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November 10, 2009

Ms. Diana Messina
Senior WRC Engineer, NPDES Permit Section
Regional Water Quality Control Board, Central Valley Region
11020 Sun Center Drive, 200
Rancho Cordova, CA 95670

SUBJECT: Antidegradation Analysis Report County of Placer Department of Facility Services Sewer Maintenance District 1 Wastewater Treatment Plant

Dear Ms. Messina:

Placer County (County) hereby transmits its Antidegradation Analysis Report (AAR) in support of the Report of Waste Discharge (ROWD) request for an increase in permitted capacity as part of the renewal of NPDES permit No. CA0079316 for the Sewer Maintenance District 1 (SMD 1) Wastewater Treatment Plant (WWTP).

The County has conducted a review of planned growth within the service area that indicates a treatment capacity expansion is necessary for the SMD 1 WWTP to accommodate an average dry weather flow (ADWF) of 2.7 million gallons per day (mgd) by 2034. Additionally, substantial treatment process upgrades to the SMD 1 WWTP will be necessary to comply with the current and anticipated effluent limitations for turbidity, disinfection byproducts, ammonia and nitrate. The expansion is anticipated to include upgrades throughout most of the facility, including new biological nutrient removal facilities and a new ultra-violet (U.V.) disinfection system.

The enclosed AAR compares water quality effects on downstream waterbodies from the current plant at the currently permitted capacity (2.18 mgd ADWF) to that which would occur from the expanded discharge from the upgraded plant (2.7 mgd ADWF) on a constituent-by-constituent basis in compliance with current antidegradation policies. The AAR also includes an evaluation of whether the upgraded and expanded plant will meet best practicable treatment and control (BPTC). In addition, the AAR provides a socioeconomic analysis to evaluate the economic and social benefits of increasing plant capacity versus the water quality impacts and the cost and feasibility of alternatives.

In closing, the County is committed to working with Regional Water Board staff to facilitate the expedited development of the renewed permit prior to March 2010. Please contact Dave Atkinson (530) 886-4968 of my staff if you have any questions about this submittal.

Sincerely,

Will Dickinson
Deputy Director

WD:KB:lm

cc: Mr. Jim Parker, P.G. Environmental
~~letter only~~
Dr. Michael Bryan; Robertson-Bryan, Inc.
Mr. Steve Herrera; OWEN PSOMAS

Enclosures: SMD1 WWTP Antidegradation Analysis Report

ANTIDEGRADATION ANALYSIS FOR THE PLACER COUNTY SMD1 WASTEWATER TREATMENT PLANT

Prepared for:

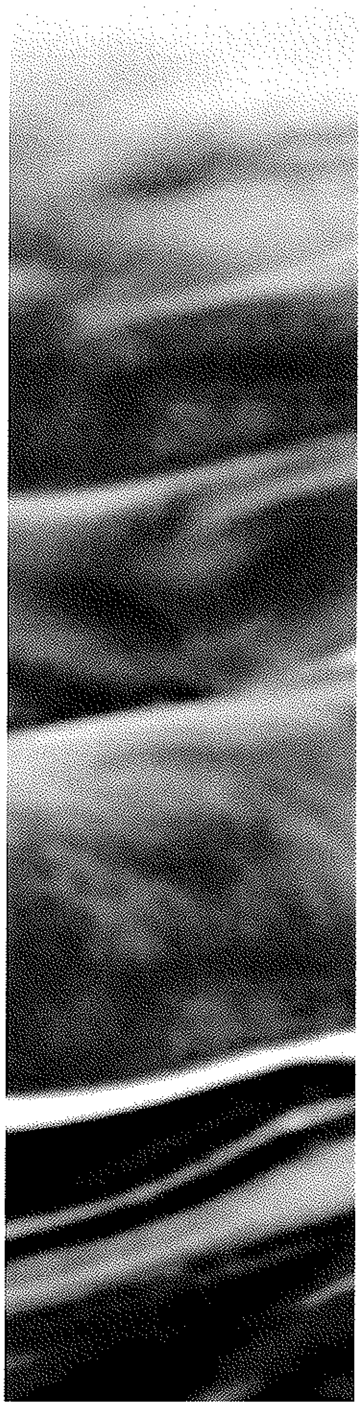
PLACER COUNTY

Prepared by:

ROBERTSON - BRYAN, INC.
Solutions for Progress

October 2009

ANTIDEGRADATION ANALYSIS
FOR THE
PLACER COUNTY SMD1 WASTEWATER TREATMENT PLANT



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October 2009

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ACRONYMS AND ABBREVIATIONS

ADWF	average dry weather flow
APU	Administrative Procedure Update
Basin Plan	Water Quality Control Plan, Central Valley Region, Sacramento River and San Joaquin River Basins
BDCM	bromodichloromethane
BNR	biological nutrient removal
BOD	biochemical oxygen demand
BPTC	best practical treatment or control
CCC	criterion continuous concentration
CMC	criterion maximum concentration
CTR	California Toxics Rule
CVRWQCB	Central Valley Regional Water Quality Control Board
DAF	dissolved air flotation
DBCM	dibromochloromethane
DHS	Department of Health Services
DO	dissolved oxygen
EC	electrical conductivity (i.e., specific conductance at 25 °C)
MBAS	methylene blue active substances
MCL	maximum contaminant level
mgd	million gallons per day
NPDES	National Pollutant Discharge Elimination System
NTR	National Toxics Rule
NTU	Nephelometric Turbidity Unit
POTWs	publicly owned treatment works
RWQCB	Regional Water Quality Control Board
SWRCB	State Water Resources Control Board
TDS	total dissolved solids
U.S. EPA	United States Environmental Protection Agency
WER	water-effect ratio
WWTP	wastewater treatment plant

EXECUTIVE SUMMARY

Introduction

Placer County Department of Facility Services (County) owns and operates Sewer Maintenance District 1 Wastewater Treatment Plant (SMD1 WWTP). The plant is located in the north Auburn area, and discharges treated effluent to Rock Creek. Approximately 200 feet downstream, Rock Creek is tributary to Dry Creek. Currently, the County is designing upgrades to the plant to: 1) comply with effluent limitations in the existing and anticipated renewal NPDES Permit and Cease and Desist Order, and 2) expand capacity from 2.18 mgd to 2.7 mgd average dry weather flow (ADWF) to meet the needs of planned growth in the service area. The expansion is anticipated to include upgrades throughout most of the facility, including new biological nutrient removal facilities and a new ultra-violet (U.V.) disinfection system.

Because the County is seeking a renewed NPDES permit that would increase the SMD1 WWTP discharge capacity, the Central Valley Regional Water Quality Control Board (CVRWQCB) has requested an antidegradation analysis be performed in accordance with State and federal antidegradation policies. The primary objective of the State and federal antidegradation policies is to protect receiving water quality that is better than applicable water quality criteria and, if not better, to otherwise ensure beneficial uses are protected. The antidegradation analysis compares, constituent-by-constituent, the water quality effects on downstream waterbodies from the current plant at the currently permitted capacity to that which would occur with the expanded discharge from the upgraded plant. Furthermore, this report evaluates the significance of the water quality effects, the cost and feasibility of alternatives, and determines whether allowing the potential incremental degradation defined herein would be consistent with maximum benefit to the people of the State, given the socioeconomic benefits of increasing plant capacity.

Water Quality Analysis

The extent of impacts from SMD1 WWTP's proposed increased discharge capacity were primarily assessed on the basis of assimilative capacity utilization – on a mass balance approach for all constituents and, additionally for bioaccumulative constituents, on a mass loading basis. To calculate use of available assimilative capacity, the applicable criteria need to be defined, often based on site-specific characteristics. Generally, relevant water quality standards are concentration-based in order to prevent exceedances of concentration-based exposure thresholds. Thus, critical receiving water flows and representative water quality measurements were criteria-dependent (i.e., shorter representative averaging periods for acute effects as compared to long-term human health criteria). Furthermore, the nature of downstream water bodies may facilitate extended residence time or deposition of contaminants. Therefore, for bioaccumulative constituents, mass loadings were also considered in assessing potential lowering of water quality from increased SMD1 WWTP discharge.

Best Practicable Treatment and Control Analysis

The term "best practical treatment or control" (BPTC) appears in the State's antidegradation policy (Resolution No. 68-16). However, nowhere in State regulations or policies has BPTC been defined in terms of specific treatment processes for specific constituents, or in terms of specific effluent quality. A review of Clean Water Act (CWA) requirements for publicly owned treatment works (POTWs) and non-POTWs was used to determine that, in the State and federal regulations, achievement of "best practical treatment or control" and "best practicable waste treatment technology" are defined in terms of plant performance and maintenance of water quality standards, rather than specific treatment technologies. Thus, an evaluation was made of the anticipated plant performance for the planned upgraded and expanded SMD1 WWTP and the anticipated ability of the plant to comply with applicable water quality standards.

Socioeconomic and Alternatives Analysis

The objective of the socioeconomic analysis is to determine if the lowering of Rock Creek and Dry Creek water quality is in the "best interest" of the people of the State. The socioeconomic evaluation considered: 1) the social benefits and costs based on the ability to accommodate socioeconomic development in the Placer County General Plan; 2) the magnitude of the water quality impacts, the change in water quality from existing conditions, and expected effects on beneficial uses of Rock and Dry creeks and downstream waters; 3) the feasibility and effectiveness of reducing the lowering of water quality by implementing alternatives to the proposed project; and 4) the economic costs for alternatives and a comparison of alternative costs to the current project expansion cost estimate of $87 million, the increased cost for ratepayers, and the magnitude of the change in ratepayer costs.

The following six alternatives were evaluated for their ability to reduce or eliminate the lowering of water quality that would result from discharging an additional 0.52 mgd ADWF of treated effluent form the upgraded and expanded plant.

- Higher level of treatment using microfiltration
- Zero discharge (100%) recycling of additional plant capacity
- Flow restricted discharge
- Pollutant source minimization
- Connect to City of Lincoln Wastewater Treatment Plant
- Change in drinking water source

Findings and Conclusions

The water quality of Rock and Dry creeks, with respect to chemical constituents, pH, and turbidity would remain better than necessary to fully protect beneficial uses. Resulting temperature and DO conditions in Rock and Dry creeks are expected to remain at levels throughout the year that would be protective of beneficial uses. For all of the constituents assessed, any lowering of receiving water quality would be minor and would use less than 10% of the available assimilative capacity. Thus, the incremental increase in discharge would not significantly lower water quality for any constituent in Rock and Dry creeks, relative to that which would occur under the current permitted capacity for the SMD1 WWTP.

The incremental increase in discharge would not lead to significant increase in mass loading of bioaccumulative constituents such as mercury or other conserved constituents such as total dissolved solids. Total dissolved solids are expected to decrease as the WWTP converts from a chlorine-based disinfection process to U.V. disinfection. In short, no beneficial uses of Rock Creek, Dry Creek, or downstream waters are anticipated to be adversely affected by the planned expansion.

The expansion of the SMD1 WWTP from its current 2.18 mgd ADWF permitted capacity to 2.7 mgd ADWF would accommodate planned and approved growth in the service area. Having new development in the region independently treat its wastewater in an effort to eliminate any incremental degradation of water quality in Rock and Dry creeks would not be cost-effective, may not reduce loadings to downstream portions of the watershed (e.g., Sacramento River), and may not improve water quality (from a constituent concentration basis) throughout Rock and Dry creeks.

Several alternatives were considered and found to be infeasible for cost or logistical reasons or both, when compared to the proposed action of increased SMD 1 WWTP discharge from an upgraded plant. The County will operate an upgraded treatment train that meets and exceeds BPTC of the discharge and will facilitate greater use of recycled water, upon demand for such water developing in the area. Placing connection bans on the SMD1 WWTP to prevent the non-significant degradation of water quality would have direct adverse effects on important socioeconomic development approved for the region, which, in turn, would adversely affect the County's future rate payer and tax base.

Based on the assessment contained herein, it is determined that the SMD1 WWTP upgrade and expansion project will operate to meet the highest statutory and regulatory NPDES requirements which result in BPTC necessary to assure that a water quality nuisance will not occur and that beneficial uses are fully protected. The limited degradation in receiving water quality that may occur as a result of planned discharge expansion is not significant and would accommodate important socioeconomic development in the service area while maintaining full protection of the Rock Creek and Dry Creek beneficial uses. An evaluation of several alternatives, and their effects on water quality impacts and beneficial use protection did not identify any feasible alternative control measure that more effectively would accommodate the planned and approved growth that would result from implementing the alternative, relative to implementing the planned upgrade/expansion project.

Based on the analysis contained herein, the anticipated water quality changes in Rock and Dry creeks will be consistent with State and federal antidegradation policies, will be to the important socioeconomic benefit to the people of the region, be to the maximum benefit of the people of the State, and will not result in water quality less than that prescribed in the policies that are required to prevent a nuisance or that are required to protect beneficial uses.

1 INTRODUCTION

1.1 Discharger Description

Placer County Department of Facility Services (County) owns and operates the Sewer Maintenance District 1 Wastewater Treatment Plant (SMD1 WWTP). The treatment plant is located in Auburn, approximately 40 miles northeast of Sacramento and provides service to the unincorporated area of North Auburn in Placer County, which serves a population of approximately 15,000 and includes much of the industrial area of Auburn. The plant discharges treated effluent to Rock Creek. Approximately 200 feet downstream, Rock Creek is tributary to Dry Creek, which merges with Orr Creek and is then called Coon Creek. Coon Creek splits into several channels (Main Canal, Markham, Bunkham, and East Side Canal), eventually entering the Natomas Cross Canal and subsequently the Sacramento River just below the confluence with the Feather River.

The treatment plant provides tertiary treatment when influent flows are 3.5 mgd or less and a mixture of secondary and tertiary treatment when flows are greater than 3.5 mgd. The plant consists of headworks including comminution and aerated grit removal, four primary clarifiers, three rotating biological contactors (RBCs), two trickling filters, four secondary clarifiers, six gravity filters with anthracite media, three chlorine contact chambers and dechlorination, primary and secondary digesters, belt press, and sludge drying beds. Dewatered sludge is disposed at a landfill.

Currently, the County is designing upgrades to the plant to: 1) comply with effluent limitations in the existing and anticipated renewed NPDES Permit and Cease and Desist Order, and 2) expand capacity from 2.18 mgd to 2.7 mgd ADWF to meet increasing flows from a growing number of customers in the collection system. The County has submitted a Report of Waste Discharge (ROWD) (Placer County 2009) for a renewed NPDES permit for the expanded capacity and upgraded facility. The expansion is anticipated to include upgrades and additional unit process throughout most of the facility, including new flow equalization facilities, new biological nutrient removal facilities, and a new ultraviolet (U.V.) disinfection system. The expansion is in the design phase and is expected to be completed in 2014.

1.2 Purpose of Analysis

The County has proposed increasing the discharge capacity of the SMD1 WWTP from 2.18 mgd to 2.7 mgd ADWF, and is seeking a renewed NPDES permit for discharges to Rock Creek. Hence, the Central Valley Regional Water Quality Control Board (CVRWQCB) has requested an antidegradation analysis be performed in accordance with State and federal antidegradation policies. This antidegradation analysis has been performed to assess the nature and degree to which increased discharge would result in a lowering of water quality in Rock Creek, and Dry Creek given its close proximity (i.e., approximately 200 feet downstream), whether resultant conditions would be protective of the creeks' beneficial uses, and whether allowing the potential incremental degradation defined herein would be consistent with maximum benefit to the people of the State, given the economic and social benefits of increasing plant capacity versus the water quality impacts and the cost and feasibility of alternatives.

2 ANTIDEGRADATION POLICY AND GUIDANCE

Antidegradation policies and guidance have been issued at both the federal and state level, as described in the following sections.

2.1 Federal Antidegradation Policy and Guidance

The federal antidegradation policy is designed to protect existing uses and the level of water quality necessary to protect existing uses, and provide protection for higher quality and outstanding national water resources. The federal policy directs states to adopt a policy that includes the following primary provisions; these provisions have since become used to classify water body quality as Tier 1, Tier 2, or Tier 3 waters (Title 40 of the Code of Federal Regulations, Section 131.12 (40 CFR 131.12)):

(1) Existing instream water uses and the level of water quality necessary to protect the existing uses shall be maintained and protected. **[Tier 1]**

(2) Where the quality of waters exceed levels necessary to support propagation of fish, shellfish, and wildlife and recreation in and on the water, that quality shall be maintained and protected unless the State finds, after full satisfaction of the intergovernmental coordination and public participation provisions of the State's continuing planning process, that allowing lower water quality is necessary to accommodate important economic or social development in the area in which the waters are located. In allowing such degradation or lower water quality, the State shall assure water quality adequate to protect existing uses fully. Further, the State shall assure that there shall be achieved the highest statutory and regulatory requirements for all new and existing point sources and all cost-effective and reasonable best management practices for nonpoint source control. **[Tier 2]**

(3) Where high quality waters constitute an outstanding national resource, such as waters of national and State parks and wildlife refuges and waters of exceptional recreational or ecological significance, that water quality shall be maintained and protected. **[Tier 3]**

(4) In those cases where potential water quality impairment associated with a thermal discharge is involved, the antidegradation policy and implementing method shall be consistent with Section 316 of the Act.

The United States Environmental Protection Agency (U.S. EPA), Region 9 published *Guidance on Implementing the Antidegradation Provisions of 40 CFR 131.12* (USEPA 1987). The document provides general program guidance for states in Region 9 on developing procedures for implementing antidegradation policies.

In August 2005, the U.S. EPA issued a memorandum discussing Tier 2 antidegradation reviews and significance thresholds (U.S. EPA 2005). The use of a 10% reduction in available assimilative capacity as a significance threshold was considered "to be workable and protective in identifying those significant lowerings of water quality that should receive a full Tier 2 antidegradation review, including public participation" (U.S. EPA 2005).

> *Given the different approaches states and tribes have taken recently to define significance, it is important to clarify that the most appropriate way to define a significance threshold is in terms of assimilative capacity...Further, given the importance of public participation and transparency, it is clear that a definition of significance that directly links to the resource to be protected (assimilative capacity) is more likely to be understood by the public (U.S. EPA 2005).*

2.2 State Antidegradation Policy and Guidance

2.2.1 Resolution No. 68-16

The State Water Resources Control Board (SWRCB) has interpreted Resolution No. 68-16 to incorporate the federal antidegradation policy (CVRWQCB 1998). Resolution No. 68-16 states, in part:

1. *Whenever the existing quality of water is better than the quality established in policies as of the date on which such policies become effective, such existing high quality will be maintained until it has been demonstrated to the State that any change will be consistent with maximum benefit to the people of the State, will not unreasonably affect present and anticipated beneficial use of such water and will not result in water quality less than that prescribed in the policies.*

2. *Any activity which produces or may produce a waste or increased volume or concentration of waste and which discharges or proposes to discharge to existing high quality waters will be required to meet waste discharge requirements which will result in the best practicable treatment or control of the discharge necessary to assure that (a) a pollution or nuisance will not occur and (b) the highest water quality consistent with maximum benefit to the people of the State will be maintained.*

2.2.2 1987 Policy Memorandum

In 1987, the SWRCB issued a policy memorandum to the RWQCBs to provide guidance on the application of the federal antidegradation policy for SWRCB and RWQCB actions, including establishing water quality objectives, issuing NPDES permits, and adopting waivers and exceptions to water quality objectives or control measures. In conducting these actions, the RWQCBs must assure full protection of existing instream beneficial uses, that the lowering of water quality is necessary to accommodate important economic or social development, and that outstanding national resource waters be maintained and protected.

2.2.3 Administrative Procedures Update 90-004

In 1990, the SWRCB issued guidance as Administrative Procedures Update (APU) 90-004 to the RWQCBs for implementing Resolution No. 68-16 in NPDES permitting. APU 90-004 requires the RWQCBs to determine the need to make findings as to whether water quality degradation is permissible when balanced against benefit to the public. APU 90-004 describes two types of antidegradation analyses – a "simple" analysis and a "complete" analysis. Furthermore APU 90-004 identifies conditions when a complete antidegradation analysis must be performed.

Need for a Complete Antidegradation Analysis

A complete antidegradation analysis is required if the proposed activity results in:

1. *A substantial increase in mass emissions of a pollutant, even if there is no other indication that the receiving waters are polluted; or*
2. *Mortality or significant growth or reproductive impairment of resident species.*

In particular, an antidegradation finding [based on a complete analysis] *should be made and, if necessary, an analysis should be conducted when performing the following permit activities:*

1. *Issuance of a permit for any new discharge, including Section 401 certifications; or*
2. *Material and substantial alterations to the permitted facility, such as relocation of an existing discharge; or*
3. *Reissuance or modification of permits which would allow a significant increase in the concentration or mass emission of any pollutant in the discharge.*

A complete antidegradation analysis will not be required if:

1. *A Regional Board determines that the reduction of water quality will be spatially localized or limited with respect to the waterbody; e.g., confined to the mixing zone; or*
2. *A Regional Board determines the reduction in water quality is temporally limited and will not result in any long-term deleterious effects on water quality; e.g., will cease after a storm event is over; or*
3. *A Regional Board determines the proposed action will produce minor effects which will not result in a significant reduction of water quality; e.g., a POTW has a minor increase in the volume of discharge subject to secondary treatment; or*
4. *The Regional Board determines that the proposed activity, which may potentially reduce water quality, has been approved in the General Plan of a political subdivision and has been adequately subjected to the environmental and economic analyses in an environmental impact report (EIR) required under the California Environmental Quality Act (CEQA). If the Regional Board finds the EIR inadequate, the Regional Board must supplement this information to support the decision.*

The County is seeking reissuance of an NPDES permit for discharge of treated effluent from the SMD1 WWTP to Rock Creek, including an increase in allowable discharge capacity from 2.18 mgd to 2.7 mgd ADWF. This 59% increase in allowable discharge capacity is substantial; hence, a complete antidegradation analysis has been performed and is presented herein.

Elements of a Complete Antidegradation Analysis

APU 90-004 describes the procedure for a complete antidegradation analysis. There are three main elements to the complete antidegradation analysis, which are quoted below.

"*1. Compare receiving water quality to the water quality objectives established to protect designated beneficial uses.*

a. If baseline water quality is equal to or less than the quality as defined by the water quality objective, water quality shall be maintained or improved to a level that achieves the objectives. … **[Tier 1]**

b. If baseline water quality is better than the water quality as defined by the water quality objective, the baseline water quality shall be maintained unless poorer water quality is necessary to accommodate important economic or social development and is considered to be of maximum benefit to the people of the State. **[Tier 2]**

2. Balancing the proposed action against the public interest.

a. Past, present, and probable beneficial uses of the water.

b. Economic and social cost, tangible and intangible, of the proposed discharge compared to benefits. …

c. The environmental aspects of the proposed discharge must be evaluated.

d. The implementation of feasible alternative control measures ….

3. Report on the antidegradation analysis.

a. The water quality parameters and beneficial uses which will be affected by the proposed action and the extent of the impact.

b. The scientific rationale for determining that the proposed action will or will not lower water quality.

c. A description of the alternative measures that were considered.

d. A description of the socioeconomic evaluation.

e. The rationale for determining that the proposed action is or is not justified by socioeconomic considerations."

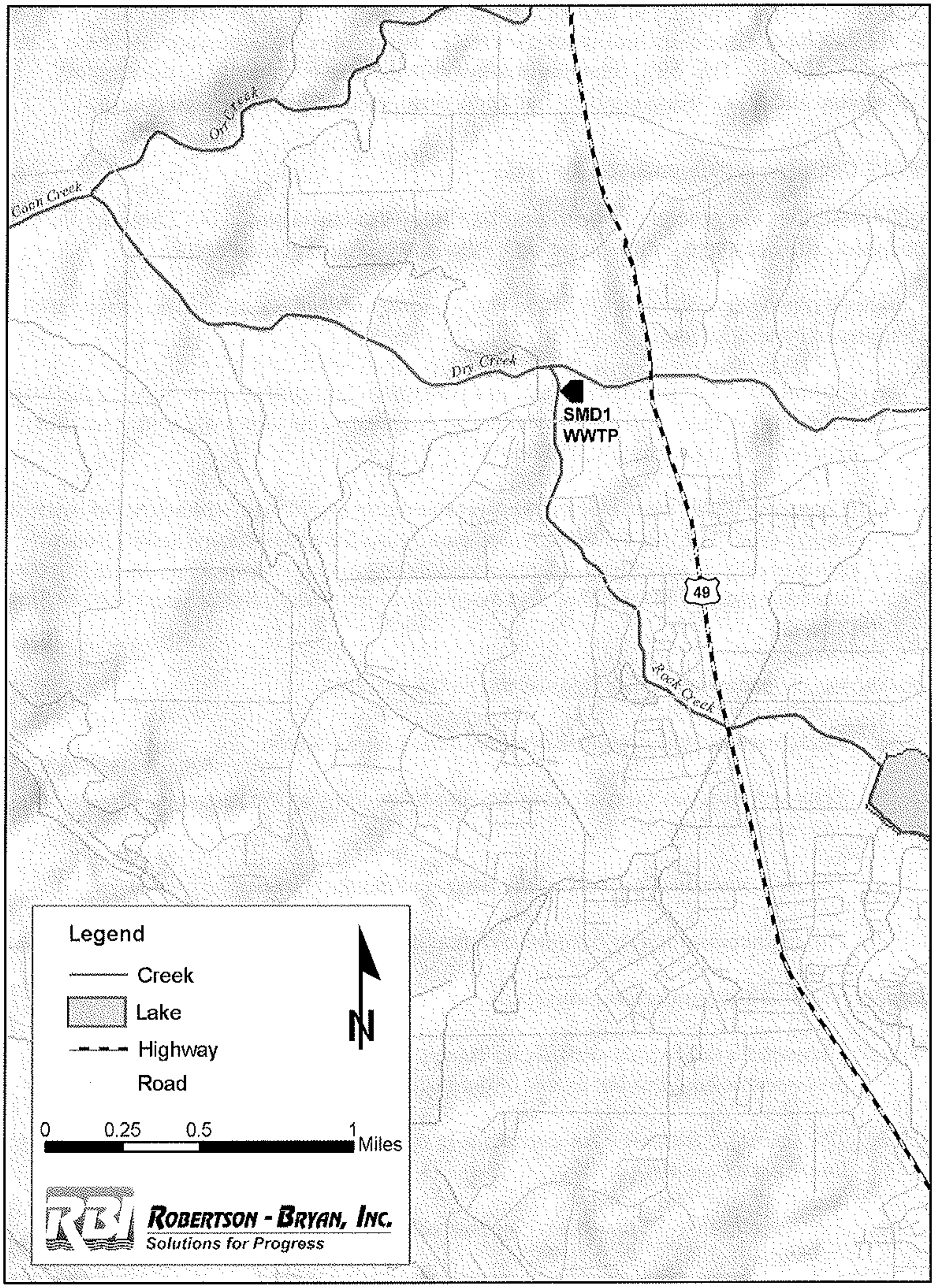

Figure 1. Location of the Placer County SMD1 Wastewater Treatment Plant northwest of the North Auburn area and north of Auburn, CA. Highway 49 intersects with interstate 80 south of the map at Auburn. The map also shows the water bodies downstream of the discharge (Rock and Dry creeks).

3 WATER QUALITY STANDARDS

A water quality standard consists of: 1) the designated beneficial uses of a water body to be protected; 2) adopted criterion designed to protect those uses; and 3) an antidegradation policy. The federal and State antidegradation policies are presented in Section 2. The following sections describe the beneficial uses and water quality criteria applicable to the receiving water, Rock Creek, and to Dry Creek.

3.1 Beneficial Uses

The beneficial uses of Rock Creek and Dry Creek are designated via the "tributary statement" in the *Water Quality Control Plan (Basin Plan), Central Valley Region, Sacramento River and San Joaquin River Basins* (CVRWQCB 2004). Because Rock Creek and Dry Creek are tributary to the Sacramento River, the beneficial uses of the Sacramento River between Colusa Drain and the I Street Bridge have been designated for Rock Creek and Dry Creek through application of the tributary statement of the Basin Plan. **Table 1** identifies the designated beneficial uses for surface water, while groundwater, unless otherwise designated, is considered as suitable or potentially suitable for the beneficial uses listed in **Table 2**.

Table 1. Surface water beneficial uses.

Beneficial Use	Abbreviation	Beneficial Use	Abbreviation
Municipal and domestic supply	MUN	Cold freshwater habitat	COLD
Agricultural supply (irrigation and stock watering)	AGR	Migration of aquatic organisms	MIGR
Contact water recreation	REC-1	Spawning, reproduction, and/or early development	SPWN
Non-contact water recreation	REC-2	Wildlife habitat	WILD
Warm freshwater habitat	WARM	Groundwater recharge	GWR

Table 2. Groundwater beneficial uses.

Beneficial Use	Abbreviation	Beneficial Use	Abbreviation
Municipal and domestic supply	MUN	Agricultural supply	AGR
Industrial service supply	IND	Industrial process supply	PRO

3.2 Criteria / Objectives

Applicable water quality criteria adopted by the State of California (called objectives) can be found in the Basin Plan (CVRWQCB 2004). The Basin Plan incorporates, by reference, the Department of Public Health (DPH) drinking water maximum contaminant levels (MCLs) as objectives for water bodies designated for use as domestic or municipal water supply. In addition, the U.S. EPA promulgated numeric criteria for priority pollutants in the National Toxics Rule (NTR) and California Toxics Rule (CTR) (U.S. EPA 1992, 2000, 2001). The water quality standards contained in the Basin Plan, NTR/CTR, and MCLs have undergone agency, peer, and public review, and have been adopted by the relevant agencies (e.g., Regional Water Board, SWRCB, DPH, and U.S. EPA).

Numerous water quality "goals" exist in the literature that have not been adopted by the State or U.S. EPA as water quality "standards." These include U.S. EPA recommended ambient water quality criteria for the protection of aquatic life and human health. The Regional Water Board sometimes uses U.S. EPA recommended ambient water quality criteria in determining reasonable potential and developing NPDES permit effluent limitations, particularly if no adopted water quality standard exists for a specific constituent when addressing the narrative toxicity objective in the Basin Plan. For example, California does not currently have a numeric standard for ammonia. Nevertheless, because ammonia can cause toxicity to aquatic life under certain conditions, the Regional Water Board commonly applies the U.S. EPA's recommended ambient water quality criteria for ammonia as a means of upholding the Basin Plan's narrative toxicity objective with regards to ammonia.

4 WATER QUALITY ASSESSMENT

The following sections identify the degree to which Rock Creek and Dry Creek water quality would be lowered by the proposed increase in effluent discharge, relative to that already permitted, and whether water quality would be protective of the creek's beneficial uses.

4.1 Assessment Approach

This assessment identifies the incremental change in water quality that would occur in Rock Creek and Dry creeks due to an increase in the SMD1 WWTP discharge rate from 2.18 mgd ADWF, the current permitted discharge rate, to 2.7 mgd ADWF. The CVRWQCB previously made antidegradation findings stating that the discharge of 2.18 mgd (ADWF) from the SMD1 WWTP is consistent with the antidegradation policies. This approach is consistent with APU 90-004, which states, "*...the most recent water quality resulting from permitted action is the baseline water quality to be considered in any antidegradation analysis*" (SWRCB 1990).

The first element of a complete antidegradation analysis is to "[c]*ompare receiving water quality to the water quality objectives*" (SWRCB 1990). California's guidance on antidegradation (APU 90-004) states: *"The baseline water quality should be representative of the water body, accounting for temporal and spatial variability" (page 4).* The Porter-Cologne Water Quality Control Act (2006) provides a definition of water quality as:

> *"'Quality of the water' refers to chemical, physical, biological, bacteriological, radiological, and other properties and characteristics of water which affect its use."*

Thus, to assess the water quality in Rock and Dry creeks, it is necessary to consider the beneficial uses and the objectives meant to protect those uses. Generally water quality standards are concentration-based in order to prevent exceedances of concentration-based exposure thresholds. It is also necessary to describe relevant exposure scenarios for the beneficial uses to be protected. This requires defining criteria-dependent critical flows and the criteria-dependent representative averages for assessing water quality.

Although bioaccumulation is considered in the development of human health and aquatic life criteria, the nature of downstream water bodies may facilitate extended residence time or deposition of contaminants. Therefore, for bioaccumulative constituents, mass loadings were also considered in assessing potential lowering of water quality from increased SMD1 WWTP discharge.

4.2 Mass Balance Assessment of Water Quality

Priority pollutant data are available for Rock and Dry creeks upstream of the SMD1 WWTP outfall (R1 and R3 monitoring stations) and for the undiluted effluent, but not for Rock and Dry creeks downstream of the outfall at the downstream (R2 and R4) stations. Some parameters (e.g., dissolved oxygen, temperature, turbidity, pH) are measured at the R2 and R4 stations as part of monthly self-monitoring conducted for the NPDES permit. Therefore, the creek quality under the current and future permitted discharge capacities (i.e., creek quality at the downstream R2 and R4 stations) is represented by a steady-state, mass-balance of data collected on the effluent and creek at the upstream (R1 and R3) monitoring locations, unless measured data at the R2 and R4 monitoring location are available. The mass-balanced, downstream water quality in Rock Creek at R2 was determined from the following equation:

$$C_{R2} = \frac{C_{R1} \cdot Q_{R1} + C_{Effluent} \cdot Q_{Effluent}}{Q_{R1} + Q_{Effluent}}$$

where:

C = constituent concentration

Q = flow/discharge rate

The downstream water quality in Dry Creek at R4 is influenced by upstream conditions in Rock and Dry creeks as well as effluent quality. Thus, the mass-balanced, downstream water quality in Dry Creek at R4 is determined as follows:

$$C_{R4} = \frac{C_{R1} \cdot Q_{R1} + C_{R3} \cdot Q_{R3} + C_{Effluent} \cdot Q_{Effluent}}{Q_{R1} + Q_{R3} + Q_{Effluent}}$$

where:

C = constituent concentration

Q = flow/discharge rate

To assess the significance of any lowering of the water quality, the change in the assimilative capacity, on a constituent-specific basis, for Rock and Dry creeks was calculated. The assimilative capacity is the concentration increment between the ambient water quality and the water quality standard (WQS) and is calculated for Rock Creek as the change in constituent concentration at R2 (as a result of the plant expansion) divided by the difference between the WQS and R2 (under existing conditions; 2.18 mgd).

$$Assimilative\ capacity_{Rock\ Creek} = WQS - \frac{(C_{R1} \cdot Q_{R1} + C_{Effluent} \cdot Q_{Effluent})}{(Q_{R1} + Q_{Effluent})}\ (at\ 2.18\ mgd)$$

The utilization of assimilative capacity is the change in downstream receiving water concentration, measured at R2, divided by the assimilative capacity.

$$\%\ Assimilative\ Capacity\ used_{Rock\ Creek} = 100 \cdot \frac{(R2_{2.7mgd} - R2_{2.18mgd})}{Assimilative\ capacity_{Rock\ Creek}}$$

To calculate the ambient water quality in Dry Creek downstream of the confluence with Rock Creek, the influence of Rock Creek, Dry Creek, and the effluent must be considered. Thus the assimilative capacity in Dry Creek is calculated as follows:

$$Assimilative\ capacity_{Dry\ Creek} = WQS - \frac{(C_{R1} \cdot Q_{R1} + C_{R3} \cdot Q_{R3} + C_{Effluent} \cdot Q_{Effluent})}{(Q_{R1} + Q_{R3} + Q_{Effluent})}\ (at\ 2.18\ mgd)$$

The utilization of assimilative capacity is the change in downstream receiving water concentration, measured at R2, divided by the assimilative capacity.

$$\%\ Assimilative\ Capacity\ used_{Dry\ Creek} = 100 \cdot \frac{(R2_{2.7mgd} - R2_{2.18mgd})}{Assimilative\ capacity_{Dry\ Creek}}$$

4.2.1 Critical Flows for the Criteria-dependent Protection of Beneficial Uses

NPDES permit limitations assume a worst-case condition of no dilution (zero Rock Creek flow) degradation. However this would lead to the conclusion that when there is no Rock Creek flow, there would be no need for an antidegradation analysis as there would be no existing water quality to protect. Since the creek has some measurable flow during the period of discharge (**Appendix A**), an antidegradation analysis is thus necessary.

The Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California (State Implementation Plan or SIP) addresses effluent and receiving water critical flow considerations in the context of the criteria, and thus beneficial uses to be protected (SWRCB 2005).

- Effluent flow ($Q_{Effluent}$) is assessed at 2.18 mgd ADWF, the current permitted capacity, and 2.7 mgd ADWF, the proposed future permitted capacity.

- Critical flow for acute aquatic life criteria, and acute human health effects, is 1Q10.
- Critical flow for chronic aquatic life criteria is 7Q10.
- Critical flow for long-term human health criteria and other long-term criteria (e.g. agriculture) is the harmonic mean (i.e., average of flow rate).

4.2.2 Criteria-dependent Representative Water Quality Measurements

Acute aquatic life criteria are typically based on 1-hour exposure which is far shorter than the typical monitoring frequency for many constituents. Chronic aquatic criteria are typically based on short-term, chronic 4-day exposures. To be protective to aquatic life beneficial use, the maximum, measured effluent and receiving water concentrations are used as a conservative measure of representative water quality.

Long-term human health effects and other long-term criteria (e.g., agriculture) are much less sensitive to short-term exceedances of the criteria. Thus, for long-term human health and other effects, the representative water quality is the mean of the measured effluent and receiving water concentrations which reflects the overall, long-term water quality and potential for degradation of beneficial uses.

Many constituents have "non-detect" values in the data set. For purposes of calculating average concentrations, one-half the reporting limit is used for non-detects. For long-term criteria only, if 80 percent or more of constituent's data set is non-detect, then the constituent is not carried forward for further analysis because, at this detection level frequency, the constituent would not cause consistent lowering of water quality. Summary statistics for effluent quality, Rock Creek, and Dry Creek water quality are provided in **Appendix B**, **Appendix C**, and **Appendix D**, respectively.

4.2.3 Summary of Critical Flows and Representative Water Quality Measurements

Table 3 summarizes the critical flows and representative effluent and receiving water quality measurements used to assess potential lowering of water quality from increased SMD1 WWTP discharge.

Table 3. Summary of critical flows and representative water quality to be used for the criteria-dependent analysis.

Criteria/Beneficial Use	Critical Flow	Representative Rock Creek Flow from Existing Dataset	Representative Dry Creek Flow from Existing Dataset	Representative Effluent and Receiving Water Quality
Acute aquatic life Acute human health	1Q10	0.07 mgd, minimum measured flow	0.01 mgd, minimum measured flow	Maximum measured concentration
Chronic aquatic life	7Q10	0.07 mgd, minimum measured flow	0.01 mgd, minimum measured flow	Maximum measured concentration
Long-term human health Other long-term criteria	Harmonic mean	3.4 mgd	0.14 mgd	Mean of measured concentrations

4.3 Mass Loading Assessment of Water Quality

Although bioaccumulation is considered in the development of human health and aquatic life criteria, the nature of downstream water bodies may facilitate extended residence time or deposition of contaminants. This would lead to an accumulation of bioaccumulative constituents in downstream water bodies and/or sediments (see Figure 1). Therefore mass loadings also were considered in order to assess potential lowering of downstream water quality from bioaccumulative constituents in the increased SMD1 WWTP discharge.

The assessment of available mass loading assimilative capacity is the maximum mass load, downstream in Rock Creek at R2 with the project, that the water body could carry without exceeding the WQC/WQO minus the upstream load and previously permitted/existing loads.

$$Available\ Mass\ Loading_{Rock\ Creek} = WQS \cdot \left(Q_{R2,2.7mgd}\right) - \left(Q_{R1} \cdot C_{R1}\right) - \left(Q_{Eff,2.18mgd} \cdot C_{Eff,2.18mgd}\right)$$

The mass loading use of assimilative capacity is the new load divided by the assimilative capacity.

$$\%\ Assimilative\ Capacity\ used_{Rock\ Creek} = 100 \cdot \frac{\left(Load_{2.7mgd} - Load_{2.18mgd}\right)}{Assimilative\ mass\ loading\ capacity_{Rock\ Creek}}$$

Similarly, the calculation of available mass loading assimilative capacity and mass loading use for Dry Creek downstream at R4 is as follows:

$$Available\ Mass\ Loading_{Dry\ Creek} = WQS \cdot \left(Q_{R4,2.7mgd}\right) - \left(Q_{R1} \cdot C_{R1}\right) - \left(Q_{R3} \cdot C_{R3}\right) - \left(Q_{Eff,2.18mgd} \cdot C_{Eff,2.18mgd}\right)$$

$$\%\ Assimilative\ Capacity\ used_{Dry\ Creek} = 100 \cdot \frac{\left(Load_{2.7mgd} - Load_{2.18mgd}\right)}{Assimilative\ mass\ loading\ capacity_{Dry\ Creek}}$$

Table 4 lists the mean monthly flows for waterbodies downstream of the SMD1 WWTP discharge.

Table 4. Water bodies downstream of the Placer County SMD1 Wastewater Treatment Plant and mean flows.

Downstream Water Body	Mean Monthly Flow (mgd)	303(d) listed constituents	Proposed additions to 303(d) list
Rock Creek (upstream)	4.8 [1]	None	None
Dry Creek (upstream)	1.6 [2]	None	None
Coon Creek	--	None	Chlorpyrifos, E. Coli, Unknown Toxicity
Main Canal	--	None	None
Bunkham Slough	--	None	None
Markham Ravine	--	None	None
East Side Canal	--	None	None
Sacramento River	12,611 [3]	Mercury, Unknown Toxicity	Chlordane, DDT, Dieldrin, PCBs

Notes:
1 Based on SMD1 WWTP R1 monitoring (7/1/2006 through 6/30/2009).
2 Based on SMD1 WWTP R3 monitoring (7/1/2006 through 6/30/2009).
3 Based on USGS gauging station dataset at Verona (10/1988 through 09/2008).

4.4 Baseline Effluent and Receiving Water Quality

4.4.1 Existing Water Quality Monitoring Data

Effluent and creek water quality is characterized from monitoring data collected from April 2002 through March 2003 in response to CVRWQCB's request pursuant to California Water Code Section 13267 (RBI 2003), and Discharger Self-Monitoring Report data from July 2006 through June 2009 as contained in the ROWD (Placer County 2009). The current permit, authorizing 2.18 mgd ADWF discharge capacity, was issued in June 2005.

As reported in the ROWD, several outlier values were identified in the existing dataset (i.e., Table 3-5 of the ROWD). For the antidegradation analysis, the R2 pH values for June 2007 were excluded because of equipment malfunction that resulted in R2 pH substantially larger (i.e., 1.0 to 3.5 pH units higher) than R1 and effluent pH. Similarly, extreme outlier R2 temperature values of 115.1°C and 116°C were excluded from the dataset.

Initially, the outlier values for copper, lead, and zinc concentrations on January 4, 2008 were kept in the dataset. However for copper and lead, inclusion of the outlier values results in the existing discharge exceeding applicable water quality objectives and would result in the revised NPDES permit including copper and lead effluent limitations. Furthermore, given the low critical receiving water flows, inclusion of the outliers means the existing downstream condition is already degraded and the future discharge of effluent meeting applicable criteria would improve the downstream condition (i.e., there would be no assimilative capacity utilization and no need for discharger-specific water-effect ratios and/or translators to be developed, which would re-define available assimilative capacity).

Conversely, if the copper and lead outliers are excluded and the next highest values used, then the existing downstream condition would have available assimilative capacity, and an assessment of the utilization of the available assimilative capacity by the increased discharge capacity can be made. This latter approach is more conservative and accurate, given the historical dataset, for an antidegradation analysis because it assesses the impact of the proposed upgrade/expansion on maintaining downstream water quality that is better than applicable criteria. This later approach was used for copper and lead assessments.

As identified in Footnote B to Table 3-3 in the ROWD, there have been no detects of bis (2-ethylhexylphthalate) in the effluent since the County implemented clean sampling techniques in January 2007.

For purposes of this analysis, future effluent quality is assumed to be the same as current effluent quality with the exception of: 1) trihalomethanes (THM) which, upon implementation of U.V. disinfection which will reduce all effluent THM concentrations to non-detects; 2) electrical conductivity (EC) and total dissolved solids (TDS) which will decrease when chlorine disinfection ceases (because the dissolved chlorine and sulfur dioxide gases increase the concentration of ions in the effluent) and biological nutrient removal is added to the process; 3) turbidity and total coliform for which compliance will be achieved by improved treatment efficiency via flow equalization and removal via new primary and secondary clarifiers and new tertiary filters (or new membrane bioreactor facilities); and 4) ammonia and nitrate for which compliance will be achieved by improved treatment efficiency through flow equalization and improved removal with the new aeration basins (which include anoxic and oxic selectors for biological nutrient removal).

The decrease in EC and TDS is due primarily to the conversion to U.V. disinfection. Since the existing chlorination/dechlorination process uses chlorine gas and sulfur dioxide gas, the switch to U.V. disinfection and elimination of chlorine and sulfur dioxide gas utilization is expected to appreciably decrease levels of EC and TDS in the effluent. Experience at another foothill plant upgrading from chlorine/sulfur dioxide to U.V. disinfection and biological nutrient removal has resulted in a decrease in EC of ~40% to date. Similarly, for a foothill plant upgrading from sodium hypochlorite/sodium bisulfite to U.V. disinfection, the decrease in EC has been ~40% from to ~750 µmhos/cm to 450 µmhos/cm (RBI 2007). For the purposes of this analysis, the anticipated reduction in EC and TDS for the upgraded and expanded SMD1 WWTP is conservatively set at 30%.

Phosphorus effluent levels are also expected to decrease in the upgraded and expanded SMD1 WWTP. However an accurate quantification of the expected decrease cannot be calculated at this time.

4.4.2 303(D) Listed and Other Non-High Quality Water Body Constituents

When existing baseline water quality exceeds water quality objectives, the water quality standards require improving the existing water quality to meet objectives. On a constituent-specific basis, a balancing analysis of the proposed action and the public interest of the State, is not triggered if the receiving water is not high quality (i.e, better than the applicable criteria/objectives).

The SWRCB (2006) has listed one downstream waterbodies (a portion of the Sacramento River) as impaired, in accordance with Section 303(d) of the Clean Water Act. Thus, 303(D) listed waterbodies are not high quality with respect to listed constituents. As such, there is no analysis for antidegradation for listed constituents. However, as part of a TMDL process, the SMD1 WWTP would be held to meet existing objectives for listed constituents.

In particular, the Sacramento River from Knights Landing to the Delta is listed for unknown toxicity, mercury, and diazinon. The 2008 303(D) list has the following proposed changes: 1) add lower Coon Creek, (from Pacific Avenue to Main Canal, Sutter County) for chlorpyrifos, Escherichia coli (E. coli), and unknown toxicity; 2) for the Sacramento River from Knights Landing to the Delta: remove diazinon from the list and add chlordane, DDT, dieldrin, and PCBs; and 3) add Natomas Cross Canal for mercury.

The following constituents in the receiving water exceed water quality standards upstream of the discharge and thus do not trigger a balancing of the proposed action with public interest of the State:

- Aluminum,
- Bis (2-ethylhexyl) phthalate[1], and
- Iron.

For bis (2-ethylhexyl) phthalate, it is probable that the historical detects are due to contamination during sampling. As noted in the previous section, after the County implemented clean sampling techniques in January 2007, there were no detects for bis (2-ethylhexyl) phthalate in the effluent. There is no corresponding receiving water monitoring data for bis (2-ethylhexyl) phthalate after 2007.

The additional constituents, aluminum, bis (2-ethylhexyl) phthalate, and iron, are similarly not addressed further in this analysis. When the receiving water exceeds objectives and the constituent is detected in the effluent (Step 4 in the reasonable potential analysis outlined in the SIP), the SIP independently provides the means to prevent further degradation of the receiving water through the implementation of effluent monitoring for that constituent and may impose effluent limitations.

[1] For bis (2-ethylhexyl) phthalate, it is probable that the historical detects are due to contamination during sampling. As noted in the previous section, after the County implemented clean sampling techniques in January 2007, there were no detects for bis (2-ethylhexyl) phthalate in the effluent. There is no corresponding receiving water monitoring data for bis (2-ethylhexyl) phthalate after January 2007. Regardless of the accuracy of the receiving water bis (2-ethylhexyl) phthalate data, the non-detects in effluent mean that the existing or future effluent discharges are not expected to negatively affect bis (2-ethylhexyl) phthalate levels in the downstream receiving water.

4.5 Incremental Change in Rock Creek and Dry Creek Water Quality and Effects on Beneficial Uses

The following sections describe the incremental change in Rock Creek and Dry Creek water quality that would occur by increasing the SMD1 WWTP's permitted discharge rate from 2.18 mgd ADWF to 2.7 mgd ADWF, and the effect of that increase on water quality.

4.5.1 Mass Balance Constituents

The existing NPDES permit cites available information to determine that Rock Creek and Dry Creek are low-flow or intermittent streams in the absence of the SMD1 WWTP discharge or the upstream reservoirs. Therefore, under the NPDES permit's design flow scenario, in which Rock Creek and Dry Creek flow is zero, the creek quality is the same as the effluent quality, and the incremental change in constituent concentrations due to an increase in discharge from 2.18 mgd ADWF to 2.7 mgd ADWF would be zero; therefore, no degradation would occur from a constituent concentration basis due to the increased discharge rate.

When there is creek flow, however, there would be some change to creek water quality, downstream of the discharge, due to an increased discharge rate. **Table 5** presents the incremental change in Rock Creek water quality for detected effluent constituents. Table 5 also identifies the available assimilative capacity (criterion minus R2 concentration at 2.18 mgd discharge rate), and the percent of remaining assimilative capacity used by the 0.52 mgd ADWF incremental increase in discharge proposed. Similarly, **Table 6** presents the incremental change in Dry Creek water quality for detected effluent constituents.

For completeness, Table 5 and Table 6 show the potential effects for copper and lead with and without inclusion of the outlier values. As can be seen in the tables, inclusion of the outlier values results in no available assimilative capacity. Similarly, Table 5 and Table 6 show the potential effects of EC and TDS at existing levels and the effects at anticipated levels (i.e., at least 30% lower due, primarily, to the conversion to U.V. disinfection).

Table 5 and Table 6 show a decrease in downstream concentrations for aluminum, barium, chromium, cyanide, iron, manganese, mercury, nickel, the dioxin congener OCDD, and tributyltin because current and anticipated SMD1 WWTP effluent levels are less than upstream receiving water concentrations.

Constituents with long-term effects (e.g., human health constituents based on cancer risk associated with long-term exposures) that have a detection frequency less than 20% in effluent samples (see Section 4.2.2 for basis of this threshold) are not considered to cause a consistent or notable effect. The incremental change in water quality due to discharging these infrequently detected constituents with long-term effects is shown in **Appendix E.**

Table 5. Incremental mass balance change in Rock Creek water quality due to future 2.7 mgd ADWF discharge of constituents and comparison to applicable water quality standards.

Constituent	Units	Effluent Percent Detect	Concentration in Rock Creek downstream of WWTP outfall (R2)			Lowest Applicable Water Quality Criteria		Assimilative Capacity		Further Analysis
			@ Current (2.18 mgd) Discharge Rate	@ Future (2.7 mgd) Discharge Rate	Incremental Increase	Value	Basis	Available	Used by Expansion	
Aluminum	µg/L	92%	164	163.34	-0.310	200	EPA	NA [1]	NA	N
Ammonia	mg/l	69%	14.6	1.9508	-12.7	2.7	EPA	NA	NA [2]	N
Antimony	µg/L	60%	0.179	0.196	0.0169	6	DHS MCL	5.82	0.3%	N
Arsenic	µg/L	100%	2.48	2.762	0.282	10	DHS MCL	7.52	3.7%	N
Atrazine	µg/L	19%	1.98	1.9848	0.00350	NA	NA	NA	NA	N
Barium	µg/L	100%	9.17	8.7953	-0.371	1000	USEPA Advisory	991	0.0%	N
Cadmium	µg/L	60%	0.0351	0.0353	0.000169	3.22	CTR	3.18	0.0%	N
Chloride	mg/L	100%	23.8	26.418	2.59	106	Basin	82.2	3.2%	N
Chloroform	µg/L	96%	9.37	ND	NA [3]	5.7	NTR	NA	NA [2]	N
Chromium (III)	µg/L	60%	0.413	0.3881	-0.0247	50	DHS MCL	49.6	0.0%	N
Chromium (IV)	µg/L	15%	0.968	0.9661	-0.00140	11	CTR	10.0	0.0%	N
Copper	µg/L	95%	21.3	21.4	0.109	12.51	CTR	NA	NA	N
Copper (w/o outlier)	µg/L	95%	9.89	9.93	0.0398	12.51	CTR	2.62	1.5%	N
Cyanide	µg/L	33%	0.103	0.0856	-0.0175	5.2	CTR	5.10	-0.3%	N
DBCM	µg/L	29%	0.214	ND	NA [3]	0.4	CTR	0.186	NA [2]	N
DCBM	µg/L	75%	1.38	ND	NA [3]	0.56	CTR	NA	NA [2]	N
Di-n-butyl phthalate	µg/L	20%	0.506	0.512	0.00556	2700	CTR	2,700	0.0%	N
Electrical conductivity (EC)	µmhos/cm	100%	316	344	28.5	700	Basin	384	7.4%	N
EC anticipated with upgraded/expanded plant	µmhos/cm	100%	316	258	-57.8	700	Basin	384	-15%	N
Fluoride	µg/L	58%	0.145	0.145	0.000381	2000	DHS MCL	2,000	0.0%	N

Table 5. Incremental mass balance change in Rock Creek water quality due to future 2.7 mgd ADWF discharge of constituents and comparison to applicable water quality standards.

Constituent	Units	Effluent Percent Detect	Concentration in Rock Creek downstream of WWTP outfall (R2)			Lowest Applicable Water Quality Criteria		Assimilative Capacity		Further Analysis
			@ Current (2.18 mgd) Discharge Rate	@ Future (2.7 mgd) Discharge Rate	Incremental Increase	Value	Basis	Available	Used by Expansion	
Iron	µg/L	100%	218	204	-13.7	300	DHS MCL	NA [1]	NA	N
Lead	µg/L	95%	24.4	24.6	0.145	4.48	CTR	NA	NA	N
Lead (w/o outlier)	µg/L	95%	1.21	1.22	0.00537	4.48	CTR	3.27	0.2%	N
Manganese	µg/L	100%	27.1	26.7	-0.498	50	DHS MCL	22.9	-2.2%	N
Mercury	µg/L	79%	0.0034	0.0033	-0.000160	0.05	CTR	0.0466	-0.3%	N
Methylene blue active substances	mg/L	92%	0.058	0.0636	0.00558	0.5	DHS MCL	0.442	1.3%	N
Molinate	µg/L	20%	2.23	2.25	0.0124	13	CDFG	10.8	0.1%	N
Nickel	µg/L	75%	2.71	2.71	-0.00128	69.8	CTR	67.1	0.0%	N
Nitrate	mg/L	100%	47.5	9.77	-37.7	10	DHS MCL	NA	NA [1]	N
OCDD		30%	11.9	11.5	-0.487	NA		NA	NA	N
Phosphorus	µg/L	100%	1.77	2.01	0.235 [4]	10	USEPA-Nutrient	8.23	2.9% [4]	N
Selenium	µg/L	50%	1.17	1.17	0.00630	5	CTR	3.83	0.2%	N
Silver	µg/L	5%	0.0198	0.0198	3.50E-05	3.36	CTR	3.34	0.0%	N
Sulfate	mg/L	100%	18.7	20.5	1.83	250	DHS 2°MCL	231	0.8%	N
TDS	mg/L	100%	184	200	16.2	450	Basin Plan	266	6.1%	N
TDS anticipated with upgraded/expended plant	mg/L	100%	184	150	-33.5	450	Basin Plan	266	-13%	N
Tributyltin	µg/L	9%	0.0025	0.0025	-1.5E-05	0.072	USEPA-AQ	0.0695	0.0%	N
Zinc	µg/L	100%	46.7	46.9	0.246	160.3	CTR	114	0.2%	N

Notes:
CTR-AQ = California Toxics Rule criterion for the acute/chronic protection of aquatic life. Based on a minimum effluent hardness of 141 mg/L as $CaCO_3$.
CTR-HH = California Toxics Rule criterion for the protection of human health (consumption of water and organisms).
DHS MCL = Department of Health Services maximum contaminant level.

Table 5. Incremental mass balance change in Rock Creek water quality due to future 2.7 mgd ADWF discharge of constituents and comparison to applicable water quality standards.

Constituent	Units	Effluent Percent Detect	Concentration in Rock Creek downstream of WWTP outfall (R2)			Lowest Applicable Water Quality Criteria		Assimilative Capacity		Further Analysis
			@ Current (2.18 mgd) Discharge Rate	@ Future (2.7 mgd) Discharge Rate	Incremental Increase	Value	Basis	Available	Used by Expansion	

DHS 2nd MCL= Department of Health Services secondary maximum contaminant level.

Total Rec. = total recoverable.

NA = not applicable and/or no assimilative capacity is available.

ND = non-detect

All effluent values expected to be non-detectable with UV disinfection.

[1] Currently there is no assimilative capacity because the upstream receiving water exceeds the applicable water quality criteria.

[2] Currently there is no assimilative capacity. However effluent from the upgraded/expanded plant and downstream receiving waters will meet applicable water quality criteria.

[3] The anticipated decrease cannot be calculated since effluent levels are expected to be non-detect for the upgraded/expanded plant.

[4] Phosphorus levels are anticipated to decrease in effluent form the upgraded/expanded plant. However, an accurate quantification of the anticipated decrease cannot be calculated at this time.

Table 6. Incremental mass balance change in Dry Creek water quality due to future 2.7 mgd ADWF discharge of constituents and comparison to applicable water quality standards.

Constituent	Units	Effluent Percent Detect	Concentration in Dry Creek downstream of WWTP and Rock Creek (R4)			Lowest Applicable Water Quality Criteria		Assimilative Capacity		Further Analysis
			@ Current (2.18 mgd) Discharge Rate	@ Future (2.7 mgd) Discharge Rate	Incremental Increase	Value	Basis	Available	Used by Expansion	
Aluminum	µg/L	92%	163	163	-0.49	200	EPA	NA [1]	NA	N
Ammonia	mg/l	69%	14.6	1.95	-12.6	2.7	EPA	NA	NA [2]	N
Antimony	µg/L	60%	0.176	0.196	0.0199	6	DHS MCL	5.82	0.3%	N
Arsenic	µg/L	100%	2.43	2.76	0.334	10	DHS MCL	7.57	4.4%	N
Atrazine	µg/L	19%	1.98	1.98	0.0062	NA	NA	NA	NA	N
Barium	µg/L	100%	9.32	8.87	-0.448	1000	USEPA Advisory	991	0.0%	N
Cadmium	µg/L	60%	0.035	0.0353	0.0003	3.22	CTR	3.19	0.0%	N
Chloride	mg/L	100%	23.5	26.5	3.057	106	Basin	82.5	3.7%	N
Chloroform	µg/L	96%	9.14	ND	NA [3]	5.7	NTR	NA	NA [2]	N
Chromium (III)	µg/L	60%	0.426	0.396	-0.03	50	DHS MCL	49.6	-0.1%	N
Chromium (IV)	µg/L	15%	0.967	0.965	-0.002	11	CTR	10.0	0.0%	N
Copper	µg/L	95%	21.2	21.425	0.19	12.51	CTR	NA	NA	N
Copper (w/o outlier)	µg/L	95%	9.85	9.92	0.0709	12.51	CTR	2.66	2.7%	N
Cyanide	µg/L	33%	0.127	0.0938	-0.034	5.2	CTR	5.07	-0.7%	N
DBCM	µg/L	29%	0.211	ND	NA [3]	0.4	CTR	0.189	NA [2]	N
DCBM	µg/L	75%	1.343	ND	NA [3]	0.56	CTR	NA	NA [2]	N
Di-n-butyl phthalate	µg/L	20%	0.506	0.512	0.0066	2700	CTR	2,700	0.0%	N
Electrical conductivity (EC)	µmhos/cm	100%	313	347	33.5	700	Basin	387	8.7%	N
EC anticipated with upgraded/expanded plant	µmhos/cm	100%	316	260	-52.9	700	Basin	387	-14%	N
Fluoride	µg/L	58%	0.1428	0.143	0.0006	2000	DHS MCL	2,000	0.0%	N

Table 6. Incremental mass balance change in Dry Creek water quality due to future 2.7 mgd ADWF discharge of constituents and comparison to applicable water quality standards.

Constituent	Units	Effluent Percent Detect	Concentration in Dry Creek downstream of WWTP and Rock Creek (R4)			Lowest Applicable Water Quality Criteria		Assimilative Capacity		Further Analysis
			@ Current (2.18 mgd) Discharge Rate	@ Future (2.7 mgd) Discharge Rate	Incremental Increase	Value	Basis	Available	Used by Expansion	
Iron	µg/L	100%	224	207	-16.6	300	DHS MCL	NA [1]	NA	N
Lead	µg/L	95%	24.3	24.6	0.252	4.48	CTR	NA	NA	N
Lead (w/o outlier)	µg/L	95%	1.21	1.22	0.0094	4.48	CTR	3.27	0.3%	N
Manganese	µg/L	100%	27.7	27.0	-0.632	50	DHS MCL	22.3	-2.8%	N
Mercury	µg/L	79%	0.0034	0.00323	-2E-04	0.05	CTR	0.0466	-0.4%	N
Methylene blue active substances	mg/L	92%	0.057	0.0636	0.0066	0.5	DHS MCL	0.443	1.5%	N
Molinate	µg/L	20%	2.22	2.25	0.0216	13	CDFG	10.8	0.2%	N
Nickel	µg/L	75%	2.73	2.72	-0.008	69.8	CTR	67.1	0.0%	N
Nitrate	mg/L	100%	47.3	9.77	-37.5	10	DHS MCL	NA	NA	N
OCDD		30%	11.9	11.3	-0.563	NA		NA	N	N
Phosphorus	µg/L	100%	1.73	2.01	0.278 [4]	10	USEPA-Nutrient	8.27	3.4% [4]	N
Selenium	µg/L	50%	1.162	1.17	0.011	5	CTR	3.84	0.3%	N
Silver	µg/L	5%	0.0198	0.0198	7E-05	3.36	CTR	3.34	0.0%	N
Sulfate	mg/L	100%	18.4	20.5	2.15	250	DHS 2°MCL	232	0.9%	N
TDS	mg/L	100%	182	201	19.1	450	Basin Plan	268	7.1%	N
TDS anticipated with upgraded/expended plant	mg/L	100%	184	152	-30.6	450	Basin Plan	268	-11%	N
Tributyltin	µg/L	9%	0.0025	0.00247	-3E-05	0.072	USEPA-AQ	0.0695	0.0%	N
Zinc	µg/L	100%	46.5	46.9	0.426	160	CTR	114	0.4%	N

Notes:
CTR-AQ= California Toxics Rule criterion for the acute/chronic protection of aquatic life. Based on a minimum effluent hardness of 141 mg/L as $CaCO_3$.
CTR-HH = California Toxics Rule criterion for the protection of human health (consumption of water and organisms).
DHS MCL = Department of Health Services maximum contaminant level.

Table 6. **Incremental mass balance change in Dry Creek water quality due to future 2.7 mgd ADWF discharge of constituents and comparison to applicable water quality standards.**

Constituent	Units	Effluent Percent Detect	Concentration in Dry Creek downstream of WWTP and Rock Creek (R4)			Lowest Applicable Water Quality Criteria		Assimilative Capacity		Further Analysis
			@ Current (2.18 mgd) Discharge Rate	@ Future (2.7 mgd) Discharge Rate	Incremental Increase	Value	Basis	Available	Used by Expansion	

DHS 2nd MCL= Department of Health Services secondary maximum contaminant level.
Total Rec. = total recoverable.
NA = not applicable and/or no assimilative capacity is available.
ND = non-detect
All effluent values expected to be non-detectable with UV disinfection.
[1] Currently there is no assimilative capacity because the upstream receiving water exceeds the applicable water quality criteria.
[2] Currently there is no assimilative capacity, however effluent from the upgraded/expanded plant and downstream receiving waters will meet applicable water quality criteria.
[3] The anticipated decrease cannot be calculated since effluent levels are expected to be non-detect for the upgraded/expanded plant.
[4] Phosphorus levels are anticipated to decrease in effluent form the upgraded/expanded plant. However, an accurate quantification of the anticipated decrease cannot be calculated at this time.

For each constituent in Table 5 and Table 6, a determination has been made about the significance of the change in water quality. If further analysis is needed (i.e., if 10% or greater use of available assimilative capacity is expected to occur), it is so noted. In general, the results for both Rock Creek and Dry Creek are very similar. As shown in Table 5 and Table 6, expanding the discharge capacity would not result in lowered water quality at or above the 10% assimilative capacity threshold defined in EPA guidance.

Note that the assessment of assimilative capacity utilization for phosphorus is conservative because it is based on existing plant performance projected to a 2.7 mgd ADWF capacity while the upgraded and expanded plant will have greater capacity for biological nutrient removal. Thus, future effluent phosphorus levels are expected to be lower than existing levels.

4.5.2 Mass Loading Constituents

Bioaccumulative constituents detected in SMD1 WWTP effluent are listed in **Table 7.** For both mercury and selenium, the area with the greatest likelihood of contributing to existing concerns is in the Delta. Although the organic forms of mercury and selenium have the greatest potential to bioaccumulate, inorganic monitoring data is more readily available and can be indicative of potential impacts. Most "persistent, chlorinated pesticides" have significant potential to bioaccumulate and have a "non-detect" objective in the Basin Plan.

Table 7. Bioaccumulative and other constituents that have been detected in Placer County SMD1 WWTP effluent that will be analyzed for the potential to affect downstream water body concentration or accumulate in sediments.

Mercury[1]	Selenium	TDS (Total Dissolved Solids)
[1] On 2006 303(d) list of impaired water bodies for these constituents.		

Table 8 presents the incremental change in mass loading and the incremental use in available assimilative capacity for Rock Creek while **Table 9** shows the incremental increase in mass loading and incremental use in available assimilative capacity for Dry Creek downstream of the SMD1 WWTP. For completeness Table 8 and Table 9 show the potential effects of TDS at existing levels and the effects at anticipated levels (i.e., at least 30% lower due, primarily, to the conversion to U.V. disinfection).

For each constituent in Table 8 and Table 9, a determination has been made about the significance of the change in water quality. If further analysis is needed (i.e., if 10% or greater use of available assimilative capacity is expected to occur), it is so noted. In general, the results for both Rock Creek and Dry Creek are very similar. As shown in Table 8 and Table 9, expanding the discharge capacity would not result in lowered water quality at or above the 10% assimilative capacity threshold defined in EPA guidance.

Table 8. Incremental change in Rock Creek water quality, on a mass loading basis, due to future discharges of bioaccumulative constituents.

Constituent	Units	Effluent Percent Detect	Mass Loading to Rock Creek (lbs/day)			Lowest Applicable Water Quality Criteria		Assimilative Capacity		Further Analysis
			@ Current (2.18 mgd) Discharge Rate	@ Future (2.7 mgd) Discharge Rate	Net Loading Increase	Value lbs/day	Basis	Available lbs/day	Used by Expansion	
Mercury	µg/L	79%	2.81×10^{-5}	3.48×10^{-5}	0.67×10^{-5}	0.00254	CTR-HH	0.00217	0.31%	N
Selenium	µg/L	50%	0.0218	0.0270	0.0052	0.116	CTR-AQ	0.0719	7.2%	N
TDS	mg/L	100%	6,800	8,430	1,620	22,900	Basin Plan	21,400	**13%**	**N**[1]
TDS anticipated with the upgraded/expanded plant	mg/L	100%	6,800	5,900	-905	22,900	Basin Plan	21,400	-7.3%	N

Notes:
CTR-AQ= California Toxics Rule criterion for the acute/chronic protection of aquatic life. Based on a minimum effluent hardness of 141 mg/L as $CaCO_3$.
CTR-HH = California Toxics Rule criterion for the protection of human health (consumption of water and organisms).
[1] The conversion to U.V. disinfection is expected to decrease TDS levels at least 30%.

Table 9. Incremental change in Dry Creek water quality, on a mass loading basis, due to future discharges of bioaccumulative constituents.

Constituent	Units	Effluent Percent Detect	Mass Loading to Dry Creek (lbs/day)			Lowest Applicable Water Quality Criteria		Assimilative Capacity		Further Analysis
			@ Current (2.18 mgd) Discharge Rate	@ Future (2.7 mgd) Discharge Rate	Net Loading Increase	Value lbs/day	Basis	Available lbs/day	Used by Expansion	
Mercury	µg/L	79%	2.19×10^{-5}	3.48×10^{-5}	1.29×10^{-5}	0.00260	CTR-HH	0.00222	0.30%	N
Selenium	µg/L	50%	0.0170	0.0270	0.0100	0.116	CTR-AQ	0.0723	7.2%	N
TDS	mg/L	100%	5,310	8,430	3,120	23,400	Basin Plan	21,500	**13%**	**N**[1]
TDS anticipated with the upgraded/expanded plant	mg/L	100%	6,800	5,900	-905	22,900	Basin Plan	21,400	-7.2%	N

Notes:
CTR-AQ= California Toxics Rule criterion for the acute/chronic protection of aquatic life. Based on a minimum effluent hardness of 141 mg/L as $CaCO_3$.
CTR-HH = California Toxics Rule criterion for the protection of human health (consumption of water and organisms).
[1] The conversion to U.V. disinfection is expected to decrease TDS levels at least 30%.

4.5.3 Effects of Receiving Water Quality Changes on Beneficial Uses

Ammonia

The existing facilities have been continually modified and expanded to improve ammonia removal. However, the monitoring data demonstrates that although effluent ammonia levels have decreased the current facilities can not consistently remove ammonia to a level fully protective of aquatic life beneficial uses. Difficultly in maintain nitrification with the existing rotating biological contactor (RBC) has been hampered by the capabilities of the RBC, particularly during cooler weather. As part of the expansion process, the County evaluated existing nitrification performance and identified the necessary operation plans to consistently achieve full nitrification year-round with the new aeration basins. As a result, the SMD1 WWTP effluent is expected to maintain effluent ammonia levels of less than 1 mg/L with maximum effluent ammonia levels of 2 mg/L.

Fixed ammonia water quality criteria at the discharge location, and consistent with the U.S. EPA's 1999 Ammonia Update, have been developed for SMD1 WWTP based on reasonable worst-case conditions from effluent monitoring data collected from July 2006 through June 2009. The criterion maximum concentration (CMC) for ammonia varies only with pH and was calculated with the maximum allowable pH (8.5) under the Basin Plan objective for pH in Rock and Dry creeks, and the CMC is 2.1 mg N/L as a 1-hour average. The maximum historical effluent pH for SMD1 WWTP is 7.7 which would result in a CMC of 9.6 mg/L. If the SMD1 WWTP elects to meet an effluent pH maximum (e.g., 8.2) more stringent than the Basin Plan, then the effluent ammonia limitations would be based on a reasonable worst-case condition rather than the unreasonable assumption of a maximum effluent pH of 8.5 given that the historical maximum effluent pH value is 7.7.

The criterion continuous concentration (CCC) for ammonia varies with pH and temperature. The 30-day average CCC is calculated using the temperature and pH of the effluent. First, the CCC was calculated for each day when temperature and pH were measured. Then, the 30-day CCC is calculated. U.S. EPA guidance for aquatic life protection requires that the applicable criteria are not to be exceeded at a frequency greater than once in three years. This requires that the 99.9% value in the monitoring dataset be at or below the applicable criteria. The lowest 99.9% 30-day average CCC was 2.70 mg/L as N during this period.

Using a reasonable worst-case maximum effluent pH of 8.2, the applicable effluent ammonia criteria to protect aquatic life beneficial uses would be an average monthly effluent limitation (AMEL) of 1.4 mg/L as N and a maximum daily effluent limitation (MDEL) of 3.8 mg/L as N. Thus, as stated above, the expected ammonia removal performance of the upgraded and expanded SMD1 WWTP will be a substantial improvement over current conditions and is more than adequate to ensure that applicable water quality objectives are met and aquatic life beneficial uses protected.

Dissolved Oxygen

The components of wastewater with the potential to affect dissolved oxygen (DO) concentrations include biochemical oxygen demand (BOD) and ammonia. The NPDES permit contains monthly average (10 mg/L), weekly average (15 mg/L), and daily average (25 mg/L) effluent limits for BOD, and limits for ammonia, based on the U.S. EPA's recommended water quality criteria for aquatic life. The NPDES permit also has a DO limitation for Rock and Dry creeks that states the discharge shall not cause the DO to fall below 7.0 mg/L, which is derived from the Basin Plan objective for DO.

The SMD1 WWTP produces tertiary-treated effluent when influent flows are less than 3.5 mgd and provides a combination of secondary and tertiary treatment when influent flows are greater than 3.5 mgd. While effluent ammonia levels have been elevated (average of 2.4 mg/L) and variable (maximum of 15.1 mg/L), the effluent has been characterized by low concentrations of BOD (typically less than 4.7 mg/L, average of 2.8 mg/L). Re-aeration of downstream waters due to physical processes and photosynthesis tends to offset the oxygen demand of effluent as it flows downstream. As discharge rates increase in the future, the proportion of creek water constituted by effluent also would increase, thereby increasing the relative portion of BOD and ammonia load. Thus, the incremental increase in discharge, without improvement in effluent quality, could result in the lowering of water quality with respect to DO. As stated above, effluent ammonia levels are expected to decrease substantially to an average of <1 mg/L and a maximum of 2 mg/L.

The ROWD (Placer County 2009) indicates that historical discharge season DO monitoring in Rock Creek and Dry Creek downstream of the outfall between July 2006 and June 2009 indicates a 99% (1085 of 1096) compliance rate at both locations with the daily minimum DO limitation of 7.0 mg/L. **Table 10** identifies the concurrent R1/R2 and R3/R4 DO levels when either R2 or R4 DO levels are below 7.0 mg/L. For nine of the eleven occurrences when downstream DO levels in Dry Creek (R4) were below 7.0 mg/L, the upstream (R3) DO level was the same or lower. This indicates that when the effluent may cause a temporary DO sag in Rock or Dry Creek, the creek is re-aerated above 7.0 mg/L within 350 feet of the discharge location (the R4 monitoring location is 150 feet below the confluence of Rock and Dry creeks which is 200 feet downstream of the discharge location on Rock Creek). Thus, any incremental DO load that would potentially cause a "sag" in downstream DO concentrations would occur within Rock Creek or Dry Creek (within 350 feet of the discharge), and thus would not affect DO levels further downstream in Dry Creek, in Coon Creek, or other downstream waterbodies, including the Sacramento River, due to full assimilation of the DO demand within Rock and Dry creeks and to continued downstream re-aeration, photosynthesis, etc.

Table 10. Dissolved oxygen (DO) concentrations in Rock Creek (R2) and Dry Creek (R4) that were below 7.0 mg/L at the downstream monitoring station and concurrent upstream DO concentrations (R1 and R3, respectively).

Date	Dissolved Oxygen (mg/L)			
	R1	R2	R3	R4
7/21/2006	7.5	6.8	6.1	6.7
7/22/2006	8	6.8	6.7	6.9
7/23/2006	7.9	6.9	6.8	7.8
7/28/2006	8.4	6.3	7.5	7.4
8/4/2006	8	6	7.2	6.3
9/1/2006	8.2	5.9	7.5	6.2
8/2/2007	7.7	7.1	6.4	6.7
4/27/2008	8.6	7.4	7.1	6.9
5/16/2008	7.8	6.8	5.4	6.7
6/8/2008	7.8	6.9	6.8	6.8
7/12/2008	7.4	7.2	5.2	6.1
7/13/2008	7.1	6.9	5.5	7.2
7/23/2008	7	6.7	6.3	7.1
8/14/2008	7.8	7	6	6.5
9/9/2008	7	7	5.3	6.9
9/12/2008	6.7	6.8	5.7	6.9

Nitrate

The SMD1 WWTP does not currently include denitrification facilities. Historical effluent nitrate levels are seasonally near 30 mg/L and have been as high as 49 mg/L. The California Primacy maximum contaminant level (MCL) for nitrate is 10 mg/L as N. Planned improvements to increase ammonia removal will also result in increased conversion of ammonia to nitrate. Thus, the planned addition of denitrification capacity to the upgraded and expanded SMD1 WWTP will result in maximum effluent nitrate levels of 10 mg/L, which is a substantial improvement over existing conditions.

pH

The SMD1 WWTP NPDES permit has an effluent limitation that requires discharges to have a pH between 6.5 and 8.5. Of the 1096 effluent pH measurements measured from July 2006 through June 2009, only one pH value was less than 6.5 and no pH values were greater than 8.5. Based on the current science regarding pH requirements of freshwater aquatic life (the beneficial use of Rock and Dry creeks most sensitive to pH) the Regional Water Board has processed a Basin Plan amendment that removes the 0.5-unit change requirement of the current pH objective, leaving the component that requires controllable factors affecting water quality to maintain receiving water pH between 6.5 and 8.5 units (CVRWQCB 2002). Recently, the Regional Water Board received notification from USEPA that it has approved the pH Basin Plan amendment. Because the permit requires effluent discharged to Rock and Dry creeks to have a pH between

6.5 and 8.5, future discharges, regardless of volume, would not cause Rock and Dry creeks pH values to fall outside this range. Thus, the 0.52 mgd ADWF increase in discharge would not result in a lowering of water quality with respect to pH. As such, beneficial uses of Rock and Dry creeks and downstream waters will not be adversely affected by the incremental change in pH due to expanded capacity of the SMD1 WWTP.

Temperature

The temperature of Rock and Dry creeks downstream of the SMD1 WWTP outfall is dependent on upstream creek and effluent discharge flow rates and temperatures. The Basin Plan's temperature objective states, *"At no time or place shall the temperature of COLD or WARM intrastate waters be increased more than 5°F above natural receiving water temperature."* While the SMD1 WWTP has a high degree of compliance with this objective, the objective is not well supported by the current science on the protection of aquatic life, nor is it consistent with U.S. EPA's recommendations for regulating thermal effects of discharges. It is the resulting downstream temperature regime within Rock and Dry creeks that is of interest in terms of assessing thermal effects of the discharge on downstream beneficial uses, the most sensitive of which is the aquatic life use.

Table 11 summarizes Rock and Dry creek water temperatures upstream and downstream of the discharge, under historic operations. Average temperatures in Rock Creek downstream of the outfall (R2) are higher than those upstream (R1), typically by 2°F, and always by less than 4°F. Likewise, R1/R2 and R3/R4 minimum and maximum temperatures are generally similar. Upstream temperatures on Dry Creek (R3) vary substantially from upstream temperatures on Rock Creek (R1) and range from over 2°F colder to over 7°F warmer.

The effect of the SMD1 discharge downstream on Dry Creek (R4) was determined by first predicting the downstream temperatures from upstream flows and temperatures (R1 and R3) with and without the effluent discharge. The monthly average flow values for the period July 2006–June 2009 used are summarized in **Table 12.** Predicted mean monthly downstream temperatures with effluent discharge (R4) differed from monitoring data by -0.4°F, on average (difference ranged from -1.0°F to 0.1°F). The net effect of the discharge is to increase mean monthly downstream Dry Creek temperatures by 1.5°F (effect ranged from 1.2–2.8°F). Current temperature conditions within the creek, based on available temperature data, indicate thermal effects at levels that would not be expected to adversely affect downstream beneficial uses, including aquatic life uses.

Table 11. Rock Creek and Dry Creek temperatures[1] upstream (R1/R3) and downstream (R2/R4) of the SMD1 Wastewater Treatment Plant outfall.

Statistic	Location	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Count	R1	93	85	93	90	93	90	93	93	90	93	90	93
	Effluent	93	85	93	90	93	90	93	93	90	93	90	93
	R2	92	84	93	90	90	90	92	91	90	90	89	93
	R3	93	85	93	90	93	90	93	93	90	93	90	93
	R4	93	85	93	90	93	90	93	93	90	93	90	93
Average	R1	44.18	47.71	51.92	55.18	60.51	63.69	68.47	69.43	66.72	59.07	54.62	46.66
	Effluent	57.13	57.86	60.71	63.55	68.80	72.18	75.62	75.96	74.08	68.39	65.04	59.28
	R2	47.99	50.51	54.53	57.10	62.43	65.48	70.45	71.37	67.93	61.17	57.49	50.48
	R3	42.70	47.66	54.12	59.92	66.78	71.07	74.58	73.07	66.66	56.64	52.44	44.51
	R4	46.93	49.81	54.64	58.02	63.14	66.44	70.83	71.57	68.02	61.10	56.83	49.66
Minimum	R1	35.6	39.74	44.96	46.94	49.46	55.94	58.64	62.06	61.52	51.8	44.6	41
	Effluent	50	53.96	53.06	59	61.7	68	71.6	71.6	68	64.22	59	53.6
	R2	40.46	41.54	48.2	48.56	49.64	56.48	59.36	62.6	62.6	55.22	50	42.98
	R3	34.52	39.74	45.32	53.06	55.58	63.68	61.16	66.02	58.64	48.02	41.9	38.84
	R4	37.94	41	46.76	50	35.78	57.56	60.08	62.6	62.42	55.04	48.92	43.7
Maximum	R1	51.98	54.5	59.18	66.38	70.16	74.84	79.7	76.64	78.8	65.48	60.8	53.24
	Effluent	62.78	61.34	64.76	69.8	80.6	76.64	81.86	81.32	81.5	74.3	68.54	64.4
	R2	53.42	56.84	61.16	67.46	71.42	77	81.14	78.26	79.52	66.56	64.04	57.38
	R3	50.72	55.04	63.14	73.04	78.98	78.98	83.12	79.34	80.24	64.94	59.54	53.42
	R4	53.24	56.48	61.7	68.54	71.96	78.08	81.14	78.8	79.7	66.74	64.22	55.76

[1] Temperature data collected daily from June 2006 through July 2009.

Table 12. Mean monthly flows (mgd) for upstream Rock Creek (R1), effluent, and upstream Dry Creek (R3) for the period June 2006 through July 2009.

Location	Mean Monthly Flow (mgd)											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Upstream Rock Creek (R1)	4.09	4.95	4.05	4.98	5.21	5.01	4.49	4.73	6.72	5.28	3.78	4.24
Effluent	1.72	2.23	1.70	1.46	1.47	1.37	1.37	1.41	1.40	1.41	1.41	1.67
Upstream Dry Creek (R3)	2.57	4.94	2.90	1.68	1.72	0.61	0.23	0.47	0.37	0.43	1.51	2.27

With an incremental increase in discharge, temperatures downstream of the outfall could further increase, relative to historic conditions. Whether resultant future downstream Rock or Dry Creek temperatures under a 2.7 mgd discharge scenario would adversely affect aquatic life beneficial uses cannot be definitively determined from available information. More detailed information on the aquatic communities within Rock and Dry creeks would be needed to definitively address effects on aquatic life beneficial uses. In addition, any future assessments/antidegradation determinations with regards to temperature should be consistent with Section 316 of the Act. Nevertheless, based on the relatively small temperature changes that have occurred historically and would be expected to occur under the expanded permitted capacity, no significant adverse thermal effects to aquatic life would be expected to occur.

5 EVALUATION OF BEST PRACTICAL TREATMENT OR CONTROL

5.1 Applicable Regulations

The term "best practical treatment or control" (BPTC) appears in the State's antidegradation policy (Resolution No. 68-16):

> *"Any activity which produces or may produce a waste or increased volume or concentration of waste and which discharges or proposes to discharge to existing high quality waters will be required to meet waste discharge requirements which will result in best practicable treatment or control of the discharge necessary to assure that (a) a pollution or nuisance will not occur and (b) the highest water quality consistent with maximum benefit to the people of the state will be maintained."* [emphasis added]

However, nowhere in State regulations or policies has BPTC been defined in terms of specific treatment processes for specific constituents, or in terms of specific effluent quality.

Sections 301, 302, 306, and 307 of the Clean Water Act incorporates technology-based effluent limits according to "best practical control technology," "best available technology economically achievable," and "best conventional pollutant control technology economically achievable;" however, these terms are used in the context of regulating discharges from point sources other than publicly owned treatment works (POTWs).

For POTWs, Section 301(b)(1)(B) of the Clean Water Act requires that secondary treatment standards be met. Secondary treatment standards are defined by numeric effluent limitations for the pollutant parameters 5-day biological oxygen demand, suspended solids, and pH (40 CFR 133.102). More stringent limitations beyond those required to meet the definition of secondary treatment may be incorporated, if necessary, to achieve certain water quality standards [Section 301(b)(1)(C) of the Clean Water Act].

Furthermore NPDES permits contain the following technology-based treatment requirements in accordance with the following statutory deadlines (40 CFR 125.3(a)(1)):

(i) Secondary treatment--from date of permit issuance; and

(ii) The best practicable waste treatment technology--not later than July 1, 1983.

Best practicable waste treatment technology is defined as (40 CFR 35.2005):

> *The cost-effective technology that can treat wastewater, combined sewer overflows and non-excessive infiltration and inflow in publicly owned or individual wastewater treatment works, to meet the applicable provisions of:*
>
> *(i) 40 CFR part 133--secondary treatment of wastewater;*
>
> *(ii) 40 CFR part 125, subpart G--marine discharge waivers;*
>
> *(iii) 40 CFR 122.44(d)--more stringent water quality standards and State standards; or*
>
> *(iv) 41 FR 6190 (February 11, 1976)--Alternative Waste Management Techniques for Best Practicable Waste Treatment (treatment and discharge, land application techniques and utilization practices, and reuse).*

Thus, in the State and federal regulations, achievement of "best practical treatment or control" and "best practicable waste treatment technology" are defined in terms of plant performance and maintenance of water quality standards, rather than specific treatment technologies.

5.2 Findings

The SMD1 WWTP is in the design stage of an upgrade and expansion project. Upgrades are anticipated to include new headworks with improved grit removal equipment, new primary clarifiers, biological nutrient removal facilities to reduce nitrogen and phosphorus compounds, new secondary clarifiers and tertiary filters, UV disinfection which should eliminate THMs and reduce chemical usage, and new or renovated solids handling facilities. These facilities are representative of industry-standards and will provide a high level of treatment. The upgraded and expanded facility is expected to produce treated effluent of a quality equivalent to the best WWTPs in the region.

With regard to salinity control, the measured levels of EC and TDS in the effluent are below the non-site specific numeric values the Regional Water Board has used for screening to interpret the narrative Basin Plan to protect beneficial uses, including agriculture uses. Thus, there is no justification for the County to consider salinity control measures in order to achieve BPTC. In fact, at this time reverse osmosis is not considered BPTC, as the State Water Board, in Water Quality Order 2005-005 (for the City of Manteca), has stated:

> *"Construction and operation of reverse osmosis facilities to treat discharges...prior to implementation of other measures to reduce the salt load in the southern Delta, would not be a reasonable approach."*

Because the plant's facilities and effluent quality meet or exceed the regulations discussed in Section 5.1, and because current and future expected operations of the plant will achieve compliance with NPDES permit requirements, thereby assuring a water quality nuisance will not occur and the highest water quality consistent with maximum benefit to the people of the region and the state will be maintained, and because the upgraded facility will produce an effluent quality equivalent to other state-of-the-art WWTPs in the region, it is determined that the planned future facilities and operations of the SMD1 WWTP are consistent with BPTC as it is defined and intended in Resolution No. 68-16.

6 SOCIOECONOMIC CONSIDERATIONS

6.1 Constituents Addressed in the Socioeconomic Analysis

To assess potential lowering of Rock Creek and Dry Creek water quality, a mass balance, and where appropriate, a mass loading assessment of the use of available assimilative capacity was made. When there is no assimilative capacity with either calculation, then there truly is no available assimilative capacity and no utility to a socioeconomic justification. When calculation of assimilative capacity is not relevant to the criteria (e.g., for temperature, pH, etc.), the need for a socioeconomic justification is driven by the significance of the impact to beneficial uses.

Based on the above considerations and the constituent-specific discussions in Section 4.5.3, no constituents were identified in Tables 5, 6, 8, and 9 that warrant further analysis based on substantial use of available assimilative capacity (i.e., exceeding the 10% assimilative capacity significance threshold). Thus, there are no constituents to be carried forward into the socioeconomic analysis. Nonetheless a socioeconomic analysis is provided to evaluate the justifications for the non-significant lowering of water quality in Rock Creek and Dry creeks.

6.2 Socioeconomic Assessment Approach

Placer County has estimated the cost of improvements necessary to expand and upgrade the SMD1 WWTP plant from 2.18 mgd ADWF to 2.7 ADWF mgd at $87 million (Placer County 2009). The economic costs for alternatives will be assessed relative to the current project expansion cost estimate of $87 million, the increased cost for ratepayers, and the magnitude of the change in ratepayer costs. Alternatives will also be assessed for feasibility of implementation and effectiveness at reducing the lowering of water quality. The social benefits and costs will be assessed based on the ability to accommodate important socioeconomic development in the

Placer County General Plan the change in water quality from existing conditions and the magnitude of the water quality impacts.

6.3 Benefits of Increased Discharge

From 2000-2008, the overall population of Placer County increased by 34%, the second highest growth rate of all counties in California over that period (California Department of Finance 2008). County population projections anticipate population growth of 23.3% from 2010 to 2020, and 61% from 2010 to 2034, the expected life of the planned WWTP upgrades (California Department of Finance 2007). The County's consulting engineer, Owen Psomas, evaluated census data for the County, Auburn, and the North Auburn census-designated place (CDP) to determine the average household population (Owen Psomas 2009a). Furthermore, Owen Psomas evaluated projected annual growth rates from the California Department of Finance and the Sacramento Area Council of Governments (SACOG) for both Placer County and Auburn to determine the projected annual growth rate for residential and commercial/industrial equivalent dwelling units (EDUs) in the SMD 1 WWTP service area (i.e., 1.9%). Also, the Auburn-Bowman Community Plan was used to develop the current limits of planned sewer service. Influent flow and BOD and TSS loadings for existing residential and commercial/industrial EDUs were scaled up based on the projected growth rates to determine the ADWF needed in 2034 (i.e., 2.7 mgd ADWF) and at buildout (4.0 mg ADWF).

The Placer County General Plan requires limiting expansion of urban communities to areas where community wastewater treatment systems can be provided to accommodate planned and approved growth (Placer County 1994). Anticipated future growth of these communities will thus be hindered if increased wastewater capacity is not provided.

6.4 Alternatives: Incremental Effects on Water Quality and Socioeconomic Development

Several alternatives were considered that would reduce or eliminate the lowering of water quality, for certain constituents, resulting from the additional 0.52 mgd of discharge capacity proposed with the plant expansion. These plant expansion alternatives are:

(1) Higher level of treatment using microfiltration;

(2) Zero discharge (100%) recycling of additional plant capacity;

(3) Flow restricted discharge;

(4) Pollutant source minimization;

(5) Connect to other wastewater facilities in the region (i.e., regionalization); and

(6) Change in drinking water source.

Each alternative was assessed for feasibility in implementation and effectiveness in reducing the lowering of water quality.

The costs to implement alternatives can be evaluated three ways: (1) relative to the current project cost estimate of $87 million; (2) as the increased cost for ratepayers; (3) and the magnitude of the change in ratepayer costs. The generally higher costs to implement alternatives would be borne by both existing development and the new development that is requiring the plant expansion. These higher costs could possibly prohibit some of the socioeconomic growth for the area by making it economically impractical for the new development to occur in this area.

6.4.1 Higher Level of Treatment

During the initial design phase, the County and its consulting engineer, Owen Psomas, have not identified a need for advanced treatment in order to achieve compliance with applicable water quality objectives. Thus, there are no SMD1 WWTP-specific treatment costs estimates beyond the planned BPTC facility upgrades (i.e., new flow equalization facilities, new biological nutrient removal facilities, and a new UV disinfection system).

To provide an order of magnitude estimate for advanced treatment costs in addition to the proposed project, the experience of another discharger is provided here. Microfiltration is an advanced filtration technology that provides less contaminant removal than ultrafiltration and reverse osmosis but also at a lower cost. In 2007, the cost of a 4 mgd microfiltration plant was estimated to have construction costs of $37 million and engineering and administration costs of $7.4 million for total estimated costs of $44.4 million while the annual operation and maintenance costs are estimated to be $2.26 million (RBI 2007a). Since the expanded capacity of the SMD1 WWTP is 0.52 mgd, the use of microfiltration to mitigate any incremental degradation of the expansion on Rock and Dry creeks would be at least one eighth the costs referenced above (i.e., total cost of $5.6 million with annual operation and maintenance costs of $0.28 million). Note that these costs would be in addition to the planned upgrade/expansion project costs. This is a conservative estimate since the treatment cost for smaller plants are generally higher per mgd than for a larger plant, and because these cost estimates were made in 2007 rather than 2009.

6.4.2 Zero Discharge

Zero discharge through 100% recycling of the additional 0.52 mgd of plant capacity would require increased demand for recycled water and increased storage capacity during the non-irrigation season. A 1998 report on regionalization identified the southwest portion of Placer County (i.e., in the vicinity of the City of Lincoln) for water reuse because of the abundance of agricultural land requiring irrigation (CH2MHill 1998). However, no viable water reuse customers have been identified.

In 1993, the County investigated the possibility of reusing water for a hypothetical golf course irrigation project. The report estimated that irrigation requirements for a single 18-hole golf course would be approximately 1 mgd during the summer, and essentially nothing in the winter. Thus one golf course irrigation project and the associated storage and distribution facilities would be needed to accommodate the year-round planned plant capacity increase. However, it is understood that both water purveyors in the SMD1 WWTP vicinity (Nevada Irrigation District (NID) and Placer County Water Agency (PCWA)) have plentiful water supplies and can sell water much cheaper than SMD1 could provide it. That said, provided demand existed in the vicinity of SMD1 WWTP, it is technically feasible to establish a water reuse project; however, it is highly likely that the County would have to sell the recycled water at a loss.

In 1993, the construction costs to deliver, not store, recycled water for a hypothetical golf course located one mile from the WWTP were estimated to be $340,000 with annual operating costs of $18,000. Using the Engineering News Report (ENR) Construction Cost Indices for 1993 and October 2009 (5210 and 8596, respectively), this corresponds to an estimated construction cost in 2009 of $560,000 and annual operating costs of $30,000. The majority of delivery construction costs are associated with the distribution pipeline. Thus, delivery construction costs for golf courses at greater distances would increase approximately proportionally with distance (Placer 1993).

Based on a recent economic analysis (Owen Psomas 2009b), the total project cost to store and deliver recycled water service to the two largest golf courses in the SMD1 WWTP area (approximately 150 irrigated acres each is roughly estimated at $25 to $30 million. The majority of the cost would be associated with the approximately 180 million gallon (MG) seasonal storage reservoir that would be needed to provide approximately 6 months of storage during the wet season. Constructing this additional storage is not possible within the limited footprint of the existing plant. This cost estimate does not include land acquisition costs[2] or right-of-way acquisition costs, which could be considerable. Furthermore, it does not include any additional cost to improved plant performance and certify the effluent meets Title 22 reuse standards. The annual operations and maintenance cost for the reservoir, pump station, pipelines is estimated at $0.5 to $1.0 million. These costs are in addition to the proposed project costs. Accordingly, zero discharge is infeasible due to a lack of recycled water demand, sufficient land to construct the storage reservoir, and cost.

6.4.3 Flow-restricted Discharge

Flow-restricted discharge was evaluated based on available dilution in the historic dataset for Rock Creek and further downstream (approximately 2 miles) in Coon Creek. Given the distance to Coon Creek, any available dilution in Coon Creek would only be applicable for water quality objectives protecting beneficial uses with longer term averaging periods (e.g, chronic human health and agricultural). While dilutions above 3:1 could not be evaluated because the maximum measurable flow was truncated at 8.2 mgd, the analysis summarized in **Table 13** showed that 3:1 dilution is available in both water bodies less than a third of the time. Thus, any potential dilution greater than 3:1 would occur infrequently. Table 13 also indicates that 1:1 dilution is available in both water bodies greater than 80% of the time.

Perhaps more importantly, a majority of the dates when 3:1 dilution was present in Rock Creek or Coon Creek were during the summer of 2007, indicating that irrigation flows being conveyed through Rock Creek was primarily responsible for the dilution. The County has indicated that flows of 5 cfs in the summer and 3 cfs in the winter from NID conveyed through Rock Creek have occurred in the past. There is no guarantee that these flows will always be present in the future, and in fact, they may be discontinued in the near future after completion of the

[2] The 181 million gallon reservoir with a depth of 10 feet would require 65 acres.

upgrade/expansion project. Therefore, available dilution in the future could be substantially lower than indicated in the historic data set.

Based on this information, it is unlikely that flow-restricted discharge would be a viable alternative to provide greater dilution and limit the use of available assimilative capacity. Implementation of any flow-restricted discharge would require finding additional land suitable for expanding storage capacity to accommodate periods of no discharge.

Table 13. Frequency of Dilution Ratios in Rock and Coon Creeks.

Water Body	Frequency of Dilution		
	3:1	2:1	1:1
Rock Creek	27%	34%	82%
Coon Creek	32%	43%	90%

6.4.4 Pollutant Source Minimization

Pollutant source minimization is an ongoing activity. The County submitted an Industrial Pretreatment Program (IPP) to monitor and control sources of industrial contaminants entering the SMD1 sewer collection system to the Regional Water Board and USEPA in September 2005.

6.4.5 Regionalization

Several options for regionalization were considered and presented in a report prepared by CH2MHill in 1998. These options included connections to a new regional facility southwest of the City of Lincoln, connections to the City of Lincoln's facility, and connections to the Sacramento Regional Wastewater Treatment Plant. These options were evaluated in terms of costs, impact on local streams, reuse potential, and ease of implementation. The long-term recommendation from this study was to further consider regionalizing all of Placer County dischargers into three facilities: Roseville's Dry Creek and Pleasant Grove WWTPs, and Lincoln's WWTP (CH2MHill 1998).

A more detailed and recent regionalization assessment evaluated construction of a pumping station and wastewater storage facility and regional pipeline to connect to the City of Lincoln's WWTP, and expansion of the Lincoln WWTP. This project would expand the capacity available to SMD1 to 2.05 mgd, with a total potential capacity up to 4.6 mgd allocated to SMD1 in the future. The total costs of this project are estimated at $141 million and included costs for the City of Lincoln to expand their plant, costs for the County to reimburse the City for having oversized the Lincoln Collection system in order to accommodate potential regional wastewater flows. Annual operations and maintenance costs are estimated at $11.2 million (Placer County 2008). The costs would be an alternative to the proposed project.

6.4.6 Change in Source Water Supply

The County's current water source is surface water purchased through NID and Placer County Water Agency that originates as Sierra snowpack and is taken from the Yuba and Bear River watersheds or through Lake Spaulding. The source water quality is very high, with low turbidity and TDS. It is not feasible to find a better quality water source or to change water source as a means of controlling or improving post-expansion receiving water quality.

6.4.7 Rate Payer Cost Increases

To evaluate alternatives to expanding SMD1 WWTP's discharge capacity, the County has calculated the average annual rate increase per customer in the service area. The rate increases also assumed a fixed average customer consumption rate, fixed financing rate and that no other funding sources were available to offset the rate increases. **Table 14** summarizes the plan elements for the proposed project and alternatives, construction and operations costs, and the annual rate increase associated with each of the alternatives discussed above.

Table 14. Summary of costs and annual rate increases for alternatives to expanding Placer County SMD1 discharge capacity.

Alternative	Plan Elements	Construction Cost	Operations Cost	Annual Rate Increase
Proposed Upgrade/expansion[1]	Flow equalization, biological nutrient removal, & UV disinfection system	$87,000,000	$10,321,000	$432
Higher level of treatment	Microfiltration added to proposed project	$5,600,000	$280,000	$468 ($432+$36)
Zero discharge	181 million gallon storage, 5 miles of pipeline, customers added to proposed project	$37,200,000	$960,000	$689 ($432+$257)
Flow-restricted discharge	Flow conditions are too infrequent or unreliable to provide any significant benefit.			
Regionalization	Pipeline, reimbursements to City of Lincoln for WWTP expansion and collection system oversizing	$141,000,000	$11,199,095	$816
Change in water supply	It is not possible to find a better quality water source than existing sources.			

Notes:
[1] Past cost estimates are based on expansion to 3.0 mgd while current plans are to expand to 2.7 mgd. Given the current costs for construction and financing, these past cost estimates for 3.0 mgd are representative of current anticipated costs for a 2.7 mgd expansion.

6.5 Environmental Considerations

Having new development in the region independently treat its wastewater in an effort to eliminate any incremental degradation of water quality in Rock Creek or Dry Creek would not be cost-effective, may not reduce loadings to downstream portions of the watershed, and may not improve water quality (from a constituent concentration basis) throughout the creeks. Moreover, disposal of the new developments' wastewater elsewhere would not eliminate the need to meet water quality objectives elsewhere in Rock Creek or Dry Creek, in another surface water body, or in groundwater. Installation of advanced treatment facilities designed to eliminate all incremental changes in downstream water quality (e.g., microfiltration or reverse osmosis for a significant portion of the plant's flow) would be very costly, and would result in new environmental concerns associated with increased energy use and brine disposal.

6.6 Socioeconomic Considerations

Placing connection bans on the SMD1 WWTP to prevent increased discharges, thereby eliminating any incremental change to Rock Creek and Dry Creek water quality, would have negative socioeconomic effects on the area and would not be in the best interest of the people of the region or the state, in light of the magnitude of incremental changes to water quality that are expected as a result of plant expansion from 2.18 to 2.7 mgd (ADWF) with concurrent treatment upgrades.

Should the incremental changes in Rock Creek and Dry Creek water quality characterized herein (which could occur as a result of accommodating planned and approved growth within the SMD1 WWTP service area) be disallowed, such action would: 1) force future developments to find alternative methods for disposing of wastewater, 2) require adding microfiltration or a reverse-osmosis treatment processes to a significant portion of flow at the SMD1 WWTP, and possibly other plant expansions/upgrades, to eliminate the increment for all constituents from the additional discharge rate, or 3) prohibit planned and approved development within and adjacent to the SMD1 WWTP service area.

The County will continue to operate a treatment plant that meets BPTC. Any potential for discharges to cause exceedances of adopted water quality criteria/objectives would be effectively addressed through the NPDES permit renewal process, thereby being addressed in a timely manner. Thus, resulting downstream water quality within Rock Creek and Dry Creek would not cause a nuisance and would continue to be protective of all beneficial uses under the proposed upgrade/expansion project.

7 ANTIDEGRADATION ANALYSIS FINDINGS

This section addresses each of the five items identified in state implementation guidance for antidegradation analysis for NPDES permits.

1. **The water quality parameters and beneficial uses which will be affected by the proposed action and the extent of the impact.**

   Section 3.1 details the beneficial uses of Rock and Dry creeks. The extent of water quality impacts from the proposed plant upgrade/expansion project are assessed in Section 4.5, through tables and discussion, and summarized below.

   The extent of impacts from SMD1 WWTP's proposed increased discharge capacity were primarily assessed on the basis of assimilative capacity utilization – on a mass balance approach for all constituents and, additionally for bioaccumulative constituents, on a mass loading basis.

The water quality of Rock and Dry creeks, with respect to chemical constituents, pH, and turbidity would remain better than necessary to fully protect beneficial uses. Resulting temperature and DO conditions in Rock and Dry creeks are expected to remain at levels throughout the year that would be protective of beneficial uses; however, further assessment of these parameters may be warranted. For all of the constituents assessed, any lowering of Rock Creek and Dry Creek water quality would be minor and would use less than 10% of available assimilative capacity (Tables 5, 6, 8, and 9).

The incremental increase in discharge would not significantly lower water quality for any constituent in Rock and Dry creeks, relative to that which would occur under the current permitted capacity for the SMD1 WWTP. The incremental increase in discharge would not lead to significant increase in mass loading of bioaccumulative constituents such as mercury or other conserved constituents such as total dissolved solids. Total dissolved solids are expected to decrease as the WWTP converts from a chlorine-based disinfection process to U.V. disinfection. In short, no beneficial uses of Rock Creek, Dry Creek or downstream waters are anticipated to be adversely affected by the planned expansion.

2. The scientific rationale for determining that the proposed action will or will not lower water quality.

Sections 4.1 through 4.4 detail the scientific rationale for determining if lowering of water quality occurs. This rationale is based on federal (Section 2.1.1) and State (Section 2.2.3) guidance and tracks the use of assimilative capacity to link changes in water quality to the beneficial uses to be protected.

Generally, the relevant water quality standards are concentration-based in order to prevent exceedances of concentration-based exposure thresholds. Critical flows and representative water quality measurements were criteria-dependent (i.e. shorter representative averaging periods for acute effects as compared to long-term human health criteria).

The nature of downstream water bodies may facilitate extended residence time or deposition of contaminants. Therefore, for bioaccumulative constituents, mass loadings were also considered in assessing potential lowering of water quality from increased SMD1 WWTP discharge.

Incremental change in water quality that would occur in Rock and Dry creeks due to an increase in the SMD1 WWTP discharge rate from 2.18 mgd ADWF, the current permitted discharge rate, to 2.7 mgd ADWF were quantitatively identified.

3. A description of the alternative control measures that were considered.

Six alternatives were considered that would reduce or eliminate the lowering of water quality resulting from the additional 0.52 mgd of discharge capacity proposed with the plant expansion. These plant expansion alternatives are listed below, and are described in detail in Section 6.2.

- Higher level of treatment using microfiltration
- Zero discharge (100%) recycling of additional plant capacity
- Flow restricted discharge
- Pollutant source minimization
- Connect to City of Lincoln Wastewater Treatment Plant
- Change in drinking water source

4. A description of the socioeconomic evaluation.

To assess potential lowering of Rock and Dry creeks water quality, a mass balance, and where appropriate, a mass loading assessment of the use of available assimilative capacity was made. No constituents exceeded the 10% significance threshold or, for other reasons, triggered a detailed socioeconomic analysis and consideration of alternatives to the potential water quality impacts. Nevertheless, a socioeconomic analysis was provided to facilitate weighing the benefits of the non-significant lowering of water quality that may occur. The objective of the socioeconomic analysis is to determine if the lowering of Rock Creek and Dry Creek water quality is in the "best interest" of the people of the State.

The socioeconomic evaluation considered:

- The social benefits and costs based on the ability to accommodate socioeconomic development in the Placer County General Plan.

  Finding: Given the current infrastructure in place, future development in the service area also would rely on the County and the SMD1 WWTP for wastewater collection, treatment, and recycled water services. The expansion of the SMD1 WWTP from its current 2.18 mgd ADWF permitted capacity to 2.7 mgd ADWF would accommodate planned and approved growth in the surrounding areas. Placing connection bans on the SMD1 WWTP to prevent increased discharges, thereby eliminating any incremental change to Rock Creek and Dry Creek water quality, would have negative effects on important socioeconomic development in the area. Should the incremental changes in Rock Creek and Dry Creek water quality characterized herein be disallowed, such action would: 1) force future developments to find alternative methods for disposing of wastewater, 2) require adding microfiltration or a reverse-osmosis treatment processes to a significant portion of flow at the SMD1 WWTP, and possibly other plant expansions/upgrades, to eliminate the increment for all constituents from the additional discharge rate, or 3) prohibit planned and approved development within and adjacent to the SMD1 WWTP service area.

- The magnitude of the change in water quality from existing conditions, the water quality impacts, and expected effects on beneficial uses of Rock and Dry creeks and downstream waters.

  Finding: No constituents formally triggered a detailed socioeconomic analysis since use of available assimilative capacity was less than ten percent. Furthermore, all applicable water quality criteria/objectives are anticipated to be met and all beneficial uses protected by the improved effluent quality of the upgraded and expanded plant. With the higher 2.7 mgd discharge rate, some constituents would have either an improvement (i.e., lowered creek concentration) or little to no change in creek concentrations or mass loading downstream of the discharge.

- The feasibility and effectiveness of reducing the lowering of water quality by implementing alternatives to lowering of Rock Creek and Dry Creek water quality.

  Finding: An evaluation of several alternatives, and their effects on water quality impacts and beneficial use protection, did not identify any feasible alternative control measure that more effectively would accommodate the planned and approved growth that would result from implementing the alternative, relative to implementing the proposed project (i.e., planned upgrade/expansion). For example, regionalizing the entire discharge is the most effective alternative to prevent lowering of water quality in Rock and Dry creeks, but it comes with the greatest cost. Regionalization of the entire discharge would remove approximately 35% of the average monthly flow in Rock Creek and more than 25% of the average monthly flow in Dry Creek, move potential water quality impacts further downstream in the same watershed, and cost approximately 50% more than the estimated cost of the proposed increased discharge project.

- The economic costs for alternatives and assessed alternative costs against the current project expansion cost estimate of $87 million, the increased cost for ratepayers, and the magnitude of the change in ratepayer costs.

  Finding: In general, the cost to implement alternatives would be distributed to ratepayers based on need to address existing versus expansion-related water quality issues. New development, that requires plant expansion for capacity, and existing development, which requires increased treatment to meet applicable water quality objectives, would equally share costs associated with additional capacity, thereby possibly prohibiting some of the important socioeconomic growth for the area by making it economically impractical for the new development to occur and further increasing the cost to existing customers to upgrade the plant. The additional costs for implementing alternatives ranged up to 50% more than the estimated costs for the proposed expansion of discharge capacity. For the four viable alternatives, the annual rate increase for new and existing customers ranged from $432 to $816 as compared to the proposed project.

5. **The rationale for determining that the proposed action is or is not justified by socioeconomic considerations.**

The expansion of the SMD1 WWTP from its current 2.18 mgd ADWF permitted capacity to 2.7 mgd ADWF would accommodate planned and approved growth in the neighboring areas. Having new development in the region independently treat its wastewater in an effort to eliminate any incremental degradation of water quality in Rock and Dry creeks would not be cost-effective, may not reduce loadings to downstream portions of the watershed (e.g., Sacramento River), and may not improve water quality (from a constituent concentration basis) throughout Rock and Dry creeks. Moreover, disposal of the new development's wastewater elsewhere may simply cause similar and possibly new forms of degradation elsewhere in Rock and Dry creeks, in other surface waterbodies, or in groundwater.

The SMD1 WWTP has sought to identify customers for use of recycled water. Currently prospective customers can obtain water from NID at a cheaper cost, however, the County will continue to pursue potential recycled water use opportunities in the future, thereby minimizing discharges to surface waters. The County will continue to operate a treatment train that meets and exceeds BPTC and will facilitate greater use of recycled water, upon demand for such water developing in the area. Any potential for discharges to cause exceedances of adopted water quality criteria/objectives would be effectively addressed through the NPDES permit renewal process, thereby being addressed in a timely manner. Thus, resulting downstream water quality within Rock and Dry creeks would not cause a nuisance and would continue to be protective of all beneficial uses within the creek, as well as uses of downstream waters.

Section 6.2 considered several alternatives and found them infeasible for cost or logistic concerns or both, when compared to the proposed action of increased SMD 1 WWTP discharge. Installation of advanced treatment designed to eliminate all incremental changes in downstream water quality would be very costly, and would result in new environmental concerns associated with increased energy use and brine disposal. Placing connection bans on the SMD1 WWTP to prevent the non-significant degradation of water quality would have direct adverse effects on important socioeconomic development approved for the region, which, in turn, would adversely affect the County's future rate payer and tax base.

Based on the assessment contained herein, it is determined that the SMD1 WWTP upgrade and expansion project will operate to meet the highest statutory and regulatory NPDES requirements which result in the best practicable treatment and control of the discharge necessary to assure that a water quality nuisance will not occur and that beneficial uses are fully protected. The limited degradation in receiving water quality that may occur as a result of planned discharge expansion is not significant and would accommodate important socioeconomic development in the service area while maintaining full protection of the Rock Creek and Dry Creek beneficial uses. An evaluation of several alternatives, and their effects on water quality impacts and beneficial use protection did not identify any feasible alternative control measure that more effectively would accommodate the planned and approved growth that would result from implementing the alternative, relative to implementing the planned upgrade/expansion project.

Based on the analysis contained herein, the anticipated water quality changes in Rock and Dry creeks will be consistent with state and federal antidegradation policies, will be to the important socioeconomic benefit to the people of the region, be to the maximum benefit of the people of the State, and will not result in water quality less than that prescribed in the policies that are required to prevent a nuisance or that are required to protect beneficial uses.

8 REFERENCES

California Department of Finance. 2007. Population Projections for California and Its Counties 2000-2005. July.

California Department of Finance. 2008. California County Population Estimates and Components of Change by Year—July 1, 2000-2008. December.

CVRWQCB (Central Valley Regional Water Quality Control Board). 1998. Water Quality Control Plan (Basin Plan), Central Valley Region, Sacramento River and San Joaquin River Basins, Fourth Edition.

Owen Psomas. 2009a. SMD 1 WWTP Upgrade & Expansion Preliminary Design Report: Technical Memorandum No. 1 Flow and Loading Analysis. Prepared for: Placer County Department of Facility Services. Draft. September 15.

———. 2009b. SMD1 WWTP: Zero Discharge Through Recycling. Draft letter report to Kevin Bell from Steve Herrera. October, 28.

Placer County. 1994. Placer County General Plan. August.

Placer County. 2009. Report of Waste Discharge. Prepared for and submitted to the Central Valley Regional Water Quality Control Board. September.

RBI (Robertson-Bryan, Inc.). 2003. Effluent and Receiving Water Quality Assessment for the Sewer Maintenance District No. 1 Wastewater Treatment Plant. On Behalf of Placer County Department of Facility Services, Auburn, CA. February.

———. 2007. Antidegradation Analysis for El Dorado Hills Wastewater Treatment Plant. On Behalf of El Dorado Irrigation District, Placerville, CA. April.

SWRCB (State Water Resources Control Board). 1990. Antidegradation Policy Implementation for NPDES Permitting. Administrative Procedure Update (APU) Number 90-004. July 2.

———. 2005. The Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California. February 24, 2005.

———. 2006. Proposed 2006 CWA Section 303(d) List of Water Quality Limited Segments. Draft. Released September 15, 2006.

USEPA (United States Environmental Protection Agency). 1987. Region 9: Guidance on Implementing the Antidegradation Provisions of 40 CFR 131.12. June 3.

———. 1992. Water Quality Standards; Establishment of Numeric Criteria for Priority Toxic Pollutants; States' Compliance Final Rule. Federal Register Vol. 57, No. 246. December 22.

———. 2000. Water Quality Standards; Establishment of Numeric Criteria for Priority Toxic Pollutants for the State of California; Rule. Federal Register Vol. 65, No. 97. May 18.

———. 2001. Water Quality Standards; Establishment of Numeric Criteria for Priority Toxic Pollutants for the State of California; Correction. Federal Register Vol. 66, No. 30. February 13.

———. 2005. King, Ephraim S. Director. Office of Science and Technology, Washington, DC. August 10–Memorandum to Water Management Division Directors, Regions 1-10, regarding Tier 2 Antidegradation Reviews and Significance Thresholds.

Appendix A

Rock Creek, Effluent, and Dry Creek Flow Rates

SMD1 Flows				
Date	Rock Ck R1-Daily (mgd)	Effluent Daily (mgd)		Dry Ck R3-Daily (mgd)
7/1/2006	2.9	1.37		0.2
7/2/2006	2.8	1.28		0.5
7/3/2006	3	1.34		0.3
7/4/2006	3	1.25		0.3
7/5/2006	2.1	1.36		0.3
7/6/2006	1.4	1.36		0.3
7/7/2006	0.5	1.35		0.3
7/8/2006	3.2	1.32		0.04
7/9/2006	3	1.25		0.07
7/10/2006	3.4	1.35		0.1
7/11/2006	3	1.35	<	0.01
7/12/2006	2.9	1.39	<	0.01
7/13/2006	2.9	1.45	<	0.01
7/14/2006	3.3	1.41		0.1
7/15/2006	3.1	1.32		0.02
7/16/2006	3.2	1.3		0.03
7/17/2006	3	1.4	<	0.01
7/18/2006	3	1.41	<	0.01
7/19/2006	3	1.34	<	0.01
7/20/2006	3	1.35	<	0.01
7/21/2006	3	1.44		0.1
7/22/2006	3	1.43		0.02
7/23/2006	2.9	1.49		0.04
7/24/2006	3	1.44	<	0.01
7/25/2006	3	1.41	<	0.01
7/26/2006	3	1.45	<	0.01
7/27/2006	3	1.47	<	0.01
7/28/2006	3	1.47	<	0.01
7/29/2006	3	1.37	<	0.01
7/30/2006	2.2	1.34	<	0.01
7/31/2006	3	1.43	<	0.01
8/1/2006	2.1	1.43	<	0.01
8/2/2006	3	1.33	<	0.01
8/3/2006	2.5	1.4	<	0.01
8/4/2006	0.5	1.38	<	0.01
8/5/2006	2.3	1.42	<	0.01
8/6/2006	3	1.39	<	0.01
8/7/2006	3.4	1.48	<	0.01
8/8/2006	3	1.44		0.3
8/9/2006	3	1.51		0.3
8/10/2006	3	1.84		0.3
8/11/2006	3	1.45		0.3
8/12/2006	3	1.36		0.04
8/13/2006	3	1.35		0.04
8/14/2006	3.4	1.4	<	0.01

SMD1 Flows				
Date	Rock Ck R1-Daily (mgd)	Effluent Daily (mgd)		Dry Ck R3-Daily (mgd)
8/15/2006	3	1.44	<	0.01
8/16/2006	3	1.43	<	0.01
8/17/2006	0.3	1.41		0.1
8/18/2006	3	1.43		0.3
8/19/2006	2.2	1.4		0.02
8/20/2006	2.4	1.37		0.02
8/21/2006	3	1.43	<	0.01
8/22/2006	2.4	1.45	<	0.01
8/23/2006	2.5	1.45		0.3
8/24/2006	1.8	1.41		0.01
8/25/2006	1.8	1.36		0.01
8/26/2006	2.6	1.44		0.3
8/27/2006	2.5	1.41		0.3
8/28/2006	3	1.44		0.3
8/29/2006	2.9	1.4		0.3
8/30/2006	3.5	1.42		0.4
8/31/2006	3.9	1.4		0.3
9/1/2006	0.3	1.39		0.3
9/2/2006	3.4	1.44		0.3
9/3/2006	4.2	1.32		0.1
9/4/2006	3.9	1.36	<	0.01
9/5/2006	3.9	1.48		0.2
9/6/2006	3.9	1.36		0.1
9/7/2006	3.9	1.44	<	0.01
9/8/2006	3.9	1.47	<	0.01
9/9/2006	4.2	1.41	<	0.01
9/10/2006	3.9	1.38	<	0.01
9/11/2006	3.9	1.48		0.3
9/12/2006	3.9	1.39		0.1
9/13/2006	3.9	1.44		0.3
9/14/2006	3.9	1.45		0.1
9/15/2006	3.9	1.39		0.1
9/16/2006	3.4	1.35		0.5
9/17/2006	3.2	1.34		0.4
9/18/2006	3.9	1.44		0.1
9/19/2006	3.9	1.42		0.3
9/20/2006	3.9	1.38		0.1
9/21/2006	3.4	1.42		0.1
9/22/2006	4.4	1.41		0.27
9/23/2006	3.4	1.41		0.1
9/24/2006	4.4	1.33		0.1
9/25/2006	4.1	1.36		0.2
9/26/2006	4.4	1.45		0.3
9/27/2006	4.4	1.42		0.3
9/28/2006	3.9	1.41		0.3

SMD1 Flows				
Date	Rock Ck R1-Daily (mgd)	Effluent Daily (mgd)		Dry Ck R3-Daily (mgd)
9/29/2006	3	1.38		0.3
9/30/2006	4	1.36		0.3
10/1/2006	3.7	1.41		0.3
10/2/2006	3.9	1.42		0.3
10/3/2006	4.4	1.41		0.5
10/4/2006	3.4	1.39		1.1
10/5/2006	7	1.38		1
10/6/2006	4.4	1.41		0.8
10/7/2006	4	1.36		0.8
10/8/2006	3.9	1.31		0.8
10/9/2006	4.9	1.36		0.9
10/10/2006	7	1.45		0.8
10/11/2006	4.9	1.37		0.4
10/12/2006	5.1	1.39		0.3
10/13/2006	5.4	1.37		0.5
10/14/2006	3.4	1.31		0.3
10/15/2006	3.9	1.34		0.3
10/16/2006	2.1	1.41		0.3
10/17/2006	2.9	1.38		0.3
10/18/2006	3.4	1.33		0.3
10/19/2006	3.4	1.38		0.3
10/20/2006	3.4	1.31		0.3
10/21/2006	3.9	1.38		0.1
10/22/2006	1.8	1.36		0.1
10/23/2006	4.4	1.34		0.1
10/24/2006	3.9	1.4		0.1
10/25/2006	4.9	1.35		0.04
10/26/2006	7	1.36		0.1
10/27/2006	3.9	1.32		0.1
10/28/2006	3.9	1.31		3
10/29/2006	4.9	1.29		0.07
10/30/2006	4.4	1.31		0.1
10/31/2006	4.9	1.33		0.1
11/1/2006	4.7	1.36		0.1
11/2/2006	3.4	1.56		0.1
11/3/2006	3.9			0.3
11/4/2006	1.1	1.38		0.8
11/5/2006	0.1	1.37		0.3
11/6/2006	1.8	1.4		0.3
11/7/2006	0.8	1.37		0.3
11/8/2006	1.8	1.43		0.07
11/9/2006	0.8	1.34		0.1
11/10/2006	0.8	1.39		0.3
11/11/2006	0.8	1.39		0.3
11/12/2006	0.8	1.37		0.6

SMD1 Flows				
Date	Rock Ck R1-Daily (mgd)	Effluent Daily (mgd)		Dry Ck R3-Daily (mgd)
11/13/2006	1.8	1.45		0.6
11/14/2006	2.1	1.48		0.7
11/15/2006	2.5	1.4		0.8
11/16/2006	2.5	1.45		0.5
11/17/2006	2.5	1.42		0.3
11/18/2006	3.4	1.41		0.3
11/19/2006	2.1	1.38		0.3
11/20/2006	2.1	1.41		0.3
11/21/2006	2.5	1.37		0.3
11/22/2006	2.1	1.44		0.3
11/23/2006	3	1.32		0.5
11/24/2006	2.1	1.29		0.5
11/25/2006	2.5	1.33		0.3
11/26/2006	3.9	1.36		1.3
11/27/2006	5.4	1.38		0.3
11/28/2006	3.4	1.37		0.3
11/29/2006	2.5	1.36		0.3
11/30/2006	2.1	1.36		0.3
12/1/2006	2.1	1.37		0.3
12/2/2006	2.5	1.37		0.5
12/3/2006	2	1.35		0.3
12/4/2006	2.5	1.35		0.5
12/5/2006	2.5	1.3		0.3
12/6/2006	2	1.32		0.3
12/7/2006	2.5	1.31		0.5
12/8/2006	2.5	1.32		0.5
12/9/2006	8.2	1.8		3
12/10/2006	8.2	1.94		4.9
12/11/2006	3.4	1.66		2.5
12/12/2006	8.2	2.33		4.4
12/13/2006	8.2	2.36	>	8.2
12/14/2006	4.4	1.85		3
12/15/2006	6.5	1.8		2.5
12/16/2006	3.6	1.6		3
12/17/2006	3	1.51		1.4
12/18/2006	3	1.52		0.7
12/19/2006	2.8	1.46		0.8
12/20/2006	2.5	1.45		0.7
12/21/2006	6.5	1.74		1.1
12/22/2006	3.9	1.85		4.4
12/23/2006	3.9	1.65		2.5
12/24/2006	2.9	1.56		1.4
12/25/2006	3.4	1.37		1.1
12/26/2006	3	1.68		1.1
12/27/2006	8.2	2.84	>	8.2

SMD1 Flows				
Date	Rock Ck R1-Daily (mgd)	Effluent Daily (mgd)		Dry Ck R3-Daily (mgd)
12/28/2006	3	2		4.4
12/29/2006	4	1.74		2.5
12/30/2006	3	1.6		1.8
12/31/2006	2.5	1.54		1.3
1/1/2007	2.6	1.47		1.3
1/2/2007	3	1.53		1.3
1/3/2007	3.9	1.58		1.3
1/4/2007	8.2	2.07	>	8.2
1/5/2007	4.4	1.86		3.4
1/6/2007	5.9	1.7		2.5
1/7/2007	3	1.58		1.5
1/8/2007	3.4	1.64		1.5
1/9/2007	2.8	1.55		1.5
1/10/2007	3.4	1.58		0.8
1/11/2007	3.4	1.51		1.4
1/12/2007	3.4	1.44		1.1
1/13/2007	3	1.51		1.4
1/14/2007	3	1.47		1
1/15/2007	3	1.5		0.8
1/16/2007	3	1.44		1
1/17/2007	3	1.43		1.4
1/18/2007	3	1.42		2.5
1/19/2007	2.1	1.41		2.1
1/20/2007	3	1.44		1
1/21/2007	2.8	1.37		0.9
1/22/2007	2.7	1.35		0.8
1/23/2007	2.5	1.46		0.9
1/24/2007	3	1.57		0.8
1/25/2007	3	1.32		0.5
1/26/2007	3	1.35		0.5
1/27/2007	2.8	1.4		0.5
1/28/2007	3	1.32		0.8
1/29/2007	2.6	1.4		0.8
1/30/2007	3	1.37		0.8
1/31/2007	2.5	1.3		0.6
2/1/2007	3.4	1.36		0.8
2/2/2007	3.4	1.4		0.8
2/3/2007	3	1.36		0.8
2/4/2007	3	1.32		0.6
2/5/2007	2.6	1.39		0.6
2/6/2007	2.2	1.38		0.5
2/7/2007	2.1	1.54		0.3
2/8/2007	3	1.65		1.1
2/9/2007	8.2	2.82	>	8.2
2/10/2007	8.2	5.11	>	8.2

SMD1 Flows				
Date	Rock Ck R1-Daily (mgd)	Effluent Daily (mgd)		Dry Ck R3-Daily (mgd)
2/11/2007	8.2	5.13	>	8.2
2/12/2007	4.9	2.84	>	8.2
2/13/2007	7	3.03	>	8.2
2/14/2007	4.9	2.34		7.4
2/15/2007	4.4	2.08		4.4
2/16/2007	3	1.95		3.4
2/17/2007	2.8	1.83		2.5
2/18/2007	2.1	1.7		2.1
2/19/2007	3	1.72		2.1
2/20/2007	2.7	1.65		2.1
2/21/2007	3	1.62		1.8
2/22/2007	8.2	2.25	>	8.2
2/23/2007	5.4	2.11	>	8.2
2/24/2007	8.2	1.91		3.9
2/25/2007	8.2	3.32	>	8.2
2/26/2007	8.2	4.21	>	8.2
2/27/2007	8.2	3.28	>	8.2
2/28/2007	8.2	3.43	>	8.2
3/1/2007	7	2.7	>	8.2
3/2/2007	6.5	2.13		7.6
3/3/2007	5.9	2.08		5.9
3/4/2007	4.8	1.95		4.7
3/5/2007	1.4	1.88		3.4
3/6/2007	1	1.8		3
3/7/2007	4.9	1.76		2.5
3/8/2007	3.9	1.71		2.5
3/9/2007	3.9	1.73		2.1
3/10/2007	6.6	1.61		1.8
3/11/2007	7	1.6		1.8
3/12/2007	5.9	1.65		1.8
3/13/2007	4.3	1.63		1.8
3/14/2007	3.4	1.56		1.8
3/15/2007	5.4	1.56		2.5
3/16/2007	2.1	1.62		3
3/17/2007	1.8	1.51		3
3/18/2007	1.4	1.49		3.4
3/19/2007	5.4	1.5		1.8
3/20/2007	2.1	1.56		1.4
3/21/2007	2.5	1.53		1.4
3/22/2007	2.5	1.51		1.1
3/23/2007	2.1	1.54		1.1
3/24/2007	2.1	1.47		1.1
3/25/2007	2.1	1.5		0.9
3/26/2007	2	1.63		0.8
3/27/2007	2.5	1.56		2.5

SMD1 Flows				
Date	Rock Ck R1-Daily (mgd)	Effluent Daily (mgd)		Dry Ck R3-Daily (mgd)
3/28/2007	2.8	1.55		1.9
3/29/2007	3.4	1.5		2.1
3/30/2007	3.4	1.63		1.8
3/31/2007	3.1	1.6		3.9
4/1/2007	3.8	1.46		1.4
4/2/2007	4.4	1.5		1.8
4/3/2007	3.1	1.45		0.8
4/4/2007	8.2	1.48		1.1
4/5/2007	8.2	1.48		0.8
4/6/2007	8.2	1.49		0.8
4/7/2007	8.2	1.5		0.8
4/8/2007	8.2	1.37		0.7
4/9/2007	8.2	1.41		0.5
4/10/2007	7.6	1.43		0.5
4/11/2007	8.2	1.43		1.2
4/12/2007	8.2	1.41		1.1
4/13/2007	8.2	1.38		2.5
4/14/2007	8.2	1.48		2.5
4/15/2007	8.2	1.43		3
4/16/2007	8.2	1.45		2.1
4/17/2007	8.2	1.44		2.5
4/18/2007	7.4	1.33		1.1
4/19/2007	8.2	1.39		1.1
4/20/2007	8.2	1.34		0.8
4/21/2007	8.2	1.43		0.8
4/22/2007	8.2	2.62	>	8.2
4/23/2007	8.2	1.79		4.4
4/24/2007	8.2	1.63		2.1
4/25/2007	8.2	1.61		2.1
4/26/2007	8.2	1.54		2.1
4/27/2007	8.2	1.51		2.1
4/28/2007	8.2	1.59		1.8
4/29/2007	8.2	1.45		1.3
4/30/2007	8.2	1.5		1.1
5/1/2007	8.2	1.46		0.8
5/2/2007	8.2	1.63		2.9
5/3/2007	8.2	1.52		2.1
5/4/2007	8.2	1.58		2.1
5/5/2007	8.2	1.5		1.8
5/6/2007	8.2	1.39		0.8
5/7/2007	8.2	1.46		0.8
5/8/2007	8.2	1.44		0.8
5/9/2007	8.2	1.38		1.3
5/10/2007	7.6	1.4		0.8
5/11/2007	6.5	1.39		0.8

SMD1 Flows			
Date	Rock Ck R1-Daily (mgd)	Effluent Daily (mgd)	Dry Ck R3-Daily (mgd)
5/12/2007	8.2	1.47	0.8
5/13/2007	6.5	1.39	0.9
5/14/2007	7.7	1.37	1.1
5/15/2007	8.2	1.4	1.1
5/16/2007	7.6	1.41	1.1
5/17/2007	8.2	1.37	0.8
5/18/2007	8.2	1.34	0.8
5/19/2007	8.2	1.37	0.8
5/20/2007	7	1.33	0.7
5/21/2007	8.2	1.31	0.5
5/22/2007	7.6	1.39	0.8
5/23/2007	8.2	1.38	1.5
5/24/2007	7	1.39	1.1
5/25/2007	8.2	1.34	0.8
5/26/2007	8.2	1.42	0.3
5/27/2007	8.2	1.42	0.4
5/28/2007	8.2	1.43	0.5
5/29/2007	8.2	1.37	0.5
5/30/2007	8.2	1.37	0.3
5/31/2007	8.2	1.34	0.5
6/1/2007	8.2	1.38	0.5
6/2/2007	8.2	1.36	0.8
6/3/2007	7	1.29	0.7
6/4/2007	8.2	1.32	0.5
6/5/2007	8.2	1.35	0.3
6/6/2007	8.2	1.33	1
6/7/2007	7.6	1.39	0.8
6/8/2007	8.2	1.4	0.5
6/9/2007	8.2	1.37	0.5
6/10/2007	8.2	1.36	0.4
6/11/2007	8.2	1.34	0.3
6/12/2007	8.2	1.35	0.4
6/13/2007	8.2	1.34	0.3
6/14/2007	8.2	1.39	0.5
6/15/2007	8.2	1.33	0.3
6/16/2007	8.2	1.33	0.3
6/17/2007	8.2	1.27	0.2
6/18/2007	8.2	1.35	0.3
6/19/2007	8.2	1.43	0.3
6/20/2007	8.2	1.49	0.1
6/21/2007	8.2	1.35	0.2
6/22/2007	8.2	1.41	0.3
6/23/2007	8.2	1.34	0.3
6/24/2007	8.2	1.32	0.2
6/25/2007	8.2	1.33	0.1

SMD1 Flows			
Date	Rock Ck R1-Daily (mgd)	Effluent Daily (mgd)	Dry Ck R3-Daily (mgd)
6/26/2007	8.2	1.38	0.1
6/27/2007	8.2	1.37	0.1
6/28/2007	8.2	1.42	0.1
6/29/2007	8.2	1.4	0.5
6/30/2007	8.2	1.31	0.3
7/1/2007	8.2	1.29	0.3
7/2/2007	8.2	1.33	0.3
7/3/2007	8.2	1.38	0.3
7/4/2007	8.2	1.33	0.3
7/5/2007	8.2	1.41	0.3
7/6/2007	8.2	1.45	0.3
7/7/2007	8.2	1.37	0.8
7/8/2007	8.2	1.35	0.3
7/9/2007	8.2	1.37	0.01
7/10/2007	8.2	1.41	0.3
7/11/2007	8.2	1.43	0.5
7/12/2007	8.2	1.44	0.5
7/13/2007	8.2	1.41	0.6
7/14/2007	8.2	1.32	0.3
7/15/2007	8.2	1.25	0.3
7/16/2007	8.2	1.39	0.1
7/17/2007	8.2	1.4	0.1
7/18/2007	8.2	1.43	0.2
7/19/2007	8.2	1.4	0.1
7/20/2007	8.2	1.4	0.3
7/21/2007	8.2	1.37	0.1
7/22/2007	8.2	1.32	0.1
7/23/2007	8.2	1.28	0.1
7/24/2007	8.2	1.5	0.1
7/25/2007	8.2	1.42	0.3
7/26/2007	8.2	1.36	0.4
7/27/2007	8.2	1.35	0.8
7/28/2007	8.2	1.29	0.8
7/29/2007	8.2	1.34	0.8
7/30/2007	1.8	1.4	0.7
7/31/2007	1.9	1.4	0.8
8/1/2007	1.8	1.36	0.3
8/2/2007	2.1	1.43	0.3
8/3/2007	8.2	1.42	0.8
8/4/2007	8.2	1.35	1.1
8/5/2007	8.2	1.34	0.4
8/6/2007	8.2	1.39	0.6
8/7/2007	8.2	1.41	0.8
8/8/2007	8.2	1.41	1.1
8/9/2007	8.2	1.4	0.8

SMD1 Flows			
Date	Rock Ck R1-Daily (mgd)	Effluent Daily (mgd)	Dry Ck R3-Daily (mgd)
8/10/2007	8.2	1.4	0.8
8/11/2007	8.2	1.34	0.8
8/12/2007	8.2	1.31	0.6
8/13/2007	8.2	1.39	0.4
8/14/2007	8.2	1.39	0.3
8/15/2007	8.2	1.37	1.1
8/16/2007	8.2	1.36	0.8
8/17/2007	8.2	1.38	0.8
8/18/2007	8.2	1.35	0.8
8/19/2007	8.2	1.37	1.1
8/20/2007	8.2	1.44	0.8
8/21/2007	8.2	1.41	1.1
8/22/2007	8.2	1.43	0.8
8/23/2007	8.2	1.44	1.4
8/24/2007	8.2	1.42	1.1
8/25/2007	8.2	1.36	1.1
8/26/2007	8.2	1.37	1.1
8/27/2007	8.2	1.4	1
8/28/2007	8.2	1.44	1.1
8/29/2007	8.2	1.44	0.8
8/30/2007	8.2	1.47	0.5
8/31/2007	8.2	1.47	0.3
9/1/2007	8.2	1.41	0.3
9/2/2007	8.2	1.32	1.1
9/3/2007	8.2	1.41	0.8
9/4/2007	8.2	1.43	0.5
9/5/2007	8.2	1.39	0.4
9/6/2007	8.2	1.41	0.3
9/7/2007	8.2	1.41	0.5
9/8/2007	8.2	1.38	0.5
9/9/2007	8.2	1.39	0.5
9/10/2007	8.2	1.42	0.5
9/11/2007	8.2	1.42	0.5
9/12/2007	8.2	1.4	0.7
9/13/2007	8.2	1.46	0.8
9/14/2007	8.2	1.43	0.8
9/15/2007	8.2	1.42	0.8
9/16/2007	8.2	1.4	0.8
9/17/2007	8.2	1.46	0.8
9/18/2007	8.2	1.44	0.5
9/19/2007	8.2	1.43	0.4
9/20/2007	8.2	1.42	0.5
9/21/2007	8.2	1.39	0.5
9/22/2007	8.2	1.39	0.5
9/23/2007	8.2	1.4	0.8

SMD1 Flows			
Date	Rock Ck R1-Daily (mgd)	Effluent Daily (mgd)	Dry Ck R3-Daily (mgd)
9/24/2007	8.2	1.41	0.3
9/25/2007	8.2	1.38	0.5
9/26/2007	8.2	1.38	0.5
9/27/2007	8.2	1.39	0.2
9/28/2007	8.2	1.39	0.5
9/29/2007	8.2	1.33	0.3
9/30/2007	8.2	1.34	0.5
10/1/2007	8.2	1.39	0.3
10/2/2007	8.2	1.34	0.1
10/3/2007	8.2	1.39	0.4
10/4/2007	8.2	1.44	0.3
10/5/2007	8.2	1.4	0.3
10/6/2007	8.2	1.35	0.3
10/7/2007	8.2	1.34	0.3
10/8/2007	8.2	1.42	0.3
10/9/2007	8.2	1.41	0.3
10/10/2007	8.2	1.65	1.4
10/11/2007	8.2	1.46	0.8
10/12/2007	8.2	1.51	0.5
10/13/2007	8.2	1.45	0.5
10/14/2007	5.9	1.42	0.3
10/15/2007	3	1.44	0.3
10/16/2007	4.9	1.55	0.3
10/17/2007	3.7	1.48	0.3
10/18/2007	3.9	1.49	0.3
10/19/2007	3.4	1.66	0.3
10/20/2007	6.5	1.63	1.4
10/21/2007	3.9	1.44	0.3
10/22/2007	3	1.46	0.2
10/23/2007	3	1.48	0.2
10/24/2007	3.5	1.44	0.2
10/25/2007	4.4	1.37	0.3
10/26/2007	3	1.46	0.3
10/27/2007	3	1.42	0.3
10/28/2007	2.7	1.34	0.3
10/29/2007	2.1	1.48	0.3
10/30/2007	3	1.41	0.3
10/31/2007	5.9	1.41	0.8
11/1/2007	2.1	1.42	1.4
11/2/2007	2.1	1.39	1.4
11/3/2007	2.1	1.33	1.4
11/4/2007	2.1	1.32	5.9
11/5/2007	1.8	1.36	5.9
11/6/2007	1.8	1.46	5.9
11/7/2007	3	1.41	

SMD1 Flows				
Date	Rock Ck R1-Daily (mgd)	Effluent Daily (mgd)		Dry Ck R3-Daily (mgd)
11/8/2007	3	1.44		5.9
11/9/2007	8.2	1.42		
11/10/2007	8.2	1.47		
11/11/2007	8.2	1.94		
11/12/2007	8.2	1.66		
11/13/2007	3.4	1.49		
11/14/2007	3.4	1.44		
11/15/2007	4.4	1.5		
11/16/2007	4.4	1.41		
11/17/2007	4.4	1.37		
11/18/2007	8.2	1.33		
11/19/2007	8.2	1.41		
11/20/2007	8.2	1.39		
11/21/2007	8.2	1.4		
11/22/2007	8.2	1.28		
11/23/2007	8.2	1.29		
11/24/2007	8.2	1.33		
11/25/2007	8.2	1.36		
11/26/2007	8.2	1.42		
11/27/2007	8.2	1.39		
11/28/2007	4.4	1.36		
11/29/2007	3.4	1.34		
11/30/2007	4.9	1.35		
12/1/2007	4.4	1.34		
12/2/2007	3.9	1.37		
12/3/2007	4.4	1.41		
12/4/2007	5.4	1.47		
12/5/2007	3.3	1.4		
12/6/2007	8.2	1.67		
12/7/2007	8.2	3.44	>	8.2
12/8/2007	5.9	1.86		3.9
12/9/2007	4.9	1.61		1.1
12/10/2007	2.5	1.58		
12/11/2007	3.9	1.48		
12/12/2007	3.5	1.45		
12/13/2007	4.4	1.44		
12/14/2007	4.4	1.41		
12/15/2007	4.4	1.41		
12/16/2007	4.1	1.42		
12/17/2007	8.2	1.9		
12/18/2007	8.2	3.31		
12/19/2007	8.2	2.48		
12/20/2007	8.2	3.79	>	8.2
12/21/2007	6.5	2.24		7
12/22/2007	5.4	1.91		5.9

SMD1 Flows				
Date	Rock Ck R1-Daily (mgd)	Effluent Daily (mgd)		Dry Ck R3-Daily (mgd)
12/23/2007	4.1	1.75		2.3
12/24/2007	3.9	1.69		2.1
12/25/2007	5	1.4		
12/26/2007	4.9	1.59		
12/27/2007	4.9	1.56		
12/28/2007	4.9	1.54		
12/29/2007	4.9	1.66		
12/30/2007	4.3	1.72		
12/31/2007	4.4	1.65		
1/1/2008	5.4	1.5		
1/2/2008	4.7	1.55		
1/3/2008	4.9	1.65		
1/4/2008	8.2	3.35		
1/5/2008	8.2	3.94	>	8.2
1/6/2008	8.2	3.22	>	8.2
1/7/2008	7.8	2.59	>	8.2
1/8/2008	5.1	2.56		4.9
1/9/2008	8.2	2.67	>	8.2
1/10/2008	6.5	2.33		5.9
1/11/2008	4.9	2.1		3.9
1/12/2008	4.9	1.95		3.9
1/13/2008	4	1.78		3.1
1/14/2008	4.7	1.78		
1/15/2008	3.9	1.69		
1/16/2008	3.8	1.6		
1/17/2008	3.8	1.57		
1/18/2008	5.9	1.57		
1/19/2008	5.9	1.49		
1/20/2008	2.2	1.44		
1/21/2008	2.5	1.57		
1/22/2008	2.1	1.53		
1/23/2008	4.9	1.69	>	8.2
1/24/2008	8.2	2.18		
1/25/2008	5.9	1.95	>	8.2
1/26/2008	5.9	2.06	>	8.2
1/27/2008	7	2.36		
1/28/2008	6.5	2.36		
1/29/2008	6.2	2.46		
1/30/2008	4.4	2.42		
1/31/2008	3.9	2.63		
2/1/2008	8.2	3.37	>	8.2
2/2/2008	8.2	2.61	>	8.2
2/3/2008	8.2	3.75		
2/4/2008	7.1	2.89		
2/5/2008	4.9	2.31	>	8.2

SMD1 Flows				
Date	Rock Ck R1-Daily (mgd)	Effluent Daily (mgd)		Dry Ck R3-Daily (mgd)
2/6/2008	5.4	2.11		5.9
2/7/2008	4.4	1.98		4.4
2/8/2008	4.4	1.85		3.9
2/9/2008	3.4	1.75		3.4
2/10/2008	3.4	1.66		2.8
2/11/2008	3.5	1.69		2.5
2/12/2008	3.4	1.63		3.4
2/13/2008	2.6			2.5
2/14/2008	2.6	1.56		2.2
2/15/2008	3.4	1.54		2.2
2/16/2008	3.4	1.51		2.2
2/17/2008	2.5	1.44		
2/18/2008	2.6	1.52		
2/19/2008	2.6			
2/20/2008	5.9			
2/21/2008	3.4			
2/22/2008	5.4	1.88		
2/23/2008	4.9	1.86		
2/24/2008	8.2	2.78		
2/25/2008	5.8	2.54		
2/26/2008	4.9	2.09		
2/27/2008	4.2	1.94		
2/28/2008	4	1.86		
2/29/2008	3.4	1.85		
3/1/2008	3.4	1.69		
3/2/2008	2.9	1.66		
3/3/2008	2.7	1.68		
3/4/2008	2.5	1.59		
3/5/2008	2.5	1.57		
3/6/2008	2.3	1.56		
3/7/2008	3	1.53		
3/8/2008	2.8	1.53		
3/9/2008	2.8	1.52		
3/10/2008	3	1.54		
3/11/2008	3.4	1.54		
3/12/2008	2.5	1.53		
3/13/2008	2.8	1.52		
3/14/2008	3	1.52		
3/15/2008	3	1.47		
3/16/2008	3	1.44		
3/17/2008	3	1.49		
3/18/2008	4	1.48		
3/19/2008	4	1.5		
3/20/2008	4.9	1.49		
3/21/2008	4	1.5		

SMD1 Flows				
Date	Rock Ck R1-Daily (mgd)	Effluent Daily (mgd)		Dry Ck R3-Daily (mgd)
3/22/2008	3.7	1.45		
3/23/2008	4	1.2		
3/24/2008	3.4	1.5		
3/25/2008	2.5	1.49		
3/26/2008	3	1.48		
3/27/2008	2.7	1.45		
3/28/2008	3.4	1.48		
3/29/2008	8.2	1.62		
3/30/2008	2.5	1.49		
3/31/2008	2.5	1.49		
4/1/2008	3	1.49		
4/2/2008	2.6	1.46		
4/3/2008	2.7	1.94		
4/4/2008	2.5	1.47		
4/5/2008	2.5	1.44		
4/6/2008	2.5	1.44		
4/7/2008	7.1	1.46		
4/8/2008	7.1	1.45		
4/9/2008	3.1	1.47		
4/10/2008	2.1	1.45		
4/11/2008	3.4	1.41		
4/12/2008	3.4	1.27		
4/13/2008	2.6	1.39		
4/14/2008	2.5	1.45		
4/15/2008	2.5	1.42		
4/16/2008	2.5	1.41		
4/17/2008	3	1.45		
4/18/2008	3.1	1.45		
4/19/2008	2.3	1.35		
4/20/2008	3.1	1.34		
4/21/2008	3.1	1.43		
4/22/2008	3.8	1.45		
4/23/2008	3.9	1.48		
4/24/2008	3.9	1.35		
4/25/2008	3.9	1.36		
4/26/2008	3.9	1.35		
4/27/2008	3.1	1.34		
4/28/2008	2.7	1.43		
4/29/2008	2.5	1.36		
4/30/2008	3	1.32		
5/1/2008	3	1.33		
5/2/2008	3	1.36		
5/3/2008	2.8	1.34		
5/4/2008	2.6	1.31		
5/5/2008	2.5	1.41		

SMD1 Flows			
Date	Rock Ck R1-Daily (mgd)	Effluent Daily (mgd)	Dry Ck R3-Daily (mgd)
5/6/2008	2.8		
5/7/2008	3		
5/8/2008	0.8		
5/9/2008	0.8		
5/10/2008	3	1.38	
5/11/2008	3.4	1.34	
5/12/2008	3.4	1.4	
5/13/2008	3.7	1.36	
5/14/2008	4	1.39	
5/15/2008	3.6	1.46	
5/16/2008	3.4	1.45	
5/17/2008	3	1.43	
5/18/2008	3.4		
5/19/2008	3.1	1.46	
5/20/2008	3.4	1.44	
5/21/2008	3	1.42	
5/22/2008	3	1.43	
5/23/2008	3	1.41	
5/24/2008	4.4	1.4	
5/25/2008	3	1.32	
5/26/2008	3	1.41	
5/27/2008	3	1.42	
5/28/2008	2.9	1.42	
5/29/2008	3	1.42	
5/30/2008	3.4	1.38	
5/31/2008	3	1.4	
6/1/2008	3	1.38	
6/2/2008	3	1.4	
6/3/2008	3	1.42	
6/4/2008	3	1.4	
6/5/2008	0.8	1.38	
6/6/2008	3	1.4	
6/7/2008	4.9	1.33	
6/8/2008	3	1.33	
6/9/2008	3	1.4	
6/10/2008	3	1.42	
6/11/2008	0.8	1.44	
6/12/2008	2.3	1.42	
6/13/2008	2.5	1.34	
6/14/2008	3	1.33	
6/15/2008	3	1.35	
6/16/2008	3	1.39	
6/17/2008	2.8	1.39	
6/18/2008	3	1.41	
6/19/2008	3	1.39	

SMD1 Flows			
Date	Rock Ck R1-Daily (mgd)	Effluent Daily (mgd)	Dry Ck R3-Daily (mgd)
6/20/2008	3.4	1.38	
6/21/2008	3	1.37	
6/22/2008	3	1.34	
6/23/2008	3	1.28	
6/24/2008	3.1	1.5	
6/25/2008	2.1	1.45	
6/26/2008	4	1.42	
6/27/2008	3.4	1.43	
6/28/2008	2.5	1.36	
6/29/2008	2.1	1.36	
6/30/2008	2.3	1.36	
7/1/2008	2.1	1.37	
7/2/2008	2.1	1.44	
7/3/2008	3	1.4	
7/4/2008	4	1.3	
7/5/2008	3.5	1.24	
7/6/2008	2.1	1.33	
7/7/2008	2.1	1.4	
7/8/2008	2.5	1.42	
7/9/2008	3	1.38	
7/10/2008	2.1	1.41	
7/11/2008	3.4	1.46	
7/12/2008	3	1.36	
7/13/2008	2.1	1.32	
7/14/2008	2.1	1.43	
7/15/2008	3	1.37	
7/16/2008	3.4	1.36	
7/17/2008	3	1.43	
7/18/2008	3.4	1.34	
7/19/2008	3	1.35	
7/20/2008	2.3	1.32	
7/21/2008	3	1.32	
7/22/2008	3.4	1.38	
7/23/2008	3	1.37	
7/24/2008	3	1.37	
7/25/2008	3.4	1.37	
7/26/2008	3.7	1.34	
7/27/2008	3.1	1.33	
7/28/2008	3.1	1.36	
7/29/2008	3.1	1.47	
7/30/2008	3.1	1.39	
7/31/2008	0.9	1.38	
8/1/2008	3	1.3	
8/2/2008	3	1.5	
8/3/2008	3	1.3	

SMD1 Flows			
Date	Rock Ck R1-Daily (mgd)	Effluent Daily (mgd)	Dry Ck R3-Daily (mgd)
8/4/2008	3.4	1.34	
8/5/2008	3.4	1.34	
8/6/2008	3.1	1.36	
8/7/2008	3.1	1.41	
8/8/2008	3.9	1.43	
8/9/2008	3.1	1.37	
8/10/2008	3	1.34	
8/11/2008	3	1.44	
8/12/2008	3	1.44	
8/13/2008	3	1.46	
8/14/2008	2.7	1.49	
8/15/2008	3.2	1.45	
8/16/2008	4.4	1.41	
8/17/2008	4.9	1.43	
8/18/2008	4.7	1.31	
8/19/2008	4.4	1.36	
8/20/2008	4.9	1.41	
8/21/2008	4.9	1.49	
8/22/2008	3.5	1.39	
8/23/2008	3.9	1.36	
8/24/2008	3.4	1.38	
8/25/2008	3.1	1.55	
8/26/2008	3.1		
8/27/2008	3.1		
8/28/2008	3.1		
8/29/2008	3		
8/30/2008	8.2	1.33	
8/31/2008	7	1.53	
9/1/2008	8.2	1.34	
9/2/2008	8.2	1.39	
9/3/2008	8.2	1.39	
9/4/2008	8.2	1.36	
9/5/2008	8.2	1.34	
9/6/2008	8.2	1.34	
9/7/2008	8.2	1.38	
9/8/2008	8.2	1.38	
9/9/2008	8.2	1.35	
9/10/2008	8.2	1.37	
9/11/2008	8.2	1.4	
9/12/2008	8.2	1.4	
9/13/2008	8.2	1.34	
9/14/2008	8.2	1.36	
9/15/2008	8.2	1.37	
9/16/2008	8.2	1.4	
9/17/2008	8.2	1.39	

SMD1 Flows			
Date	Rock Ck R1-Daily (mgd)	Effluent Daily (mgd)	Dry Ck R3-Daily (mgd)
9/18/2008	8.2	1.36	
9/19/2008	8.2	1.38	
9/20/2008	8.2	1.38	
9/21/2008	8.2	1.36	
9/22/2008	8.2	1.39	
9/23/2008	8.2	1.39	
9/24/2008	8.2	1.41	
9/25/2008	8.2	1.48	
9/26/2008	8.2	1.45	
9/27/2008	8.2	1.42	
9/28/2008	8.2	1.42	
9/29/2008	8.2	1.48	
9/30/2008	8.2	1.45	
10/1/2008	8.2	1.46	
10/2/2008	8.2	2.22	
10/3/2008	8.2	1.46	
10/4/2008	8.2	1.55	
10/5/2008	8.2	1.43	
10/6/2008	8.2	1.48	
10/7/2008	6.5	1.45	
10/8/2008	6.5	1.41	
10/9/2008	7	1.41	
10/10/2008	6.5	1.41	
10/11/2008	6.5	1.39	
10/12/2008	6.5	1.38	
10/13/2008	5.9	1.42	
10/14/2008	5.9	1.39	
10/15/2008	5.9	1.39	
10/16/2008	7.6	1.41	
10/17/2008	5.9	1.39	
10/18/2008	4.7	1.37	
10/19/2008	4.1	1.34	
10/20/2008	4.1	1.39	
10/21/2008	3.9	1.37	
10/22/2008	4.1	1.34	
10/23/2008	3.9	1.37	
10/24/2008	4.4	1.36	
10/25/2008	3.9	1.34	
10/26/2008	3	1.33	
10/27/2008	3	1.38	
10/28/2008	5	1.34	
10/29/2008	5.9	1.35	0.3
10/30/2008	5	1.37	0.3
10/31/2008	8.2	1.45	
11/1/2008	8.2	2.12	

SMD1 Flows			
Date	Rock Ck R1-Daily (mgd)	Effluent Daily (mgd)	Dry Ck R3-Daily (mgd)
11/2/2008	6.5	1.99	
11/3/2008	2.9	1.77	3.9
11/4/2008	4.9	1.68	
11/5/2008	3.1	1.46	5.9
11/6/2008	3	1.51	6.5
11/7/2008	2.1	1.42	1.4
11/8/2008	2.5	1.43	3
11/9/2008	2.9	1.39	4.1
11/10/2008	8.2	1.43	2.6
11/11/2008	8.2	1.41	1.4
11/12/2008	5	1.37	0.3
11/13/2008	1.1	1.39	0.4
11/14/2008	2.1	1.37	0.5
11/15/2008	2.5	1.36	0.5
11/16/2008	1.4	1.34	0.3
11/17/2008	3.3	1.38	1.4
11/18/2008	3.7	1.37	6.6
11/19/2008	1.8	1.36	7
11/20/2008	3	1.38	7.1
11/21/2008	5.4	1.35	0.5
11/22/2008	5.4	1.3	0.3
11/23/2008	2.1	1.28	0.5
11/24/2008	2.4	1.33	0.3
11/25/2008	2.1	1.38	0.3
11/26/2008	2.1	1.45	0.3
11/27/2008	3	1.24	0.3
11/28/2008	2.5	1.29	0.8
11/29/2008	2.1	1.27	0.8
11/30/2008	2.1	1.28	0.3
12/1/2008	2.1	1.36	
12/2/2008	2.1	1.4	
12/3/2008	2.1	1.4	
12/4/2008	2.1	1.3	
12/5/2008	2.5	1.3	0.5
12/6/2008	2.5	1.26	0.5
12/7/2008	2.1	1.28	0.4
12/8/2008	2.7	1.32	0.4
12/9/2008	2.5	1.33	0.5
12/10/2008	2	1.31	0.5
12/11/2008	2	1.33	0.3
12/12/2008	3	1.33	0.3
12/13/2008	4	1.27	0.3
12/14/2008	2	1.28	0.3
12/15/2008	8.2	1.7	0.3
12/16/2008	3.4	1.46	1.4

SMD1 Flows				
Date	Rock Ck R1-Daily (mgd)	Effluent Daily (mgd)		Dry Ck R3-Daily (mgd)
12/17/2008	2.2	1.41		0.3
12/18/2008	2.5	1.4		0.8
12/19/2008	5.4	1.6		1.8
12/20/2008	3	1.44		0.8
12/21/2008	8.2	1.89		0.3
12/22/2008	6.1	2.36	>	8.2
12/23/2008	3.3	1.74		3.9
12/24/2008	5.9	1.83		2.1
12/25/2008	8.2	2.73	>	8.2
12/26/2008	5.9	1.95		3.9
12/27/2008	2.5	1.73		2.5
12/28/2008	2.1	1.59		1.4
12/29/2008	2.1	1.6		1.1
12/30/2008	2.1	1.55		1.1
12/31/2008	3	1.48		0.8
1/1/2009	3.1	1.39		1.4
1/2/2009	8.2	1.65		2.1
1/3/2009	2.5	1.55		1.8
1/4/2009	2.5	1.47		1.4
1/5/2009	2.9	1.52		1.4
1/6/2009	2.1	1.47		1.4
1/7/2009	2	1.44		0.8
1/8/2009	2.1	1.44		1.1
1/9/2009	3	1.39		0.8
1/10/2009	3	1.38		0.8
1/11/2009	2.1	1.37		0.8
1/12/2009	2.5	1.45		0.8
1/13/2009	2.5	1.38		1.1
1/14/2009	2.5	1.35		1.4
1/15/2009	3	1.39		1.1
1/16/2009	3	1.39		1.1
1/17/2009	2.5	1.34		1.1
1/18/2009	2.5	1.31		1.1
1/19/2009	2.5	1.38		1.1
1/20/2009	3	1.34		1.1
1/21/2009	2.1	1.33		1.1
1/22/2009	8.2	2.6		0.8
1/23/2009	8.2	2.16	>	8.2
1/24/2009	8.2	2.43		8.2
1/25/2009	8.2	2	>	8.2
1/26/2009	3.4	1.89		
1/27/2009	2.5	1.57		3.4
1/28/2009	2.5	1.56		
1/29/2009	4.4	1.55		
1/30/2009	2.5	1.51		

SMD1 Flows				
Date	Rock Ck R1-Daily (mgd)	Effluent Daily (mgd)		Dry Ck R3-Daily (mgd)
1/31/2009	2.5	1.49		
2/1/2009	2.5	1.42		1.4
2/2/2009	2.8	1.47		1.4
2/3/2009	3	1.44		
2/4/2009	2.8	1.43		
2/5/2009	3	1.55		
2/6/2009	3	1.51		
2/7/2009	3	1.43		
2/8/2009	2.8	1.45		
2/9/2009	5.7	1.7		
2/10/2009	3	1.52		
2/11/2009	4.9	1.81		
2/12/2009	7	1.77		
2/13/2009	8.2	2.83	>	8.2
2/14/2009	8.2	3.16	>	8.2
2/15/2009	8.2	2.42	>	8.2
2/16/2009	5	2.65	>	8.2
2/17/2009	8.2	4.03	>	8.2
2/18/2009	8.2	3.51	>	8.2
2/19/2009	5	2.46	>	8.2
2/20/2009	3.9	2.16	>	8.2
2/21/2009	3.4	1.95		
2/22/2009	8.2	2.57		
2/23/2009	8.2	4.53		
2/24/2009	8.2	3.41		
2/25/2009	5.9	2.5		
2/26/2009	6.9	2.34	>	8.2
2/27/2009	3.9	2		
2/28/2009	3.9	1.89		
3/1/2009	8.2	2.26		
3/2/2009	8.2	3.48	>	8.2
3/3/2009	8.2	4.33	>	8.2
3/4/2009	8.2	4.01	>	8.2
3/5/2009	7	3.16	>	8.2
3/6/2009	6.5	2.29	>	8.2
3/7/2009	5.4	2.02		
3/8/2009	4.1	1.9		
3/9/2009	3.7	1.78		3.9
3/10/2009	3	1.72		3.4
3/11/2009	2.7	1.65		3.3
3/12/2009	3	1.58		2.5
3/13/2009	3.6	1.57		2.1
3/14/2009	3.6	1.52		2.1
3/15/2009	6.2	1.5		1.8
3/16/2009	5.8	1.59		2.1

SMD1 Flows				
Date	Rock Ck R1-Daily (mgd)	Effluent Daily (mgd)		Dry Ck R3-Daily (mgd)
3/17/2009	3.7	1.53		1.5
3/18/2009	8.2	1.49		0.8
3/19/2009	8.2	1.79		0.82
3/20/2009	8.2	1.77		1.3
3/21/2009	5.9	1.46		2.1
3/22/2009	8.2	1.58		5.9
3/23/2009	4.9	1.53		1.5
3/24/2009	2.5	1.46		1.6
3/25/2009	3	1.44		1.4
3/26/2009	2.7	1.47		1.4
3/27/2009	3.1	1.43		0.8
3/28/2009	3	1.39		1.4
3/29/2009	2.5	1.37		1.4
3/30/2009	2.5	1.47		3
3/31/2009	8.2	1.43		1.2
4/1/2009	8.2	1.44		0.9
4/2/2009	6.1	1.41		0.8
4/3/2009	3.4	1.36		1.1
4/4/2009	3	1.34		1.1
4/5/2009	3	1.3		0.8
4/6/2009	3	1.37		0.8
4/7/2009	2.5	1.39		0.8
4/8/2009	5.1	1.61		1.1
4/9/2009	7	1.64		1.7
4/10/2009	5.9	1.69		5.9
4/11/2009	4.1	1.5		3.1
4/12/2009	3.1	1.39		1.7
4/13/2009	3	1.57		2.1
4/14/2009	4.2	1.49		1.4
4/15/2009	4.1	1.36		2.1
4/16/2009	3.9	1.46		1.4
4/17/2009	4.4	1.45		1.8
4/18/2009	3.9	1.39		1.8
4/19/2009	3	1.38		1.4
4/20/2009	3.9	1.44		1.9
4/21/2009	2.9	1.39		1.4
4/22/2009	3.6	1.47		1.1
4/23/2009	3.6	1.42		1.4
4/24/2009	3.7	1.33		2.1
4/25/2009	3.3	1.31		1.1
4/26/2009	3	1.31		1.3
4/27/2009	3	1.39		1.2
4/28/2009	3.9	1.32		1.4
4/29/2009	3.4			1.4
4/30/2009	3.9			1.4

SMD1 Flows				
Date	Rock Ck R1-Daily (mgd)	Effluent Daily (mgd)		Dry Ck R3-Daily (mgd)
5/1/2009	3.9			1.8
5/2/2009	8.2	1.94		8.2
5/3/2009	8.2	2.34		8.2
5/4/2009	6.5	2.09		5.4
5/5/2009	8.2	3.19		8.2
5/6/2009	5.9	2.12		7.4
5/7/2009	2.4	1.91		3.1
5/8/2009	1.8	1.71		3.9
5/9/2009	5.6	1.59		3.4
5/10/2009	4.9	1.54		1.8
5/11/2009	4.9	1.55		1.9
5/12/2009	4.9	1.51		2
5/13/2009	4.9	1.5		2
5/14/2009	4.7	1.51		1.7
5/15/2009	4.4	1.39		1.8
5/16/2009	5.1	1.4		1.4
5/17/2009	3.9	1.41		1
5/18/2009	3.9	1.53		0.8
5/19/2009	3.7	1.47		1
5/20/2009	4.4	1.28		1.1
5/21/2009	4.4	1.41		1.1
5/22/2009	4.4	1.42		1.1
5/23/2009	4.4	1.38		1.1
5/24/2009	3.9	1.27		1.1
5/25/2009	3.9	1.37		0.9
5/26/2009	3.9	1.37		1.1
5/27/2009	3.9			0.8
5/28/2009	3.9	1.35		0.8
5/29/2009	3.9	1.35		0.8
5/30/2009	3.9	1.33		0.8
5/31/2009	3.9	1.34		0.8
6/1/2009	3.9	1.4		0.8
6/2/2009	3.9	1.42		0.8
6/3/2009	3.9	1.45		0.8
6/4/2009	6.5	1.43		2.2
6/5/2009	4.4	1.47		1.8
6/6/2009	4.4	1.35		1.4
6/7/2009	3.9	1.29		1.4
6/8/2009	3.9	1.33		1.1
6/9/2009	3.9	1.35		0.8
6/10/2009	3.9	1.4		0.5
6/11/2009	3.9	1.36		0.5
6/12/2009	3.9	1.34		0.8
6/13/2009	3.9	1.3		1.1
6/14/2009	3.4	1.28		0.8

SMD1 Flows			
Date	Rock Ck R1-Daily (mgd)	Effluent Daily (mgd)	Dry Ck R3-Daily (mgd)
6/15/2009	3.4	1.35	0.8
6/16/2009	3.4	1.34	0.8
6/17/2009	3	1.36	0.8
6/18/2009	4.9	1.36	0.8
6/19/2009	4.4	1.36	0.5
6/20/2009	4.9	1.29	0.5
6/21/2009	4.4	1.24	0.8
6/22/2009	4.4	1.37	0.8
6/23/2009	3.9	1.35	0.8
6/24/2009	3.9	1.43	0.8
6/25/2009	3.9	1.36	0.8
6/26/2009	3.9	1.34	0.8
6/27/2009	4.4	1.3	0.5
6/28/2009	3.9	1.28	0.5
6/29/2009	3.9	1.32	0.5
6/30/2009	3.7	1.33	0.3

Appendix B

Effluent Quality Summary Statistics

Constituent	Percent Detects	Units	Location	Count	MinOfDate	MaxOfDate		Min		Max	Avg
1,1,1-Trichloroethane	0%	µg/L	Effluent	6	25-Oct-06	09-Oct-08	<	0.5	<	0.5	0.2500
1,1,2,2-Tetrachloroethane	0%	µg/L	Effluent	6	25-Oct-06	09-Oct-08	<	0.5	<	0.5	0.2500
1,1,2-Trichloroethane	0%	µg/L	Effluent	6	25-Oct-06	09-Oct-08	<	0.5	<	0.5	0.2500
1,1-Dichloroethane	0%	µg/L	Effluent	6	25-Oct-06	09-Oct-08	<	0.5	<	0.5	0.2500
1,1-Dichloroethylene	0%	µg/L	Effluent	5	25-Oct-06	09-Oct-08	<	0.5	<	0.5	0.2500
1,2,3,4,6,7,8 Hp CDD	0%	pg/L	Effluent	10	20-Sep-06	26-Mar-09	<	0.864	<	6.11	1.2277
1,2,3,4,7,8,9-Hp CDF	0%	pg/L	Effluent	10	20-Sep-06	26-Mar-09	<	0.485	<	3.32	0.6423
1,2,4-Trichlorobenzene	0%	µg/L	Effluent	10	25-Oct-06	08-Apr-09	<	0.1	<	5	0.9100
1,2-Dichlorobenzene	0%	µg/L	Effluent	7	25-Oct-06	09-Oct-08	<	0.5	<	5	0.6786
1,2-Dichloroethane	0%	µg/L	Effluent	5	25-Oct-06	09-Oct-08	<	0.5	<	0.5	0.2500
1,2-Dichloropropane	0%	µg/L	Effluent	6	25-Oct-06	09-Oct-08	<	0.5	<	0.5	0.2500
1,2-Diphenylhydrazine	0%	µg/L	Effluent	3	25-Oct-06	08-Apr-09	<	1	<	5	1.1667
1,3-Dichlorobenzene	0%	µg/L	Effluent	7	25-Oct-06	09-Oct-08	<	0.5	<	5	0.6071
1,3-Dichloro-Propylene	0%	µg/L	Effluent	5	25-Oct-06	09-Oct-08	<	0.5	<	0.5	0.2500
1,4-Dichlorobenzene	0%	µg/L	Effluent	10	25-Oct-06	08-Apr-09	<	0.2	<	5	0.7250
2,3,7,8-TCDD	0%	pg/L	Effluent	10	20-Sep-06	26-Mar-09	<	0.231	<	3.5	0.7242
2,4,5-TP (Silvex) (µg/L)	0%	µg/L	Effluent	9	25-Oct-06	08-Apr-09	<	0.5	<	1	0.4014
2,4,6-Trichlorophenol	0%	µg/L	Effluent	10	25-Oct-06	08-Apr-09	<	0.1	<	10	1.6950
2,4-D (µg/L)	0%	µg/L	Effluent	9	25-Oct-06	08-Apr-09	<	0.4	<	10	2.4722
2,4-Dichlorophenol	0%	µg/L	Effluent	10	25-Oct-06	08-Apr-09	<	0.1	<	5	0.9700
2,4-Dimethylphenol	0%	µg/L	Effluent	10	25-Oct-06	08-Apr-09	<	0.1	<	5	0.8200
2,4-DinitRophenol	0%	µg/L	Effluent	10	25-Oct-06	08-Apr-09	<	0.1	<	30	3.7200
2,4-Dinitrotoluene	0%	µg/L	Effluent	10	25-Oct-06	08-Apr-09	<	0.1	<	5	0.9700
2,6-Dinitrotoluene	0%	µg/L	Effluent	9	25-Oct-06	08-Apr-09	<	0.1	<	5	0.9667
2-Chloro-	0%	µg/L	Effluent	1	25-Oct-06	25-Oct-06	<	1	<	1	0.5000
2-Chloronaphthalene	0%	µg/L	Effluent	10	25-Oct-06	08-Apr-09	<	0.1	<	5	0.9700
2-Chlorophenol	0%	µg/L	Effluent	10	25-Oct-06	08-Apr-09	<	0.1	<	5	0.9700
2-Nitrophenol	0%	µg/L	Effluent	10	25-Oct-06	08-Apr-09	<	0.1	<	10	1.6950
3,3-Dichlorobenzidine	0%	µg/L	Effluent	10	25-Oct-06	08-Apr-09	<	0.1	<	5	1.1950
3,4 Benzo-	0%	µg/L	Effluent	6	25-Oct-06	02-Jan-08	<	0.1	<	5	1.0333
3,4 Benzo-Fluoranthene (Benzo(b)fluoranthene)	0%	µg/L	Effluent	4	09-Jul-08	08-Apr-09	<	1	<	2	0.8750

Constituent	Percent Detects	Units	Location	Count	MinOfDate	MaxOfDate		Min		Max	Avg
4,6-Dinitro-O-Cresol (4,6-Dinitro-2-Methylphenol) (ug/L)	0%	µg/L	Effluent	10	25-Oct-06	08-Apr-09	<	0.1	<	30	3.4700
4-Bromophenyl	0%	µg/L	Effluent	10	25-Oct-06	08-Apr-09	<	0.1	<	5	0.9700
4-Chlorophenyl	0%	µg/L	Effluent	10	25-Oct-06	08-Apr-09	<	0.1	<	5	0.9700
4-Nitrophenol	0%	µg/L	Effluent	10	25-Oct-06	08-Apr-09	<	0.1	<	10	1.4700
Acenaphthene	0%	µg/L	Effluent	10	25-Oct-06	08-Apr-09	<	0.1	<	5	0.7700
Acenaphthylene	0%	µg/L	Effluent	10	25-Oct-06	08-Apr-09	<	0.1	<	5	0.9700
Acrolein	0%	µg/L	Effluent	1	25-Oct-06	25-Oct-06	<	2	<	2	1.0000
Acrylonitrile	0%	µg/L	Effluent	1	25-Oct-06	25-Oct-06	<	2	<	2	1.0000
Alachlor (µg/L)	18%	µg/L	Effluent	22	10-Jul-06	08-Apr-09		0	<	1.25	0.1659
Ammonia	69%	mg/L	Effluent	1094	01-Jul-06	30-Jun-09		0.06		15.1	2.3952
Anthracene	0%	µg/L	Effluent	10	25-Oct-06	08-Apr-09	<	0.1	<	5	0.9700
Antimony	60%	µg/L	Effluent	5	25-Oct-06	09-Apr-09		0.246		0.481	0.3770
Arochlor 1016 (µg/L)	0%	µg/L	Effluent	20	10-Jul-06	08-Apr-09	<	0.08	<	1	0.1408
Arochlor 1221 (µg/L)	0%	µg/L	Effluent	20	10-Jul-06	08-Apr-09	<	0.06	<	25	0.8090
Arochlor 1260 (µg/L)	0%	µg/L	Effluent	20	10-Jul-06	08-Apr-09	<	0.04	<	1	0.1398
Arsenic	100%	µg/L	Effluent	4	08-Nov-07	09-Apr-09		0.48		21.5	5.7875
Asbestos	0%	MFL	Effluent	9	19-Mar-02	20-Nov-02	<	0.021	<	2.071	0.13805556
Atrazine (µg/L)	19%	µg/L	Effluent	21	10-Jul-06	08-Apr-09		0	<	2	0.1500
Barium (total recoverable)	100%	ug/l	Effluent	12	14-Mar-02	04-Feb-03		3.31		9.2	4.8175
Benzene	0%	µg/L	Effluent	6	25-Oct-06	09-Oct-08	<	0.5	<	0.5	0.2500
Benzidine	0%	µg/L	Effluent	10	25-Oct-06	08-Apr-09	<	0.1	<	10	1.2200
Benzo(A)Anthracene	0%	µg/L	Effluent	10	25-Oct-06	08-Apr-09	<	0.1	<	5	0.9700
Benzo(a)Pyrene	0%	µg/L	Effluent	10	25-Oct-06	08-Apr-09	<	0.1	<	10	1.2200
Benzo(GHI)Perylene)	0%	µg/L	Effluent	9	25-Oct-06	08-Apr-09	<	0.1	<	5	1.0722
Benzo(K)Fluoranthene	0%	µg/L	Effluent	10	25-Oct-06	08-Apr-09	<	0.1	<	10	1.2200
Berylium	0%	µg/L	Effluent	4	08-Nov-07	09-Apr-09	<	0.06	<	5	0.6475
Bis (2-Chloroethoxy)	0%	µg/L	Effluent	10	25-Oct-06	08-Apr-09	<	0.1	<	5	0.9700
Bis (2-Chloroethyl)-	0%	µg/L	Effluent	9	25-Oct-06	08-Apr-09	<	0.1	<	5	0.7444
Bis (2-Chloroiso-Propyl)	0%	µg/L	Effluent	10	25-Oct-06	08-Apr-09	<	0.1	<	5	0.8200
Bis (2-Ethylhexyl)	17%	µg/L	Effluent	23	10-Jul-06	08-Apr-09	<	0.1		18	2.0826

Constituent	Percent Detects	Units	Location	Count	MinOfDate	MaxOfDate		Min		Max	Avg
Bis (2-Ethylhexyl)--After 2007	17%	µg/L	Effluent	18	3-Jan-07	08-Apr-09	<	0.1	<	18	1.206
Bromoform	0%	µg/L	Effluent	6	25-Oct-06	09-Oct-08	<	0.5	<	0.5	0.2500
Butyl Benzyl Pthalate	0%	µg/L	Effluent	23	10-Jul-06	08-Apr-09	<	0.1	<	10	1.2978
Cadmium	60%	µg/L	Effluent	5	25-Oct-06	09-Apr-09		0.022		0.036	0.0297
Carbon Tetrachloride	0%	µg/L	Effluent	6	25-Oct-06	09-Oct-08	<	0.5	<	0.5	0.2500
Chloride	100%	mg/l	Effluent	12	19-Mar-02	05-Feb-03		42		65	54.25
Chlorine	0%	mg/L	Effluent	1095	01-Jul-06	30-Jun-09	<	0.01		7.5	0.0156
Chlorobenzene	8%	ug/l	Effluent	12	19-Mar-02	05-Feb-03	<	0.07		0.078	0.078
Chlorodibromo-	29%	µg/L	Effluent	7	25-Oct-06	09-Oct-08		0.5		0.97	0.3886
Chloroethane	0%	µg/L	Effluent	6	25-Oct-06	09-Oct-08	<	0.5	<	0.5	0.2500
Chloroform	96%	µg/L	Effluent	23	10-Jul-06	08-Apr-09	<	1		99	23.8609
Chloromethane	8%	ug/l	Effluent	12	19-Mar-02	05-Feb-03	<	0.14		0.19	0.10833333
Chromium	60%	µg/L	Effluent	5	30-Oct-06	09-Apr-09		0.1		0.16	0.1233
Chromium VI	15%	ug/l	Effluent	13	19-Mar-02	05-Feb-03	<	0.126		0.96	0.19792308
Chrysene	0%	µg/L	Effluent	10	25-Oct-06	08-Apr-09	<	0.1	<	5	0.9700
Clorobenzene	0%	µg/L	Effluent	6	25-Oct-06	09-Oct-08	<	0.5	<	0.5	0.2500
Copper	95%	µg/L	Effluent	19	11-Jul-06	09-Apr-09		1.1		21.9	3.6905
Cyanide	33%	mg/L	Effluent	3	25-Oct-06	09-Oct-08	<	0.005		0.01	0.0100
Dalapon (µg/L)	0%	µg/L	Effluent	9	25-Oct-06	08-Apr-09	<	0.6	<	10	2.4972
DDE (µg/L)	0%	µg/L	Effluent	20	10-Jul-06	08-Apr-09	<	0.003	<	0.05	0.0100
delta-BHC (µg/L)	0%	µg/L	Effluent	21	10-Jul-06	08-Apr-09	<	0.003	<	0.05	0.0119
Dibenzo(A,H)	0%	µg/L	Effluent	10	25-Oct-06	08-Apr-09	<	0.1	<	10	1.2200
Dichlorobromo	75%	µg/L	Effluent	24	10-Jul-06	08-Apr-09		0.5		14	3.4208
Diethyl Phthalate	0%	µg/L	Effluent	23	10-Jul-06	08-Apr-09	<	0.1	<	10	1.2957
Dimethyl Phthalate	0%	µg/L	Effluent	14	10-Jul-06	08-Apr-09	<	0.1	<	10	1.4250
Di-N-Butyl	0%	µg/L	Effluent	23	10-Jul-06	08-Apr-09	<	0.1	<	10	1.3022
Di-n-butyl phthalate	20%	ug/l	Effluent	5	19-Mar-02	05-Feb-03	<	0.93		1	0.572
Di-N-Octyl	4%	µg/L	Effluent	23	10-Jul-06	08-Apr-09	<	0.1		20	1.7478
Dinoseb (µg/L)	0%	µg/L	Effluent	9	25-Oct-06	08-Apr-09	<	0.4	<	2	0.6944
Effluent	100%	mg/L	Effluent	23	11-Jul-06	09-Apr-09		141		301	227.3043
Electrical Conductivity	100%	umhos/cm	Effluent	1095	01-Jul-06	30-Jun-09		332		1090	650.3005
Endosulfan I (µg/L)	0%	µg/L	Effluent	21	10-Jul-06	08-Apr-09	<	0.002	<	0.047	0.0093

Constituent	Percent Detects	Units	Location	Count	MinOfDate	MaxOfDate		Min		Max	Avg
Endosulfan II (µg/L)	0%	µg/L	Effluent	21	10-Jul-06	08-Apr-09	<	0.002	<	0.047	0.0070
Ethylbenzene	0%	µg/L	Effluent	6	25-Oct-06	09-Oct-08	<	0.5	<	0.5	0.2500
Fluoranthene	0%	µg/L	Effluent	10	25-Oct-06	08-Apr-09	<	0.1	<	5	0.7700
Fluorene	0%	µg/L	Effluent	10	25-Oct-06	08-Apr-09	<	0.1	<	5	0.9700
Fluoride	58%	mg/l	Effluent	12	19-Mar-02	05-Feb-03	<	0.06		0.28	0.14933333
gamma- Chlordane (µg/L)	0%	µg/L	Effluent	19	10-Jul-06	08-Apr-09	<	0.012	<	0.47	0.0910
Heptachlor epoxcide (µg/L)	0%	µg/L	Effluent	21	10-Jul-06	08-Apr-09	<	0.002	<	0.024	0.0059
Hexachlorethane	0%	µg/L	Effluent	10	25-Oct-06	08-Apr-09	<	0.1	<	5	0.7700
Hexachlorobenzene	0%	µg/L	Effluent	19	25-Oct-06	08-Apr-09	<	0.1	<	5	0.5237
Hexachlorobutadiene	0%	µg/L	Effluent	10	25-Oct-06	08-Apr-09	<	0.1	<	5	0.6200
Hexachlorocyclo-Pentadiene	0%	µg/L	Effluent	19	25-Oct-06	08-Apr-09	<	0.1	<	20	1.1789
Indeno(1,2,3-CD)	0%	µg/L	Effluent	10	25-Oct-06	08-Apr-09	<	0.1	<	10	1.4450
Iron	100%	µg/L	Effluent	18	11-Jul-06	09-Apr-09		24.2		94	57.1167
Isophorone	0%	µg/L	Effluent	10	25-Oct-06	08-Apr-09	<	0.1	<	5	0.7700
Lead	95%	µg/L	Effluent	19	11-Jul-06	09-Apr-09		0.194		25.2	2.0344
Manganese, Total Recoverable (µg/L)	100%	µg/L	Effluent	22	11-Jul-06	09-Apr-09		4.09		35.2	21.3086
Mercury	79%	ng/L	Effluent	14	11-Jul-06	09-Apr-09		0.87		3.23	1.5464
Methyl Bromide	0%	µg/L	Effluent	5	25-Oct-06	09-Oct-08	<	0.5	<	0.5	0.2500
Methyl Chloride	0%	µg/L	Effluent	5	25-Oct-06	09-Oct-08	<	0.5	<	5	0.7000
Methylene blue active substances	92%	mg/l	Effluent	12	19-Mar-02	05-Feb-03		0.068		0.22	0.12345455
Methylene Chloride	0%	µg/L	Effluent	6	25-Oct-06	09-Oct-08	<	0.5	<	5	1.7500
Molinate	20%	ug/l	Effluent	5	19-Mar-02	05-Feb-03	<	0.169		2.3	2.3
MTBE	0%	µg/L	Effluent	21	10-Jul-06	08-Apr-09	<	0.5	<	3	0.5833
Naphthalene	0%	µg/L	Effluent	10	25-Oct-06	08-Apr-09	<	0.1	<	5	0.6950
Nickel	75%	µg/L	Effluent	4	08-Nov-07	09-Apr-09		2.1		2.7	2.4667
Nitrate plus Nitrite	100%	mg/L	Effluent	1094	01-Jul-06	30-Jun-09		4.3		49	17.4791
Nitrite	0%	mg/L	Effluent	1094	01-Jul-06	30-Jun-09		0.05		3.12	0.1851
Nitrobenzene	0%	µg/L	Effluent	10	25-Oct-06	08-Apr-09	<	0.1	<	5	0.7700
N-Nitrosodi-	0%	µg/L	Effluent	30	25-Oct-06	08-Apr-09	<	0.1	<	5	0.9033
OCDD (pg/L)	30%	pg/L	Effluent	10	20-Sep-06	26-Mar-09	<	0.634		9.41	6.2233

Constituent	Percent Detects	Units	Location	Count	MinOfDate	MaxOfDate		Min		Max	Avg
OCDF (pg/L)	0%	pg/L	Effluent	10	20-Sep-06	26-Mar-09	<	0.497	<	10.6	1.7479
Oil and Grease	0%	mg/L	Effluent	17	10-Jul-06	08-Apr-09	<	4.9	<	10	3.6735
P-Chloro-	0%	µg/L	Effluent	9	25-Oct-06	08-Apr-09	<	0.1	<	5	0.9944
Pentachlorophenol	0%	µg/L	Effluent	11	25-Oct-06	08-Apr-09	<	0.1	<	5	0.7318
Phenanthrene	0%	µg/L	Effluent	10	25-Oct-06	08-Apr-09	<	0.1	<	5	0.9700
Phenol	0%	µg/L	Effluent	10	25-Oct-06	08-Apr-09	<	0.1	<	5	0.7700
Phosphorus (Total)	100%	mg/L	Effluent	3	25-Oct-06	09-Oct-08		1.7		8.58	4.5267
Pyrene	0%	µg/L	Effluent	10	25-Oct-06	08-Apr-09	<	0.1	<	5	0.9700
Selenium	50%	µg/L	Effluent	4	08-Nov-07	09-Apr-09	<	0.6		1.2	1.0500
Silver	5%	µg/L	Effluent	19	11-Jul-06	09-Apr-09		0.02		0.02	0.0200
Sulfate as SO4	100%	mg/l	Effluent	12	19-Mar-02	05-Feb-03	<	35		59	40.0666667
Tetrachloro-	0%	µg/L	Effluent	5	25-Oct-06	09-Oct-08	<	0.5	<	0.5	0.2500
Thallium	0%	µg/L	Effluent	4	25-Oct-06	09-Apr-09	<	0.005	<	20	2.5263
Toluene	0%	µg/L	Effluent	6	25-Oct-06	09-Oct-08	<	0.5	<	0.5	0.2500
Total Aluminum (µg/L)	92%	µg/L	Effluent	25	11-Jul-06	09-Apr-09		11.8		162	54.9600
Total Dissolved Solids	100%	mg/L	Effluent	39	05-Jul-06	03-Jun-09		54		486	374.2821
Total Phenolic	0%	µg/L	Effluent	11	25-Oct-06	08-Apr-09	<	0.1	<	30	3.4000
Trans-1,2-Dichloro-Ethylene	0%	µg/L	Effluent	5	25-Oct-06	09-Oct-08	<	0.5	<	0.5	0.2500
Tributyltin (µg/L)	9%	µg/L	Effluent	23	10-Jul-06	08-Apr-09		0.001		0.002	0.0018
Trichlorethylene	0%	µg/L	Effluent	6	25-Oct-06	09-Oct-08	<	0.5	<	0.5	0.2500
Vinyl Chloride	0%	µg/L	Effluent	6	25-Oct-06	09-Oct-08	<	0.5	<	0.5	0.2500
Zinc	100%	µg/L	Effluent	19	11-Jul-06	09-Apr-09		15.8		48	26.9263

Appendix C

Rock Creek Water Quality Summary Statistics

Location	Constituent	Units	Count	MinOfDate	MaxOfDate	Percent Detects		Min		Max	Avg
R-1	1,1,1-Trichloroethane	ug/l	12	19-Mar-02	05-Feb-03	0%	<	0.05	<	0.19	0.06541667
R-1	1,1,2,2-Tetrachloroethane	ug/l	12	19-Mar-02	05-Feb-03	0%	<	0.17	<	0.59	0.11875
R-1	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ug/l	12	19-Mar-02	05-Feb-03	0%	<	0.05		0.07	0.07
R-1	1,1,2-Trichloroethane	ug/l	12	19-Mar-02	05-Feb-03	0%	<	0.08	<	0.43	0.08916667
R-1	1,1-Dichloroethane	ug/l	12	19-Mar-02	05-Feb-03	0%	<	0.04	<	0.22	0.065
R-1	1,1-Dichloroethene	ug/l	12	19-Mar-02	05-Feb-03	0%	<	0.06	<	0.24	0.075
R-1	1,2,3,4,6,7,8-HpCDD	pg/l	4	14-Mar-02	19-Nov-02	0%	<	2.37	<	3.05	1.355
R-1	1,2,3,4,6,7,8-HpCDF	pg/l	4	14-Mar-02	19-Nov-02	0%	<	2.57	<	3.57	1.535
R-1	1,2,3,4,7,8,9-HpCDF	pg/l	4	14-Mar-02	19-Nov-02	0%	<	2.38	<	3.13	1.3775
R-1	1,2,3,4,7,8-HxCDD	pg/l	4	14-Mar-02	19-Nov-02	0%	<	1.75	<	2.01	0.94
R-1	1,2,3,4,7,8-HxCDF	pg/l	4	14-Mar-02	19-Nov-02	0%	<	2.06	<	2.38	1.11
R-1	1,2,3,6,7,8-HxCDD	pg/l	4	14-Mar-02	19-Nov-02	0%	<	1.75	<	1.87	0.905
R-1	1,2,3,6,7,8-HxCDF	pg/l	4	14-Mar-02	19-Nov-02	0%	<	2.44	<	2.57	1.2525
R-1	1,2,3,7,8,9-HxCDD	pg/l	4	14-Mar-02	19-Nov-02	0%	<	2.71	<	3.95	1.665
R-1	1,2,3,7,8,9-HxCDF	pg/l	4	14-Mar-02	19-Nov-02	0%	<	2.04	<	2.31	1.0875
R-1	1,2,3,7,8-PeCDD	pg/l	4	14-Mar-02	19-Nov-02	0%	<	1.39	<	2.81	1.05
R-1	1,2,3,7,8-PeCDF	pg/l	4	14-Mar-02	19-Nov-02	0%	<	2.25	<	3.06	1.3275
R-1	1,2,4-Trichlorobenzene	ug/l	12	19-Mar-02	05-Feb-03	0%	<	0.1	<	0.41	0.10458333
R-1	1,2-Dibromo-3-chloropropane	ug/l	5	19-Mar-02	05-Feb-03	0%	<		<		
R-1	1,2-Dibromoethane	ug/l	5	19-Mar-02	05-Feb-03	0%	<		<		
R-1	1,2-Dichlorobenzene	ug/l	12	19-Mar-02	05-Feb-03	0%	<	0.11	<	0.31	0.08416667
R-1	1,2-Dichloroethane	ug/l	12	19-Mar-02	05-Feb-03	0%	<	0.08	<	0.42	0.08833333
R-1	1,2-Dichloropropane	ug/l	12	19-Mar-02	05-Feb-03	0%	<	0.07	<	0.32	0.06708333
R-1	1,2-Diphenylhydrazine	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.49	<	0.49	0.245
R-1	1,3-Dichlorobenzene	ug/l	12	19-Mar-02	05-Feb-03	0%	<	0.13	<	0.34	0.1
R-1	1,3-Dichloropropene	ug/l	12	19-Mar-02	05-Feb-03	0%	<	0.08	<	0.34	0.075
R-1	1,4-Dichlorobenzene	ug/l	12	19-Mar-02	05-Feb-03	0%	<	0.11	<	0.46	0.09541667
R-1	2,3,4,6,7,8-HxCDF	pg/l	4	14-Mar-02	19-Nov-02	0%	<	2.48	<	3.06	1.385
R-1	2,3,4,7,8-PeCDF	pg/l	4	14-Mar-02	19-Nov-02	0%	<	1.84	<	2.38	1.055
R-1	2,3,7,8-TCDD	pg/l	4	14-Mar-02	19-Nov-02	0%	<	0.637	<	0.847	0.371
R-1	2,3,7,8-TCDF	pg/l	4	14-Mar-02	19-Nov-02	0%	<	0.478	<	1.03	0.377
R-1	2,4,5-TP (Silvex)	ug/l	5	19-Mar-02	05-Feb-03	40%		0.021		0.37	0.0884

Location	Constituent	Units	Count	MinOfDate	MaxOfDate	Percent Detects		Min		Max	Avg
R-1	2,4,6-Trichlorophenol	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.91	<	0.91	0.455
R-1	2,4-D	ug/l	5	19-Mar-02	05-Feb-03	20%		0.056		0.056	0.056
R-1	2,4-Dichlorophenol	ug/l	5	19-Mar-02	05-Feb-03	0%	<	1.07	<	1.07	0.535
R-1	2,4-Dimethylphenol	ug/l	5	19-Mar-02	05-Feb-03	0%	<	1.96	<	1.96	0.98
R-1	2,4-Dinitrophenol	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.97	<	0.97	0.485
R-1	2,4-Dinitrotoluene	ug/l	5	19-Mar-02	05-Feb-03	0%	<	1.25	<	1.25	0.625
R-1	2,6-Dinitrotoluene	ug/l	5	19-Mar-02	05-Feb-03	0%	<	1.46	<	1.46	0.73
R-1	2-Chloroethyl vinyl ether	ug/l	11	19-Mar-02	05-Feb-03	0%	<	0.11	<	0.22	0.10045455
R-1	2-Chloronaphthalene	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.83	<	0.83	0.415
R-1	2-Chlorophenol	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.71	<	0.71	0.355
R-1	2-Methyl-4,6-dinitrophenol	ug/l	5	19-Mar-02	05-Feb-03	0%	<	1.51	<	1.51	0.755
R-1	2-Nitrophenol	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.8	<	0.8	0.4
R-1	3,3'-Dichlorobenzidine	ug/l	5	19-Mar-02	05-Feb-03	0%	<	1.51	<	1.51	0.755
R-1	4,4'-DDD	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.00992	<	0.00992	0.00496
R-1	4,4'-DDE	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.002	<	0.002	0.001
R-1	4,4'-DDT	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.00104	<	0.00104	0.00052
R-1	4-Bromophenyl phenyl ether	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.64	<	0.64	0.32
R-1	4-Chloro-3-methylphenol	ug/l	5	19-Mar-02	05-Feb-03	0%	<	1	<	1	0.5
R-1	4-Chlorophenyl phenyl ether	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.53	<	0.53	0.265
R-1	4-Nitrophenol	ug/l	5	19-Mar-02	05-Feb-03	0%	<	1.03	<	1.03	0.515
R-1	Acenaphthene	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.27	<	0.27	0.135
R-1	Acenaphthylene	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.011	<	0.011	0.0055
R-1	Acrolein	ug/l	22	19-Mar-02	05-Feb-03	0%	<	0.7	<	1.8	1.0625
R-1	Acrylonitrile	ug/l	22	19-Mar-02	05-Feb-03	0%	<	0.26	<	1.1	0.70795455
R-1	Alachlor	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.0674	<	0.0674	0.0337
R-1	Aldrin	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.00156	<	0.00156	0.00078
R-1	alpha-BHC	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.00164	<	0.00164	0.00082
R-1	Aluminum (dissolved)	ug/l	12	14-Mar-02	04-Feb-03	100%		8		48.6	18.7
R-1	Aluminum (total recoverable)	ug/l	12	14-Mar-02	04-Feb-03	100%		54.1		215	126.908333
R-1	Ammonia (as N)	mg/l	5	19-Mar-02	05-Feb-03	0%	<	0.052	<	0.055	0.0187
R-1	Anthracene	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.029	<	0.029	0.0145
R-1	Antimony (dissolved)	ug/l	12	14-Mar-02	04-Feb-03	100%		0.033		0.11	0.0495
R-1	Antimony (total recoverable)	ug/l	12	14-Mar-02	04-Feb-03	100%		0.037		0.117	0.05233333

Location	Constituent	Units	Count	MinOfDate	MaxOfDate	Percent Detects		Min		Max	Avg
R-1	Aroclor 1016	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.0648	<	0.0648	0.0324
R-1	Aroclor 1221	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.0648	<	0.0648	0.0324
R-1	Aroclor 1232	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.0648	<	0.0648	0.0324
R-1	Aroclor 1242	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.0648	<	0.0648	0.0324
R-1	Aroclor 1248	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.0648	<	0.0648	0.0324
R-1	Aroclor 1254	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.0262	<	0.0262	0.0131
R-1	Aroclor 1260	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.0262	<	0.0262	0.0131
R-1	Arsenic (dissolved)	ug/l	12	14-Mar-02	04-Feb-03	100%		0.192		0.397	0.2885
R-1	Arsenic (total recoverable)	ug/l	12	14-Mar-02	04-Feb-03	100%		0.251		0.502	0.35933333
R-1	Asbestos	MFL	10	19-Mar-02	18-Dec-02	20%	<	0.021		0.207	0.06325
R-1	Atrazine	ug/l	5	19-Mar-02	05-Feb-03	40%	<	0.0596		1.4	1.4
R-1	Barium (dissolved)	ug/l	12	14-Mar-02	04-Feb-03	100%		7.88		19.4	10.69
R-1	Barium (total recoverable)	ug/l	12	14-Mar-02	04-Feb-03	100%		8.96		21.1	11.9541667
R-1	Bentazon	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.00762	<	0.00762	0.00381
R-1	Benzene	ug/l	12	19-Mar-02	05-Feb-03	0%	<	0.05	<	0.28	0.05666667
R-1	Benzidine	ug/l	5	19-Mar-02	05-Feb-03	0%	<	3.45	<	3.45	1.725
R-1	Benzo(a)anthracene	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.023	<	0.023	0.0115
R-1	Benzo(a)pyrene	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.03	<	0.03	0.015
R-1	Benzo(b)fluoranthene	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.03	<	0.03	0.015
R-1	Benzo(g,h,l)perylene	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.029	<	0.029	0.0145
R-1	Benzo(k)fluoranthene	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.029	<	0.029	0.0145
R-1	Beryllium (dissolved)	ug/l	12	14-Mar-02	04-Feb-03	8%	<	0.002		0.005	0.005
R-1	Beryllium (total recoverable)	ug/l	12	14-Mar-02	04-Feb-03	25%		0.005		0.008	0.006
R-1	beta-BHC	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.00176	<	0.00176	0.00088
R-1	Bis(2-chloroethoxy)methane	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.83	<	0.83	0.415
R-1	Bis(2-chloroethyl)ether	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.55	<	0.55	0.275
R-1	Bis(2-chloroisopropyl)ether	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.64	<	0.64	0.32
R-1	Bis(2-ethylhexyl)phthalate	ug/l	5	19-Mar-02	05-Feb-03	0%	<	3.21	<	3.21	1.605
R-1	Bromodichloromethane	ug/l	12	19-Mar-02	05-Feb-03	0%	<	0.05	<	0.25	0.06416667
R-1	Bromoform	ug/l	12	19-Mar-02	05-Feb-03	0%	<	0.11	<	0.18	0.08833333
R-1	Bromomethane	ug/l	12	19-Mar-02	05-Feb-03	0%	<	0.19	<	0.61	0.15625
R-1	Butyl benzyl phthalate	ug/l	5	19-Mar-02	05-Feb-03	0%	<	1	<	1	0.5
R-1	Cadmium (dissolved)	ug/l	12	14-Mar-02	04-Feb-03	42%		0.001		0.004	0.003

Location	Constituent	Units	Count	MinOfDate	MaxOfDate	Percent Detects		Min		Max	Avg
R-1	Cadmium (total recoverable)	ug/l	12	14-Mar-02	04-Feb-03	42%		0.005		0.007	0.0062
R-1	Carbofuran	ug/l	4	19-Mar-02	20-Nov-02	0%	<	0.5	<	5	1.9375
R-1	Carbon tetrachloride	ug/l	12	19-Mar-02	05-Feb-03	0%	<	0.06	<	0.37	0.10833333
R-1	Chlordane	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.03388	<	0.03388	0.01694
R-1	Chloride	mg/l	12	19-Mar-02	05-Feb-03	100%	<	2.3		7.4	4.31666667
R-1	Chlorobenzene	ug/l	12	19-Mar-02	05-Feb-03	0%	<	0.07	<	0.32	0.06333333
R-1	Chloroethane	ug/l	12	19-Mar-02	05-Feb-03	0%	<	0.11	<	0.31	0.09416667
R-1	Chloroform	ug/l	12	19-Mar-02	05-Feb-03	0%	<	0.07	<	0.37	0.07125
R-1	Chloromethane	ug/l	12	19-Mar-02	05-Feb-03	0%	<	0.14	<	0.18	0.09833333
R-1	Chlorpyrifos	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.0151	<	0.0151	0.00755
R-1	Chromium (dissolved)	ug/l	12	14-Mar-02	04-Feb-03	67%	<	0.02		0.34	0.12375
R-1	Chromium (total recoverable)	ug/l	12	14-Mar-02	04-Feb-03	100%		0.24		1.17	0.59833333
R-1	Chromium VI	ug/l	13	19-Mar-02	05-Feb-03	15%	<	0.126		1.2	0.221
R-1	Chrysene	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.028	<	0.028	0.014
R-1	cis-1,2-Dichloroethene	ug/l	12	19-Mar-02	05-Feb-03	0%	<	0.09	<	0.31	0.07458333
R-1	Copper (dissolved)	ug/l	12	14-Mar-02	04-Feb-03	100%		0.87		2.31	1.325
R-1	Copper (total recoverable)	ug/l	12	14-Mar-02	04-Feb-03	100%		1.03		3.28	1.82166667
R-1	Cyanide	ug/l	12	19-Mar-02	05-Feb-03	0%	<	3	<	3	1.5
R-1	Dalapon	ug/l	5	19-Mar-02	05-Feb-03	40%	<	0.0124		4.7	1.22372
R-1	delta-BHC	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.00136	<	0.00136	0.00068
R-1	Di(2-ethylhexyl)adipdate	ug/l	6	19-Mar-02	05-Feb-03	0%	<	1.2	<	1.2	0.6
R-1	Diazinon	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.0641	<	0.0641	0.03205
R-1	Dibenzo(a,h)anthracene	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.027	<	0.027	0.0135
R-1	Dibromochloromethane	ug/l	12	19-Mar-02	05-Feb-03	0%	<	0.06	<	0.47	0.10166667
R-1	Dieldrin	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.00184	<	0.00184	0.00092
R-1	Diethyl phthalate	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.63	<	0.63	0.315
R-1	Dimethyl phthalate	ug/l	5	19-Mar-02	05-Feb-03	0%	<	1	<	1	0.5
R-1	Di-n-butyl phthalate	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.93	<	0.93	0.465
R-1	Di-n-octyl phthalate	ug/l	5	19-Mar-02	05-Feb-03	0%	<	2.72	<	2.72	1.36
R-1	Dinoseb	ug/l	5	19-Mar-02	05-Feb-03	20%		0.031		0.031	0.031
R-1	Diquat	ug/l	4	19-Mar-02	20-Nov-02	0%	<	4	<	4	2
R-1	Endosulfan I	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.00168	<	0.00168	0.00084
R-1	Endosulfan II	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.00092	<	0.00092	0.00046

Location	Constituent	Units	Count	MinOfDate	MaxOfDate	Percent Detects		Min		Max	Avg
R-1	Endosulfan sulfate	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.00232	<	0.00232	0.00116
R-1	Endothall	ug/l	4	19-Mar-02	20-Nov-02	0%	<	45	<	45	22.5
R-1	Endrin	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.00192	<	0.00192	0.00096
R-1	Endrin aldehyde	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.002	<	0.002	0.001
R-1	Ethylbenzene	ug/l	12	19-Mar-02	05-Feb-03	0%	<	0.1	<	0.24	0.07416667
R-1	Fluoranthene	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.033	<	0.033	0.0165
R-1	Fluorene	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.15	<	0.15	0.075
R-1	Fluoride	mg/l	12	19-Mar-02	05-Feb-03	8%	<	0.06		1.5	0.142
R-1	gamma-BHC (Lindane)	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.00144	<	0.00144	0.00072
R-1	Glyphosate	ug/l	4	19-Mar-02	20-Nov-02	0%	<	25	<	25	12.5
R-1	Hardness (as CaCO3)	mg/l	10	19-Mar-02	05-Feb-03	100%		25		260	69.3
R-1	Heptachlor	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.00176	<	0.00176	0.00088
R-1	Heptachlor epoxide	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.00152	<	0.00152	0.00076
R-1	Hexachlorobenzene	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.72	<	0.72	0.36
R-1	Hexachlorobutadiene	ug/l	17	19-Mar-02	05-Feb-03	0%	<	0.084	<	0.5	0.095
R-1	Hexachlorocyclopentadiene	ug/l	5	19-Mar-02	05-Feb-03	0%	<	1.18	<	1.18	0.59
R-1	Hexachloroethane	ug/l	5	19-Mar-02	05-Feb-03	0%	<	1.46	<	1.46	0.73
R-1	Indeno(1,2,3-c,d)pyrene	ug/l	4	19-Mar-02	20-Nov-02	0%	<	0.035	<	0.035	0.0175
R-1	Iron (dissolved)	ug/l	12	14-Mar-02	04-Feb-03	100%		56.4		148	78.7833333
R-1	Iron (total recoverable)	ug/l	12	14-Mar-02	04-Feb-03	100%		181		480	321.083333
R-1	Isophorone	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.86	<	0.86	0.43
R-1	Lead (dissolved)	ug/l	12	14-Mar-02	04-Feb-03	67%		0.008		0.047	0.01866667
R-1	Lead (total recoverable)	ug/l	12	14-Mar-02	04-Feb-03	100%		0.051		0.32	0.15483333
R-1	Manganese (dissolved)	ug/l	12	14-Mar-02	04-Feb-03	100%		3.75		30.2	10.5
R-1	Manganese (total recoverable)	ug/l	12	14-Mar-02	04-Feb-03	100%		12.4		58.6	30.8916667
R-1	Mercury (dissolved)	ug/l	12	14-Mar-02	04-Feb-03	100%		0.00079		0.00543	0.00177
R-1	Mercury (total recoverable)	ug/l	12	14-Mar-02	04-Feb-03	100%		0.0015		0.012	0.00462583
R-1	Methoxychlor	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.0024	<	0.0024	0.0012
R-1	Methyl tert-butyl ether	ug/l	12	19-Mar-02	05-Feb-03	25%		0.17		0.55	0.15875
R-1	Methylene blue active substances	mg/l	12	19-Mar-02	05-Feb-03	17%	<	0.02		0.025	0.01604167
R-1	Methylene chloride	ug/l	12	19-Mar-02	05-Feb-03	42%		0.13		2	0.992

Location	Constituent	Units	Count	MinOfDate	MaxOfDate	Percent Detects		Min		Max	Avg
R-1	Molinate	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.169	<	0.169	0.0845
R-1	Naphthalene	ug/l	17	19-Mar-02	05-Feb-03	0%	<	0.1	<	0.93	0.17
R-1	Nickel (dissolved)	ug/l	12	14-Mar-02	04-Feb-03	100%		0.38		2.15	0.91583333
R-1	Nickel (total recoverable)	ug/l	12	14-Mar-02	04-Feb-03	100%	<	0.83		2.92	1.61083333
R-1	Nitrate as N	mg/l	12	19-Mar-02	05-Feb-03	92%	<	0.06		0.92	0.19983333
R-1	Nitrite as N	mg/l	12	19-Mar-02	05-Feb-03	0%	<	0.043	<	0.1	0.01279167
R-1	Nitrobenzene	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.76	<	0.76	0.38
R-1	N-Nitrosodimethylamine	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.67	<	0.67	0.335
R-1	N-Nitroso-di-n-propylamine	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.86	<	0.86	0.43
R-1	N-Nitrosodiphenylamine	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.57	<	0.57	0.285
R-1	OCDD	pg/l	4	14-Mar-02	19-Nov-02	75%	<	9.67		18.4	15.6
R-1	OCDF	pg/l	4	14-Mar-02	19-Nov-02	0%	<	4.26	<	6.17	2.6075
R-1	Oxamyl	ug/l	4	19-Mar-02	20-Nov-02	0%	<	0.61	<	20	7.57625
R-1	Pentachlorophenol	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.00508	<	0.00508	0.00254
R-1	Phenanthrene	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.012	<	0.012	0.006
R-1	Phenol	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.52	<	0.52	0.26
R-1	Phosphorus, total	mg/l	12	19-Mar-02	05-Feb-03	17%	<	0.0056		0.013	0.00751667
R-1	Picloram	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.00762	<	0.00762	0.00381
R-1	Pyrene	ug/l	4	19-Mar-02	20-Nov-02	0%	<	0.04	<	0.04	0.02
R-1	Selenium (dissolved)	ug/l	12	14-Mar-02	04-Feb-03	75%	<	0.026		0.105	0.047125
R-1	Selenium (total recoverable)	ug/l	12	14-Mar-02	04-Feb-03	58%	<	0.026		0.121	0.04154167
R-1	Silver (dissolved)	ug/l	12	14-Mar-02	04-Feb-03	33%		0.001		0.01	0.00375
R-1	Silver (total recoverable)	ug/l	12	14-Mar-02	04-Feb-03	33%		0.002		0.014	0.005
R-1	Simazine	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.0641	<	0.0641	0.03205
R-1	Specific Conductivity @ 25 C	umhos/cm	12	19-Mar-02	05-Feb-03	100%		57		220	101.416667
R-1	Styrene	ug/l	12	19-Mar-02	05-Feb-03	0%	<	0.09	<	0.33	0.08125
R-1	Sulfate as SO4	mg/l	12	19-Mar-02	05-Feb-03	92%	<	0.33		16	4.93875
R-1	Sulfide	mg/l	12	24-Apr-02	05-Feb-03	8%	<	0.14		0.67	0.105
R-1	Sulfite	mg/l	13	19-Mar-02	05-Feb-03	0%	<		<		
R-1	Tetrachloroethene	ug/l	12	19-Mar-02	05-Feb-03	0%	<	0.08	<	0.44	0.07875
R-1	Thallium (dissolved)	ug/l	12	14-Mar-02	04-Feb-03	42%		0.001		0.003	0.002
R-1	Thallium (total recoverable)	ug/l	12	14-Mar-02	04-Feb-03	50%		0.002		0.005	0.00258333
R-1	Thiobencarb	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.0924	<	0.0924	0.0462

Location	Constituent	Units	Count	MinOfDate	MaxOfDate	Percent Detects		Min		Max	Avg
R-1	Toluene	ug/l	12	19-Mar-02	05-Feb-03	8%	<	0.07		0.58	0.58
R-1	Total dissolved solids	mg/l	12	19-Mar-02	05-Feb-03	100%	<	29		130	61.6666667
R-1	Toxaphene	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.052	<	0.052	0.026
R-1	trans-1,2-Dichloroethene	ug/l	12	19-Mar-02	05-Feb-03	0%	<	0.09	<	0.26	0.07291667
R-1	Tributyltin	ug/l	10	19-Mar-02	18-Dec-02	0%	<	0.005	<	0.005	0.0025
R-1	Trichloroethene	ug/l	12	19-Mar-02	05-Feb-03	0%	<	0.06	<	0.36	0.085
R-1	Trichlorofluoromethane	ug/l	12	19-Mar-02	05-Feb-03	0%	<	0.07	<	0.42	0.10791667
R-1	Vinyl chloride	ug/l	12	19-Mar-02	05-Feb-03	0%	<	0.06	<	0.16	0.07083333
R-1	Xylenes, total	ug/l	12	19-Mar-02	05-Feb-03	0%	<	0.21	<	0.48	0.16375
R-1	Zinc (dissolved)	ug/l	12	14-Mar-02	04-Feb-03	100%		0.86		3.95	1.96
R-1	Zinc (total recoverable)	ug/l	12	14-Mar-02	04-Feb-03	100%		1.94		5.81	3.64

Location	Constituent	Units	Count	MinOfDate	MaxOfDate	Percent Detects		Min		Max	Avg
R-3	1,1,1-Trichloroethane	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.05	<	0.19	0.062
R-3	1,1,2,2-Tetrachloroethane	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.17	<	0.59	0.126
R-3	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.05	<	0.25	0.058
R-3	1,1,2-Trichloroethane	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.08	<	0.43	0.091
R-3	1,1-Dichloroethane	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.04	<	0.22	0.062
R-3	1,1-Dichloroethene	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.06	<	0.24	0.072
R-3	1,2,3,4,6,7,8-HpCDD	pg/l	4	14-Mar-02	19-Nov-02	0%	<	2.37	<	3.05	1.355
R-3	1,2,3,4,6,7,8-HpCDF	pg/l	4	14-Mar-02	19-Nov-02	0%	<	2.57	<	3.57	1.535
R-3	1,2,3,4,7,8,9-HpCDF	pg/l	4	14-Mar-02	19-Nov-02	0%	<	2.38	<	3.13	1.3775
R-3	1,2,3,4,7,8-HxCDD	pg/l	4	14-Mar-02	19-Nov-02	0%	<	1.75	<	2.01	0.94
R-3	1,2,3,4,7,8-HxCDF	pg/l	4	14-Mar-02	19-Nov-02	0%	<	2.06	<	2.38	1.11
R-3	1,2,3,6,7,8-HxCDD	pg/l	4	14-Mar-02	19-Nov-02	0%	<	1.75	<	1.87	0.905
R-3	1,2,3,6,7,8-HxCDF	pg/l	4	14-Mar-02	19-Nov-02	0%	<	2.44	<	2.57	1.2525
R-3	1,2,3,7,8,9-HxCDD	pg/l	4	14-Mar-02	19-Nov-02	0%	<	2.71	<	3.95	1.665
R-3	1,2,3,7,8,9-HxCDF	pg/l	4	14-Mar-02	19-Nov-02	0%	<	2.04	<	2.31	1.0875
R-3	1,2,3,7,8-PeCDD	pg/l	4	14-Mar-02	19-Nov-02	0%	<	1.39	<	2.81	1.05
R-3	1,2,3,7,8-PeCDF	pg/l	4	14-Mar-02	19-Nov-02	0%	<	2.25	<	3.06	1.3275
R-3	1,2,4-Trichlorobenzene	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.1	<	0.41	0.104
R-3	1,2-Dibromo-3-chloropropane	ug/l	5	19-Mar-02	05-Feb-03	0%	<		<		
R-3	1,2-Dibromoethane	ug/l	5	19-Mar-02	05-Feb-03	0%	<		<		
R-3	1,2-Dichlorobenzene	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.11	<	0.31	0.085
R-3	1,2-Dichloroethane	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.08	<	0.42	0.09
R-3	1,2-Dichloropropane	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.07	<	0.32	0.069
R-3	1,2-Diphenylhydrazine	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.49	<	0.49	0.245
R-3	1,3-Dichlorobenzene	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.13	<	0.34	0.1
R-3	1,3-Dichloropropene	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.08	<	0.34	0.069
R-3	1,4-Dichlorobenzene	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.11	<	0.46	0.099
R-3	2,3,4,6,7,8-HxCDF	pg/l	4	14-Mar-02	19-Nov-02	0%	<	2.48	<	3.06	1.385
R-3	2,3,4,7,8-PeCDF	pg/l	4	14-Mar-02	19-Nov-02	0%	<	1.84	<	2.38	1.055
R-3	2,3,7,8-TCDD	pg/l	4	14-Mar-02	19-Nov-02	0%	<	0.637	<	0.847	0.371
R-3	2,3,7,8-TCDF	pg/l	4	14-Mar-02	19-Nov-02	0%	<	0.478	<	1.03	0.377
R-3	2,4,5-TP (Silvex)	ug/l	5	19-Mar-02	05-Feb-03	40%		0.019		0.61	0.136
R-3	2,4,6-Trichlorophenol	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.91	<	0.91	0.455

Location	Constituent	Units	Count	MinOfDate	MaxOfDate	Percent Detects		Min		Max	Avg
R-3	2,4-D	ug/l	5	19-Mar-02	05-Feb-03	20%		0.049		0.049	0.049
R-3	2,4-Dichlorophenol	ug/l	5	19-Mar-02	05-Feb-03	0%	<	1.07	<	1.07	0.535
R-3	2,4-Dimethylphenol	ug/l	5	19-Mar-02	05-Feb-03	0%	<	1.96	<	1.96	0.98
R-3	2,4-Dinitrophenol	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.97	<	0.97	0.485
R-3	2,4-Dinitrotoluene	ug/l	5	19-Mar-02	05-Feb-03	0%	<	1.25	<	1.25	0.625
R-3	2,6-Dinitrotoluene	ug/l	5	19-Mar-02	05-Feb-03	0%	<	1.46	<	1.46	0.73
R-3	2-Chloroethyl vinyl ether	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.11	<	0.22	0.105
R-3	2-Chloronaphthalene	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.83	<	0.83	0.415
R-3	2-Chlorophenol	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.71	<	0.71	0.355
R-3	2-Methyl-4,6-dinitrophenol	ug/l	5	19-Mar-02	05-Feb-03	0%	<	1.51	<	1.51	0.755
R-3	2-Nitrophenol	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.8	<	0.8	0.4
R-3	3,3'-Dichlorobenzidine	ug/l	5	19-Mar-02	05-Feb-03	0%	<	1.51	<	1.51	0.755
R-3	4,4'-DDD	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.00992	<	0.00992	0.00496
R-3	4,4'-DDE	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.002	<	0.002	0.001
R-3	4,4'-DDT	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.00104	<	0.00104	0.00052
R-3	4-Bromophenyl phenyl ether	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.64	<	0.64	0.32
R-3	4-Chloro-3-methylphenol	ug/l	5	19-Mar-02	05-Feb-03	0%	<	1	<	1	0.5
R-3	4-Chlorophenyl phenyl ether	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.53	<	0.53	0.265
R-3	4-Nitrophenol	ug/l	5	19-Mar-02	05-Feb-03	0%	<	1.03	<	1.03	0.515
R-3	Acenaphthene	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.27	<	0.27	0.135
R-3	Acenaphthylene	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.011	<	0.011	0.0055
R-3	Acrolein	ug/l	9	19-Mar-02	05-Feb-03	0%	<	0.7	<	1.8	1.111111
R-3	Acrylonitrile	ug/l	9	19-Mar-02	05-Feb-03	0%	<	0.26	<	1.1	0.748889
R-3	Alachlor	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.0674	<	0.0674	0.0337
R-3	Aldrin	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.00156	<	0.00156	0.00078
R-3	alpha-BHC	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.00164	<	0.00164	0.00082
R-3	Aluminum (dissolved)	ug/l	5	14-Mar-02	04-Feb-03	100%		6.2		38.8	14.22
R-3	Aluminum (total recoverable)	ug/l	5	14-Mar-02	04-Feb-03	100%	<	39.3		178	102.82
R-3	Ammonia (as N)	mg/l	5	19-Mar-02	05-Feb-03	40%	<	0.052		0.43	0.26
R-3	Anthracene	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.029	<	0.029	0.0145
R-3	Antimony (dissolved)	ug/l	5	14-Mar-02	04-Feb-03	100%		0.049		0.079	0.0592
R-3	Antimony (total recoverable)	ug/l	5	14-Mar-02	04-Feb-03	100%		0.054		0.083	0.0612
R-3	Aroclor 1016	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.0648	<	0.0648	0.0324

Location	Constituent	Units	Count	MinOfDate	MaxOfDate	Percent Detects		Min		Max	Avg
R-3	Aroclor 1221	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.0648	<	0.0648	0.0324
R-3	Aroclor 1232	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.0648	<	0.0648	0.0324
R-3	Aroclor 1242	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.0648	<	0.0648	0.0324
R-3	Aroclor 1248	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.0648	<	0.0648	0.0324
R-3	Aroclor 1254	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.0262	<	0.0262	0.0131
R-3	Aroclor 1260	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.0262	<	0.0262	0.0131
R-3	Arsenic (dissolved)	ug/l	5	14-Mar-02	04-Feb-03	100%		0.263		0.577	0.366
R-3	Arsenic (total recoverable)	ug/l	5	14-Mar-02	04-Feb-03	100%		0.321		0.729	0.4764
R-3	Asbestos	MFL	4	19-Mar-02	20-Nov-02	0%	<	0.021	<	0.207	0.03625
R-3	Atrazine	ug/l	5	19-Mar-02	05-Feb-03	40%	<	0.0596		1.3	0.53788
R-3	Barium (dissolved)	ug/l	5	14-Mar-02	04-Feb-03	100%		9.02		17.8	14.304
R-3	Barium (total recoverable)	ug/l	5	14-Mar-02	04-Feb-03	100%		10		20.6	15.48
R-3	Bentazon	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.00762	<	0.00762	0.00381
R-3	Benzene	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.05	<	0.28	0.058
R-3	Benzidine	ug/l	5	19-Mar-02	05-Feb-03	0%	<	3.45	<	3.45	1.725
R-3	Benzo(a)anthracene	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.023	<	0.023	0.0115
R-3	Benzo(a)pyrene	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.03	<	0.03	0.015
R-3	Benzo(b)fluoranthene	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.03	<	0.03	0.015
R-3	Benzo(g,h,l)perylene	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.029	<	0.029	0.0145
R-3	Benzo(k)fluoranthene	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.029	<	0.029	0.0145
R-3	Beryllium (dissolved)	ug/l	5	14-Mar-02	04-Feb-03	0%	<	0.004	<	0.02	0.0074
R-3	Beryllium (total recoverable)	ug/l	5	14-Mar-02	04-Feb-03	20%		0.006		0.006	0.006
R-3	beta-BHC	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.00176	<	0.00176	0.00088
R-3	Bis(2-chloroethoxy)methane	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.83	<	0.83	0.415
R-3	Bis(2-chloroethyl)ether	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.55	<	0.55	0.275
R-3	Bis(2-chloroisopropyl)ether	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.64	<	0.64	0.32
R-3	Bis(2-ethylhexyl)phthalate	ug/l	5	19-Mar-02	05-Feb-03	20%	<	3.21		64	14.084
R-3	Bromodichloromethane	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.05	<	0.25	0.063
R-3	Bromoform	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.11	<	0.18	0.084
R-3	Bromomethane	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.19	<	0.61	0.158
R-3	Butyl benzyl phthalate	ug/l	5	19-Mar-02	05-Feb-03	0%	<	1	<	1	0.5
R-3	Cadmium (dissolved)	ug/l	5	14-Mar-02	04-Feb-03	40%		0.003		0.003	0.003
R-3	Cadmium (total recoverable)	ug/l	5	14-Mar-02	04-Feb-03	40%		0.005		0.006	0.0055

Location	Constituent	Units	Count	MinOfDate	MaxOfDate	Percent Detects		Min		Max	Avg
R-3	Carbofuran	ug/l	4	19-Mar-02	20-Nov-02	0%	<	0.5	<	5	1.9375
R-3	Carbon tetrachloride	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.06	<	0.37	0.103
R-3	Chlordane	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.03388	<	0.03388	0.01694
R-3	Chloride	mg/l	6	19-Mar-02	05-Feb-03	100%	<	10		12	10.13333
R-3	Chlorobenzene	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.07	<	0.32	0.066
R-3	Chloroethane	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.11	<	0.31	0.093
R-3	Chloroform	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.07	<	0.37	0.074
R-3	Chloromethane	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.14	<	0.18	0.094
R-3	Chlorpyrifos	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.0151	<	0.0151	0.00755
R-3	Chromium (dissolved)	ug/l	5	14-Mar-02	04-Feb-03	80%	<	0.07		0.54	0.329
R-3	Chromium (total recoverable)	ug/l	5	14-Mar-02	04-Feb-03	100%	<	0.57		1.59	0.966
R-3	Chromium VI	ug/l	6	19-Mar-02	05-Feb-03	17%	<	0.126		0.74	0.175833
R-3	Chrysene	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.028	<	0.028	0.014
R-3	cis-1,2-Dichloroethene	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.09	<	0.31	0.076
R-3	Copper (dissolved)	ug/l	5	14-Mar-02	04-Feb-03	100%		1.01		1.49	1.236
R-3	Copper (total recoverable)	ug/l	5	14-Mar-02	04-Feb-03	100%		1.19		1.87	1.558
R-3	Cyanide	ug/l	5	19-Mar-02	05-Feb-03	20%	<	3		5.6	5.6
R-3	Dalapon	ug/l	5	19-Mar-02	05-Feb-03	40%	<	0.0124		1.9	1.04
R-3	delta-BHC	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.00136	<	0.00136	0.00068
R-3	Di(2-ethylhexyl)adipdate	ug/l	5	19-Mar-02	05-Feb-03	0%	<	1.2	<	1.2	0.6
R-3	Diazinon	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.0641	<	0.0641	0.03205
R-3	Dibenzo(a,h)anthracene	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.027	<	0.027	0.0135
R-3	Dibromochloromethane	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.06	<	0.47	0.101
R-3	Dieldrin	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.00184	<	0.00184	0.00092
R-3	Diethyl phthalate	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.63	<	0.63	0.315
R-3	Dimethyl phthalate	ug/l	5	19-Mar-02	05-Feb-03	0%	<	1	<	1	0.5
R-3	Di-n-butyl phthalate	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.93	<	0.93	0.465
R-3	Di-n-octyl phthalate	ug/l	5	19-Mar-02	05-Feb-03	0%	<	2.72	<	2.72	1.36
R-3	Dinoseb	ug/l	5	19-Mar-02	05-Feb-03	20%		0.021		0.021	0.021
R-3	Diquat	ug/l	4	19-Mar-02	20-Nov-02	0%	<	4	<	4	2
R-3	Endosulfan I	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.00168	<	0.00168	0.00084
R-3	Endosulfan II	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.00092	<	0.00092	0.00046
R-3	Endosulfan sulfate	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.00232	<	0.00232	0.00116

Location	Constituent	Units	Count	MinOfDate	MaxOfDate	Percent Detects		Min		Max	Avg
R-3	Endothall	ug/l	4	19-Mar-02	20-Nov-02	0%	<	45	<	45	22.5
R-3	Endrin	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.00192	<	0.00192	0.00096
R-3	Endrin aldehyde	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.002	<	0.002	0.001
R-3	Ethylbenzene	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.1	<	0.24	0.074
R-3	Fluoranthene	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.033	<	0.033	0.0165
R-3	Fluorene	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.15	<	0.15	0.075
R-3	Fluoride	mg/l	6	19-Mar-02	05-Feb-03	17%	<	0.06		0.29	0.061333
R-3	gamma-BHC (Lindane)	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.00144	<	0.00144	0.00072
R-3	Glyphosate	ug/l	4	19-Mar-02	20-Nov-02	0%	<	25	<	25	12.5
R-3	Hardness (as CaCO3)	mg/l	6	19-Mar-02	05-Feb-03	100%		81		120	98.16667
R-3	Heptachlor	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.00176	<	0.00176	0.00088
R-3	Heptachlor epoxide	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.00152	<	0.00152	0.00076
R-3	Hexachlorobenzene	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.72	<	0.72	0.36
R-3	Hexachlorobutadiene	ug/l	10	19-Mar-02	05-Feb-03	0%	<	0.084	<	0.5	0.0815
R-3	Hexachlorocyclopentadiene	ug/l	5	19-Mar-02	05-Feb-03	0%	<	1.18	<	1.18	0.59
R-3	Hexachloroethane	ug/l	5	19-Mar-02	05-Feb-03	0%	<	1.46	<	1.46	0.73
R-3	Indeno(1,2,3-c,d)pyrene	ug/l	4	19-Mar-02	20-Nov-02	0%	<	0.035	<	0.035	0.0175
R-3	Iron (dissolved)	ug/l	5	14-Mar-02	04-Feb-03	100%		121		206	167.4
R-3	Iron (total recoverable)	ug/l	5	14-Mar-02	04-Feb-03	100%		307		701	460.8
R-3	Isophorone	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.86	<	0.86	0.43
R-3	Lead (dissolved)	ug/l	5	14-Mar-02	04-Feb-03	80%		0.003		0.056	0.0261
R-3	Lead (total recoverable)	ug/l	5	14-Mar-02	04-Feb-03	100%		0.074		0.28	0.1484
R-3	Manganese (dissolved)	ug/l	5	14-Mar-02	04-Feb-03	100%		23.2		39.6	29.36
R-3	Manganese (total recoverable)	ug/l	5	14-Mar-02	04-Feb-03	100%	<	35.8		58.1	48.52
R-3	Mercury (dissolved)	ug/l	5	14-Mar-02	04-Feb-03	100%		0.0011		0.00759	0.002836
R-3	Mercury (total recoverable)	ug/l	5	14-Mar-02	04-Feb-03	100%		0.00232		0.0036	0.003036
R-3	Methoxychlor	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.0024	<	0.0024	0.0012
R-3	Methyl tert-butyl ether	ug/l	5	19-Mar-02	05-Feb-03	20%		0.29		0.29	0.29
R-3	Methylene blue active substances	mg/l	5	19-Mar-02	05-Feb-03	20%	<	0.02		0.025	0.0164
R-3	Methylene chloride	ug/l	5	19-Mar-02	05-Feb-03	40%	<	0.23		1.3	0.535
R-3	Molinate	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.169	<	0.169	0.0845
R-3	Naphthalene	ug/l	10	19-Mar-02	05-Feb-03	0%	<	0.1	<	0.93	0.1485
R-3	Nickel (dissolved)	ug/l	5	14-Mar-02	04-Feb-03	100%		3.02		4.26	3.7

Location	Constituent	Units	Count	MinOfDate	MaxOfDate	Percent Detects		Min		Max	Avg
R-3	Nickel (total recoverable)	ug/l	5	14-Mar-02	04-Feb-03	100%		4.41		7.16	5.104
R-3	Nitrate as N	mg/l	6	19-Mar-02	05-Feb-03	100%	<	0.14		0.55	0.217833
R-3	Nitrite as N	mg/l	6	19-Mar-02	05-Feb-03	17%	<	0.043		0.2	0.038583
R-3	Nitrobenzene	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.76	<	0.76	0.38
R-3	N-Nitrosodimethylamine	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.67	<	0.67	0.335
R-3	N-Nitroso-di-n-propylamine	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.86	<	0.86	0.43
R-3	N-Nitrosodiphenylamine	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.57	<	0.57	0.285
R-3	OCDD	pg/l	4	14-Mar-02	19-Nov-02	50%	<	6.96		12.7	10.03
R-3	OCDF	pg/l	4	14-Mar-02	19-Nov-02	0%	<	4.26	<	6.17	2.6075
R-3	Oxamyl	ug/l	4	19-Mar-02	20-Nov-02	0%	<	0.61	<	20	7.57625
R-3	Pentachlorophenol	ug/l	5	19-Mar-02	05-Feb-03	20%	<	0.00508		0.0063	0.003292
R-3	Phenanthrene	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.012	<	0.012	0.006
R-3	Phenol	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.52	<	0.52	0.26
R-3	Phosphorus, total	mg/l	5	19-Mar-02	05-Feb-03	20%	<	0.0056		0.0092	0.0084
R-3	Picloram	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.00762	<	0.00762	0.00381
R-3	Pyrene	ug/l	4	19-Mar-02	20-Nov-02	0%	<	0.04	<	0.04	0.02
R-3	Selenium (dissolved)	ug/l	5	14-Mar-02	04-Feb-03	80%		0.026		0.054	0.037
R-3	Selenium (total recoverable)	ug/l	5	14-Mar-02	04-Feb-03	100%		0.033		0.05	0.0406
R-3	Silver (dissolved)	ug/l	5	14-Mar-02	04-Feb-03	40%		0.001		0.003	0.002
R-3	Silver (total recoverable)	ug/l	5	14-Mar-02	04-Feb-03	40%		0.002		0.007	0.0045
R-3	Simazine	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.0641	<	0.0641	0.03205
R-3	Specific Conductivity @ 25 C	umhos/cm	5	19-Mar-02	05-Feb-03	100%	<	200		250	210
R-3	Styrene	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.09	<	0.33	0.082
R-3	Sulfate as SO4	mg/l	6	19-Mar-02	05-Feb-03	100%	<	7.3		11	7.466667
R-3	Sulfide	mg/l	3	16-May-02	20-Nov-02	0%	<		<		
R-3	Sulfite	mg/l	4	19-Mar-02	20-Nov-02	0%	<		<		
R-3	Tetrachloroethene	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.08	<	0.44	0.083
R-3	Thallium (dissolved)	ug/l	5	14-Mar-02	04-Feb-03	40%		0.001		0.001	0.001
R-3	Thallium (total recoverable)	ug/l	5	14-Mar-02	04-Feb-03	40%		0.002		0.002	0.002
R-3	Thiobencarb	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.0924	<	0.0924	0.0462
R-3	Toluene	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.07	<	0.32	0.093
R-3	Total dissolved solids	mg/l	6	19-Mar-02	05-Feb-03	100%		97		130	119.5
R-3	Toxaphene	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.052	<	0.052	0.026

Location	Constituent	Units	Count	MinOfDate	MaxOfDate	Percent Detects		Min		Max	Avg
R-3	trans-1,2-Dichloroethene	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.09	<	0.26	0.073
R-3	Tributyltin	ug/l	4	19-Mar-02	20-Nov-02	0%	<	0.005	<	0.005	0.0025
R-3	Trichloroethene	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.06	<	0.36	0.084
R-3	Trichlorofluoromethane	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.07	<	0.42	0.105
R-3	Vinyl chloride	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.06	<	0.16	0.066
R-3	Xylenes, total	ug/l	5	19-Mar-02	05-Feb-03	0%	<	0.21	<	0.48	0.161
R-3	Zinc (dissolved)	ug/l	5	14-Mar-02	04-Feb-03	100%		0.62		2.31	1.178
R-3	Zinc (total recoverable)	ug/l	5	14-Mar-02	04-Feb-03	100%	<	0.94		6.47	2.446

Appendix E

Incremental Water Quality Changes for Infrequently Detected Long-term Constituents

Table E-1. Incremental mass balance change in Rock Creek water quality due to future 2.7 mgd ADWF discharge of infrequently detected constituents and comparison to applicable water quality standards.

Constituent	Units	Effluent Percent Detected	Concentration in Rock Creek downstream of WWTP outfall (R2)			Lowest Applicable Water Quality Criteria		Assimilative Capacity		Further Analysis
			@ Current (2.18 mgd) Discharge Rate	@ Future (2.7 mgd) Discharge Rate	Incremental Increase	Value	Basis	Available	Used by Expansion	
Chlorobenzene	µg/L	8%	0.0691	0.0698	0.000762	680	CTR-HH	680	0.0%	N
Chloromethane	µg/L	8%	0.102	0.103	0.000519	3	USEPA-HH	2.90	0.0%	N
Di-octyl phthalate	µg/L	4%	1.51	1.53	0.0201		NA	NA	NA	N

Notes:
CTR-AQ = California Toxics Rule criterion for the acute/chronic protection of aquatic life. Based on a minimum effluent hardness of 141 mg/L as $CaCO_3$.
CTR-HH = California Toxics Rule criterion for the protection of human health (consumption of water and organisms).
DHS MCL = Department of Health Services maximum contaminant level.
DHS 2nd MCL= Department of Health Services secondary maximum contaminant level.
Total Rec. = total recoverable.
NA = not applicable and/or no assimilative capacity is available.
ND = non-detect
All effluent values expected to be non-detectable with UV disinfection.

Table E-2. Incremental mass balance change in Dry Creek water quality due to future 2.7 mgd ADWF discharge of infrequently detected constituents and comparison to applicable water quality standards.										
Constituent	Units	Effluent Percent Detected	Concentration in Rock Creek downstream of WWTP outfall (R2)			Lowest Applicable Water Quality Criteria		Assimilative Capacity		Further Analysis
			@ Current (2.18 mgd) Discharge Rate	@ Future (2.7 mgd) Discharge Rate	Incremental Increase	Value	Basis	Available	Used by Expansion	
Chlorobenzene	µg/L	8%	0.0690	0.0698	0.0009	680	CTR	680	0.0%	N
Chloromethane	µg/L	8%	0.102	0.103	0.0006	3	USEPA-HH	2.90	0.0%	N
Di-octyl phthalate	µg/L	4%	1.51	1.53	0.0239	0	NA	NA	NA	N

Notes:
CTR-AQ = California Toxics Rule criterion for the acute/chronic protection of aquatic life. Based on a minimum effluent hardness of 141 mg/L as $CaCO_3$.
CTR-HH = California Toxics Rule criterion for the protection of human health (consumption of water and organisms).
DHS MCL = Department of Health Services maximum contaminant level.
DHS 2nd MCL= Department of Health Services secondary maximum contaminant level.
Total Rec. = total recoverable.
NA = not applicable and/or no assimilative capacity is available.
ND = non-detect
All effluent values expected to be non-detectable with UV disinfection.