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| **Environmental Enlightenment #144**By Ami Adini - Reissued February 29, 2016

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| This is a SHORT, LIGHT and SIMPLE newsletter. Its purpose is to rekindle in the initiated terminology they have once learned, and enlighten the uninitiated on terms they may have heard but never known the meaning of. |
| **Darcy’s Law**When water flows downhill inside an aquifer, from a higher elevation **(h1)** to a lower elevation **(h2)** along a distance **(d)**, we know that the a larger difference in the elevations **(h1 – h2)** will results in a faster flow.http://amiadini.com/NewsletterArchive/160229NL144/envEnl-144_clip_image001.gifOn the other hand, an increase in the horizontal distance between the**(h1)**elevation to the**(h2)**elevation will interspace more aquifer material (sand, stone, clay or silt) between the start and end points, thus more resistance, resulting in a slower flow.We represent the flow by a letter “**Q**” expressed, for example, in gallons per minute running through every square foot of cross section of the aquifer.We say that the flow **Q** is directly proportional to the difference in elevation, but is inversely proportional to the distance and we express these relationships in a mathematical formula:**Q  = [ K• (h1 – h2) ] / d**The dot (•) in the formula indicates multiplication, the slash (/) indicates division and the “K” is a factor that determines the proportionality.  The K magnitude is determined by the materials of which the interspacing material is made.  We experiment with different materials and find their K value.We call K, “hydraulic conductivity.”  *Hydraulic* means *water* and *conductivity*is the ability to transmit.  Thus, K represents the ability of a material to transmit waterWe immediately see that the K will be large for a highly permeable material like sand and gravel. It will be small for dense clay or silt.http://amiadini.com/NewsletterArchive/160229NL144/envEnl-144_clip_image005.jpgIn 1856, Henry Darcy, the Engineer of the town of Dijon, in Southern France, investigated the flow of water in a sand filter in connection with the city's fountains. From his experiments, he developed the above formula which will forever now memorialize his investigative spirit.http://amiadini.com/NewsletterArchive/160229NL144/envEnl-144_clip_image007.jpgWhen groundwater moves down-hill through the pore space of the aquifer, we name it “porous flow.”  Darcy's law is operative in porous flow environments.http://amiadini.com/NewsletterArchive/160229NL144/envEnl-144_clip_image009.jpgWe need to know the K to enable us calculate groundwater flow. Estimates can be made from knowledge of the geologic material, or from aquifer hydraulic tests.Here are comparative values of K (expressed in units of foot per day)Clay                         K =  0.00005Silty Sand                 K =  0.3Well Sorted Sands      K =  30Well Sorted Gravels     K =  3000 |
| You can find past issues of our "Environmental Enlightenment" at [amiadini.com](http://www.amiadini.com/)Wealth of information about environmental site assessments in the real estate transactions and issues concerning assessment and cleanup of contamination in the subsurface soil and groundwater. |

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| Call me if you have any questions. There are **no obligations.**Ami Adini Environmental Services, Inc.Environmental Consultants & General Engineering ContractorsCalifornia Lic. #1009513 A B HAZ ASB**818-824-8102**; **mail@amiadini.com**[www.amiadini.com](http://amiadini.com/)Ami Adini is a veteran environmental practitioner with over 40 years of experience. He carries a Bachelor of Science degree (B.Sc.) in Mechanical Engineering including academic credits in Nuclear and Chemical Engineering and postgraduate education in these fields. His career includes design and construction of nuclear plant facilities, chemical processing plants and hazardous wastewater treatment systems. He is a former California Registered Environmental Assessor Levels I & II in the 1988-2012 registry that certified environmental professionals in the assessment and remediation of environmentally impacted land, and a Registered Environmental Professional (REP) since 1989 with the National Registry of Environmental Professionals (NREP). He is a California Business & Professions Code Qualifying Responsible Managing Officer (RMO) in the General Engineering Contractor classification with Hazardous Substance Removal and Asbestos certifications, and president of AMI ADINI ENVIRONMENTAL SERVICES, INC. (AAES), a general engineering contractor and consulting firm specializing in environmental site assessments, rehabilitation of contaminated sites and removal of environmental risks from real-estate transactions. (Contact Ami for a complete resume.) **AAES provides practical solutions to environmental concerns using the highest standards of ethics and integrity while providing its clients with maximum return on their investments.** |

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