



Environmental Remediation Times Website Upgrade

The Broward County Environmental Protection Department has upgraded the website for the Environmental Remediation Times. The internet address for the website is: http://www.broward.org/pprd/cs_remediationtimes.htm



Our goal is to make the Times more accessible and useful to property owners, consultants, regulators, and the general public. In addition to making past editions easier to access, we have added a list of the topics that are included in each edition. We have also added a section of Frequently Referenced Articles that provides links to topics that we are often asked about.

Since 2000, the Times has provided information regarding regulatory updates, technical issues, and announcements associated with the assessment and remediation of

contaminated sites in Broward County. We welcome your feedback. If you have any comments or suggestions for how we can improve our service, please see the Feedback Forum information on Page 3.

The main website for the Broward County Environmental Protection Department can be found at: <http://www.broward.org/environment/>

The webpage for the Environmental Assessment and Remediation Section is at: <http://www.broward.org/pprd/ppi01500.htm>

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Double-Cased Monitoring Well Construction

This article addresses the appropriate design of double-cased wells installed to investigate the vertical extent of groundwater contamination. The casing diameter, well screen length, well depth, and filter pack must be properly designed to ensure that the well will provide representative groundwater samples.

In general, the vertical investigation of groundwater contamination is required under the following circumstances:

- Contaminant concentrations in groundwater samples collected from shallow wells are above Natural Attenuation Default Concentrations (NADCs) as specified in Chapter 62-777, Florida Administrative Code (F.A.C.),
- There is a possibility that public or private supply wells in the vicinity may be impacted by the contamination, or,
- There is reason to believe a high vertical (downward) hydraulic gradient exists which may affect the groundwater contamination.

The requirement to install vertical delineation wells may also be based on site-specific factors beyond the circumstances listed above. The vertical migration of groundwater contaminants was previously discussed in the November/December 2005 issue of the EAR Remediation Times, which can be found at <http://www.broward.org/pprd/novdec05.pdf>

Typically, vertical delineation wells are installed with double-casing to prevent contaminants in the upper aquifer from impacting the deeper groundwater. In order to determine the appropriate diameter of the outer casing, one must understand that the component most responsible for influencing this diameter is the annular space. Section 2.3.1 of the February 18, 2008, United States Environmental Protection Agency (USEPA) Region 4 guidance document entitled *Design and Installation of Monitoring Wells* requires the annular space of any well to be "of sufficient diameter so that well construction can proceed without major difficulties."

For wells installed within an open borehole, the borehole is typically created via solid stem auger or direct push. For such an installation method, Section 2.3.1 of the USEPA document specifies "the annular space should be approximately 2" to allow the uniform deposition of well materials around the screen and riser, and to allow the passage of tremie pipes and well materials without unduly disturbing the borehole wall." Since the annular space must be two inches in all directions, Section 2.3.1 of the USEPA document concludes "a 2" nominal diameter (nom.) casing would require a 6" inside diameter (ID) borehole." For surface casing of vertical extent wells, the May 2, 2005, Florida Department of Environmental Protection (FDEP) Standard Operating Procedures (SOP) PCS-006 entitled *Design, Installation, and Placement of Monitoring Wells* builds upon the USEPA guidance document by stating "(t)he diameter of the surface casing should allow for the proper placement of the well casing and the 2-inch minimum annular space for the filter pack." Therefore, for double-cased wells in which the inner casing will be inserted through the outer casing and into an open borehole generated below the outer casing, it must be presumed that the outer casing is a minimum of six inches in diameter to allow the tools necessary to advance the required six-inch diameter borehole.

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For wells installed via hollow stem auger, the well screen and casing are set within the auger flight. In this instance, Section 2.3.1 of the USEPA guidance document states the ID of the auger flight "should be of sufficient size to allow the passage of the tremie pipe to be used for well grout placement, as well as free passage of filter sands or bentonite pellets dropped through the auger or casing. In general, 4¼" ID should be the minimum size used for placement of 2" nom. casing." Page 6 of the FDEP SOP PCS-006 states "a 4¼-inch ID hollow-stem auger with 2-inch auger flighting will drill an 8¼-inch diameter borehole that will allow sufficient space for setting the well and placement of the minimum 2-inch sand pack." Therefore, when the inner casing of a double-cased well is installed via hollow stem auger, a minimum 8¼-inch diameter outer casing is necessary to advance the auger flight necessary to install a two-inch diameter well.

In addition to the casing diameters, the well screen length and depth must be designed. The FDEP SOP PCS-006 indicates that the well screens for vertical delineation wells should be 5-feet, unless the aquifer is slow to recharge. The top of the filter pack for a vertical extent well screen should be separated from the surface casing by a minimum of 3 feet. The top of the screen for a vertical extent well should be installed 10 to 20 feet below the bottom of the screens of the shallow wells. Keep in mind that if the first round of vertical delineation well samples indicate groundwater contamination is present, additional investigation may be required vertically as well as horizontally at the depth of the deeper well.

Questions concerning this article can be directed to David Singleton, P.G., at (954) 519-1429 or dsingleton@broward.org

References:

USEPA February 18, 2008, Design and Installation of Monitoring Wells:

<http://www.epa.gov/region4/sesd/fbqstp/>

FDEP PCS-006, May 2, 2005, Design, Installation, and Placement of Monitoring Wells:

http://www.dep.state.fl.us/waste/quick_topics/publications/pss/pcp/MW-SOP-Final-Ap15.pdf

Chapter 62-777, Florida Administrative Code:

http://www.dep.state.fl.us/waste/quick_topics/rules/default.htm

Feedback Forum

In order to improve the services we provide and better understand your needs, we need your feedback! Do you have a suggestion for the Times newsletter? Are there areas in which the Department can serve you better?

There are several ways to contact us:

- For questions or comments regarding this newsletter, you may contact Paul Waite at (954) 519-1467 or pwaite@broward.org
- If you have comments or questions regarding the Broward County Environmental Protection Department, Environmental Assessment and Remediation Section, you may contact Lorenzo Fernandez, P.E., at (954) 519-1249 or lfernandez@broward.org
- Our mailing address is:
Broward County Environmental Protection Department
115 South Andrews Avenue, Room A-240, Fort Lauderdale, Florida 33301

We look forward to hearing from you!