

# COMMONWEALTH OF VIRGINIA

## Department of Environmental Quality


Division of Water Quality Programs

Ellen Gilinsky, Director

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**SUBJECT:** **Guidance Memorandum No. 06-2012, Amendment #1**  
Review Procedures for WQIF Grant Applications and Agreement Negotiations

**TO:** Regional Directors

**FROM:** Ellen Gilinsky, Ph.D., Director 

**DATE:** December 10, 2007

**COPIES:** James Golden; Rick Weeks; CBP staff; CAP Staff; Regional WPM, OWPP Staff, OWE Staff

**Background and Purpose:** In September 2006, DEQ issued GM 06-2012 to standardize the process and criteria used to review Water Quality Improvement Fund (WQIF) applications, and aid in making consistent grant eligibility determinations during agreement negotiations.

The 2007 General Assembly directed DEQ to identify and evaluate options to ensure the efficient use of WQIF grants, to develop cost-effectiveness policies and guidelines, and include appropriate cost control measures in grant agreements issued after October 1, 2007. Details on developing the cost control measures are contained in a report, "*Cost Control Policies and Guidelines for the Water Quality Improvement Fund*", accessible at this weblink: <http://www.deq.virginia.gov/bay/CostControlPoliciesandGuidelines.pdf>.

As a result of adding these cost control policies and guidelines to the WQIF Point Source Program, it became necessary to update and revise GM #06-2012, particularly Section 6, Methods or Information to Aid in Controlling Excessive Costs.

The purpose of this guidance is to:

- Assure use of a consistent and equitable decision making process in reviewing applications and prioritizing grant agreement drafting/negotiation.
- Standardize methodologies used to determine the eligible scope of work and appropriate cost-share percentages for units comprising the nutrient reduction technology being designed and installed.

**Electronic Copy:** An electronic copy of this guidance in PDF format is available for staff internally on DEQNET, and for the general public on DEQ's website at <http://www.deq.virginia.gov/bay/wqif.html> .

**Contact Information:** Please contact John Kennedy, DEQ Chesapeake Bay Program, at (804) 698-4312 or [jmkennedy@deq.virginia.gov](mailto:jmkennedy@deq.virginia.gov) with any questions regarding the application of this guidance.

**Disclaimer:** This document is provided as guidance and, as such, sets forth standard operating procedures for the agency. However, it does not mandate any particular method nor does it prohibit any particular method for the analysis of data, calculation of a WQIF cost share percentage, or establishment of an eligible scope of work. If alternative proposals are made,

such proposals may be reviewed and accepted or denied based on their technical adequacy and compliance with appropriate laws and regulations.

## Review Methodology and Procedures

1. Prioritizing Applicants for Agreement Negotiations: In accordance with Virginia Code, the DEQ Director must sign a grant agreement with all eligible WQIF applicants unless it is determined that use of the Nutrient Credit Exchange Program would be significantly more cost effective than adding nutrient reduction technology (NRT) at the plant in question. Therefore, for projects approved to receive grant funding this prioritization is not a ranking relative to project merit, but rather is a ranking relative to timing or “readiness to proceed”.

Unless there are extenuating circumstances, grant agreement negotiations will not begin until an acceptable Preliminary Engineering Report (PER) is submitted. Subsequent to the initial PER review, a meeting will be scheduled to discuss any remaining issues relative to eligible scope of work, cost-share percentage, and grant administration.

Applicants are grouped into four scheduling blocks according to “readiness-to-proceed”, as follows:

**Priority 1** = project completed, under construction, or acceptable Preliminary Engineering Report (PER) submitted.

**Priority 2** = PER being drafted and submittal expected within a few months; relatively complete application with some additional information/clarification needed.

**Priority 3** = similar to Priority 2, but need for other regulatory actions to occur before PER can be drafted (e.g., permit modification to include a new design flow tier).

**Priority 4** = status of PER unknown/not provided in application; major questions about project design capacity, nutrient effluent levels (especially proposals with limited additional value/nutrient reduction gained for expenditure of grant funds).

Applicants in Priority categories 2 through 4 will be moved into Priority 1 upon submission of an acceptable PER. Future solicitations will be coordinated to the extent practicable to coincide with the annual application schedule used for the Virginia Clean Water Revolving Loan Fund Program.

2. Determining Appropriate Grant Percentage:
  - a. The **basis for calculating the authorized cost-share percentage** is specified in the Water Quality Improvement Act (WQIA). Determinants include Median Household Income (MHI) figures, “reasonable” sewer cost and annual residential sewer charge current at the time of application for the service area. Any updates to MHI figures and calculated reasonable sewer costs will be used as soon as they are adopted by the SWCB.
  - b. **Multi-jurisdiction service areas** – Where multiple jurisdictions receive sewer service through a District/Authority or an inter-municipal agreement, weighted averages of the median household income and sewer charge will be calculated for comparison to the “reasonable sewer costs.” Staff will interpret these factors to be weighted according to the current conditions (e.g., portion of plant capacity presently used by each jurisdiction and location of residents served).
  - c. **Requests for cost-share above authorized amounts** – The Director may approve a request for cost share above the authorized grant amount specified in the WQIA. Whenever an application exceeds the authorized grant amount, the Director shall consider the additional factors of comparative revenue capacity,

revenue efforts and fiscal stress as reported by the Commission on Local Government. Staff will apply these criteria for grant requests above 75%:

- i. If ratio of current sewer cost to reasonable charge is **1.0 or above**, and locality’s fiscal stress rating is “**above average**”, then **cost-share = 80%**.
- ii. If ratio of current sewer cost to reasonable charge is **1.0 or above**, and locality’s fiscal stress rating is “**high**”, then **cost-share = 90%**.
- iii. If ratio of current sewer cost to reasonable charge is **1.25 or above**, then **cost-share = 90%**. (The COLG’s fiscal stress rating may be used to judge the reasonableness of this cost-share level, acknowledging that Towns do not have separate ratings apart from the surrounding County.)

3. Determining Performance Requirements: WQIF agreements must include enforceable concentration-based performance requirements, which are to be based on the technology installed and expressed as annual average concentrations. This authorization appears in the WQIA (§ 10.1-2131. C. (i)), the Chesapeake Bay Watershed Nutrient Credit Exchange Program law (§62.1-44.19:18.B), and is consistent with provisions for nutrient limitations in discharge permits under SWCB Regulation (9 VAC 25-40-70.A.).

a. Using general system descriptions and unit processes, establish performance expectations associated with the nutrient removal technology installed for Biological Nutrient Removal (“BNR”), Enhanced Nutrient Removal (“ENR”), and State-of-the-Art (“SOA”) Nutrient Removal as follows:

| Nutrient Removal Technology | System Description; Unit Processes  | TN Effluent Conc. (mg/l; annual avg.) | TP Effluent Conc. (mg/l; annual avg.) |
|-----------------------------|---|---------------------------------------|---------------------------------------|
| “BNR”                       | TN: Proven anoxic-aerobic technology (e.g., Orbal extended aeration, Schreiber, Bardenpho, MLE, SBR, VIP, Kruger, 3-5 stage activated sludge, IFAS).<br>TP: biological phosphorus removal, or chemical precipitation.             | 8.0                                   | 1.0                                   |
| “ENR”                       | TN: Proven BNR technology and supplemental carbon source (e.g., methanol).<br>TP: chemical precipitation.   | 5.0                                   | 0.5                                   |
| “SOA”                       | TN: proven BNR technology and supplemental carbon source with denitrification filters or other tertiary process; Membrane Bioreactor (MBR) with supplemental carbon.<br>TP: chemical precipitation with tertiary filtration; MBR. | 3.0                                   | 0.3                                   |

The above TN and TP concentrations are anticipated for use with the described technologies, but may be subject to change on a case-by-case basis through negotiations with applicants who can demonstrate significant differing conditions or constraints at their plant. In addition, any allowable “buffer” authorized under the WQIA will be included in the agreement.

- b. Review PER compared to technology basis for required treatment at new/expanding plants, per the Nutrient Credit Exchange Law and the Point Source “Technology Regulation” (9 VAC 25-40).
  - c. Consider “phased” approaches to meet nutrient waste load allocations, either through progressive technology installation or reliance on flow projections below design capacity. The second possibility is acceptable if it is consistent with the Watershed General Permit now being drafted. Under a phased approach the performance requirements will be based on the technology installed.
  - d. Review any established performance requirements in light of compliance plans submitted by each significant discharger under the Watershed General Permit.
4. Eligibility of Unit Processes and other Budget Items in Scope of Work – CBP staff have developed an approach to determine eligibility of multi-purpose units and expanded tankage, where the eligibility is limited only to nutrient removal requirements. Unit processes largely dedicated to nutrient removal may be at or near 100% grant eligibility. Details on eligible unit process and/or associated grant percentages can be found in Appendix A. In addition, an overall eligible percentage of total construction cost will usually be applied to other fixed project costs (e.g., design, construction management, administration, inspection, etc.).
5. Basis for Calculating Monetary Assessment Figures included in Grant Agreement
- a. Calculation will consider all current and prior construction grant funds awarded for installation of nutrient removal technology (Technical Assistance grants awarded for drafting Basis of Design Reports or Interim Optimization Plans will not be included). For projects that have previously been retrofitted using WQIF cost-share, the monetary assessment calculation will factor in the remaining useful service life of the system installed and deduct any years elapsed since the Certificate to Operate was issued for the original project(s).
  - b. Calculate nutrient removal performance relative to original baseline nutrient discharge levels, for projects where a plant was previously upgraded under an earlier WQIF grant.
6. Cost Control Measures to make Efficient Use of WQIF Grants: The following methods and information shall be considered in developing grant agreements to be executed on or after October 1, 2007. In considering these items and determining whether they are appropriate for a particular grant agreement, DEQ will take into account the status and progress of the nutrient control project for which funding is requested.
- a. To assure that costs are fair and competitive, require compliance with the Virginia Public Procurement Act for purchase of all grant-funded goods and services, with no exception for smaller localities (population less than 3,500).
  - b. Analyze and compare estimated project costs to prevailing, actual bid costs for similar project types.
  - c. As needed, consult information sources such as the Engineering News Record (ENR) index (<http://enr.construction.com/features/conEco/>), Association of General Contractors (<http://www.agc.org/index.wv>), and Bureau of Labor Statistics producer price index (<http://www.bls.gov/ppi>) for anticipated unit costs of basic construction materials and skilled labor.

- d. Support for owner-selected alternatives to the standard procurement method of competitive sealed bidding, such as the “Design-Build” approach, public-private partnerships, or others, to aid in reducing capital costs and expediting construction schedules. For “Design-Build”, make information available on the Design-Build Construction Management Review Board regulations (1VAC17-20-10), along with any guidelines, model ordinances and Department of General Services staff contact information. For public-private partnerships, make information available on the statutory requirements (Va. Code §56-575.1) and model guidelines developed by the State Work Group under the Division of Legislative Services (dls.state.va.us/ppca.htm).
- e. Require Value Engineering (VE) Analysis when the capital cost estimate for the nutrient reduction technology portion of a project is equal to or greater than \$10 million. The scope of the VE Analysis must be consistent with the definition for “value engineering” found in Va. Code § 2.2-1133.A. The VE Analysis should be performed at the end of the Preliminary Engineering Report stage and before final engineering design is complete. Multiple VE Analysis efforts could be required depending on the size and complexity of the project. The cost of the VE Analysis will be eligible for cost share reimbursement under the WQIF grant agreement. A grantee may perform a VE analysis if the NRT cost estimate is lower, but this is optional and voluntary.
- f. A Life Cycle Cost Evaluation must be provided in conjunction with the Preliminary Engineering Report, for the overall NRT system selected and the feasible options considered. As needed, the evaluation should consider individual units and technology options within the selected process, to aid in determining if alternatives are available that may reduce the size of a unit, or the cost of equipment or construction, without sacrificing performance or reliability. If additional costs are incurred resulting from this extended evaluation or any pilot testing, these will be eligible for cost share reimbursement under the WQIF grant agreement. If a lower-cost alternative is shown to be viable and the grantee chooses a more costly option, grant eligibility may be prorated.
- g. Review Preliminary Engineering Report for design assumptions of unit processes associated with nutrient removal technology; receive upfront justification and negotiate cost-share limitations for overly-conservative design/sizing of any unit processes.
- h. The WQIF Grant Guidelines allow nutrient removal technology systems to be sized to treat the flow in any reasonable and necessary expansion of the wastewater facility, which is generally limited to a 20-year design life. Details on the types of acceptable documentation and analyses, to substantiate expanded future design flow as reasonable and necessary, are described in Appendix B.
- i. Nutrient Credit Exchange Program:
  - 1. The DEQ Director is not required to enter into a grant agreement with an eligible facility if it is determined that using nutrient credits in accordance with the Chesapeake Bay Watershed Nutrient Credit Exchange Program (§ 62.1-44.19:12 et seq.) would be significantly more cost-effective than installing nutrient controls at the facility in question. The criteria to be evaluated in making this determination will include, but are not limited to:

- Cost-effectiveness indicators such as the cost per pound of nutrient reduced at design flow or the cost per million gallons treated, compared to the cost of nitrogen and phosphorus credits acquired from the Water Quality Improvement Fund as specified in the Chesapeake Bay Watershed General Permit Regulation (9 VAC 25-820-70-Part 1.J.).
  - Non-monetary factors may also be considered, as applicable, such as:
    - water quality conditions in receiving waters (e.g., impaired waters; areas requiring more stringent nutrient control than the Chesapeake Bay regulations mandate);
    - the applicant's opportunity to undertake a nutrient upgrade simultaneously with other facility expansion, upgrade or rehabilitation projects;
    - the quantity of credits needed compared to the projected supplies available.
2. To aid in implementing the Nutrient Credit Exchange Program, WQIF grantees shall make all credits generated in a calendar year available for nutrient allocation compliance.
7. Design Flow: As noted above in Item 1, grant negotiations will begin after receipt of an acceptable PER. In order to be acceptable to WQIF staff, the facility design flow in the PER must conform to the current design flow certified for operation or a design flow tier found in the individual VPDES Permit. In the case of a facility expansion, if the proposed design flow is not a VPDES Permit tier, then the grant agreement cannot be finalized until a permit modification is secured.
8. Coordination Among Agency Programs (WQIF, CAP, OWE reviews)
- a. Utilize and update as necessary the MOU between the Construction Assistance Program (CAP) and CBP for mutual review of payment requests, change orders, and RO staff performing Interim Project Evaluations (site visits during construction for jointly funded projects).
  - b. Maintain close coordination between CBP and technology experts in OWE who have lead responsibilities to review and issue the certificate to construct and certificate to operate for proposed treatment systems. When needed, jointly review eligibility of proposed unit processes, based on design criteria, SCAT Regulations, the proposed technology, and general nutrient removal technology descriptions.
  - c. Maintain coordination between CBP, OWP, and DCR regarding any projects involving wastewater reuse for irrigation and resulting nutrient management planning requirements.

## Appendix A Grant Eligible Percentages by Unit Process

| Unit Process                           | Eligible Percentage/Allowances  |
|--|---|
| Influent Screening/Pumping             | 0%  |
| Flow Equalization                      | If installation results in a peak factor of 2.5 or less, the eligible percentage shall be equal to the percentage of the biological process dedicated to the anoxic volume or 50%, whichever is less.   |
| Primary Clarification*                 | Where a new primary clarifier with chemical phosphorus removal is constructed, eligibility shall not exceed 20%.  |
| Biological Basin/Reactor*              | <p>A) Where a VPDES permit requires year round nitrification, equivalent to an annual average TKN concentration of 6.0 mg/L or less (and respective to a proposed BNR technology) or an annual average ammonia-nitrogen concentration of 2.0 mg/L or less (and respective to a proposed ENR/SOA technology), the grant eligible percentage of the structure shall be determined by the volume associated with nutrient reduction (anaerobic/anoxic) zones. Mixers and baffles in these zones are 100% grant eligible. For any swing zones, the volume, mixers, and baffles shall be 50% grant eligible; aeration components in swing zones are not grant eligible.</p> <p>B) Where a VPDES permit includes a seasonal nitrification requirement equivalent to an annual average TKN concentration greater than 6.0 mg/L (and respective to a proposed BNR technology) or an annual average ammonia-nitrogen concentration greater than 2.0 mg/L (and respective to a proposed ENR/SOA technology), the nitrification volume, aeration process, and baffling associated with the nutrient reduction project shall be grant eligible only at the existing design flow.</p> <p>C) For projects involving a flow expansion, the eligible percentage of the structure shall be determined by the volume associated with nutrient reduction (anaerobic/anoxic) zones. Mixers and baffles in these zones are 100% grant eligible. For any swing zones, the volume, mixers, and baffles shall be 50% grant eligible; aeration components in swing zones are not grant eligible.</p> |
| Batch Process*                         | <p>A) Where a VPDES permit requires year round nitrification, equivalent to an annual average TKN concentration of 6.0 mg/L or less (and respective to a proposed BNR technology) or an annual average ammonia-nitrogen concentration of 2.0 mg/L or less (and respective to a proposed ENR/SOA technology), the grant eligible percentage of the structure shall be determined by run cycle/phases associated with nutrient reduction (anaerobic/anoxic) mode. The volume and aeration system necessary to nitrify is considered ineligible because it would be required, regardless of nutrient reduction requirements.</p> <p>B) Where a VPDES permit includes a seasonal nitrification requirement equivalent to an annual average TKN concentration greater than 6.0 mg/L (and respective to a proposed BNR technology) or an annual average ammonia-nitrogen concentration greater than 2.0 mg/L (and respective to a proposed ENR/SOA technology), the nitrification volume and aeration process associated with the nutrient reduction project shall be grant eligible, only at the existing design flow.</p> <p>C) For projects involving a flow expansion, the grant eligible percentage shall be determined by the run cycle/phases associated with nutrient reduction (anaerobic/anoxic) mode.</p> <p>D) The post-equalization structure and pumping shall be grant eligible at the same percentage as the batch process.</p>   |
| Nitrified Recycle Pumping              | 100%  |
| Sludge Fermentation for VFA Production | 100%  |
| Chemical Phosphorus Removal            | 100% of chemical storage tanks, metering pumps, and mixing systems.   |
| Supplemental Carbon                    | 100% of chemical storage tanks, metering pumps, and mixing systems.   |



| Unit Process  | Eligible Percentage/Allowances   |
|---|--|
| Secondary clarification*:   | <p>A) Grant eligibility is limited to the certified design flow reflected in the VPDES permit; higher design capacities will result in prorated eligibility.</p> <p>B) The process shall qualify for cost share, where design capacity and permit flow are consistent and the surface overflow rate (SOR) is in the range of 800 to 1,200 GPD/ft<sup>2</sup> at peak flow. Projects proposing a more conservative SOR may be funded at a prorated level.</p> <p>C) The process shall qualify for cost share, where design capacity and permit flow are consistent and solids' loading is in the range of 1.4 to 1.8 lb/ft<sup>2</sup> /hr at peak flow.</p> <p>D) The overall eligible percentage for new construction shall not exceed 50% for the unit process; modifications to baffles/mechanism (not previously funded) shall be cost shared up to 100%, where the modification is necessary for nutrient removal capability.</p> |
| Internal and RAS Pumping*   | Case by case as "supported" for any nutrient removal capability.   |
| Denitrification filters   | 100%   |
| Tertiary Filtration   | <p>A) Where the VPDES permit includes a TSS limitation of 5.0 mg/L or less, the process shall not be eligible for cost share.</p> <p>B) Where the VPDES permit includes a TSS limitation greater than 5.0 mg/L but less than or equal to 10 mg/L, grant eligibility shall be 50%.</p> <p>C) Where the VPDES permit includes a TSS limitation greater than 10 mg/L, grant eligibility shall be 100%.</p>  |
| Microscreens for MBR  | The eligible percentage shall be equal to the percentage of the biological reactor dedicated to the anoxic volume.   |
| Membrane filtration   | The eligible percentage shall be equal to the percentage of the biological reactor dedicated to the anoxic volume. Where there is no expansion and the process replaces both secondary clarifiers and tertiary filtration, eligibility shall not exceed 75%.   |
| Solids handling*  | Eligibility shall be on a case by case basis and only as "supported" for any nutrient removal capability. Where chemical phosphorus removal is designed into the secondary clarifier and flow expansion is not a part of the project, WAS pumping eligibility shall not exceed 40%.  |
| Disinfection  | 0%   |
| Post Aeration   | 0%, generally.   |
| Effluent pumping  | 0%   |
| Site Work, Electrical, Non-Potable Water, Const. Management, etc. | Eligibility shall be determined on a case by case basis and derived by using the overall grant eligible costs as a percentage of the total construction costs.   |
| Contingency   | 10% of the eligible project costs as estimated prior to bidding; will be reduced to 5% after receipt of bids.  |
| Hydraulic/Peak Factor   | <p>For peak flows, a peak factor of up to three times the average daily design flow will be considered acceptable in determining eligibility of individual unit processes. Beyond a daily peak factor of three, the grantee has the option to either:</p> <p>A) install influent flow equalization to reduce the peaking factor below three, or</p> <p>B) receive prorated eligibility of individual unit processes respective to the proposed peaking factor.</p>   |

NOTE: \*Any alternate request for cost share in a unit process must be supported by engineering calculations with respect to the volume, run time, etc., by which nutrient reduction requirements cause an increased need or size in the unit process.

Example documentation sources associated with determinations of grant eligibility for nutrient removal technology are as follows.

1. Design of Municipal Wastewater Treatment Plants, WEF Manual of Practice 8.
2. Wastewater Engineering, Metcalf and Eddy, current edition.
3. Biological and Chemical Systems for Nutrient Removal, WEF Special Publication.
4. Virginia Sewage Collection and Treatment Regulations.
5. WQIF Grant Guidelines.

6. Modeling data and/or vendor supplied information.

## Appendix B

### Determination of Reasonable and Necessary Flow Expansion

|   |   |
|---|---|
| <p>I) Basic documentation:</p>  | <p>A) For existing discharges, current average flow per housing unit or equivalent residential connection (ERC), as substantiated through the WQIF application and back-up documentation, should be utilized as the “not to exceed” flow in gallons per day (GPD).</p> <p>B) Because construction of new sanitary facilities necessitates the use of water conservation devices and new trunk sewers should be more watertight, these factors support utilizing a flow (as determined in I.A) less than 300 GPD/unit.</p> <p>C) In cases where more than one design flow tier appears in the VPDES permit, certified for operation on a seasonal basis, the lower dry-weather flow tier shall be used as the existing design flow of the facility.</p>  |
| <p>II) Method to determine the average design flow supported for grant funds</p>        | <p>A) The base flow or starting point for sizing the average daily flow (see 9 VAC 25-790-460, item C.3) shall be determined during a period of normal/reasonable precipitation and, at a minimum, shall include a consecutive 12 month period.</p> <p>B) A detailed break down of the number and location of anticipated and planned future residential connections for a 20-year useful service life must be provided as part of the documentation (not just a lump sum value). Tabular flow information resulting from the number of ERC times the current average flow per housing unit (as determined in I.A.) should be provided. If the flow increase is statistically consistent with historical population growth, the same percentage associated with population increase may be used in lieu of the detailed breakdown, but this will be determined on a case-by-case basis.</p> <p>C) Some infiltration and inflow (I&amp;I) is expected and may be included in the average design flow, where it is considered cost-effective to convey and treat rather than remove. However, the WQIF should not fund capacity for excessive I&amp;I in lieu of sewer repair and rehabilitation. Therefore, the aggregate amount of I&amp;I to be included in the determination of the design flow for a 20 year useful service life should not exceed 20% of the existing average flow (II.A. above).</p> |
| <p>III) For expansions, WQIF will participate in minimal “speculative” design flow:</p> | <p>A) Speculative/projected flow should be limited to 15% of total documented design flow, or</p> <p>B) Consistent with WQIF efforts to set grant cost share percentages based on existing residential rates, financial conditions, and existing number of housing units, the portion of an expansion to serve industrial/commercial speculation may be considered ineligible and should be funded (§ 10.1-2129 item B. 3. iv.) by other sources.</p> <p>C) The Virginia Employment Commission (VEC) is given statutory authority (§ 60.2-113, item 5) to prepare official short and long-range population projections in the Commonwealth for use by the General Assembly and state agencies. DEQ staff will compare the applicant’s flow projection documentation to VEC data, and may consult with VEC on the applicant’s projected service population to assess reasonableness and consistency with their demographic information.</p>  |