

SYSTEM GROUP	FORMATION	SECTION	THICKNESS, FEET	LITHOLOGY	TOPOGRAPHY AND GEOLOGIC SETTING	HYDROLOGY
QUATERNARY	Alluvium	0-80-1	0-80-1	Silt, clay, sand, and gravel.	Thickest deposits in Jonathan Creek. Up to 15 feet thick in small tributaries. Base of alluvium as indicated by barge at Egner Ferry Bridge is about 250 feet above sea level.	Water perched above cemented material or clay lenses usually supplies for domestic use in large diameter wells. The occurrence of cemented material in the upper reaches of the stream valleys may yield minor supplies of water, but probably will not provide an adequate supply. If sufficient water is not found on the alluvium, an adequate supply may be obtained from the underlying Pleistocene or Mississippian rocks. Water from the main zone of saturation will be composed of heavy material and will not yield sufficient water to the wells.
	Loess	0-4	0-4	Silt and clay, unstratified, scattered small ferruginous concretions.	Wind-blown deposit on tops of ridges and on uplands.	Not an aquifer. When saturated, transmits water to underlying units.
CRETACEOUS	McNairy Formation	0-300-1	0-300-1	Red to brown subangular to well-rounded pebbles, cobbles, and boulders and very fine to very coarse-grained sand.	Underlies loess in upland. Thickest deposits around Fairdealing. Locally unit is missing.	Water is perched above cemented sand of the McNairy Formation southeast of Jonathan Creek catch area. Supplies sufficient water for domestic use, but may be affected by droughts. One large-diameter well near Pleasant Hope Church taps the main zone of saturation in a great channel.
	Tunolow Formation	0-100-1	0-100-1	White rounded pebbles and cobbles in tripolitic matrix.	Present beneath McNairy Formation and crops out in uplands adjacent to Kentucky Lake. Fills depressions and channels in wooded Pleistocene rock surface.	Not significant as an aquifer. May yield sufficient water to some wells, but tripolitic clay in the formation may clog well screens. One water sample has an iron content of 7.7 ppm. Iron in excess of 0.3 ppm may cause staining of fixtures and fixtures, and imparts a disagreeable taste to water.
MISSISSIPPIAN	St. Louis Limestone	0-140	0-140	All rocks below the Cretaceous are of Paleozoic age and are the bedrock of well-irrigated.		
	Waraw Limestone	0-240	0-240	Gray to greenish crystalline limestone. Locally the upper surface of the Paleozoic rocks is highly weathered into a cherty rubble consisting chiefly of angular chert blocks in a matrix of tripolitic sandy clay. The chert rubble is as much as 295 feet thick.		
DEVONIAN	Fort Payne Formation	100-400	100-400	Dark gray fine-grained argillaceous limestone interbedded with dark gray to black chert.		
	Chatanooga Shale	0-112	0-112	Black, brown, or grayish-green shale.		
UNDIFFERENTIATED	Devonian rocks, undifferentiated	0-1000	0-1000	White to bluish cherty limestone and chert. Limestone may be finely to coarsely crystalline, and may contain silty or siliceous zones. Thin to thick beds of chert are common.		

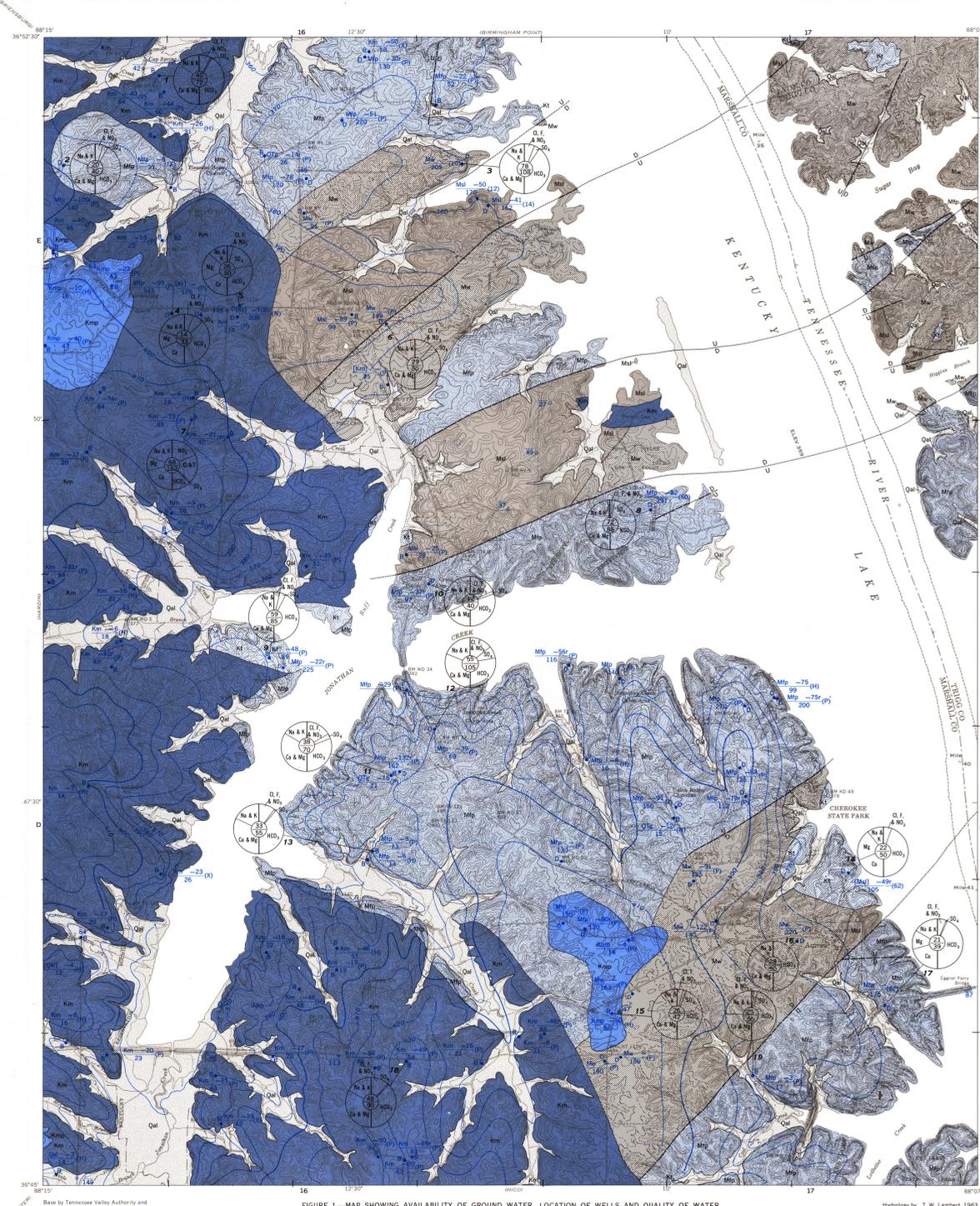


FIGURE 1.—MAP SHOWING AVAILABILITY OF GROUND WATER, LOCATION OF WELLS, AND QUALITY OF WATER

### EXPLANATION

The water-availability areas on this map show the occurrence and availability of ground water in the shallowest aquifer that may yield adequate amounts of water for domestic use in each area. As considered in this report an adequate domestic supply will furnish approximately 100 gallons per day from a well equipped with a power pump and pressure-distribution system. The shallowest aquifer is indicated by deeper water depths and water-bearing properties are described in the generalized columnar section, Figure 2.

**AREA 1**  
Water in Quaternary Alluvium  
Shallow large-diameter wells will yield sufficient water for domestic and stock uses. Locally perched water above alluvial clay or cemented gravel in the upper reaches of the stream valleys may yield minor supplies of water, but probably will not provide an adequate supply. If sufficient water is not found on the alluvium, an adequate supply may be obtained from the underlying Pleistocene or Mississippian rocks. Water from the main zone of saturation will be composed of heavy material and will not yield sufficient water to the wells.

**AREA 2**  
Perched water in the McNairy Formation  
Large-diameter borehole wells and dug wells and in one drilled well, yields more than 100 gallons per minute from the McNairy Formation and generally yield sufficient water for domestic use. Large-diameter wells tapping the Pleistocene will not yield sufficient water for domestic supply. Wells tapping the McNairy outcrop area.

**AREA 3**  
Water in the McNairy Formation  
The McNairy Formation yields sufficient water for domestic use in most large-diameter borehole or dug wells and in one drilled well. Yields range in depth from 15 to 212 feet. Because of the amount of iron in the McNairy Formation, some wells may require iron-reducing devices and screens below the level of Kentucky Lake near Boonville. Large-diameter wells probably will not yield sufficient water for domestic use. Properly constructed wells in the McNairy sand may yield more than 100 gallons per minute.

**AREA 4**  
Water in the Tunolow Formation  
In general, the Tunolow Formation is a poor producer of water. Some large-diameter borehole wells, which have a large storage capacity, may yield sufficient water for domestic use. The tripolitic matrix and chert rubble has a reported specific capacity of 22 gallons per minute per foot of drawdown. Most drilled wells will be unproductive in the underlying Waraw Limestone.

**AREA 5**  
Water in the St. Louis Limestone  
The St. Louis Limestone yields sufficient water for domestic and small stock uses in wells ranging in depth from 40 to 170 feet. Yields range from 10 to 60 gallons per minute from the chert rubble are common. One limestone well north of Harlan is reported to yield about 22 gallons per minute from a 2-inch opening. If an adequate supply cannot be obtained from the St. Louis, a well may be completed in the underlying Waraw Limestone. Water from the St. Louis is generally good, but iron in appreciable amounts may cause staining of fixtures and fixtures. Most wells are equipped with water softeners and iron-removal units.

**AREA 6**  
Water in the Waraw Limestone  
The Waraw Limestone yields sufficient water for domestic and small stock uses in wells ranging in depth from 40 to 170 feet. Yields range from 10 to 60 gallons per minute from the chert rubble are common. One limestone well north of Harlan is reported to yield about 22 gallons per minute from a 2-inch opening. If an adequate supply cannot be obtained from the St. Louis, a well may be completed in the underlying Fort Payne Formation or the Waraw Limestone. Water from the Waraw is generally good, but iron in appreciable amounts may cause staining of fixtures and fixtures. Most wells are equipped with water softeners and iron-removal units.

**AREA 7**  
Water in the Fort Payne Formation  
The chert rubble of the Fort Payne Formation yields sufficient water for domestic and small stock uses in wells ranging in depth from 40 to 170 feet. Yields range from 10 to 60 gallons per minute from the chert rubble are common. One limestone well north of Harlan is reported to yield about 22 gallons per minute from a 2-inch opening. If an adequate supply cannot be obtained from the St. Louis, a well may be completed in the underlying Waraw Limestone. Water from the Fort Payne is generally good, but iron in appreciable amounts may cause staining of fixtures and fixtures. Most wells are equipped with water softeners and iron-removal units.

**WATER LEVEL**  
Water level in well, in feet below land surface:  
1, 1.5, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000.



### EXPLANATION

Qal ..... Alluvium of Quaternary age  
Qg ..... Gravel of Pleistocene (T) age  
Km ..... McNairy Formation of Cretaceous age  
Kt ..... Tunolow Formation of Cretaceous age  
Ml ..... St. Louis Limestone of Mississippian age  
Mw ..... Waraw Limestone of Mississippian age  
Mf ..... Fort Payne Formation of Mississippian age  
Dc ..... Chatanooga Shale of Devonian age  
Du ..... Devonian rocks, undifferentiated  
U ..... Concealed fault in bedrock  
D ..... Downthrown side

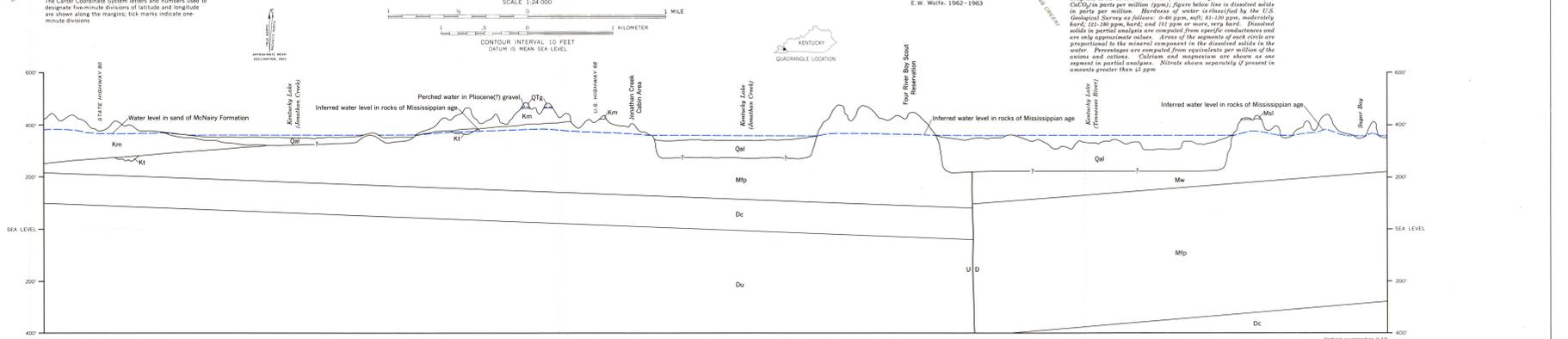


FIGURE 3.—GENERALIZED GEOLOGIC SECTION FROM NORTH OF MCCLAIN BRANCH TO SUGAR BAY

## AVAILABILITY OF GROUND WATER IN THE FAIRDEALING QUADRANGLE, KENTUCKY

By  
T. W. Lambert  
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