COMMONWEALTH OF VIRGINIA
Department of Environmental Quality
Water Division
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Subject: Guidance Memo No. **09-2011**, Conducting an Alternatives Analysis per the Requirements of 9VAC25-260-275 Protection of Eastern Shore Waters for Clams and Oysters

To: Regional Directors

From: Ellen Gilinsky, Ph.D., Director

Date: AUG 18 2009

E-Copies: Deputy Regional Directors, Regional Water Permit Managers, Regional Water Compliance Managers, Rick Weeks, James Golden, and Fred Cunningham

Summary:

This guidance is written to assist DEQ staff and the public in meeting the requirements of 9 VAC25-260-275 Protection of Eastern Shore Tidal Waters for Clams and Oysters.

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/waterguidance/permits.html

Contact Information:

Please contact Elleanore Daub, Office of Water Permit Programs and Compliance Assistance, at (804) 698-4111 or elleanore.daub@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, establishment of a wasteload allocation, or establishment of a permit limit. If alternative proposals are made, such proposals should be reviewed and accepted or denied based on their technical adequacy and compliance with appropriate laws and regulations.

I. INTRODUCTION

The purpose of the special standard is to provide additional water quality protection for clams and oysters in waters on the Eastern Shore of Virginia and to ensure that the wastewater management alternative chosen for that area has the least damaging environmental impact and that it is practicable in terms of lowest social and economic impact to the locality. The requirement for an alternatives analysis that is part of the special standard is intended to reduce condemnations on the Eastern Shore so more waters may be protected for clam and oyster production, including aquaculture.

II. WHEN THE REGULATION APPLIES

The requirements were adopted into the Virginia Water Quality Standards (WQS) and became effective on August 20, 2009. The new requirements are as follows:

9VAC25-260-275. Protection of Eastern Shore Tidal Waters for Clams and Oysters

A. This section applies to applications for individual Virginia Pollutant Discharge Elimination System (VPDES) permits authorizing new or expanded discharges to or otherwise affecting Eastern Shore tidal waters which include all tidal rivers and creeks on the Eastern Shore (Accomack and Northampton Counties) including the tidal waters within the barrier islands on the eastern seaside of the Eastern Shore (does not include Atlantic Ocean waters) and all tidal rivers and creeks on the western bayside and including the Chesapeake Bay to a point one mile offshore from any point of land on the Eastern Shore.

B. When such application proposes a new or expanded discharge that would not be denied pursuant to 9VAC25-260-270 but would result in shellfish water condemnation, then the application shall be amended to contain an analysis of wastewater management alternatives to the proposed discharge. An application shall be deemed incomplete until this analysis is provided to the Department.

C. For purposes of this part, condemnation shall mean a reclassification of shellfish waters by the State Department of Health to prohibited or restricted (as defined by the US Food and Drug Administration, National Shellfish Sanitation Program, Guide for the Control of Molluscan Shellfish, 2007 Revision, Section II, Model Ordinance, Definitions and Chapter 4, Classification of Shellfish Growing Areas) thereby signifying that shellfish from such waters are unfit for market.

D. The alternatives analysis shall first identify and describe the technical feasibility of each wastewater management alternative to the proposed new or expanded discharge. If the analysis demonstrates that any of the identified alternatives are technically feasible, then the analysis shall further describe the environmental, social and economic impacts and opportunities to mitigate any adverse impacts for those alternatives.

E. If the alternatives analysis demonstrates that the proposed new or expanded discharge is the only technically feasible alternative or produces the least environmental impact of all the technically feasible alternatives, the application will be processed in accordance with 9VAC25-31-10 et seq. (VPDES Permit Regulation). If the analysis demonstrates that a technically feasible alternative produces less of an environmental impact than that associated with the proposed new or expanded

discharge but results in significant adverse social and economic impacts to beneficial uses and to the locality and its citizens, the application shall be processed in accordance with 9VAC25-31-10 et seq.

If the analysis demonstrates that a technically feasible alternative produces less of an environmental impact than that associated with the proposed new or expanded discharge and does not result in significant adverse social and economic impacts to beneficial uses and to the locality and its citizens, then processing of the VPDES application shall be suspended while the applicant makes a good faith effort to obtain approval from the appropriate regulatory authorities for the alternative. Processing of the application shall be resumed only if the alternative form of wastewater management is disapproved by the appropriate regulatory authorities.

The amendments added a new section 275 to the WQS regulation. This section is initiated when applications for new or expanded VPDES discharges to Eastern Shore waters are not denied pursuant to 9VAC25-260-270 but still result in a shellfish condemnation. Section 270 specifies the need for a public hearing and requires a permit denial in cases where a shellfish condemnation would result and there is a violation of the General Standard (9VAC25-260-10 and 20). The General Standard is a narrative requirement that places use designations on all waters (e.g., recreation, aquatic life, wildlife and edible resources such as shellfish) and requires that state waters be free from substances that interfere with those uses or which are harmful to humans and animals.

Therefore, if the General Standard is not violated but a condemnation still results, section 275 is activated. It is anticipated this may occur in waters where recreational or commercial shellfishing is currently not occurring, so the shellfish use is not present and the General Standard cannot be violated for that use, but these waters may be prime locations for shellfish aquaculture. Section 275 requires that these applications must include an analysis that shows if a wastewater management alternative other than a surface water discharge would be feasible, produce less of an environmental impact, and not result in significant social and economic impacts to beneficial uses and to the locality and its citizens. If so, then this least damaging practicable alternative must be pursued.

Subsection A is to identify the type of VPDES permits affected by the rule (individual permits that are new or expanding and discharging to or affecting Eastern Shore tidal waters).

Subsection B imparts the requirement for the alternatives analysis and specifies when the requirement is initiated (initiated when permits are not denied per section 270).

Subsection C defines condemnation for Part VI to ensure clarity since the word 'condemnation' is not actually used in the *Guide for the Control of Molluscan Shellfish* but is used in Health Department regulations and vernacular. Since shellfish from condemned (restricted) areas can actually be marketed after being relayed or depurated (Virginia has no relay or depuration areas), condemnation signifies that shellfish taken directly from such waters are unfit for market.

Subsection D inserts an allowable 'phased' approach to the analysis to help minimize costs to the localities and other applicants. Under this phased approach, first the feasibility of each alternative must be analyzed. The analysis proceeds to include the environmental and socio-economic impacts only for those alternatives judged to be technically feasible.

Subsection E describes the three possible outcomes of the analysis. The first outcome is that the VPDES surface water discharge is judged to be the 'best' option under the regulation (i.e. it is the only technically feasible option or it is technically feasible and least environmentally damaging,). In that case, the VPDES application proceeds. The second outcome is that a feasible alternative

proves to have the least environmental impacts but results in adverse socio-economic impacts. In that case, the VPDES application still proceeds. The third outcome is that a feasible alternative to a traditional VPDES discharge is the least environmentally damaging and causes no significant adverse socio-economic impacts. In that case, a good faith effort must be made to pursue the alternative. If the alternative is disapproved by the appropriate regulatory authority, then the VPDES application can still proceed.

III. CONDUCTING AN ALTERNATIVES ANALYSIS

A. General Instructions

The following provides the general information that should be submitted to the Department of Environmental Quality as part of the alternatives analysis. The analysis must include the VPDES proposed surface water discharge system as one of the alternatives. Nothing in this guidance is intended to interfere with or supersede the requirements of 9VAC25-790 entitled Sewage Collection and Treatment Regulations or 12VAC5-610 entitled Sewage Handling and Disposal Regulations or the Procedural Guidelines for Virginia's Wastewater Revolving Loan Fund. However, some of the required information that must be submitted under these other regulations may be used to fulfill the requirements of this regulation.

The alternatives analysis should contain the following sections:

1. Title page (includes email contacts and phone numbers of consultant and county officials)
2. Table of contents (includes section titles and subsection titles, maps, graphs, illustrations, exhibits, diagrams and appendices and numbers on all pages)
3. Executive Summary of findings, conclusions and recommendations
4. Introduction – Purpose, background, need for wastewater treatment
5. Projection of population and flow
6. Feasibility of Alternatives
7. Analysis of Feasible Alternatives (if applicable)
    a. Environmental impacts
    b. Economic impacts
8. Conclusions and recommendations

The first alternative is the VPDES proposed treatment technology and surface water discharge. A preliminary engineering report (PER) accepted by the DEQ with the appropriate socio-economic impact analysis (part E below) may serve as the alternatives analysis. Since the level of treatment before effluent disposal may affect the environmental and economic impact, the effluent treatment should also be considered in the analysis.

There are many alternatives for wastewater treatment including:

- Suspended growth (activated sludge)
- Fixed growth (fixed media such as sand filters)
- Integrated fixed film/activated sludge systems (IFAS - combines both suspended growth and fixed media in same system)
- Constructed wetlands
- Physical/chemical treatment
- Tertiary treatment (includes nutrient removal,)

There are many alternatives for effluent disposal including:

- Connection to an existing wastewater treatment plant (public or private)
- Land application alternatives, such as individual/community onsite subsurface systems, drip irrigation, spray irrigation
- Wastewater reuse
- Surface water discharge through the VPDES program
- Combinations of the above

At a minimum, this analysis should include at least one land based disposal alternative in the investigation of wastewater disposal alternatives.

In order for the applicant to discount a wastewater disposal alternative, it must be shown that either the alternative is technologically infeasible, or that it would be cost prohibitive to implement relative to a direct discharge alternative. Please note that for some alternatives, it might be easier to assume an alternative is technologically feasible and immediately move on to determine whether an alternative is not viable based on high cost rather than technological feasibility. For example, for a large municipal expansion that would require several hundred acres for a land application alternative, it might be easier to simply assume that the required acreage could be purchased and calculate the present value costs for this option, rather than evaluating whether land application is technologically infeasible due to lack of available land and/or poor soil conditions. Either way, for those alternatives identified as technologically feasible, you must continue on to the environmental and socio-economic analysis.

B. Provide reasonable projections for population and flow

Sizing of a system and its appurtenances must be in conformance with established procedures as outlined in the Sewage Collection and Treatment Regulations (SCAT) and with generally accepted engineering practices. Generally, the plant capacity should not exceed a 20-year design life and sewer system (sewer lines, force mains and pump stations) capacity should not exceed a 50-year design life.

Summary of Wastewater Management Alternatives Analysis
For Eastern Shore VPDES Applicants

Phase 1- Technical Feasibility (if feasible, move to Phase 2)
Phase 2 - Impacts (Environmental and Economic) Assessment

Technical Feasibility

- Land availability and suitability for technology
- Description of technologies and narrative assessment of feasibility (not expected to be engineering designs)
- Other related information that describes the feasibility

Environmental Impacts

- Water Quality Standards
- Groundwater protection
- Shellfish condemnation
- Removal of leaking septic to central/regional facility
- Loss of shellfish resource
- Lost or gained beneficial uses (tourism, habitat, recreation, aesthetics, etc)
- Actions to be taken to mitigate any of the above impacts

Socio-economic Impacts (Public Projects)

- Calculate capital, operations and maintenance
- Cost per household
- Change in household income
- Municipal Screener Value
- Secondary Tests (Debt, Socioeconomic Financial Management Indicators)
    - Bond Rating
    - Change in tax revenue
    - Change in overall net debt
    - Unemployment Rate

C. Evaluate technologically feasible alternatives

The alternatives analysis shall first identify and describe the technical feasibility of each wastewater management alternative. It is assumed the surface water discharge with secondary or tertiary treatment is technically feasible. At a minimum, this evaluation should investigate the feasibility of additional wastewater management alternatives and should include at least one land based alternative. Other examples of alternatives that may be evaluated for feasibility might be deep ocean discharge or groundwater injection but these are not discussed below.

The following are examples of alternatives that can be analyzed:

Alternative 1. Secondary or Greater Treatment followed by Land Application

Land application disposal alternatives include individual/community onsite subsurface systems, drip irrigation, and spray irrigation.

a) Secondary or tertiary treatment is considered feasible.
b) Assess the availability of land. Provide documentation to demonstrate that sufficient land is available for sale in the project area (include real estate projections, zoning restrictions, local ordinances, statements from land owners indicating interest in selling or leasing property, conservation or protected lands, etc…). If insufficient land available for sale or lease, project is infeasible. Move to next alternative.
c) If sufficient adequate land is available, project can be considered feasible.
d) If land is available, provide other reasons for feasibility or infeasibility of project if available (e.g., soil type, depth of water table).

Alternative 2. Connection to an Existing or Planned Wastewater Treatment System.

You may evaluate the feasibility of connecting to an existing wastewater treatment system authorized by a Virginia Pollutant Discharge Elimination System (VPDES) or Virginia Pollutant Abatement (VPA) (No Discharge Permit). All connection options should include an evaluation of a gravity line and/or force main with pump station(s).

a) Identify whether there are existing sewer lines within a five-mile radius. If not, project may be considered infeasible. Alternately, consider sewer lines feasible but then consider cost effectiveness in section E of piping and pump stations needed.
b) Provide a preliminary indication of flow acceptance from existing municipal or private waste water treatment plants (WWTPs) under consideration for connection. If a municipal or private WWTP cannot accept the wastewater, include a letter documenting such and consider this alternative technologically infeasible.
c) If an existing sewerage system will accept the wastewater, evaluate the piping/pumps/resources necessary to connect to the existing wastewater treatment plant.
d) Determine if a regional sewerage system within a five mile radius is projected to be available within the next five years to receive waste from the project site. If applicable, determine availability date and flow acceptance projection from appropriate authority. If available, then project is feasible. DEQ must determine how to allow the wastewater to be disposed in the interim. One option may be to allow the surface discharge for a five-year term with a condition in the permit that upon the availability of access to the regional system, the applicant would have to connect.

Alternative 3. Secondary or Greater Treatment with Wastewater Reclamation and Reuse.

This alternative can discuss reusing all or a portion of the wastewater generated. Reuses of reclaimed water can include irrigation (i.e. for golf courses, crops, athletic fields, cemeteries, etc), commercial, construction and industrial. For a more complete and detailed list of acceptable reuses of reclaimed water, refer to the Water Reclamation and Reuse Regulation (9VAC25-740). This alternative may be evaluated for feasibility under Alternative 1, Land Application where the same project will involve both a land application option and a water reuse option (e.g., irrigation reuses) on different sites. One site can not be used for both land application and irrigation reuse. Reclamation systems must meet the permitting requirements, general requirements for design, operation and maintenance, standards,

monitoring requirements, and approved reuses for reclaimed water specified in 9VAC25-740. If the applicant would like to consider water reclamation and reuse as a feasible option, the proposed reuse plan of reclaimed water should be described and identify prospective end users, providing, if available, any documentation indicating end user interest in the reclaimed water. If water reclamation and reuse is technologically feasible, conduct environmental and socio-economic impact analysis per section E.

Alternative 4. On-site Systems
The Virginia Department of Health's Division of Onsite Sewage and Water Services are responsible for effectively adopting and implementing regulations governing onsite wastewater treatment and disposal. The Sewage Handling and Disposal Regulations (12VAC5-610) set the standards for municipal/domestic sewage treatment with subsurface disposal systems. The feasibility of an on-site (subsurface) system may be considered and a discussion of land availability, soil type or zoning would constitute a valid feasibility analysis. The applicant should be aware that feasibility determination at this point does not yet involve the Health Department and a DEQ acceptance of the feasibility of this wastewater management option does not ensure Health Department approval of the final plans.

Alternative 5. Combination of Alternatives.
Another alternative could involve a combination of wastewater management alternatives that would minimize or eliminate a direct discharge alternative. For example, consider whether the facility can operate a land application or irrigation reuse system during the dry season and operate a VPDES discharge system during the wet season when soils may not be as amenable to land application.

Other considerations for feasibility for any alternative include availability of materials or engineering expertise. The Department will consider other determinations of technical feasibility or infeasibility of projects on a case by case basis. Economic feasibility and impact is considered separately in E below.

D. Evaluate environmental impacts of technically feasible alternatives

The alternatives analysis must include information that defines the environmental impacts of the alternatives. The following is a list of environmental concerns and effects, which must be addressed, when applicable, through an environmental assessment of the alternatives being considered. Any adverse effect should be identified as short term or long term (short term means while under construction). The environmental effects should address not only the disposal alternative but what effects a new facility has on the environment. Accordingly, both adverse and beneficial impacts need to be identified. Measures that can be taken to mitigate for (i.e. lessen) the environmental effects identified should also be included. If the answer is 'no impact' or 'no effect' then a statement of explanation must follow.

a) Expected quality of the wastewater (nutrient, bacterial, conventional and toxic concentrations and loads) to be disposed.
b) For a VPDES discharge alternative, describe stream classification, special standards, stream use designation and antidegradation tier (1, 2 or 3). Describe actual (existing) uses for the receiving stream (i.e. swimming, boating, aquatic life, commercial shellfishing).
c) For a VPDES discharge alternative, water quality in vicinity of discharge. VIMS or DEQ can be consulted on water quality data. Ambient DEQ data may be obtained from http://gisweb.deq.virginia.gov/monapp/mon_query_form.cfm. Dissolved oxygen, bacteria, salinity, solids, toxics and nutrient concentrations should be presented in a graph and with summary statistics for the last 5 years if available (annual geometric means, maximum, minimum). All data used to generate graphics should be included electronically in Excel format.
d) Effects on water quality from the implementation of any alternative should be discussed. For example, where the alternative involves a discharge, the relationship of the discharge to the condition of the receiving stream should be discussed. This evaluation can utilize DEQ's 303(d) Total Maximum Daily Load Priority List, which is based on the biennial Water Quality Assessment Report to EPA. For example, describe if the project benefits or potentially

removes a waterbody on the Virginia 303 (d) list of impaired water with a Total Maximum Daily Load (TMDL) or improvement of any other documented water quality problem.

e) Water quality of the ground water (if known) and expected effect on ground water quality and quantity from the implementation of the alternative. The contribution to or elimination of groundwater contamination should be discussed. Discuss if the project or the locality will participate in a surface source water protection program or a wellhead protection program. At a minimum, consult with the Manager or one of the Environmental Specialists in the DEQ Office of Surface and Ground Water Supply Planning for information and advice on these issues (http://www.deq.virginia.gov/waterresources/contacts.html)
f) Shellfish condemnations in receiving waters, cause of condemnation and expected changes to condemnation from implementation of alternative.
g) Contribution to or elimination of public health hazards if any.
h) Factors related to water quality problems that exist due to the lack of central sewerage facilities in the area (e.g., failing septic systems, etc..).
i) Reductions or increases of storm water flow from the project and the related development or voluntary initiatives in the community to reduce stormwater flow (e.g., rain gardens, green roofs and porous pavements).
j) Improvements of aquatic/riparian habitat or measures (e.g., submerged aquatic vegetation, restore stream banks, provide stream buffers in the locality, conservation easements and oyster beds).
k) Effects on wildlife and marine life, including endangered species, and their habitats, or food chain.
l) Effects on wild, scenic, exceptional (tier 3) and/or recreational river uses
m) Effects on marshland or wetlands.
n) Effects on surrounding farm land or the loss of open space land.
o) Effects on land having archeological or historical significance.
p) Use of irretrievable resources.
q) Effects on noise, odor or air quality.
r) Damage and/or pollution of surface water resulting from erosion, storm water or other sources.
s) Aesthetic and visual impacts.
t) Floodplain impacts
u) Ways that environmental impacts can be mitigated (e.g., planting SAV beds, procuring land for special protection, providing oyster habitat, installing BMPs)
v) Lost or gained beneficial uses (tourism, habitat, recreation, aesthetics, etc).

E. Evaluate socio-economic impacts of technically feasible alternatives

This section generally follows the procedures set forth in EPA's Interim Economic Guidance for Water Quality Standards Workbook, March 1995 EPA-823-B-95-002 and can be found at the following link: http://www.epa.gov/waterscience/standards/econworkbook/
All steps in EPA's Interim Economic Guidance are summarized below; note that DEQ realizes that not all economic indicators can always be established and some estimation is allowed.

When evaluating socio-economic impacts for a public project, the following six steps should be implemented:

1. Verify project costs and calculate the annual cost of the wastewater management alternative.
2. Calculate total annualized pollution control costs per household.
3. Calculate and evaluate the municipal preliminary screener score and financial measures for private.
4. Apply the secondary tests
5. Assess where the community falls in the substantial impacts matrix for public.
6. Determine if significant adverse social and economic impacts to beneficial uses and to the locality and its citizens is demonstrated.

1. VERIFY PROJECT COSTS AND CALCULATE THE ANNUAL COST OF THE WASTEWATER MANAGEMENT ALTERNATIVE

The most accurate estimate of project costs may be available from the discharger's design engineers. If waste water disposal alternatives cost estimates are not available, project cost estimates can be derived from a comparable project from the State or from the judgment of experienced environmental engineers. There are also several references available in Appendix A of the EPA economic guidance (http://www.epa.gov/waterscience/standards/econworkbook/). The following two sections discuss analyzing public and private projects. If any costs or incomes were estimated for some prior year, these should be adjusted upward to reflect current year prices using the average annual national Consumer Price Index (CPI) inflation rate for the period. The CPI inflation rate is available from the Bureau of Labor Statistics. An additional source reporting the CPI inflation rate is the *CPI Detailed Report*, which is published monthly by the U.S. Department of Labor, Bureau of Labor Statistics. There are two sets of calculations presented in this section: one set for public projects, such as POTWs, and another for private projects, such as a new housing development.

a. Public Projects: Calculate the Annual Costs of the Wastewater Management Alternative
A worksheet is provided in Attachment A that can be used to calculate these costs.

Since capital costs typically will be paid over several years, annualized costs are used in the evaluation of economic burden to the locality and its citizens. The capital portion of public project costs is typically financed over approximately 20 years, by issuing a municipal debt instrument such as a general obligation bond or a revenue bond.

First, capital costs are summed and the portion of costs to be paid for with grant monies is deducted, as these costs will not need to be financed. Next, the annualization factor is calculated using the formula supplied, or the annualization factor is found in Attachment B. Annualized capital cost is then calculated by multiplying the total capital costs to be financed by the annualization factor.

The interest rates used to annualize costs are dependent on the type of debt instrument used as well as the issuer's credit standing. Therefore, the interest rate used reflects the debt instrument (i.e. municipal bond, commercial bank loan, state revolving fund loan, or other instrument) likely to be used by the municipality.

Next, annual operating and maintenance costs are added to the annualized capital cost. O&M costs should include the costs of monitoring, inspection, permitting fees, waste disposal charges, chemicals, electricity, repair, administration, replacement, and any other recurring costs. All recurring costs should be stated in terms of dollars per year. The sum of the annualized capital cost and total annual operating and maintenance (O&M) costs is the total annual cost of the project.

b. Public Projects: Calculate Total Annualized Wastewater Management Costs Per Household
A worksheet is provided in Attachment C that can be used to calculate these costs.

To assess the burden that the wastewater management alternative costs are expected to have on households, an average annualized cost per household should be calculated for all households in the community that would bear project costs. In order to evaluate substantial impacts, therefore, the analysis must establish which households will actually pay for wastewater management and what proportion of the costs will be borne by households. Then, these apportioned project costs are added to existing wastewater management costs paid by the households.

It is important to define the affected locality and its citizens (the community impacted). The "community" is the governmental jurisdiction or jurisdictions responsible for paying compliance costs and will probably be an incorporated Town, Accomack County, Northampton County or a combination of all three.

In calculating the total annual cost per household, current costs of wastewater management must be considered along with the projected annual costs of the wastewater management alternative. The existing cost per household usually can be obtained from the most recent municipal records. For example, use the most recent operating revenues of the sewer enterprise fund, divided by the number of households served. If the portion of proposed project costs that households are expected to pay is known or is expected to remain unchanged, then use Attachment C to calculate the total annual cost of pollution control per household. If the portion paid by households is based on flow, then refer to Attachment C.1 as well.

c. Private Projects: Calculate the Annual Costs of the Wastewater Management Alternative
A worksheet is provided in Attachment D that can be used to calculate these costs.

As with public investments, the total capital costs are usually spread out over several years. Annualization calculates the amount that will be paid each year, including the financing costs. In order to allow for comparisons across cases, the analysis should assume that the applicant will borrow the capital and repay the loan in even annual installments over a 10 year period. The assumption of ten years is based on the likely life of the equipment. The assumption of even annual installments is made for convenience. The interest rate on the loan should be equivalent to the rate the applicant pays when it borrows money.

The financial tests discussed below compare the costs of compliance to other costs and revenues of the applicant. Compliance costs and other costs and revenues must, therefore, be calculated for the same year.

2. ANALYSIS TO DETERMINE SIGNIFICANT SOCIO-ECONOMIC IMPACT

There are two sets of tests presented in this section: one set for public projects and another for private projects. The tests are not designed to determine the exact impact of wastewater management alternative costs on an entity. They merely provide indicators of whether these would result in a significant economic impact.

a. Public Projects: Calculate and Evaluate the Municipal Preliminary Screener Score
Whether or not a wastewater management alternative produces a significant economic impact is determined by jointly considering the results of two tests. The first test is a "screener" to establish whether the community can clearly pay for the project. The Municipal Preliminary Screener estimates the total per household annual wastewater management costs to be borne by households (existing costs plus those attributable to the proposed project) as a percentage of median household income. The screener is written as follows:

$$\textit{Municipal Preliminary Screener} = \frac{\textit{Average (Annual) Total Wastewater Management Cost Per Household}}{\textit{Median Household Income}}$$

Median household income information for many municipalities is available from the 2000 Census of Population. To estimate median household income for the current year, use the CPI inflation rate for the period between the year that median household income is available and the current year.

Depending on the results of the screener, the community is expected to incur small, mid-range, or large economic impacts (see Attachment E). If the total annual cost per household (existing annual cost per household plus the incremental cost related to the proposed project) is less than 1.0 percent of median household income, then the requirements are not expected to impose a significant economic hardship on households.

Localities are expected to incur mid-range impacts when the ratio of total annual wastewater management costs to median household income is between 1.0 and 2.0 percent. If the average annual cost per household exceeds 2.0 percent of median household income, then the project may place a large financial burden on many of the households within the community and the wastewater management alternative may cause significant economic impact. In either case, localities move on to the Secondary Test to demonstrate significant socio-economic impacts.

b. Public Projects: Secondary Test

The Secondary Test is designed to build upon the characterization of the locality identified in the Municipal Preliminary Screener. The Secondary Test indicates the locality's ability to obtain financing and describes the socioeconomic health of the locality. Indicators describe precompliance debt, socioeconomic, and financial management conditions in the locality. Using these indicators and the scoring system described below, the impact of the cost of wastewater management is estimated.

Debt Indicators

- Bond Rating (if available) - a measure of credit worthiness of the locality;
- Overall Net Debt as a Percent of Full Market Value of Taxable Property - a measure of debt burden on residents within the locality;

Socioeconomic Indicators

- Unemployment Rate - a measure of the general economic health of the locality;
- Median Household Income - a measure of the wealth of the locality;

Financial Management Indicators

- Property Tax Revenue as a Percent of Full Market Value of Taxable Property - a measure of the funding capacity available to support debt based on the wealth of the locality; and
- Property Tax Collection Rate - a measure of how well the local government is administered.

A more detailed description of the six indicators is presented in EPA's Interim Economic Guidance for Water Quality Standards Workbook, March 1995 EPA-823-B-95-002 (http://www.epa.gov/waterscience/standards/econworkbook/ in Section 2.4), including a discussion of alternative measures to use in States with property tax caps and limitations on assessed values. (Attachment F) can be used to estimate each of the indicators.

Attachment F.1 summarizes the indicators and what is considered to be a strong, mid-range, or weak rating. The Secondary Score is calculated for the community by weighting each indicator equally and assigning a value of 1 to each indicator judged to be weak, a 2 to each indicator judged to be mid-range, and a 3 to each strong indicator. A cumulative assessment score is arrived at by summing the individual scores and dividing by the number of factors used. Attachment F.1 guides the reader through this calculation. The cumulative assessment score is evaluated as follows:

- less than 1.5 is considered weak
- between 1.5 and 2.5 is considered mid-range
- greater than 2.5 is considered strong

If the applicant is not able to develop one or more of the six indicators, they must provide an explanation as to why the indicator is not appropriate or not available. Since the point of the analysis is to measure the overall burden to the community, the debt and socioeconomic indicators are assumed to be better measures of burden than the financial management indicators. Consequently, if one of the debt or socioeconomic indicators is not available, the applicant should average the two financial management indicators and use this averaged value as a single indicator with the remaining indicators. This averaging is necessary so that undue weight is not given to the financial management indicators.

c. Public Projects: Assess Where the Community Falls in the Substantial Impacts Matrix to Determine Socio-Economic Impact from Wastewater Management Alternative

The results of the two tests are considered jointly in determining whether the community is expected to incur significant socio-economic impacts as the result of the wastewater management costs incurred to the locality. As shown in Attachment F.2, the cumulative assessment score for the community is combined with the estimated household burden. The combination of factors establishes whether impacts can be expected to be substantial.

In the matrix, "X" indicates that the impact is likely to interfere with the development. The closer the community is to the upper right hand corner of the matrix, the greater the likelihood. Similarly, "" indicates that the impact is not likely to interfere with development. The closer to the lower left hand corner of the matrix, the smaller the likelihood. Finally, the "?" indicates that the impact is unclear.

d. Private Projects: Financial Measures

Four general categories of financial tests are used to determine if wastewater management alternative costs cause significant economic impacts to the private entity. If the private entity is significantly impacted, then the project or development may not be built. Once that is determined, the affect of the project not being built will have on the community would follow.

The four categories are divided into a primary measure of economic impacts and three secondary measures of economic impacts to the private entity:

Primary Measure

- Profit -- how much would profits decline due to wastewater management alternative costs?

Secondary Measures

- Liquidity -- how easily can an entity pay its short-term bills?
- Solvency -- how easily can an entity pay its fixed and long-term bills?
- Leverage -- how much money can the entity borrow?

Profit and solvency ratios are calculated both with and without the additional compliance costs (taking into consideration the entity's ability, if any, to increase its prices to cover part or all of the costs). Comparing these ratios to each other and to industry benchmarks provides a measure of the impact on the entity. Since these analyses involve new or expanded projects, the ratios often will be calculated using estimated values from pro-forma income statements and balance sheets prepared for the project.

For all of the tests, it is important to look beyond the individual test results and evaluate the total situation of the entity. While each test addresses a single aspect of financial health, the results of the four tests should be considered jointly to obtain an overall picture. The results should be compared with the ratios for other entities in the same industry or activity.

The primary and secondary measures are described below, along with an example of specific tests to be used. While there are several ratios that could be used for each test, to simplify the presentation only one ratio per test is described. In most cases, interpreting the results requires comparisons with typical values for the industry. Among the sources that provide comparative information are: Robert Morris Associates' *Annual Statement Studies*, *Moody's Industrial Manual*, Dun and Bradstreet's *Dun's Industry Norms*, and Standard & Poor's *Industry Surveys*. The *Annual Statement Studies*, *Dun's Industry Norms* , and Standard & Poor's *Industry Surveys* provide composite statistics for firms grouped into various manufacturing and service industries. The *Moody's Industrial Manual* provides detailed financial information on individual firms that can be used for comparison purposes. Each of the tests is discussed in more detail in EPA's Interim Economic Guidance for Water Quality Standards Workbook, March 1995 EPA-823-B-95-002 (http://www.epa.gov/waterscience/standards/econworkbook/ in Chapter 3).

e. Private Projects: Primary Measure

Primary measure is the Profit Test, which measures the development's earnings if it is to pursue a particular wastewater management alternative. If pursing the wastewater management alternative would result in considerably lower profits, then project might not take place or development built and this may incur significant socioeconomic impacts on the community. Two pieces of information are needed for the Profit Test. The first piece is the total annual cost of the required pollution control from Attachment D. The second piece is the earnings information from the entity's income statement (Attachment G).

$$\textit{Profit Test} = \frac{\textit{Earnings Before Taxes}}{\textit{Revenues}}$$

The Profit Test should be calculated with and without the cost of the wastewater management alternative. In the former case, the annualized cost of the wastewater management alternative (including O&M) is subtracted from the discharger's estimated earnings before taxes (revenues minus costs excluding income taxes). The Profit Test can be calculated using Attachment G and H. These profit rates should be compared to those for facilities in similar lines of business, using data in *Moody's Industrial Manual*, *Dun & Bradstreet's Industry Norms and Key Business Ratios*, *Standard & Poor's Industry Surveys*, or Robert Morris's *Annual Statement Studies*. The degree to which the discharger is able to raise prices is difficult to predict, and depends on many factors. Considerations should include the level of competition in the industry, the

likelihood of competitors' facilities facing similar project costs, and the willingness of consumers to pay more for the product.

f. Private Projects: Secondary Measures

The following secondary measures provide additional important information about the financial health of the entity. All primary and secondary measures should be included in the analysis.

Liquidity

Liquidity is a measure of how easily a discharger can pay its short-term bills. One measure of liquidity is the Current Ratio, which compares current assets with current liabilities. Current assets include cash and other assets that are or could reasonably be converted into cash during the current year. Likewise, current liabilities are items that must be paid within the current year.

The Current Ratio is calculated by dividing current assets by current liabilities.

$$\textit{Current Ratio} = \frac{\textit{Current Assets}}{\textit{Current Liabilities}}$$

The Current Ratio can be calculated using Attachment I. The general rule is that if the Current Ratio is greater than 2, the entity should be able to cover its short-term obligations. Frequently, lenders require this level of liquidity as a prerequisite for lending. This rule (Current Ratio > 2) may not, however, be appropriate for all types of private entities. The Current Ratio of the discharger in question should be compared with ratios for other dischargers in the same line of business.

Solvency

Solvency is a measure of an entity's ability to meet its fixed and long-term obligations. These obligations are bills and debts that are owed on a regular basis for periods longer than one year. Solvency tests are commonly used to predict financial problems that could lead to bankruptcy within the next few years.

As with liquidity, there are several possible tests for solvency. One solvency test, the Beaver's Ratio, compares cash flow to total debt. This test has been shown to be a good indicator of the likelihood of bankruptcy.

$$\textit{Beaver's Ratio} = \frac{\textit{Cash Flow}}{\textit{Total Debt}}$$

The Beaver's Ratio can be calculated using Attachment J. Cash Flow is a measure of the cash the entity has available to it in a given year. Since depreciation is an accounting cost -- a cost that does not use any currently available revenues -- it is added back to reported net income after taxes to get cash flow. Total debt is equal to the current debt for the current year plus the long term debt, since current debt includes that part of long-term debt that is due in the current year.

If the Beaver's Ratio is greater than 0.20 the project is considered to be solvent (i.e., can pay its long-term debts). If the ratio is less than 0.15 the project may be insolvent (i.e., go bankrupt). If the ratio is between 0.15 and 0.20, then future solvency is uncertain.

Leverage

Leverage tests measure the extent to which a firm has fixed financial obligations and thus indicates how much more money a firm is capable of borrowing. Firms that rely heavily on debt may find it difficult and expensive to borrow additional funds. One commonly used measure of leverage is the Debt to Equity Ratio.

$$\textit{Debt/Equity Ratio} = \frac{\textit{Long-Term Liabilities}}{\textit{Owner's Equity}}$$

The Debt to Equity Ratio can be calculated using Attachment K. Since there are no generally accepted Debt/Equity Ratio values that apply to all types of economic activity, the ratio should be compared with the ratio of firms in similar businesses. If the entity's ratio compares favorably with the median or upper quartile ratio for similar businesses, it should be able to borrow additional funds. These ratios can be calculated using data in Robert Morris Associates' *Annual Statement Studies*, *Moody's Industrial Manual*, and Dun & Bradstreet's *Dun's Industry Norms*.

For entities with special sources of funding, leverage is not an appropriate measure of their ability to raise capital. Examples are agriculture and affordable housing, where special loan programs may be available. In these cases, an analysis of the probability that the project would receive this money is appropriate.

g. Define Relevant Geographical Area

One important factor is defining the geographical area in which the impacts will occur. In the case of municipal public projects, the affected community is most often the immediate municipality. On the Eastern Shore this might be an incorporated Town, Accomack or Northampton County or both. The relevant geographic area for evaluating the importance of a private project varies with each situation. The area will typically be determined by the area in which the majority of its workers live and where most of the businesses that depend on it are located.

h. Public Projects Determine If Significant Adverse Socio-economic Impacts to Beneficial uses to the Locality and its Citizens

While there are no explicit criteria, it is recommended that changes in the socioeconomic indicators listed below be considered. For each indicator listed, the applicant should estimate the potential change that would result if a particular wastewater management alternative were constructed and operated.

- Median Household Income;
- Community Unemployment Rate;
- Overall Net Debt as a Percent of Full Market Value of Taxable Property;
- Percent of Households Below Poverty Line;
- Impact on Community Development Potential; and
- Impact on Property Values.

Estimated changes should be provided, along with supporting discussions, on Attachment L.

i. Private Project: Determine If Significant Adverse Socio-economic Impacts to Beneficial uses to the Locality and its Citizens

The financial analysis should be used to determine if there will be a significant economic impact first to the private entity. If the four tests taken together indicate that the wastewater management alternative would be subject to significant economic impact such that the project or development might not be built, then proceed to determine if the development would be considered significant in social terms.

Determination of whether or not a private project will be important to a community requires exploring more factors than is the case with public municipal projects. Attachment M has been provided to assist applicants in this evaluation of socioeconomic impacts. It is designed as a list of the factors applicants should consider in determining whether the project is important to the community. Applicants should feel free, however, to add anecdotal information to describe any current community characteristics or anticipated impacts that are not listed on Attachment M.

Potentially, one of the most important impacts on the affected community's economy is the employment to be gained. The size of this impact is dependent on the number of new jobs relative to the total number of jobs in the community, and to the other job opportunities available in the community. Typically, an increase in employment leads to an increase in personal income in the affected community. The total amount of income gained by the affected community will depend, in part, on the other job prospects of those hired. To assess the net impact on employment in the affected community, the existing rate of unemployment should be considered as an indicator of worker mobility between jobs.

The analysis should also consider whether the increase in employment opportunities may lead to a decreased need for social services in the affected community. If the cost of savings for decreased social services will be borne by the affected community, they should be included in the assessment.
The effects of increased employment and personal income will be compounded as the money moves through the economy. This multiplier effect means that each dollar gained to an employee results in the gain of more than a dollar to the local economy. Multiplier effects are discussed in more detail in Section 4.4.

Socioeconomic impacts may also include effects on the local government(s) such as property tax revenues and the demand for other public services. For example, if the development would be paying a share of the cost to upgrade a municipal treatment plant, then the analysis of community impacts is more complicated. If the development is eliminated, the system may become excessively expensive for the remaining users.

F. Process for Dispute Resolution

The technically feasible alternative that is cost effective and has the least environmental impacts will be selected by DEQ, working with the consultant and applicant. If there is an incomplete or deficient analysis or the applicant does not agree with the outcome, the agency has a process for early dispute resolution. Prior to utilizing the Process for Early Dispute Resolution (PEDR), the first and often most effective step for resolving a disagreement with DEQ is to meet with appropriate DEQ staff and engage in open and constructive dialogue concerning their interpretation of the facts, applicable laws or standards. In the event that the disagreement is not resolved, then the PEDR should be employed. The policy and process can be found at
http://www.deq.virginia.gov/export/sites/default/regulations/pdf/Process_for_Early_Dispute_Resolution_8260532.pdf

G. References

USEPA Interim Economic Guidance for Water Quality Standards, EPA-823-B-95-002, March 1995.

Sewage Collection and Treatment Regulations, February 12, 2004, Virginia Administrative Code 9VAC25-2790 et seq.

Procedural Guidelines for Virginia's Wastewater Revolving Loan Fund, Revised February 2005.

Engineering Alternatives Analysis (EAA) Guidance Document, North Carolina Division of Water Quality/ NPDES Unit, June 23, 2005.

Water Reclamation and Reuse Regulation, October 1, 2008: Virginia Administrative Code 9VAC25-740.

H. Other

A helpful website for septic system alternatives and costs:
http://www.eco-nomic.com/indexsdd.htm#Drainfield%20Depth

Attachment A

Public Project: Wastewater Management Alternative Calculation of Total Annualized Project Costs

A. Capital Costs

Capital Cost of Project	$_____
Other One-Time Costs of Project (Please List, if any):	
	$_____
	$_____
	$_____
Total Capital Costs (Sum column)	$_____ (1)
Portion of Capital Costs to be Paid for with Grant Monies	$_____ (2)
Capital Costs to be Financed [Calculate: (1) - (2)]	$_____ (3)
Type of financing (e.g., G.O. bond, revenue bond, bank loan)	
Interest Rate for Financing (expressed as decimal)	_____ (i)
Time Period of Financing (in years)	_____ (n)
Annualization Factor = $\frac{i}{[(1+i)^n-1]}+i$ (or see Attachment B)	_____ (4)
Annualized Capital Cost [Calculate: (3) x (4)]	_____ (5)

B. Operating and Maintenance Costs

Annual Costs of Operation and Maintenance (including but not limited to: monitoring, inspection, permitting fees, waste disposal charges, repair, administration and replacement.) (Please list below)

_____	$_____
_____	$_____
_____	$_____
_____	$_____
Total Annual O & M Costs (Sum column)	$_____ (6)

C. Total Annual Project Costs

Total Annual Cost of Wastewater Management Project [(5) + (6)] $_____ (7)

Attachment B

Annualization Factors

	Interest Rate											
Year	**0.50%**	**1.00%**	**1.50%**	**2.00%**	**2.50%**	**3.00%**	**3.50%**	**4.00%**	**4.50%**	**5.00%**	**5.50%**	**6.00%**
1	1.005	1.01	1.015	1.02	1.025	1.03	1.035	1.04	1.045	1.05	1.055	1.06
2	0.5038	0.5075	0.5113	0.515	0.5188	0.5226	0.5264	0.5302	0.534	0.5378	0.5416	0.5454
3	0.3367	0.34	0.3434	0.3468	0.3501	0.3535	0.3569	0.3603	0.3638	0.3672	0.3707	0.3741
4	0.2531	0.2563	0.2594	0.2626	0.2658	0.269	0.2723	0.2755	0.2787	0.282	0.2853	0.2886
5	0.203	0.206	0.2091	0.2122	0.2152	0.2184	0.2215	0.2246	0.2278	0.231	0.2342	0.2374
6	0.1696	0.1725	0.1755	0.1785	0.1815	0.1846	0.1877	0.1908	0.1939	0.197	0.2002	0.2034
7	0.1457	0.1486	0.1516	0.1545	0.1575	0.1605	0.1635	0.1666	0.1697	0.1728	0.176	0.1791
8	0.1278	0.1307	0.1336	0.1365	0.1395	0.1425	0.1455	0.1485	0.1516	0.1547	0.1579	0.161
9	0.1139	0.1167	0.1196	0.1225	0.1255	0.1284	0.1314	0.1345	0.1376	0.1407	0.1438	0.147
10	0.1028	0.1056	0.1084	0.1113	0.1143	0.1172	0.1202	0.1233	0.1264	0.1295	0.1327	0.1359
11	0.0937	0.0965	0.0993	0.1022	0.1051	0.1081	0.1111	0.1141	0.1172	0.1204	0.1236	0.1268
12	0.0861	0.0888	0.0917	0.0946	0.0975	0.1005	0.1035	0.1066	0.1097	0.1128	0.116	0.1193
13	0.0796	0.0824	0.0852	0.0881	0.091	0.094	0.0971	0.1001	0.1033	0.1065	0.1097	0.113
14	0.0741	0.0769	0.0797	0.0826	0.0855	0.0885	0.0916	0.0947	0.0978	0.101	0.1043	0.1076
15	0.0694	0.0721	0.0749	0.0778	0.0808	0.0838	0.0868	0.0899	0.0931	0.0963	0.0996	0.103
16	0.0652	0.0679	0.0708	0.0737	0.0766	0.0796	0.0827	0.0858	0.089	0.0923	0.0956	0.099
17	0.0615	0.0643	0.0671	0.07	0.0729	0.076	0.079	0.0822	0.0854	0.0887	0.092	0.0954
18	0.0582	0.061	0.0638	0.0667	0.0697	0.0727	0.0758	0.079	0.0822	0.0855	0.0889	0.0924
19	0.0553	0.0581	0.0609	0.0638	0.0668	0.0698	0.0729	0.0761	0.0794	0.0827	0.0862	0.0896
20	0.0527	0.0554	0.0582	0.0612	0.0641	0.0672	0.0704	0.0736	0.0769	0.0802	0.0837	0.0872

	Interest Rate											
Year	**6.50%**	**7.00%**	**7.50%**	**8.00%**	**8.50%**	**9.00%**	**9.50%**	**10.00%**	**10.50%**	**11.00%**	**11.50%**	**12.00%**
1	1.065	1.07	1.075	1.08	1.085	1.09	1.095	1.1	1.105	1.11	1.115	1.12
2	0.5493	0.5531	0.5569	0.5608	0.5646	0.5685	0.5723	0.5762	0.5801	0.5839	0.5878	0.5917
3	0.3776	0.3811	0.3845	0.388	0.3915	0.3951	0.3986	0.4021	0.4057	0.4092	0.4128	0.4163
4	0.2919	0.2952	0.2986	0.3019	0.3053	0.3087	0.3121	0.3155	0.3189	0.3223	0.3258	0.3292
5	0.2406	0.2439	0.2472	0.2505	0.2538	0.2571	0.2604	0.2638	0.2672	0.2706	0.274	0.2774
6	0.2066	0.2098	0.213	0.2163	0.2196	0.2229	0.2263	0.2296	0.233	0.2364	0.2398	0.2432
7	0.1823	0.1856	0.1888	0.1921	0.1954	0.1987	0.202	0.2054	0.2088	0.2122	0.2157	0.2191
8	0.1642	0.1675	0.1707	0.174	0.1773	0.1807	0.184	0.1874	0.1909	0.1943	0.1978	0.2013
9	0.1502	0.1535	0.1568	0.1601	0.1634	0.1668	0.1702	0.1736	0.1771	0.1806	0.1841	0.1877
10	0.1391	0.1424	0.1457	0.149	0.1524	0.1558	0.1593	0.1627	0.1663	0.1698	0.1734	0.177
11	0.1301	0.1334	0.1367	0.1401	0.1435	0.1469	0.1504	0.154	0.1575	0.1611	0.1648	0.1684
12	0.1226	0.1259	0.1293	0.1327	0.1362	0.1397	0.1432	0.1468	0.1504	0.154	0.1577	0.1614
13	0.1163	0.1197	0.1231	0.1265	0.13	0.1336	0.1372	0.1408	0.1444	0.1482	0.1519	0.1557
14	0.1109	0.1143	0.1178	0.1213	0.1248	0.1284	0.1321	0.1357	0.1395	0.1432	0.147	0.1509
15	0.1064	0.1098	0.1133	0.1168	0.1204	0.1241	0.1277	0.1315	0.1352	0.1391	0.1429	0.1468
16	0.1024	0.1059	0.1094	0.113	0.1166	0.1203	0.124	0.1278	0.1316	0.1355	0.1394	0.1434
17	0.0989	0.1024	0.106	0.1096	0.1133	0.117	0.1208	0.1247	0.1285	0.1325	0.1364	0.1405
18	0.0959	0.0994	0.103	0.1067	0.1104	0.1142	0.118	0.1219	0.1259	0.1298	0.1339	0.1379
19	0.0932	0.0968	0.1004	0.1041	0.1079	0.1117	0.1156	0.1195	0.1235	0.1276	0.1316	0.1358
20	0.0908	0.0944	0.0981	0.1019	0.1057	0.1095	0.1135	0.1175	0.1215	0.1256	0.1297	0.1339

Attachment C

Public Project: Calculation of Total Annual Wastewater Management Costs Per Household

A. Current Wastewater Management Costs:

Total Annual Cost of Existing Wastewater Management	$_____ (1)
Amount of Existing Costs Paid By Households	$_____ (2)
Percent of Existing Costs Paid By Households	_____%(3)
Number of Households*	_____(4)
Annual Cost Per Household [Calculate: (2)/(4)]	$_____ (5)

* Do not use number of hook-ups.

B. New Wastewater Management Alternative Project Costs

Are households expected to provide revenues for the new project in the same proportion that they support existing wastewater management? (Check a, b **or** c and continue as directed.)

a) Yes [fill in percent from (3)]	percent.(6a)
b) No, they are expected to pay	percent.(6b)

c) No, they are expected to pay based on flow. (Continue on Attachment C.1)

Total Annual Cost of Wastewater Management Alternative [Line (7), Attachment A]	$_____ (7)
Proportion of Costs Households Are Expected to Pay [(6a) or (6b)]	_____(8)
Amount to Be Paid By Households [Calculate: (9) x (10)]	$_____ (9)
Annual Cost per Household [Calculate: (11)/(4)]	$_____ (10)

C. Total Annual Cost Per Household

Total Annual Cost of Wastewater Management Alternative Per Household (5) + (10)	$_____ (11)

Attachment C.1

Public Project; Calculation of Total Annual Wastewater Management Alternative Costs Per Household Based on Flow

A. Calculating Costs Incurred By Households Based on Flow

Expected Total Usage of Project (eg. MGD for Wastewater Treatment)	_____(1)
Usage due to Household Use (MGD of Household Wastewater)	_____(2)
Percent of Usage due to Household Use [Calculate: (2)/(1)]	_____%(3)
Total Annual Cost of Wastewater Management Alternative	$_____ (4)
Industrial Surcharges, if any	$_____ (5)
Costs to be Allocated [Calculate: (4) - (5)]	$_____ (6)
Amount to Be Paid By Households [Calculate: (3) x (6)]	$_____ (7)
Annual Cost per Household for Wastewater Management Alternative [Calculate: (7)/Attachment C, (4)]	$_____ (8)

C. Total Annual Cost Per Household

Annual Existing Costs Per Household [Attachment C, (5)]	$_____ (9)
Total Annual Cost of Wastewater Management Per Household [(8) + (9)]	$_____ (10)

Attachment D

Private Project: Wastewater Management Alternative Calculation of Total Annualized Project Costs

Capital Costs to be financed (Supplied by applicant)	$_____ (1)
Interest Rate for Financing (Expressed as a decimal)	_____(i)
Time Period of Financing (Assume 10 years*)	10 years (n)
Annualization Factor = $\frac{i}{[(1+i)^n-1]}+i$ (or see Attachment B)	_____(2)
Annualized Capital Cost [Calculate: (1) x (2)]	$_____ (3)
Annual Cost of Operation and Maintenance (including but not limited to monitoring, inspection, permitting fees, waste disposal charges, repair, administration and replacement)**	$_____ (4)
Total Annual Cost of Wastewater Management Alternative [(3) + (4)]	$_____ (5)

* While actual payback schedules may differ across projects and companies, assume equal annual payments over a 10-year period for consistency in comparing projects.

** For recurring costs that occur less frequently than once a year, pro rate the cost over the relevant number of years (e.g., for pumps replaced once every three years, include one-third of the cost in each year).

Attachment E

Public Project: Municipal Preliminary Screener

The Municipal Preliminary Screener indicates quickly whether a public entity will not incur any significant economic impacts as a result of the wastewater management costs. The formula is as follows:

$$\frac{\textit{Total Annual Pollution Control Cost per Household}}{\textit{Median Household Income}} = 100$$

A. Calculation of The Municipal Preliminary Screener

Total Annual Pollution Control Cost Per Household [Attachment C, (11) or Attachment C.1, (10)]	$_____ (1)
Median Household Income*	$_____ (2)
Municipal Preliminary Screener (Calculate: [(1)/(2)] x 100)	_____%(3)

B. Evaluation of The Municipal Preliminary Screener

If the Municipal Preliminary Screener is clearly less than 1.0%, then it is assumed that the cost will not impose a significant economic impact. In this case, it is not necessary to continue with the Secondary Test. Otherwise, it is necessary to continue.

Benchmark Comparison:

Little Impact	**Mid-Range Impact**	**Large Impact**
Less than 1.0%	1.0% - 2.0%	Greater than 2.0%

Indication of no substantial economic impacts _____

Proceed to Secondary Test

* 2000 Census adjusted by CPI inflation rate if necessary.

Attachment F

Public Project: Data Used in the Secondary Test

Please list the following values used in determining the Secondary Score. Potential sources of the data are indicated.

A. Data Collection

Data	Potential Source	Value
Direct Net Debt	Community Financial Statements Town, County or State Assessor's Office	$_____ (1)
Overlapping Debt	Community Financial Statements Town, County or State Assessor's Office	$_____ (2)
Market Value of Property	Community Financial Statements Town, County or State Assessor's Office	$_____ (3)
Bond Rating	Standard and Poors or Moody's	_____ (4)
Community Unemployment Rate	2000 Census of Population Regional Data Centers	_____ %(5)
National Unemployment Rate	Bureau of Labor Statistics (202) 606-6392	_____ %(6)
Community Median Household Income	2000 Census of Population	$_____ (7)
State Median Household Income	2000 Census of Population	$_____ (8)
Property Tax Collection Rate	Community Financial Statements Town, County or State Assessor's Office	_____ %(9)
Property Tax Revenues	Community Financial Statements Town, County or State Assessor's Office	$_____ (10)

B. Calculation of Indicators

1. Overall Net Debt as a Percent of Full Market Value of Taxable Property

Overall Net Debt (Calculate: (1) + (2)) $_____ (11)

Overall Net Debt as a Percent of Full Market Value of Taxable Property (Calculate: [(11)/(3)] x 100) _____ %(12)

2. Property Tax Revenues as a Percent of Full Market Value of Taxable Property

Property Tax Revenues as a Percent of Full Market Value of Taxable Property (Calculate: [(10)/(3)] x 100) _____ %(13)

Attachment F.1

Public Project: Calculating The Secondary Score

Please check the appropriate box in each row, and record the corresponding score in the final column. Then, sum the scores and compute the average. If one of the debt or socioeconomic indicators is not available, average the two financial management indicators and use this averaged value as a single indicator with the remaining indicators.

	Secondary Indicators			**Score**
Indicator	Weak*	Mid-Range**	Strong***	_____
Bond Rating Attachment F, (4)	Below BBB (S&P) Below Baa (Moody's)	BBB (S&P) Baa (Moody's)	Above BBB (S&P) or Baa (Moody's)	_____
Overall Net Debt as Percent of Full Market Value of Taxable Property Attachment F, (12)	Above 5%	2%-5%	Below 2%	_____
Unemployment Attachment F, (5)& (6)	Above National Average	National Average	Below National Average	_____
Median Household Income Attachment F, (7) & (8)	Below State Median	State Median	Above State Median	_____
Property Tax Revenues as a Percent of Full Market Value of Taxable Property Attachment F, (13)	Above 4%	2%-4%	Below 2%	_____
Property Tax Collection Rate Attachment F, (9)	< 94%	94% - 98%	> 98%	_____
			SUM	_____
			AVERAGE	_____

* Weak is a score of 1 point

** Mid-Range is a score of 2 points

*** Strong is a score of 3 points

Attachment F.2

Public Project: Assessment of Substantial Impacts Matrix

Secondary Score	Municipal Preliminary Screener		
	Less than 1.0 Percent	Between 1.0 and 2.0 Percent	Greater than 2.0 Percent
Less than 1.5	**?**	**X**	**X**
Between 1.5 and 2.5	√	**?**	**X**
Greater than 2.5	√	√	**?**

"**X**" indicates that the socioeconomic impact is likely to be significant. The closer the locality is to the upper right hand corner of the matrix, the greater the impact. Similarly, "√" indicates that the impact is not likely to be significant. The closer to the lower left hand corner of the matrix, the smaller the likelihood. Finally, the "**?**" indicates that the impact is unclear.

Attachment G

Private Projects
Calculation of Earnings Before Taxes

A. Earnings Without Pollution Control Project Costs

$$\mathbf{EBT = R - CGS - CO}$$

B. Earnings With Pollution Control Project Costs

$$\mathbf{EWPR = EBT - ACPR}$$

Where:
- EBT = Earnings Before Taxes
- EWPR = Earnings with Pollution Project Costs
- R = Revenues
- CGS = Cost of Goods Sold (including the cost of materials, direct labor, indirect labor, rent and heat)
- CO = Portion of Corporate Overhead Assigned to the Discharger (selling, general, administrative, interest, R&D expenses, and depreciation on common property)
- ACPR = Total Annual Costs of Pollution Control Project [Attachment D (5)]

R	$_____	(1)
CGS	$_____	(2)
CO	$_____	(3)
EBT [(1) - (2) -(3)]	$_____	(4)
ACPR [Attachment D (5)]	$_____	(5)
EWPR [(4) - (5)]	$_____	(6)

Attachment H

Private Projects: Calculation of Profit Rates

A. Profit Rate Without Project Costs

PRT = EBT ÷ R

B. Profit Rate With Pollution Control Costs

PRPR = EWPR ÷ R

Where: PRT = Profit Rate Before Taxes

PRPR = Profit Rate with Pollution Control Costs

EBT = Earnings Before Taxes

EWPR = Before-Tax Earnings with Pollution Control Costs

R = Revenues

EBT [Attachment G, (4)] _____ (1)

R [Attachment G, (1)] _____ (2)

PRT = Calculate: [(1)/(2)] _____ (3)

EWPR [Worksheet V, (6)] $_____ (4)

R [Worksheet V, (1)] $_____ (5)

PRPR [Calculate: (4)/(5)] _____ (6)

Attachment I

Private Projects: Calculation of The Current Ratio

CR = CA ÷ CL

Where: CR = Current Ratio

CA = Current Assets (the sum of inventories, prepaid expenses, and accounts receivable)

CL = Current Liabilities (the sum of accounts payable, accrued expenses, taxes, and the current portion of long-term debt)

CA	$_____	(1)
CL	$_____	(2)
CR [Calculate: (1)/(2)]	_____	(3)

Attachment J

Private Project Calculation of Beaver's Ratio

BR = CF ÷ TD

Where: BR = Beaver's Ratio
CF = Cash Flow
TD = Total Debt

Cash Flow:

Net Income After Taxes	$_____	(1)
Depreciation	$_____	(2)
CF [Calculate: (1) + (2)]	$_____	(3)
Total Debt:		
Current Debt	$_____	(4)
Long-Term Debt	$_____	(5)
Total Debt	$_____	(6)
Beaver's Ratio:		
BR [(3) /(6)]	_____	(7)

Attachment K

Private Project Debt to Equity Ratio

DER = LTL ÷ OE

Where:	DER =	Debt/Equity Ratio
	LTL =	Long-Term Liabilities (long-term debt such as bonds, debentures, and bank debt, and all other noncurrent liabilities such as deferred income taxes)
	OE =	Owner Equity (the difference between total assets and total liabilities, including contributed or paid in capital and retained earnings)

LTL	$_____	(1)
OE	$_____	(2)
DER [(1)/(2)]	_____	(3)

Attachment L

Public Municipal Project
Qualitative Description of Estimated Change in Socioeconomic Indicators due to Wastewater Management Alternative Costs

Estimated change in Median Household Income (MHI)

Estimated change in the unemployment rate

Estimated change in overall net debt as a percent of full market value of taxable property

Estimated change in % of households below the poverty line

Impact on commercial development potential

Impact on Property Values

Attachment M

Private-Sector Development **Factors to Consider in Making a Determination of Significant Socio-economic Impacts**		
Define the affected community in this case; what areas are included.		(1)
Current unemployment rate in affected community (if available).		(2)
Current national unemployment rate.		(3)
Additional number of persons expected to collect unemployment in affected community due to wastewater management alternative.		(4)
Expected unemployment rate in the affected community due to wastewater management alternative (Current # of persons collecting unemployment in affected community + (4)/labor force in affected community.		(5)
Median household income in affected community.		(6)
Total number of households in affected community.		(7)
Percent of population below the poverty line in affected community.		(8)
Current expenditures on social services in affected community.		(9)
Expected expenditures on social services due to job losses in the affected community.		(10)
Current total tax revenues in the affected community.		(11)
Tax revenues paid by the private entity to the affected community.		(12)
Tax revenues paid by the private entity as a percentage of the affected community's total tax revenues.*		(13)
Current statewide unemployment rates.		(14)
Additional number of persons expected to collect unemployment in the State due to wastewater management alternative.		(15)

Expected statewide unemployment rate, after wastewater management alternative (Current # of persons collecting unemployment in State + (15)/labor force in State.	_____	(16)
Current expenditures on social services in State.	_____	(17)
Expected statewide expenditures on social services due to job losses.	_____	(18)

* In some cases, the affected community will include more than just the municipality in which the private entity is located. If so, the analysis should consider the private entity's tax revenues as a percentage of the tax revenues for only the municipality in which the entity is located.