setting: 7Ac28		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Limestone	3	6	18
Soil Media	Shrink/Swell Clay	2	7	14
Topography	6-12%	1	5	5
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	144

Setting: 7Ac29		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Limestone	3	6	18
Soil Media	Shrink/Swell Clay	2	7	14
Topography	6-12%	1	5	5
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	129

Setting: 7Ac30		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Limestone	3	6	18
Soil Media	Loam	2	5	10
Topography	6-12%	1	5	5
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	125

Setting: 7Ac31		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	4-7	4	6	24
Aquifer Media	Limestone	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	2-6%	1	9	9
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	150

Setting: 7Ac32		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Limestone	3	6	18
Soil Media	Loam	2	5	10
Topography	12-18%	1	3	3
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	133

Setting: 7Ac33		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Limestone	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	2-6%	1	9	9
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	119

Setting: 7Ac34		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Limestone	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	2-6%	1	9	9
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	129

Setting: 7Ac35		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Limestone	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	6-12%	1	5	5
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	125

Setting: 7Ac36		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Limestone	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	18%+	1	1	1
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	121

Setting: 7Ac37		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Limestone	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	130

Setting: 7Ac38		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	4-7	4	6	24
Aquifer Media	Limestone	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	140

Setting: 7Ac39		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Limestone	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	120

Setting: 7Ac40		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Limestone	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	6-12%	1	5	5
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	115

Setting: 7Ac41		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Limestone	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	12-18%	1	3	3
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	113

Setting: 7Ac42		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Limestone	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	12-18%	1	3	3
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	123

Setting: 7Ac43		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Limestone	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	2-6%	1	9	9
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	124

Setting: 7Ac44		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Limestone	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	135

Setting: 7Ac45		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Limestone	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	6-12%	1	5	5
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	130

Setting: 7Ac46		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Limestone	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	12-18%	1	3	3
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	108

Setting: 7Ac47		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	2-4	4	3	12
Aquifer Media	Limestone	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	6-12%	1	5	5
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	88

Setting: 7Ac48		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	2-4	4	3	12
Aquifer Media	Limestone	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	18%+	1	1	1
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	99

Setting: 7Ac49		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Limestone	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	2-6%	1	9	9
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	134

Setting: 7Ac50		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	3	15
Net Recharge	2-4	4	3	12
Aquifer Media	Limestone	3	6	18
Soil Media	Sandy Loam	2	6	12
Topography	12-18%	1	3	3
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	4	12
		GWPP	INDEX	102

Setting: 7Ac51		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Limestone	3	6	18
Soil Media	Sandy Loam	2	6	12
Topography	6-12%	1	5	5
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	7	35
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	137

Setting: 7Ac52		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Limestone	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	2-6%	1	9	9
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	7	35
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	135

Setting: 7Ac53		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Limestone	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	7	35
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	136

Setting: 7Ac54		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Limestone	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	6-12%	1	5	5
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	131

Setting: 7Ac55		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Limestone	3	6	18
Soil Media	Sandy Loam	2	6	12
Topography	12-18%	1	3	3
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	140

Setting: 7Ac56		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	4-7	4	6	24
Aquifer Media	Limestone	3	6	18
Soil Media	Sandy Loam	2	6	12
Topography	12-18%	1	3	3
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	150

Setting: 7Ac57		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Limestone	3	6	18
Soil Media	Sandy Loam	2	6	12
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	147

Setting: 7Ac58		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Limestone	3	6	18
Soil Media	Sandy Loam	2	6	12
Topography	6-12%	1	5	5
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	132

Setting: 7Ac59		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Limestone	3	6	18
Soil Media	Sandy Loam	2	6	12
Topography	6-12%	1	5	5
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	142

Setting: 7Ac60		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	2-4	4	3	12
Aquifer Media	Limestone	3	6	18
Soil Media	Sandy Loam	2	6	12
Topography	6-12%	1	5	5
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	105

Setting: 7Ac61		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	4-7	4	6	24
Aquifer Media	Limestone	3	6	18
Soil Media	Sandy Loam	2	6	12
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	157

Setting: 7Ac62		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Limestone	3	6	18
Soil Media	Sandy Loam	2	6	12
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	142

Setting: 7Ac63		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	2-4	4	3	12
Aquifer Media	Limestone	3	6	18
Soil Media	Sandy Loam	2	6	12
Topography	18%+	1	1	1
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	105

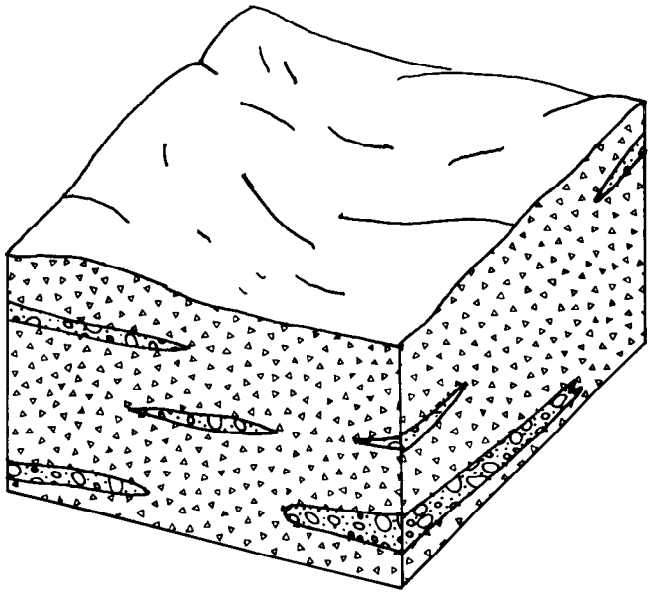
Setting: 7Ac64		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	2-4	4	3	12
Aquifer Media	Limestone	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	12-18%	1	3	3
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	96

7Ac65		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Limestone	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	115

Setting: 7Ac66		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Limestone	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	6-12%	1	5	5
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	120

Setting: 7Ac67		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	2-4	4	3	12
Aquifer Media	Limestone	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	104

Setting: 7Ac68		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	7-10	4	8	32
Aquifer Media	Limestone	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	2-6%	1	9	9
Impact of Vadose Zone	Limestone	5	6	30
Hydraulic Conductivity	100-300	3	2	6
		GWPP	INDEX	136



7Af Sand and Gravel Interbedded in Glacial Till

This hydrogeologic setting is characterized by low to moderate relief and sand and gravel deposits interbedded in glacial till. The till is composed primarily of clay with varying amounts of unsorted silt, sand, and gravel. The sand and gravel may be relatively thin and discontinuous, lens-shaped bodies, or thick layers which cover a large area. The thick units are usually confined to common horizons within the till. Ground water occurs in both the till and the sand and gravel; however, the sand and gravel serves as the principal aquifer. Recharge to the sand and gravel is primarily due to infiltration of precipitation through the till. Depth to water is highly variable, but on average ranges from 30 to 50 feet. Soils are typically described as clay loams.

The GWPP index values for the hydrogeologic setting of Sand and Gravel Interbedded in Glacial Till range from 93 to 154 with the total number of GWPP index calculations equaling 43.

Setting: 7Af1			**GENERAL**	
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	125

Setting: 7Af2		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	100-300	3	2	6
		GWPP	INDEX	122

Setting: 7Af3		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	2-6%	1	9	9
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	127

Setting: 7Af4		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	4	8
Topography	Silt Loam	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	138

Setting: 7Af5		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	12-18%	1	3	3
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	113

Setting: 7Af6		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Sandy Loam	2	6	12
Topography	18%+	1	1	1
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	120

Setting: 7Af7		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	118

Setting: 7Af8		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	2-6%	1	9	9
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	117

Setting: 7Af9		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	96

Setting: 7Af10		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Sandy Loam	2	3	6
Topography	6-12%	1	5	5
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	113

Setting: 7Af11		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	2-6%	1	9	9
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	128

7Af12		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	130

Setting: 7Af13		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	140

Setting: 7Af14		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	2-6%	1	9	9
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	139

Setting: 7Af15		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	120

Setting: 7Af16		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	2-6%	1	9	9
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	129

Setting: 7Af17		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	2-6%	1	9	9
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	119

Setting: 7Af18		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	2-6%	1	9	9
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	97

Setting: 7Af19		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	18%+	1	1	1
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	99

Setting: 7Af20		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	12-18%	1	3	3
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	101

Setting: 7Af21		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Sandy Loam	2	6	12
Topography	12-18%	1	3	3
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	102

Setting: 7Af22		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Sandy Loam	2	6	12
Topography	18%+	1	1	1
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	105

Setting: 7Af23		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	98

Setting: 7Af24		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	139

Setting: 7Af25		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Sandy Loam	2	6	12
Topography	12-18%	1	3	3
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	106

Setting: 7Af26		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Sandy Loam	2	6	12
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	150

Setting: 7Af27		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	2-6%	1	9	9
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	138

Setting: 7Af28		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	154

Setting: 7Af29		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Sandy Loam	2	6	12
Topography	6-12%	1	5	5
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	145

Setting: 7Af30		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Sandy Loam	2	6	12
Topography	18%+	1	1	1
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	93

Setting: 7Af31		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Sandy Loam	2	6	12
Topography	12-18%	1	3	3
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	105

Setting: 7Af32		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	4	12
Soil Media	Sandy Loam	2	3	6
Topography	Clay Loam	1	9	9
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	100-300	3	2	6
		GWPP	INDEX	100

Setting: 7Af33		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	4	12
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	107

Setting: 7Af34		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Loam	2	5	10
Topography	0-2%	1	10	10
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	129

Setting: 7Af35		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	12-18%	1	3	3
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	96

Setting: 7Af36		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	18%+	1	1	1
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	104

Setting: 7Af37		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	18%+	1	1	1
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	94

Setting: 7Af38		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	2-6%	1	9	9
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	124

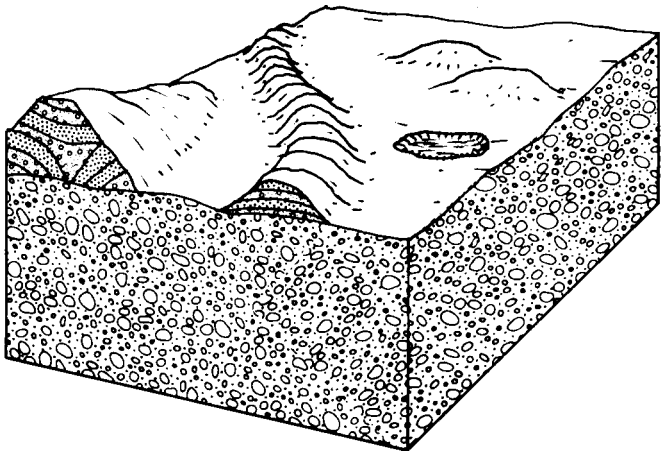
Setting: 7Af39		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Sandy Loam	2	6	12
Topography	0-2%	1	10	10
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	131

Setting: 7Af40		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	2-6%	1	9	9
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	127

Setting: 7Af41		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	128

Setting: 7Af42			**GENERAL**	
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	101

Setting: 7Af43			**GENERAL**	
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	2-6%	1	9	9
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	100-300	3	2	6
		GWPP	INDEX	121



7Ba Outwash

This hydrogeologic setting is characterized by moderate topography and varying thicknesses of outwash. This setting includes both outwash plains and terraces. Kames are also included in this setting. The outwash consists of water-washed deposits of sand and gravel which serve as the principal aquifer. Soils are typically sandy loam and permeable. Recharge to the sand and gravel is relatively high. The outwash also serves as a source of recharge to the underlying bedrock. Depth to water is generally less than 30 feet.

The GWPP index values for the hydrogeologic setting of Outwash range from 118 to 180 with the total number of GWPP index calculations equaling 16.

Setting: 7Ba1		**GENERAL**		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Sandy Loam	2	6	12
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	134

Setting: 7Ba2		**GENERAL**		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Sandy Loam	2	6	12
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	144

Setting: 7Ba3		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Silt Loam	2	4	8
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	152

Setting: 7Ba4		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Silt Loam	2	4	8
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	164

Setting: 7Ba5		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	12-18%	1	3	3
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	118

Setting: 7Ba6		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Loam	2	5	10
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	145

Setting: 7Ba7		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Clay Loam	2	3	6
Topography	2-6%	1	9	9
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	136

Setting: 7Ba8		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Sandy Loam	2	6	12
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	7	35
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	163

Setting: 7Ba9		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Sandy Loam	2	6	12
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	158

Setting: 7Ba10		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Shrink/Swell Clay	2	7	14
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	7	35
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	174

Setting: 7Ba11		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Loam	2	5	10
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	150

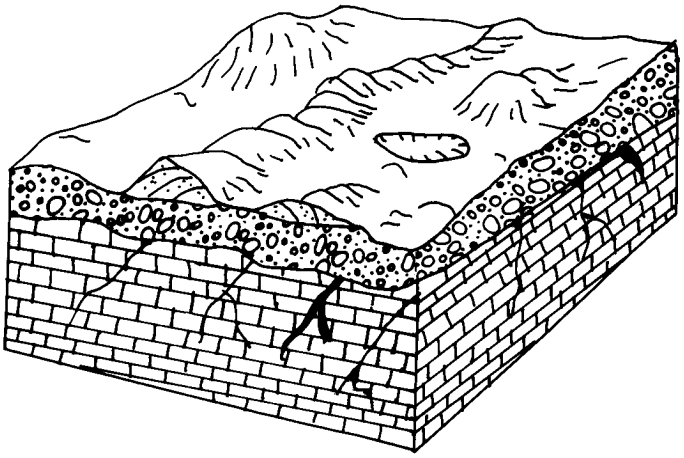
Setting: 7Ba12		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Loam	2	5	10
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	160

Setting: 7Ba13		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	9	45
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Loam	2	5	10
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	7	35
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	180

Setting: 7Ba14		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Sandy Loam	2	6	12
Topography	2-6%	1	9	9
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	139

Setting: 7Ba15		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Sandy Loam	2	6	12
Topography	6-12%	1	5	5
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	135

Setting: 7Ba16		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Sandy Loam	2	6	12
Topography	0-2%	1	9	9
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	143



7Bc Outwash Over Limestone

This setting is characterized by limestone covered by outwash deposits. Topography varies from relatively flat to gently rolling. The outwash of this setting consists primarily of sand and gravel containing minor till, silt, or clay. The outwash is typically found in terraces or kames. The outwash is too thin to comprise the aquifer, therefore ground water is obtained from the underlying limestone bedrock. Depth to water is typically under 30 feet. Soils are usually loams or sandy loams. The limestone is described in the 7Ac setting. Recharge is moderate to high due to the permeable nature of the soils and vadose, the relatively shallow depth to water, flat-lying topography, and the close proximity of the bedrock to the ground surface.

The GWPP index values for the hydrogeologic setting of Outwash over Limestone range from 126 to 169 with the total number of GWPP index calculations equaling 16.

Setting: 7Bc1			**GENERAL**	
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	7-10	4	8	32
Aquifer Media	Limestone	3	6	18
Soil Media	Sandy Loam	2	6	12
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	165

Setting: 7Bc2		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	7-10	4	8	32
Aquifer Media	Limestone	3	6	18
Soil Media	Shrink/Swell Clay	2	7	14
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	167

Setting: 7Bc3		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	7-10	4	8	32
Aquifer Media	Limestone	3	6	18
Soil Media	Loam	2	5	10
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	7	35
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	168

Setting: 7Bc4		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	7-10	4	8	32
Aquifer Media	Limestone	3	6	18
Soil Media	Loam	2	5	10
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	163

Setting: 7Bc5		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	7-10	4	8	32
Aquifer Media	Limestone	3	6	18
Soil Media	Silt Loam	2	4	8
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	161

Setting: 7Bc6		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	7-10	4	8	32
Aquifer Media	Limestone	3	6	18
Soil Media	Silt Loam	2	4	8
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	151

Setting: 7Bc7		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	7-10	4	8	32
Aquifer Media	Limestone	3	6	18
Soil Media	Sandy Loam	2	6	12
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	155

Setting: 7Bc8		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Limestone	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	6-12%	1	5	5
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	126

Setting: 7Bc9		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Limestone	3	6	18
Soil Media	Shrink/Swell Clay	2	7	14
Topography	2-6%	1	9	9
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	148

Setting: 7Bc10		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	7-10	4	8	32
Aquifer Media	Limestone	3	6	18
Soil Media	Sandy Loam	2	6	12
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	7	35
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	170

Setting: 7Bc11		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	7-10	4	8	32
Aquifer Media	Limestone	3	6	18
Soil Media	Sandy Loam	2	6	12
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	7	35
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	160

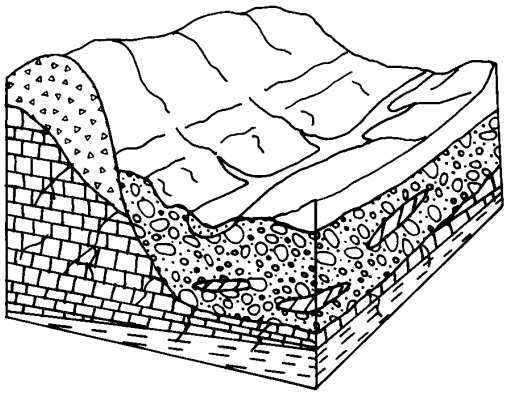
Setting: 7Bc12		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	7-10	4	8	32
Aquifer Media	Limestone	3	6	18
Soil Media	Sandy Loam	2	6	12
Topography	2-6%	1	9	9
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	154

Setting: 7Bc13		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	7-10	4	8	32
Aquifer Media	Limestone	3	6	18
Soil Media	Shrink/Swell Clay	2	7	14
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	7	35
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	162

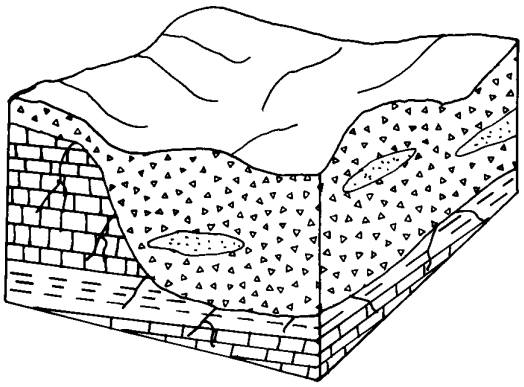
Setting: 7Bc14		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	7-10	4	8	32
Aquifer Media	Limestone	3	6	18
Soil Media	Sandy Loam	2	6	12
Topography	2-6%	1	9	9
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	7	35
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	169

Setting: 7Bc15		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	9	45
Net Recharge	7-10	4	8	32
Aquifer Media	Limestone	3	6	18
Soil Media	Loam	2	5	10
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	157

Setting: 7Bc16		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	7-10	4	8	32
Aquifer Media	Limestone	3	6	18
Soil Media	Sandy Loam	2	6	12
Topography	6-12%	1	5	5
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	7	35
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	155



(a)



(b)

7D Buried Valley

This hydrogeologic setting varied considerably across Clark County. The buried valleys were created by pre-glacial or interglacial rivers which downcut deeply into the bedrock. The differing glacial deposits filling these valleys can be best illustrated by describing the two common forms or types mapped within Clark County.

One common form of buried valley deposits (Block Diagram a) is best exemplified by the Mad River Valley. The valley is occupied by a modern river and floodplain containing abundant outwash and kame deposits, and is easy to distinguish from the surrounding till and bedrock uplands. The depth to water is usually less than 30 feet. The upper portion of the valley commonly contains 50 to 100 feet of sand and gravel outwash with minor till or fine lacustrine deposits. Yields over 500 gpm are possible from properly constructed wells. Soils are typically loams or sandy loams. The streams are usually in direct hydraulic connection with the aquifer. Recharge is typically high.

The other common form of buried valley (Block Diagram b) is best exemplified by the Teays Valley in far eastern Clark County. These valleys are typically overlain by end moraines, and the rolling topography makes it difficult to distinguish the valleys from surrounding areas. They contain either intermittent steams or no streams at all. The aquifer consists of thin lenses of sand and gravel interbedded in very thick sequences of fine-grained till and lacustrine deposits. Yields are commonly less than 25 gpm. Soils are typically clay loams. Depth to water is typically greater than 50 feet. Recharge is generally moderate to low. GWPP index values for these settings are usually less than 120 and are often less than 100.

The GWPP index values for the hydrogeologic setting Buried Valleys range from 72 to 205 with the total number of GWPP index calculations equaling 235.

Setting: 7D1		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	115

Setting: 7D2		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	130

Setting: 7D3		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	2-6%	1	9	9
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	129

Setting: 7D4		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Loam	2	5	10
Topography	6-12%	1	5	5
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	139

Setting: 7D5		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Loam	2	5	10
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	152

Setting: 7D6		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	100-300	3	2	6
		GWPP	INDEX	122

Setting: 7D7		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Loam	2	5	10
Topography	6-12%	1	5	5
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	117

Setting: 7D8		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Sandy Loam	2	6	12
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	129

Setting: 7D9		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	118

Setting: 7D10		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Sand	2	6	12
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	7	35
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	159

Setting: 7D11		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Sandy Loam	2	6	12
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	7	35
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	151

Setting: 7D12		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Sand	2	10	20
Topography	6-12%	1	5	5
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	7	35
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	162

Setting: 7D13		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Sand	2	10	20
Topography	2-6%	1	9	9
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	7	35
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	166

Setting: 7D14		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Silt Loam	2	4	8
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	7	35
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	175

Setting: 7D15		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Sandy Loam	2	6	12
Topography	18%+	1	1	1
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	7	35
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	142

Setting: 7D16		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Sandy Loam	2	6	12
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	7	35
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	173

Setting: 7D17		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Sandy Loam	2	6	12
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	7	35
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	145

Setting: 7D18		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Loam	2	5	10
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	7	35
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	171

Setting: 7D19		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Silt Loam	2	4	8
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	7	35
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	162

Setting: 7D20		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Sandy Loam	2	6	12
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	7	35
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	163

Setting: 7D21		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Silt Loam	2	4	8
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	7	35
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	159

Setting: 7D22		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Sandy Loam	2	6	12
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	7	35
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	176

Setting: 7D23		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Sandy Loam	2	6	12
Topography	18%+	1	1	1
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	7	35
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	139

Setting: 7D24		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	7	35
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Sandy Loam	2	6	12
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	161

Setting: 7D25		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Clay Loam	2	6	12
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	167

Setting: 7D26		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Sandy Loam	2	6	12
Topography	2-6%	1	9	9
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	7	35
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	171

Setting: 7D27		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	9	9
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	7	35
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	165

Setting: 7D28		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Sandy Loam	2	6	12
Topography	12-18%	1	3	3
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	7	35
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	157

Setting: 7D29		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Peat	2	8	16
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	7	35
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	186

Setting: 7D30		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Sandy Loam	2	6	12
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	7	35
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	170

Setting: 7D31		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	9	27
Soil Media	Sandy Loam	2	6	12
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	7	35
Hydraulic Conductivity	2000+	3	10	30
		GWPP	INDEX	191

Setting: 7D32		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Sandy Loam	2	6	12
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	7	35
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	182

Setting: 7D33		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	7	35
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	9	27
Soil Media	Sandy Loam	2	6	12
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	7	35
Hydraulic Conductivity	2000+	3	10	30
		GWPP	INDEX	181

Setting: 7D34		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	10+	4	9	36
Aquifer Media	Sand and Gravel	3	9	27
Soil Media	Loam	2	5	10
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	8	40
Hydraulic Conductivity	2000+	3	10	30
		GWPP	INDEX	198

Setting: 7D35		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	10+	4	9	36
Aquifer Media	Sand and Gravel	3	9	27
Soil Media	Sandy Loam	2	6	12
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	7	35
Hydraulic Conductivity	2000+	3	10	30
		GWPP	INDEX	195

Setting: 7D36		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	10+	4	9	36
Aquifer Media	Sand and Gravel	3	9	27
Soil Media	Peat	2	8	16
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	7	35
Hydraulic Conductivity	2000+	3	10	30
		GWPP	INDEX	199

Setting: 7D37		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	10+	4	9	36
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Sandy Loam	2	6	12
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	7	35
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	186

Setting: 7D38		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	7	35
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Sandy Loam	2	6	12
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	7	35
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	172

Setting: 7D39		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Sandy Loam	2	6	12
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	7	35
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	162

Setting: 7D40		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Clay Loam	2	3	6
Topography	2-6%	1	9	9
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	7	35
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	155

Setting: 7D41		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Peat	2	8	16
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	7	35
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	176

Setting: 7D42		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Sandy Loam	2	6	12
Topography	2-6%	1	9	9
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	7	35
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	171

Setting: 7D43		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Silt Loam	2	4	8
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	7	35
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	168

Setting: 7D44		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	2-6%	1	9	9
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	143

Setting: 7D45		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	2-6%	1	9	9
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	133

Setting: 7D46		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	134

Setting: 7D47		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Sandy Loam	2	6	12
Topography	6-12%	1	5	5
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	7	35
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	158

Setting: 7D48		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	10+	4	9	36
Aquifer Media	Sand and Gravel	3	9	27
Soil Media	Silt Loam	2	4	8
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	8	40
Hydraulic Conductivity	2000+	3	10	30
		GWPP	INDEX	196

Setting: 7D49		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	9	27
Soil Media	Loam	2	5	10
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	7	35
Hydraulic Conductivity	2000+	3	10	30
		GWPP	INDEX	179

Setting: 7D50		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	9	45
Net Recharge	10+	4	9	36
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Loam	2	5	10
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	8	40
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	189

Setting: 7D51		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	125

Setting: 7D52		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Loam	2	5	10
Topography	2-6%	1	9	9
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	128

Setting: 7D53		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	2-6%	1	9	9
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	117

Setting: 7D54		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	6-12%	1	5	5
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	91

Setting: 7D55		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	100+	5	1	5
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	6-12%	1	5	5
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	81

Setting: 7D56		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	75-100%	5	2	10
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	6-12%	1	5	5
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	83

Setting: 7D57		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	100+	5	1	5
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	5	15
Soil Media	Clay Loam	2	3	6
Topography	2-6%	1	3	3
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	73

Setting: 7D58		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Sandy Loam	2	6	12
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	144

Setting: 7D59		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	2-6%	1	9	9
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	114

Setting: 7D60		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	75-100	5	2	10
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	18%+	1	1	1
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	79

Setting: 7D61		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	5	15
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	90

Setting: 7D62		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	12-18%	1	3	3
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	123

Setting: 7D63		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	0-5	5	10	50
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Silt Loam	2	4	8
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	150

Setting: 7D64		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Silt Loam	2	4	8
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	164

Setting: 7D65		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Sandy Loam	2	6	12
Topography	18%+	1	1	1
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	127

Setting: 7D66			GENERAL	
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	6-12%	1	5	5
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	120

Setting: 7D67			GENERAL	
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	75-100	5	2	10
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	88

Setting: 7D68			GENERAL	
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	12-18%	1	3	3
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	86

Setting: 7D69			GENERAL	
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Sandy Loam	2	6	12
Topography	12-18%	1	3	3
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	102

Setting: 7D70			GENERAL	
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	4-7	4	3	12
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	93

Setting: 7D71		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	3	12
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	103

Setting: 7D72		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	139

Setting: 7D73		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Loam	2	5	10
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	144

Setting: 7D74		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	6-12%	1	5	5
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	135

Setting: 7D75		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	140

Setting: 7D76		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	149

Setting: 7D77		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Loam	2	5	10
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	153

Setting: 7D78		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	98

Setting: 7D79		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	2-6%	1	9	9
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	97

Setting: 7D80		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Loam	2	5	10
Topography	2-6%	1	9	9
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	133

Setting: 7D81		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	12-18%	1	3	3
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	91

Setting: 7D82		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	12-18%	1	3	3
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	96

Setting: 7D83		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	0-5	5	10	50
Net Recharge	10+	4	9	36
Aquifer Media	Sand and Gravel	3	9	27
Soil Media	Loam	2	5	10
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel	5	8	40
Hydraulic Conductivity	2000+	3	10	30
		GWPP	INDEX	203

Setting: 7D84		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	0-5	5	10	50
Net Recharge	10+	4	9	36
Aquifer Media	Sand and Gravel	3	9	27
Soil Media	Sandy Loam	2	6	12
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel	5	8	40
Hydraulic Conductivity	2000+	3	10	30
		GWPP	.	205

Setting: 7D85		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	10+	4	9	36
Aquifer Media	Sand and Gravel	3	9	27
Soil Media	Sandy Loam	2	6	12
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel	5	8	40
Hydraulic Conductivity	2000+	3	10	30
		GWPP	INDEX	200

Setting 7D86		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Silty Loam	2	4	8
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel	5	7	35
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	178

Setting: 7D87		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Sandy Loam	2	6	12
Topography	12-18%	1	3	3
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	128

Setting: 7D88		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	6-12%	1	5	5
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	124

Setting: 7D89		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	115

Setting: 7D90		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	6-12%	1	5	5
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	110

Setting: 7D91		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	2-6%	1	9	9
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	127

Setting: 7D92		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Clay Loam	2	3	6
Topography	12-18%	1	3	3
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	120

Setting:7D93		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	127

Setting: 7D94		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Clay Loam	2	3	6
Topography	6-12%	1	5	5
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	122

Setting: 7D95		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	18%+	1	1	1
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	106

Setting: 7D96		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	12-18%	1	3	3
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	108

Setting: 7D97		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	12-18%	1	3	3
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	86

Setting: 7D98		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	128

Setting: 7D99		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	2-6%	1	9	9
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	124

Setting: 7D100		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	18%+	1	1	1
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	84

Setting: 7D101			GENERAL	
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Silt Loam	2	4	8
Topography	2-6%	1	9	9
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	116

Setting: 7D102			GENERAL	
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Silt Loam	2	4	8
Topography	0-2%	1	10	10
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	117

Setting: 7D103			GENERAL	
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Silt Loam	2	4	8
Topography	0-2%	1	10	10
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	130

Setting: 7D104			GENERAL	
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	12-18%	1	3	3
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	111

Setting: 7D105			GENERAL	
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	6-12%	1	5	5
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	113

Setting: 7D106		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	12-18%	1	3	3
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	89

Setting: 7D107		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	18%+	1	1	1
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	87

Setting: 7D108		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	6-12%	1	5	5
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	123

Setting: 7D109		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	0-5	5	10	50
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Sandy Loam	2	6	12
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	7	35
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	187

Setting: 7D110		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	96

Setting: 7D111		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Sandy Loam	2	6	12
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	7	35
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	182

Setting: 7D112		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	9	45
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Loam	2	5	10
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	7	35
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	180

Setting: 7D113		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	0-5	5	10	50
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Loam	2	5	10
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	7	35
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	185

Setting: 7D114		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	18%+	1	1	1
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	94

Setting: 7D115		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Loam	2	5	10
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel	5	8	40
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	169

Setting: 7D116			GENERAL	
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	18%+	1	1	1
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	109

Setting: 7D117			GENERAL	
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	18%+	1	1	1
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	97

Setting: 7D118			GENERAL	
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	12-18%	1	3	3
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	99

Setting: 7D119			GENERAL	
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Sandy Loam	2	6	12
Topography	12-18%	1	3	3
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	7	35
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	175

Setting: 7D120			GENERAL	
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	12-18%	1	3	3
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	121

Setting: 7D121		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	1	5
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	18%+	1	1	1
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	74

Setting: 7D122		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	100+	5	1	5
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	18%+	1	1	1
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	77

Setting: 7D123		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Sandy Loam	2	6	12
Topography	2-6%	1	9	9
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	130

Setting: 7D124		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	100+	5	1	5
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	12-18%	1	3	3
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	76

Setting: 7D125		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	100+	5	1	5
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	18+	1	1	1
Impact of Vadose Zone	Till	5	3	15
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	72

Setting: 7D126		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	18%+	1	1	1
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	87

Setting: 7D127		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	10+	4	9	36
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Sandy Loam	2	6	12
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	8	40
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	191

Setting: 7D128		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Clay Loam	2	3	6
Topography	12-18%	1	3	3
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	124

Setting: 7D129		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	7	35
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Silt Loam	2	4	8
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	163

Setting: 7D130		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Clay Loam	2	3	6
Topography	2-6%	1	9	9
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	142

Setting: 7D131			GENERAL	
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	7	35
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Loam	2	5	10
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	7	35
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	170

Setting: 7D132			GENERAL	
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Sandy Loam	2	6	12
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	168

Setting: 7D133			GENERAL	
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	12-18%	1	3	3
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	101

Setting: 7D134			GENERAL	
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	136

Setting: 7D135			GENERAL	
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	135

Setting: 7D136			GENERAL	
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Silt Loam	2	4	8
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	138

Setting: 7D137			GENERAL	
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	7-10	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	138

Setting: 7D138			GENERAL	
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Loam	2	5	10
Topography	2-6%	1	9	9
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	146

Setting: 7D139			GENERAL	
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Absent	2	10	20
Topography	18%+	1	1	1
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	103

Setting: 7D140			GENERAL	
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Sandy Loam	2	6	12
Topography	12-18%	1	3	3
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	119

Setting: 7D141			GENERAL	
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	75-100	5	2	10
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Absent	2	10	20
Topography	18%+	1	1	1
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	98

Setting: 7D142			GENERAL	
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	75-100	5	2	10
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	6-12%	1	5	5
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	88

Setting: 7D143			GENERAL	
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	75-100	5	2	10
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	93

Setting: 7D144			GENERAL	
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	120

Setting: 7D145			GENERAL	
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Clay Loam	2	3	6
Topography	2-6%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	133

Setting: 7D146		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	143

Setting: 7D147		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Clay Loam	2	3	6
Topography	2-6%	1	9	9
Impact of Vadose Zone	Sand and Gravel	5	7	35
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	147

Setting: 7D148		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Silt Loam	2	4	8
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	7	35
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	168

Setting: 7D149		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Sandy Loam	2	6	12
Topography	2-6%	1	9	9
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	7	35
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	171

Setting: 7D150		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Sandy Loam	2	6	12
Topography	12-18%	1	3	3
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	7	35
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	175

Setting: 7D151		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Absent	2	10	20
Topography	18%+	1	1	1
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	7	35
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	171

Setting: 7D152		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Silt Loam	2	4	8
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	7	35
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	178

Setting: 7D153		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Absent	2	10	20
Topography	1-0	1	1	1
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	145

Setting: 7D154		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Loam	2	5	10
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	147

Setting: 7D155		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	2-6%	1	9	9
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	139

Setting: 7D156		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Loam	2	5	10
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	148

Setting: 7D157		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Sandy Loam	2	6	12
Topography	18%+	1	1	1
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	141

Setting: 7D158		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Silt Loam	2	4	8
Topography	6-12%	1	5	5
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	110

Setting: 7D159		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Loam	2	5	10
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	166

Setting: 7D160		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	18%+	1	1	1
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	115

Setting: 7D161			GENERAL	
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	124

Setting: 7D162			GENERAL	
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Absent	2	10	20
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	176

Setting: 7D163			GENERAL	
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Sandy Loam	2	6	12
Topography	1-0	1	1	1
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	121

Setting: 7D164			GENERAL	
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	2-6%	1	9	9
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	123

Setting: 7D165			GENERAL	
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	102

Setting: 7D166		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	12-18%	1	3	3
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	100-300	3	2	6
		GWPP	INDEX	107

Setting: 7D167		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	9	27
Soil Media	Loam	2	5	10
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	7	35
Hydraulic Conductivity	2000+	3	10	30
		GWPP	INDEX	189

Setting: 7D168		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	6-12%	1	9	9
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	118

Setting: 7D169		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	12-18%	1	3	3
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	112

Setting: 7D170		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Loam	2	5	10
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	156

Setting: 7D171			GENERAL	
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Sandy Loam	2	6	12
Topography	12-18%	1	3	3
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	118

Setting: 7D172			GENERAL	
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	6-12%	1	5	5
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	120

Setting: 7D173			GENERAL	
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	128

Setting: 7D174			GENERAL	
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	2-6%	1	9	9
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	138

Setting: 7D175			GENERAL	
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	6-12%	1	5	5
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	124

Setting: 7D176			GENERAL	
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Silt Loam	2	4	8
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	154

Setting: 7D177			GENERAL	
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	6-12%	1	5	5
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	93

Setting: 7D178			GENERAL	
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	110

Setting: 7D179			GENERAL	
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	3	15
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Sandy Loam	2	6	12
Topography	18%+	1	1	1
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	100

Setting: 7D180			GENERAL	
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Sandy Loam	2	6	12
Topography	18%+	1	1	1
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	122

Setting: 7D181		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	115

Setting: 7D182		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Sandy Loam	2	6	12
Topography	6-12%	1	5	5
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	114

Setting: 7D183		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	2-6%	1	9	9
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	124

Setting: 7D184		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	100+	5	1	5
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	92

Setting: 7D185		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Sandy Loam	2	6	12
Topography	6-12%	1	5	5
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	103

Setting: 7D186			GENERAL	
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Sandy Loam	2	6	12
Topography	6-12%	1	5	5
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	145

Setting: 7D187			GENERAL	
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Sandy Loam	2	6	12
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	150

Setting: 7D188			GENERAL	
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Sandy Loam	2	6	12
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	7	35
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	172

Setting: 7D189			GENERAL	
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	12-18%	1	3	3
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	105

Setting: 7D190			GENERAL	
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Sandy Loam	2	6	12
Topography	12-18%	1	3	3
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	142

Setting: 7D191			GENERAL	
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Sandy Loam	2	6	12
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	149

Setting: 7D192			GENERAL	
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Sandy Loam	2	6	12
Topography	12-18%	1	3	3
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	123

Setting: 7D193			GENERAL	
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Loam	2	5	10
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	7	35
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	161

Setting: 7D194			GENERAL	
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Sandy Loam	2	6	12
Topography	18%+	1	1	1
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	135

Setting: 7D195			GENERAL	
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Sandy Loam	2	6	12
Topography	18%+	1	1	1
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	126

Setting: 7D196			GENERAL	
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Loam	2	5	10
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	156

Setting: 7D197			GENERAL	
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	146

Setting: 7D198			GENERAL	
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Sandy Loam	2	6	12
Topography	12-18%	1	3	3
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	133

Setting: 7D199			GENERAL	
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Sandy Loam	2	6	12
Topography	2-6%	1	9	9
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	139

Setting: 7D200			GENERAL	
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Loam	2	5	10
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	133

Setting: 7D201		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Sandy Loam	2	6	12
Topography	12-18%	1	3	3
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	137

Setting: 7D202		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Clay Loam	2	3	6
Topography	2-6%	1	9	9
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	132

Setting: 7D203		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Sandy Loam	2	6	12
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	169

Setting: 7D204		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	149

Setting: 7D205		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	9	45
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Silt Loam	2	4	8
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	165

Setting: 7D206		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Loam	2	5	10
Topography	12-18%	1	3	3
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	7	35
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	173

Setting: 7D207		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	6-12%	1	5	5
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	157

Setting: 7D208		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	6-12%	1	5	5
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	141

Setting: 7D209		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	6-12%	1	5	5
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	103

Setting: 7D210		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Sandy Loam	2	6	12
Topography	12-18%	1	3	3
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	106

Setting: 7D211			GENERAL	
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Sandy Loam	2	6	12
Topography	6-12%	1	5	5
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	108

Setting: 7D212			GENERAL	
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Thin or Absent	2	10	20
Topography	12-18%	1	1	1
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	112

Setting: 7D213			GENERAL	
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Sandy Loam	2	6	12
Topography	18%+	1	1	1
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	104

Setting: 7D214			GENERAL	
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Sandy Loam	2	6	12
Topography	12-18%	1	3	3
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	116

Setting: 7D215			GENERAL	
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	12-18%	1	3	3
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	95

Setting: 7D216			GENERAL	
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	117

Setting: 7D217			GENERAL	
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Sandy Loam	2	6	12
Topography	12-18%	1	3	3
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	128

Setting: 7D218			GENERAL	
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Sandy Loam	2	6	12
Topography	6-12%	1	5	5
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	126

Setting: 7D219			GENERAL	
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	123

Setting: 7D220			GENERAL	
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	12-18%	1	3	3
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	116

Setting: 7D221		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Clay Loam	2	3	6
Topography	18%+	1	1	1
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	102

Setting: 7D222		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	12-18%	1	3	3
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	108

Setting: 7D223		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	12-18%	1	3	3
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	118

Setting: 7D224		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	125

Setting: 7D225		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Loam	2	5	10
Topography	6-12%	1	5	5
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	151

Setting: 7D226		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Loam	2	5	10
Topography	6-12%	1	5	5
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	161

Setting: 7D227		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	30-50	5	5	25
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	2-6%	1	9	9
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	102

Setting: 7D228		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	105

Setting: 7D229		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	6-12%	1	5	5
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	100

Setting: 7D230		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	2-6%	1	9	9
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	104

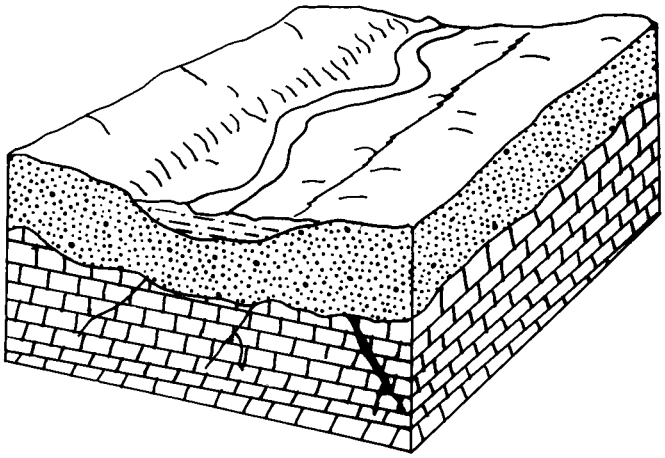
Setting: 7D231			GENERAL	
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	135

Setting: 7D232			GENERAL	
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	2-6%	1	9	9
Impact of Vadose Zone	Till	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	134

Setting: 7D233			GENERAL	
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	12-18%	1	3	3
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	91

Setting: 7D234			GENERAL	
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Sandy Loam	2	6	12
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	7	35
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	154

Setting: 7D235			GENERAL	
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	50-75	5	3	15
Net Recharge	2-4	4	3	12
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Sandy Loam	2	6	12
Topography	12-18%	1	3	3
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	97



7Ec Alluvium Over Sedimentary Rock

This hydrogeologic setting is characterized by low relief with thin to moderate thicknesses of modern, stream-deposited alluvium. The alluvium is composed of silt, sand, clay, and minor gravel. Depth to water is shallow, and the stream is usually in hydraulic connection with the alluvial deposits. The alluvial deposits are underlain by limestone. These rocks are described in the 7Ac setting. The underlying fractured limestone serves as the aquifer in this setting. The alluvial deposits serve as a source of recharge to the limestone. Soils are variable. Recharge is moderate to high due to the shallow depth to water, flat topography, and the moderately permeable nature of the alluvium.

The GWPP index values for the hydrogeologic setting Alluvium Over Sedimentary Rock range from 134 to 170 with the total number of GWPP calculations equaling 19.

Setting: 7Ec1		**GENERAL**		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	7-10	4	8	32
Aquifer Media	Limestone	3	6	18
Soil Media	Loam	2	5	10
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	157

Setting: 7Ec2		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	7-10	4	8	32
Aquifer Media	Limestone	3	6	18
Soil Media	Loam	2	5	10
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	152

Setting: 7Ec3		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	7-10	4	8	32
Aquifer Media	Limestone	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	154

Setting: 7Ec4		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	7-10	4	8	32
Aquifer Media	Limestone	3	6	18
Soil Media	Loam	2	5	10
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	158

Setting: 7Ec5		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Limestone	3	6	18
Soil Media	Silt Loam	2	4	8
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	143

Setting: 7Ec6		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	7-10	4	8	32
Aquifer Media	Limestone	3	6	18
Soil Media	Sandy Loam	2	6	12
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	165

Setting: 7Ec7		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	7-10	4	8	32
Aquifer Media	Limestone	3	6	18
Soil Media	Sandy Loam	2	6	12
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	7	35
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	170

Setting: 7Ec8		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	7-10	4	8	32
Aquifer Media	Limestone	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	159

Setting: 7Ec9		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	7-10	4	8	32
Aquifer Media	Limestone	3	6	18
Soil Media	Loam	2	5	10
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	147

Setting: 7Ec10		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Limestone	3	6	18
Soil Media	Loam	2	5	10
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	134

Setting: 7Ec11		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	7-10	4	8	32
Aquifer Media	Limestone	3	6	18
Soil Media	Clay Loam	2	3	6
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	153

Setting: 7Ec12		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	7-10	4	8	32
Aquifer Media	Limestone	3	6	18
Soil Media	Sandy Loam	2	6	12
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	159

Setting: 7Ec13		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	7-10	4	8	32
Aquifer Media	Limestone	3	6	18
Soil Media	Shrink Swell Clay	2	7	14
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	161

Setting: 7Ec14		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	7-10	4	8	32
Aquifer Media	Limestone	3	6	18
Soil Media	Loam	2	5	10
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	163

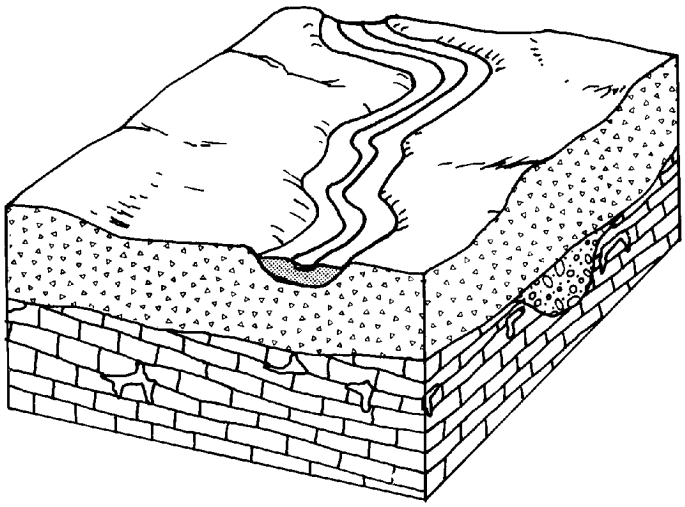
Setting: 7Ec15		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	7-10	4	8	32
Aquifer Media	Limestone	3	6	18
Soil Media	Loam	2	5	10
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	7	35
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	168

Setting: 7Ec16		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	4-7	4	6	24
Aquifer Media	Limestone	3	6	18
Soil Media	Silt Loam	2	4	8
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	137

Setting: 7Ec17		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Limestone	3	5	15
Soil Media	Silt Loam	2	4	8
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	134

Setting: 7Ec18		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Limestone	3	6	18
Soil Media	Sandy Loam	2	6	12
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	136

Setting: 7Ec19		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	4-7	4	6	24
Aquifer Media	Limestone	3	6	18
Soil Media	Loam	2	5	10
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	144



7Ed Alluvium Over Glacial Till

This hydrogeologic setting is characterized by flat-lying topography with surficial deposits of present-day, stream-deposited alluvium confined to modern floodplains in upland areas. The alluvium is composed of silt, sand, gravel, and clay that is deposited directly over the glacial till. Sand and gravel lenses within the till serve as the aquifer in this hydrogeologic setting. Depth to water is typically shallow and the overlying stream is usually in hydraulic contact with the aquifer material. The underlying till is described in setting 7Af. Soils are typically loams or silt loams.

The GWPP index values for the hydrogeologic setting of Alluvium Over Glacial Till range from 134 to 157 with the total number of GWPP index calculations equaling 5.

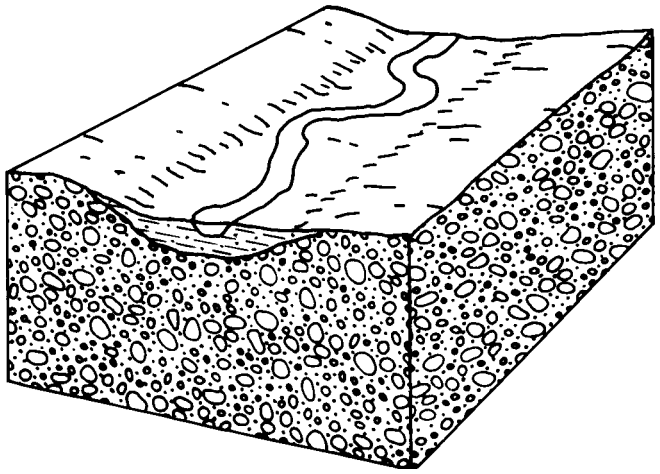
Setting: 7Ed1		**GENERAL**		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	5	15
Soil Media	Silt Loam	2	4	8
Topography	0-2%	1	10	10
Impact of Vadose Zone	Silt and Clay	5	4	20
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	142

Setting: 7Ed2		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Loam	2	5	10
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	156

Setting: 7Ed3		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Loam	2	5	10
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	152

Setting: 7Ed4		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	4-7	4	6	24
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Loam	2	5	10
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	5	25
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	134

Setting: 7Ed5		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	6	18
Soil Media	Loam	2	5	10
Topography	0-10%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	157



7Ee - Alluvium Over Outwash

This hydrogeologic setting is characterized by low relief with thin to moderate thicknesses of modern, stream-deposited alluvium overlying outwash. The alluvium is composed of silt, sand, gravel, and clay. The underlying outwash serves as the aquifer. The depth to the water table is shallow and the stream may be in hydraulic connection with the alluvial deposits. Soils are typically silty or sandy loams. The underlying outwash is described in setting 7Ba. The alluvial deposits serve as a source of recharge for the outwash. Recharge is high.

The GWPP index values for the hydrogeologic setting of Alluvium Over Outwash range from 158 to 182 with the total number of GWPP index calculations equaling 7.

Setting: 7Ee1		**GENERAL**		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Sandy Loam	2	6	12
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	7	35
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	167

Setting: 7Ee2		**GENERAL**		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Silt Loam	2	4	8
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	300-700	3	4	12
		GWPP	INDEX	158

Setting: 7Ee3		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Loam	2	5	10
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	166

Setting: 7Ee4		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Silt Loam	2	4	8
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	7	35
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	169

Setting: 7Ee5		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	0-5	5	10	50
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Silt Loam	2	4	8
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	7	35
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	183

Setting: 7Ee6		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	5-15	5	9	45
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	8	24
Soil Media	Sandy Loam	2	6	12
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	7	35
Hydraulic Conductivity	1000-2000	3	8	24
		GWPP	INDEX	182

Setting: 7Ee7		GENERAL		
FEATURE	RANGE	WEIGHT	RATING	INDEX
Depth to Water	15-30	5	7	35
Net Recharge	7-10	4	8	32
Aquifer Media	Sand and Gravel	3	7	21
Soil Media	Sandy Loam	2	6	12
Topography	0-2%	1	10	10
Impact of Vadose Zone	Sand and Gravel w/sig. Silt and Clay	5	6	30
Hydraulic Conductivity	700-1000	3	6	18
		GWPP	INDEX	158

Ground Water Pollution Potential of CLARK COUNTY

by
Michael P. Angle, Wayne Jones,
and
Joel D. Vormelker

1 0 1 2 Miles

1 0 1 2 Kilometers

CONTOUR INTERVAL 5 OR 10 FEET

County Line

Township Line

Incorporated City Limit

Description of Map Symbols

Hydrogeologic Region — Hydrogeologic Setting

7Ad6
98

Relative Pollution Potential

Observation Well Site *

Gravel Pit / Quarry

*Observation well sites indicate the location of wells used to collect ground water level information. These wells are part of the state observation well network. Hydrographs of the water levels recorded in these and other State observation wells can be obtained through ODNR-Division of Water.

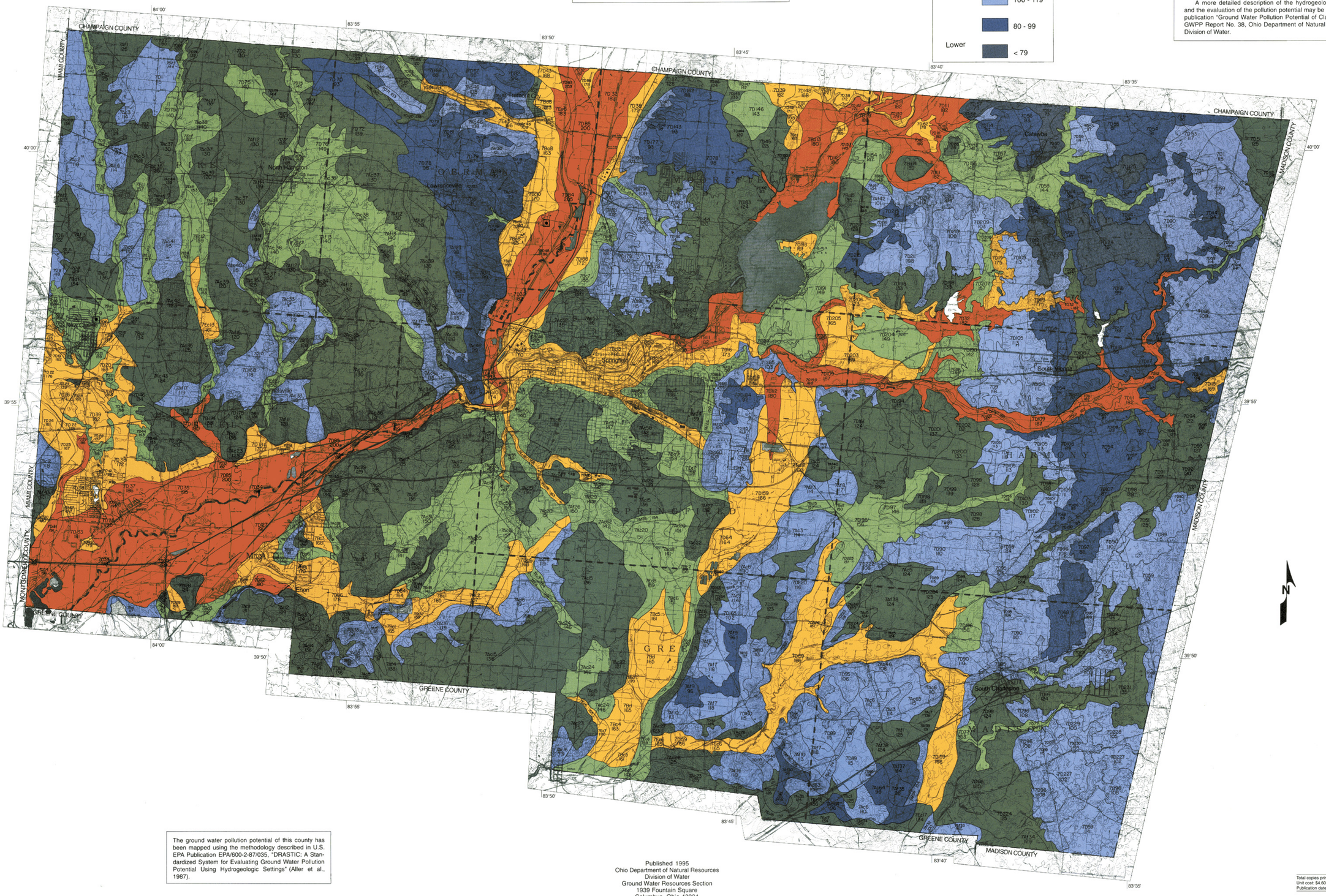
Pollution Potential Index Range

Higher	200+
	180 - 199
	160 - 179
to	140 - 159
	120 - 139
	100 - 119
	80 - 99
Lower	< 79

Hydrogeologic Settings

- 7Aa – Glacial Till Over Bedded Sedimentary Rock
- 7Ac – Glacial Till Over Limestone
- 7Af – Sand & Gravel Interbedded in Glacial Till
- 7Ba – Outwash
- 7Bc – Outwash Over Limestone
- 7D – Buried Valley
- 7Ec – Alluvium Over Bedded Sedimentary Rock
- 7Ed – Alluvium Over Glacial Till
- 7Ee – Alluvium Over Outwash

A more detailed description of the hydrogeologic settings and the evaluation of the pollution potential may be found in the publication "Ground Water Pollution Potential of Clark County," GWPP Report No. 38, Ohio Department of Natural Resources, Division of Water.



The ground water pollution potential of this county has been mapped using the methodology described in U.S. EPA Publication EPA/600-2-87/035, "DRASTIC: A Standardized System for Evaluating Ground Water Pollution Potential Using Hydrogeologic Settings" (Aller et al., 1987).

Published 1995
Ohio Department of Natural Resources
Division of Water
Ground Water Resources Section
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Columbus, Ohio 43224

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Total copies printed: 500
Unit cost: $4.60
Publication date: 2/95

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