

### 5.3.11 ILLICIT DISCHARGE ELIMINATION

*Status:* This is a potentially new BMP credit that is currently under development and may be considered for expert panel review in coming years. The proposed method shown here for defining a nutrient credit for the elimination of illicit discharges requires further technical and legal analysis. Depending on approval by the CBP, the credit may be allowed on an interim basis for select urban communities as part of the WIP planning process.

*Definition:* The proposed credit applies to episodic or chronic discharges of diluted sewage into the municipal storm drain system that are detected based on nutrient screening of dry weather flow at stormwater outfalls, tracked back up through the storm drain system to their source using the methods of Brown et al (2004) and physically eliminated.

High nutrient levels have been detected in dry weather flows in a number of urban streams in Maryland (CWP, 2010, CWP, 2011). Subsequent outfall screening using nutrient based indicators suggest that the much of nutrients are derived from illicit discharges of sewage. Part of the reason is the interaction of flows and overflows from aging sanitary sewers and storm sewers which often run close together.

Mass balance studies indicate that these discharges may account for as much as 20 to 30% of the annual nutrient load of some urban streams (CWP, 2011). This suggests that an aggressive local IDDE program could achieve significant nutrient reductions. IDDE efforts are already required under municipal MS4 stormwater permits.

*Technical Issues:* There are several issues involved in defining the nature, duration and qualifying conditions for this nutrient credit. For example, more research is needed to determine if the nutrient discharges reported by CWP (2010) are a universal phenomenon in the Bay watershed or are confined to urban watersheds with aging sewer infrastructure. Also, although most Bay communities are required to conduct outfall screening as part of their MS4 permits, few utilize screening indicators that detect the presence of diluted sewage flows, or screen smaller outfalls (less than 36 inches in diameter which have proven to be a larger share of all illicit discharges (Brown et al, 2004).

*Recommended Process:*

**Step 1:** The dry weather flow rate and nutrient concentrations should be measured at suspect outfalls identified during routine outfall screening.

**Step 2:** The discharge should be tracked back up the storm drain system to its source, using the investigation methods provided by Brown et al (2004).

**Step 3:** The flow rate and nutrient concentration from the source discharge should be monitored before and after the discharge is physically eliminated

**Step 4:** Subsequent monitoring should be conducted at the original outfall to confirm that dry weather nutrient concentrations have returned to background levels.

**Step 5:** The nutrient credit is computed by multiplying the daily flow rate and nutrient concentration of the source discharge to derive a daily nutrient load. The daily load can then be multiplied by the number of days from when the suspect outfall was discovered and when the source discharge was physically eliminated.

*Qualifying Conditions:* No credit is given for fixing sanitary sewer overflows that occur within the urban stream corridor, nor is any credit given for elimination of transitory illicit discharges such as car wash-water.

*Local Tracking, Reporting and Verification:* To receive the credit, a community must provide physical evidence of how the discharge was eliminated, and document the change in nutrient concentrations at both the outfall and the source discharge. The “fixed” outfall should be re-screened every year to verify that the discharge has been permanently eliminated.

### Proposed Framework for Defining Illicit Discharge Detection Credits

Two possible options:

1. Nutrient monitoring approach for individual discharges = actual load reduction
2. Percent credit based on programmatic categorization

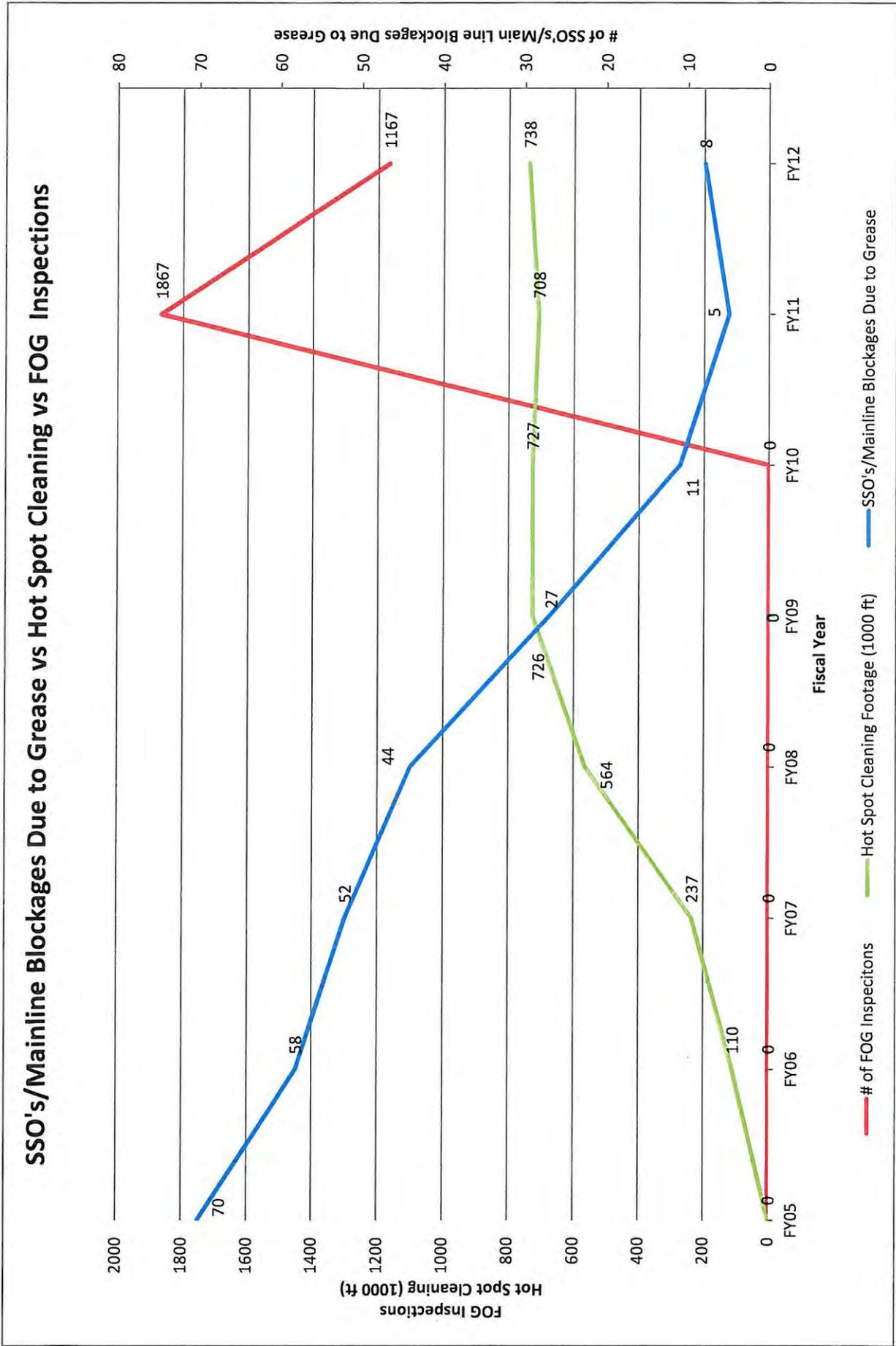
Proposed Framework For Defining Illicit Discharge Detection Credits			
Programmatic Category <sup>1</sup>	Regulated Community	Program Components	Credit (% previous)
Minimum Compliance		<ul style="list-style-type: none"> <li>• Implementation and enforcement of an ordinance to prevent illicit discharges</li> <li>• Develop a storm sewer system map,</li> <li>• Conduct ongoing field screening activities</li> <li>• Procedures to investigate portions of the separate storm sewer system that indicate a reasonable potential for containing illicit discharges</li> <li>• Procedures to prevent, contain, and respond to spills that may discharge into the MS4</li> <li>• A program to promote, publicize, and facilitate public reporting of the presence of illicit discharges or water quality impacts associated with discharges from the MS4</li> <li>• Educational activities, public information activities, and other appropriate activities to facilitate the proper management and disposal of used oil and toxic materials</li> </ul>	0%
Advanced Program		<ul style="list-style-type: none"> <li>• Hot-spot targeting</li> <li>• Desktop screening</li> <li>• Hotline or internet for public reporting</li> <li>• Detailed outreach on IDDE</li> </ul>	1%
Advanced Nutrient Program		<ul style="list-style-type: none"> <li>• Monitoring for nutrients during routine outfall screening</li> <li>• Testing for leakage of sewage into MS4 system</li> <li>• Fingerprinting library</li> <li>• Catch basin targeting</li> <li>• Door hangers</li> <li>• Enforcement</li> <li>• Hotspot Source Investigations</li> <li>• Outreach to targeted businesses</li> </ul>	2%

Reportable SSO's	FY05	FY06	FY07	FY08	FY09	FY10	FY11	FY12
Total	107	82	74	41	35	33	15	23
# Due to Grease	70	33	21	14	9	4	1	0
% Caused by Grease	65%	40%	28%	34%	26%	12%	7%	0%

Mainline Blockages	FY05	FY06	FY07	FY08	FY09	FY10	FY11	FY12
Total	Not Tracked	59	120	98	118	41	49	86
# Due to Grease	Not Tracked	25	31	30	18	7	4	8
		42%	26%	31%	15%	17%	8%	9%

FY 06 is only a partial year for Mainline blockages as that when the information began being tracked  
 FY 12 data is only as of information available on 6/8/2012

Total # SSO/Blockages	107	141	194	139	153	74	64	109
Total # due to Grease	70	58	52	44	27	11	5	8
Hot Spot Cleaning (ft)	0	110453	236541	564267	725549	727272	708296	738416
# of FOG Inspections	0	0	0	0	0	0	1867	1167
Money Spent for FOG Inspections by City							\$ 221,074.00	\$ 136,262.61





MEMBER JURISDICTIONS

December 5, 2012

CHESAPEAKE

Ms. Melissa Porterfield  
Department of Environmental Quality  
P.O. Box 1105  
Richmond, VA 23218

FRANKLIN

GLOUCESTER

RE: Proposed Ground Water Withdrawal Regulations [9 VAC 25-610]  
(WAS: State Water Control Board)

HAMPTON

Dear Ms. Porterfield:

ISLE OF WIGHT

The Hampton Roads Planning District Commission (HRPDC) submits the following comments on the proposed Ground Water Withdrawal Regulations 9 VAC 25-610. The comments have been endorsed by the HRPDC Directors of Utilities Committee, which previously commented on the draft Ground Water Withdrawal Regulations in an October 15, 2010 letter to the Department of Environmental Quality. The Committee includes the Directors of water utilities from the following localities: Cities of Chesapeake, Franklin, Hampton, Newport News, Norfolk, Poquoson, Portsmouth, Suffolk, Virginia Beach, and Williamsburg, Gloucester County, Isle of Wight County, James City County, Southampton County, Surry County, York County and the Towns of Smithfield and Windsor. HRPDC encourages the Department of Environmental Quality to consider the following recommended revisions to the proposed groundwater withdrawal regulations:

JAMES CITY

NEWPORT NEWS

NORFOLK

POQUOSON

PORTSMOUTH

**1) Human consumptive use:** The definition of human consumption needs to be broader. In several sections of the regulations, “public water systems” should replace the term “human consumption” to support all of the customers that rely on public water systems.

SOUTHAMPTON

SUFFOLK

a) In Section 610-10, the proposed definition for “Human Consumption” in the draft regulation is too narrow. It does not include toilet flushing, washing clothes, medical needs, etc. The regulation should continue to use the definition of “Human consumptive use” in the existing regulations:

SURRY

VIRGINIA BEACH

"Human consumptive use" means the withdrawal of groundwater for private residential domestic use and that portion of ground water withdrawals in a public water supply system that support residential domestic uses and domestic uses at commercial and industrial establishments.

WILLIAMSBURG

YORK

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- b) When the available supply of groundwater is not sufficient to meet all requests, meeting the demands of public water systems should be the highest priority. In the existing regulations, human consumptive use is the highest priority which leaves out a portion of the public water systems' customers and creates a burdensome task of trying to estimate human consumptive use which is not tracked by public water systems. Section 610-110 paragraph E should be revised as follows:

When proposed uses of groundwater are in conflict or available supplies of groundwater are not sufficient to support all those who desire to use them, the board shall prioritize the evaluation of applications in the following manner:

1. Applications for public water systems shall be given the highest priority;
2. Should there be conflicts between applications for public water systems, applications will be evaluated in order based on the date that said applications were considered complete; and
3. Applications for all uses, other than public water systems, will be evaluated following the evaluation of proposed public water systems' uses.

- c) Section 610-110, paragraph F.2 should be revised to ensure that public water systems have enough water to serve existing customers and to protect the health and safety of those communities. The following language is suggested:

The board shall reissue a permit to any public water supply user for an annual amount no less than the portion of the permitted withdrawal that was used by said system during any consecutive 12 month period occurring in the previous term of the permit.

- 2) Grandfathering of public water systems:** Municipal permit holders that operate public water systems have a unique responsibility unlike all other users. They are tasked with supplying safe drinking water to their communities which in turn, supports life itself, the protection of public health, and economic development. These responsibilities do not end when a permit term expires. Municipal permit holders must be able to plan for current and future population, economic development, and land use and know that the water resources to support those plans will continue to be available. If the criterion for evaluating permits is revised, public water systems should be grandfathered under the criterion used to approve the original permit. We are not making this point with respect to new or expanded applications, only those systems and withdrawals existing at the time this regulation is adopted.

- a) Existing public water systems should not be required to raise pumps because the Potomac aquifer has been redefined as one aquifer, instead of three aquifers. The new definition for this aquifer system is at least the third attempt by experts to characterize this resource in the last 30 years. As such, the regulated community cannot be expected to modify designs and infrastructure each time a new regional model is developed. Also, the pump setting

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requirements should be based on the depth and position of the well screen rather than on which aquifers are utilized as a groundwater source. Section 610-110 paragraph D.3.c should be revised with the following language:

- i) The applicant demonstrates that no pumps or water intake devices are placed lower than the top of the uppermost confined aquifer with a well screen in order to prevent dewatering of a confined aquifer, loss of inelastic storage, or damage to the aquifer from compaction.
  - ii) Public water systems with wells screened in the Potomac Aquifer may continue to operate with pumps set below the top of the Potomac Aquifer if those operational settings were approved in their permits prior to the Potomac Aquifer classification as one aquifer instead of three aquifers (Upper Potomac, Middle Potomac, and Lower Potomac).
- b) If a public water system requests a renewal of a permit with the same conditions as its existing permit, the system should be guaranteed that the renewal will not be denied based on new evaluation of water level impacts. Section 610-110 F should be revised with this additional paragraph:

The board shall not conduct or consider technical evaluations of the 80% criteria for reapplications if the applicant is a public water system.

- c) Public water systems should be granted renewals of permits with the same conditions as its existing permit regardless of the availability of surface water for purchase. Section 610-102 "Evaluation of need for withdrawal and alternatives" should be revised with this additional paragraph:

F. The board shall not consider requiring public water systems to purchase surface water in lieu of renewing a groundwater withdrawal permit.

**3) Improve technical evaluations:** Technical evaluations of proposed withdrawals should be based on the limitations of the simulation model used in the analysis and based on the impacts of proposed withdrawals during the permit term. The permit term should be extended to match typical financing periods of water infrastructure investments and water supply planning horizons.

- a) The technical evaluation of proposed withdrawals should be based on predicted water levels at the end of the proposed permit term instead of evaluating the "stabilized effects" of proposed withdrawals. A transient model simulation should be used instead of a steady state simulation to estimate water level and head changes caused by a proposed withdrawal. A steady state simulation could represent impacts that are expected to occur 50 years or longer after the permit would expire. Section 610-110 paragraph D.3.h should be revised with the following language:

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The board's technical evaluation demonstrates that the effects from the proposed withdrawal in combination with the effects of all existing lawful withdrawals at the end of the permit term will not lower water levels, in any confined aquifer that the withdrawal impacts, below a point that represents 80% of the distance between the historical prepumping water levels in the aquifer and the top of the aquifer.

- b) The point of compliance with the 80% drawdown criteria should be based on the generally recognized calibration limit of the model used for the analysis. Permit renewals should not have to meet a more stringent criterion than the permit's initial technical evaluation.
  - i) Compliance with the 80% drawdown criteria should be based on the calibration limit of a technically sound groundwater model. Section 610-110 paragraph D.3.h should be revised by adding the following paragraphs:
    - (1) Compliance with the 80% drawdown criterion for new applications will be determined at the model's minimum drawdown contour based on the predicted effects of the proposed withdrawal. The model's minimum drawdown contour is defined as the calibration limit of the specific groundwater model or assessment methodology used for the technical evaluation.
    - (2) Compliance with the 80% drawdown criterion for permit renewals will be determined at the points that are halfway between the proposed withdrawal site and the model's minimum drawdown contour based on the predicted effects of the proposed withdrawal. The model's minimum drawdown contour is defined as the calibration limit of the groundwater model used for the technical evaluation.
  - ii) The "area of impact" should be defined according to the calibration of the model used for the analysis. Section 610-10 should include the following definition:

"Area of impact" means the model's minimum drawdown contour based on the predicted effects of the proposed withdrawal. The model's minimum drawdown contour is defined as the calibration limit of the groundwater model used for the technical evaluation.
- c) Permit terms should be extended to 30 years to match the financing periods for water infrastructure investments. However, withdrawal amounts should be limited to projected demands for 15 years.
  - i) Permits should be extended from the current 10 year period to a 30 year period. Many of the permit holders must finance significant investments in the infrastructure required to withdraw, treat and convey water. These investments are often financed over 30 year periods. Section 610-106 paragraph D.13 and 610-40 paragraph A.10 in the draft regulations should be modified with the following language:

Groundwater withdrawal permits shall be effective for a fixed term not to exceed 30 years.

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- ii) If the permit term is extended beyond 10 years, the permitted withdrawal amounts should be limited to the projected water demands in the next 15 years. Groundwater should not be obligated to a permittee fifteen to thirty years before it is needed. Paragraph A.1 should be created in Section 610-102 Evaluation of need for withdrawal and alternatives. The following language is suggested:

Groundwater withdrawal permits shall be based on projected water demands for no more than 15 years from the date of the permit issuance, even if the permit term exceeds 15 years.

- d) The Virginia Coastal Plain groundwater model should be used to manage the Coastal Plain Aquifer System instead of the RASA model currently in use. The Virginia Coastal Plain (VCP) groundwater model, authored by Charles Heywood and Jason Pope from the USGS Virginia Water Science Center, incorporates the findings of the Virginia Coastal Plain Hydrologic Framework report funded by DEQ and HRPDC. The VCP model should be adopted because it produces more accurate predictions of groundwater elevations. The VCP model includes information that was not available when the RASA model was developed such as the groundwater density distribution along the saltwater interface near the Atlantic Ocean, domestic self-supplied withdrawals below the reporting threshold, the Chesapeake Bay Impact Crater, and recognition of a single Potomac aquifer.

**4) Drought relief permits:** Drought relief permits have been better defined in the draft regulations; however, several suggestions are offered to further define how these permits will be issued and evaluated.

- a) The HRPDC Directors of Utilities Committee originally supported the creation of Conjunctive Use Permits as a new permit category. However, 610-104 "Surface water and groundwater conjunctive use systems" in the draft regulations does not accomplish the goal of giving water providers the flexibility to maximize the available water resources with fewer restrictions than Drought Relief Permits. The Committee suggests that the Conjunctive Use Permit category be eliminated. Permits should be issued as either a Production Well Permit or a Drought Relief Permit.
- b) Drought Relief Permits for public water systems should not be limited to permitted withdrawals that only support human consumptive use. The definition of "Supplemental drought relief well" in Section 610-10 should be revised with the following language:

"Supplemental drought relief well" means a well permitted to withdraw a specified amount of groundwater to meet human consumptive use needs during declared drought conditions, or other declared water supply emergency, after mandatory water use restrictions have been implemented. Permits for public water systems should be permitted to withdraw groundwater

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to meet the needs of all consumers after mandatory water use restrictions have been implemented.

c) The impacts of drought relief wells should be evaluated under conditions that more closely match the past operations of drought relief wells in Virginia. The impacts should be evaluated with a transient model assuming the proposed maximum rate and withdrawal amount for two years, followed by eight years at the minimum maintenance withdrawals, and repeated if the permit term is extended beyond 10 years. This approach is based on the historical use of emergency wells in the Virginia Coastal Plain.

i) The draft regulations states that the 80% criterion will be evaluated based on the stabilized effects of the proposed withdrawal. Drought wells are rarely pumped for more than a year and almost never pumped continuously. The aquifer system is sluggish to respond to pumping stresses so using a transient model instead of a steady state model is a more accurate way to simulate the impacts of drought relief withdrawals. Section 610-106 paragraph G.6 should be revised with the following language:

The board's technical evaluation demonstrates that the effects from the proposed withdrawal amounts pumped at the maximum rate for two years followed by the withdrawal of any minimum amounts required for maintenance for eight years in combination with the effects of all existing lawful withdrawals will not lower water levels, in any confined aquifer that the withdrawal impacts, below a point that represents 80% of the distance between the historical prepumping water levels in the aquifer and the top of the aquifer.

ii) The "area of impact" should be based on the same assumptions used in the technical evaluation of the proposed withdrawal. Section 610-108 paragraph D should be revised as follows:

Mitigation plans for supplemental drought relief permits shall address the area of impact associated with the maximum groundwater withdrawal allowed by such permits assuming the proposed maximum rate and withdrawal amount for two years followed by eight years at the minimum maintenance withdrawals.

**5) Aquifer Storage Recovery wells:** The regulation should address Aquifer Storage Recovery (ASR) wells. The regulations should encourage groundwater users to recharge the aquifer system by establishing guidelines for how DEQ will treat ASR wells in the Groundwater Withdrawal Permitting Program. The following suggestions are recommended:

a) Definition – "Aquifer Storage Recovery Well" injects drinking water into the aquifer system and stores more water in the system than it withdraws.

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- b) ASR wells do not require a Groundwater Withdrawal Permit but must comply with DEQ reporting requirements for withdrawals. The EPA Underground Injection Control Program regulates injection of water at ASR wells.
- c) ASR well owners can withdraw a maximum of 70% of the volume of water that has been injected into the aquifer system or up to 95% of the injected water, as long as the utility can effectively demonstrate that the withdrawn water above the 70% point is predominantly injected water (by water quality analysis) and not native water.
- d) ASR well owners can withdraw water up to a maximum rate of four times the average daily injection rate based on the previous 12 months.
- e) Aquifer Storage Recovery wells should not be required to have a mitigation plan because by definition more water has been injected than withdrawn from the aquifer system. Any and all impacts experienced during a withdrawal cycle are temporary by definition and by operational constraints.

For the past twenty years, the region's local governments have provided financial and technical support to the USGS and DEQ through the on-going Cooperative Groundwater Study Program. The members of the HRPDC Directors of Utilities Committee bring considerable technical and policy experience and perspective to the Groundwater Withdrawal Permitting process. The proposed regulatory changes are important to the operations of the water utilities in the Hampton Roads region and the Commission would appreciate your careful consideration of its recommendations.

If you need additional information or have any questions, please contact Whitney Katchmark, HRPDC Principal Water Resources Engineer at (757) 420-8300.

Sincerely,

Thomas G. Shepperd, Jr.  
Chairman

WSK/fh

Copy: Directors of Utilities Committee  
Scott Kudlas, Department of Environmental Quality