THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

BOARD ACTION

- **Board of Directors**
  Engineering and Capital Programs Committee

August 18, 2009 Board Meeting

7-4

Subject

Appropriate $540,000; and authorize final design of the Diemer Filter Media Replacement Project and the Diemer East Washwater Tank Roof Refurbishment (Approp. 15436)

Description

This action authorizes final design of two rehabilitation and replacement (R & R) projects at the Robert B. Diemer Water Treatment Plant. The first project will replace the filter media in the Diemer plant's 48 filters to maintain high filtered water quality and to meet water quality standards. The second project will perform needed repairs to the East Washwater Tank.

Timing and Urgency

The existing filter anthracite media at the Diemer plant is coated with high levels of manganese from previous use of the coagulant ferric chloride. If not replaced, the manganese will be released into the treated water after the Diemer Oxidation Retrofit Program (ORP) completes construction in 2012, and biological filtration commences. High levels of manganese in treated water result in elevated color and turbidity, and likely complaints from member agencies and consumers. This situation occurred at the Mills plant following the switchover to biological filtration in 2003. For the Diemer East Washwater Tank, a recent inspection discovered a hole in the roof's steel plate and other structural damage to the tank roof. Refurbishment of the roof is needed to mitigate corrosion damage caused by moist chlorine vapors in the interior headspace, to protect the roof from further structural deterioration, and to extend the tank's service life.

These projects have been reviewed with Metropolitan's updated Capital Investment Plan (CIP) prioritization criteria. Staff recommends proceeding with both projects at this time to enhance Diemer plant reliability, protect Metropolitan assets, and maintain compliance with water quality regulations. Replacement of filter media is categorized as a Water Quality project and refurbishment of the East Washwater Tank roof is categorized as an Infrastructure Refurbishment project. Both projects are budgeted within Metropolitan's CIP for fiscal year 2009/10.

Background

The Robert B. Diemer Water Treatment Plant was placed into service in 1963 with an initial capacity of 200 million gallons per day (mgd). In 1969, the plant was expanded to a treatment capacity of 520 mgd. The plant delivers a blend of waters from the Colorado River and the State Water Project to Orange County and parts of Metropolitan's Central Pool portion of the distribution system.

Project No. 1 - Diemer Filter Media Replacement – Final Design Phase ($350,000)

Construction of the Diemer ORP project is scheduled to be completed in 2012. At that time, all filters will begin to operate in a biological filtration mode. Biological filtration will be initiated by halting the continuous application of chlorine onto the filters downstream of the ozonation process. These biological filters will reduce the levels of disinfection by-product (DBP) precursors and nutrients that could lead to bacterial regrowth in the distribution system.

After implementation of ozonation and biological filtration at the Mills plant in 2003, the removal of chlorination upstream of the filters resulted in the unexpected release of manganese from the filters. Testing determined that the ferric chloride coagulant used at the Mills plant contained manganese as a trace contaminant, which had accumulated over time on the filter media. This manganese release resulted in increased turbidity levels, colored (yellowish or brownish) water, and several complaints from consumers. Although manganese levels did not exceed health-based primary drinking water standards, the levels exceeded the aesthetic-based secondary drinking water standard. Resumption of filter inlet chlorination stopped both the release of manganese from the filters and the associated consumer complaints but resulted in elevated halogenated DBPs.

The existing media at the Diemer plant was originally placed in the west filters in 1969 and in the east filters in 1979. Based on media sampling conducted in 2004, high levels of manganese have also accumulated over time on the Diemer filter anthracite media. In addition, historic filter surveillances indicate that the effective sizes of filter sand media were all larger than the acceptable range to sustain optimal filter performance. To prevent further accumulation of manganese in the filters, Diemer staff switched from ferric chloride to alum coagulation in late 2004.

A number of tests have been conducted to evaluate methods to either remove the manganese from the filter media or to control the manganese release to acceptable levels. Replacement of the filter media coupled with switching coagulants from ferric chloride to alum is the only proven method to remove manganese without unacceptably constraining plant operations.

To avoid manganese release problems and to improve filter performance at the Diemer plant, staff recommends replacing the existing anthracite and sand filter media in all 48 filters with new anthracite and sand. This step will also provide the benefit of replacing older, out-of-specification media with new media that meets current size and uniformity specifications. Media will be replaced in stages so as not to interfere with the plant operations, significantly limit plant capacity, or obstruct Diemer ORP construction activities.

This action appropriates $350,000 and authorizes final design phase activities to replace filter media at the Diemer plant. Final design of the project will be performed by Metropolitan staff. The final design phase activities include: engineering design, preparation of drawings and specifications, permitting, development of a construction cost estimate, receipt of bids, and all other activities in advance of award of a construction contract. Due to the straightforward nature of this project, the cost of final design is approximately 2 percent of the total estimated construction cost. Engineering Services' goal for design of projects with construction cost greater than $3 million is 9 to 12 percent. The total cost of construction is estimated to range from $5 million to $6 million. Staff will return to the Board at a later date for award of the construction contract.

Project No. 2 - Diemer East Washwater Tank Roof Refurbishment – Final Design Phase ($190,000)

The Diemer East Washwater Tank is a cylindrical welded steel structure with a diameter of 60 feet and a height of 80 feet, holding approximately 1.5 million gallons of filtered water. The carbon steel tank is lined and coated for corrosion protection. It was erected in 1962. Water from the East Washwater Tank is normally used to backwash the plant's eastside filters. The westside filters are served by the West Washwater Tank.

Backwashing is an essential step in the filtration process to cleanse the filters. A small portion of the plant's filtered water is pumped into and stored in the plant's washwater tanks, from which it is released by gravity to backwash dirty filters on demand.

An external inspection of the East Washwater Tank conducted in December 2008 by Metropolitan staff identified several areas of coating failure, with exposed bare metal in some areas. Most of the failed coating is on the roof and stairs. A 3/8-inch-diameter hole in the roof and significantly reduced roof-plate thickness suggested likely internal coating failure as well.

A comprehensive interior inspection of the East Washwater Tank was conducted in April 2009. In addition to the exterior coating failures, accelerated corrosion has taken place throughout the interior steel roof supports and I-beams, and coating failures and/or disbonding were observed in the headspace zone. The interior lining below the normal water surface appears to be in good condition. Interior coating failures at the East Washwater Tank could be attributed to insufficient ventilation within the tank that allows moisture to accumulate under the bottom of roof beams. The combination of chlorine vapor, heat and moisture in the tank's headspace likely creates the

corrosive environment. Accelerated corrosion may lead to structural weakness, additional coating failures, and potential operational limitations that may require the tank to be taken out of service for repairs. Water production at the Diemer plant could then be limited depending on the raw water quality and backwash requirements to achieve satisfactory filter performance.

To mitigate the failed coatings and roof structural damage, and to maintain reliability of the plant, staff recommends: installation of additional openings in the East Washwater Tank's roof to improve ventilation and to dissipate moist chlorine vapor in the headspace; local repairs of failed coatings; and repair or replacement of corroded structural elements. The corrosive environment in the tank's headspace is expected to be minimized after ventilation improvements are completed and after the plant's conversion to biological filtration, when the filtered water pumped into the tank will no longer be continuously chlorinated.

As an alternative to this repair of the tank, staff considered removing the East Washwater Tank from service as an interim measure to halt further internal corrosion. Backwashing of the eastside filters may still take place due to an existing intertie pipeline which allows limited backwashing capability from the plant's West Washwater Tank. However, extended outage of the East Washwater Tank would reduce the Diemer plant's operational flexibility and could result in reduced plant capacity during periods of diminished raw water quality. As a result, this alternative is not recommended.

This action appropriates $190,000 and authorizes final design phase activities for the East Washwater Tank Roof Refurbishment at the Diemer plant. Final design of the project will be performed by Metropolitan staff. The final design phase activities include: engineering design, preparation of drawings and specifications, permitting, development of a construction cost estimate, receipt of bids, and all other activities in advance of award of a construction contract. The cost of final design is approximately 15 percent of the total estimated construction cost. Engineering Services' goal for design of projects with construction cost less than $3 million is 9 to 15 percent. The total cost of construction is estimated to range from $350,000 to $400,000. Staff will return to the Board at a later date for award of the construction contract.

See **Attachment 1** for the Financial Statement, and **Attachment 2** for the Location Map.
These two projects are consistent with Metropolitan's goals for sustainability by enhancing the reliability of the existing treatment in order to maintain reliable water deliveries in the future.

Project Milestones

February 2010 – Completion of final design of the Diemer Filter Media Replacement Project

December 2009 – Completion of final design of the Diemer East Washwater Tank Roof Refurbishment

Policy

Metropolitan Water District Administrative Code Section 5108: Appropriations

California Environmental Quality Act (CEQA)

CEQA determination for Option #1:

The environmental effects of the Diemer Improvements Program were evaluated in the Robert B. Diemer Treatment Plant Improvements Project Environmental Impact Report (EIR), Supplemental EIR, and Subsequent EIR, certified by the Board on February 13, 2001, August 20, 2002, and April 11, 2006, respectively. The Diemer Filter Media Replacement and East Washwater Tank Roof Refurbishment projects were elements of the Diemer Improvements Program. During these three board meetings, the Board also approved the Findings of Fact, the Statement of Overriding Considerations, and the Mitigation Monitoring and Reporting Program for the Diemer Improvements Project EIR, Supplemental EIR, and Subsequent EIR.

The current board action is to authorize final design for Diemer Filter Media Replacement and the Diemer East Washwater Tank Roof Refurbishment. This action constitutes a minor modification to the previously certified EIRs and will not result in any new significant effects or any substantial increase in the severity of any significant effects previously identified. Addendum No. 5 to the Final EIR was prepared in July 2009 to document the proposed minor modifications to the approved project as detailed in this board letter.

CEQA and the State CEQA Guidelines require the preparation of an addendum to a previously certified EIR if changes or additions are necessary, but none of the conditions described in Section 15162 of the State CEQA Guidelines calling for the preparation of a subsequent EIR have occurred (Section 15164 of the State CEQA Guidelines). The proposed modifications to the previously approved project also do not meet any of the conditions requiring the preparation of a supplement to an EIR (State CEQA Guidelines, Section 15163). Since the replacement of filter media and east tank roof refurbishment would not result in any new significant effects or any substantial increase in the severity of any significant effects identified in the Final EIR, an addendum is the most appropriate means of documenting the proposed changes. The Board must certify that the Addendum reflects Metropolitan's independent judgment and analysis. Addendum No. 5 is included as **Attachment 3**.

The CEQA determination is: Review and consider the information contained in Addendum No. 5 to the Final EIR for the Robert B. Diemer Treatment Plant Improvements Project and find that based on the whole record before the Board that there is no substantial evidence that the proposed modifications to the previously approved ORP will have a significant impact on the environment, and that Addendum No. 5 to the Final EIR reflects Metropolitan's independent judgment and analysis.

CEQA determination for Option #2:

None required

Board Options

Option #1

Adopt the CEQA determination and

a. Appropriate $540,000;
b. Authorize final design of the Diemer Filter Media Replacement Project; and
c. Authorize final design of the Diemer East Washwater Tank Roof Refurbishment.

Fiscal Impact: $540,000 of budgeted funds under Approp. 15436

Business Analysis: This option will ensure delivery of high quality, manganese-free water to customers, reducing the potential for consumer complaints; protect Metropolitan assets; defer major rehabilitation work; and maintain reliable plant operations.

Option #2

Do not proceed with the two Diemer projects at this time.

Fiscal Impact: None

Business Analysis: This option would forego an opportunity to refurbish two key components of the Diemer water treatment process. Delay of final design of filter media replacement would compress the time available for media replacement, which would potentially impact plant operations and delay start-up of the Diemer ORP. Delay of the East Washwater Tank roof refurbishment may lead to irreversible corrosion damage to the tank roof, resulting in extended tank outage and higher replacement cost, and greatly impeding normal plant operations.

Staff Recommendation

Option #1

7/24/2009
Roy L. Wolfe *Date*
Manager, Corporate Resources

7/31/2009
Jeffrey Kightlinger *Date*
General Manager

Attachment 1 – Financial Statement

Attachment 2 – Location Map

Attachment 3 – Addendum No. 5 to Final EIR

BLA #6707

Financial Statement for Diemer Improvements Program – Phase II

A breakdown of Board Action No. 4 for Appropriation No. 15436 is as follows:

	Previous Total Appropriated Amount (Sept. 2008)		Current Board Action No. 4 (Aug. 2009)	New Total Appropriated Amount
Labor				
Studies and Preliminary Design	$ 112,000		$ 35,800	$ 147,800
Final Design	1,569,000	*	164,700	1,733,700
Owner Costs (Program mgmt., permitting, bidding process)	781,038		192,100	973,138
Construction Inspection & Support	134,200		-	134,200
Metropolitan Force Construction	1,107,000		-	1,107,000
Materials and Supplies	606,000		-	606,000
Incidental Expenses	56,000		4,800	60,800
Professional/Technical Services	225,125			225,125
Hazardous Material Testing & Disposal	-		800	800
Environmental Monitoring	-		4,000	4,000
Equipment Use	22,000		-	22,000
Contracts	481,932		-	481,932
Remaining Budget	140,168	*	138,200	278,368
Total	**$ 5,234,000**		**$ 540,000**	**$ 5,774,000**

* Includes previous reallocation of $268,000 from Remaining Budget to Final Design for the Diemer Fire and Potable Water Pump Station.

Funding Request

Program Name:	Diemer Improvements Program – Phase II		
Source of Funds:	Revenue Bonds, Replacement and Refurbishment or General Funds		
Appropriation No.:	15436	**Board Action No.:**	4
Requested Amount:	**$** 540,000	**Capital Program No.:**	15436-I
Total Appropriated Amount:	**$** 5,774,000	**Capital Program Page No.:**	214
Total Program Estimate:	**$** 123,980,000	**Program Goal:**	I- Infrastructure Reliability

Robert B. Diemer Water Treatment Plant

ADDENDUM #5 TO THE FINAL ENVIRONMENTAL IMPACT REPORT FOR THE ROBERT B. DIEMER FILTRATION PLANT IMPROVEMENTS PROJECT (SCH # 1999071059)

Lead Agency: The Metropolitan Water District of Southern California

Addendum Prepared By:
The Metropolitan Water District of Southern California

1. Introduction

An Environmental Impact Report (EIR) was prepared by The Metropolitan Water District of Southern California (Metropolitan) as Lead Agency pursuant to the California Environmental Quality Act (CEQA) Public Resources Code 21000 et. seq., and the State CEQA Guidelines (California Code of Regulations, Section 15000 et. seq.) to evaluate the environmental effects of the Diemer Treatment Plant Improvements Project; the Oxidation Retrofit Program (ORP) is an element of the Improvements Project.

Acting as Lead Agency, Metropolitan's Board of Directors certified the Final EIR (FEIR) for the Improvements Project on February 13, 2001. The Board of Directors also certified Findings of Fact, a Statement of Overriding Considerations, and a Mitigation Monitoring and Reporting Program for the Improvements Project. Also, a Final Supplemental EIR was certified by the Board of Directors on August 20, 2002, and a Final Subsequent EIR was certified by the Board of Directors on April 11, 2006. Three prior Addenda were prepared for the FEIR, and one prior Addendum was prepared for the Subsequent EIR.

The Diemer Plant is currently using chlorine as the primary disinfectant to comply with state and federal drinking water regulations. The ORP involves modifications to existing rejection facilities, construction of ozone contact basins and ozone generation, feed gas preparation, and chemical storage facilities. The oxygen separation and ozone generation components include an off-gas destruct system to convert ozone to oxygen gas prior to venting to the atmosphere.

The purpose of Addendum No. 5 is to evaluate the environmental impacts associated with proposed modifications to the ORP element of the Improvements Project.

2. Description of Project Modifications

Since the approval of the ORP (as described in Section 1 of this addendum), project modifications have occurred that need to be addressed within the context of CEQA and the State CEQA Guidelines.

Diemer Filter Media Replacement

Construction of the Diemer ORP project is scheduled to be completed in 2012. When the ozone treatment process is in place, all Plant filters will begin to operate in a biological filtration mode. Biological filtration will be initiated by halting the continuous application of chlorine onto the filters downstream of the ozonation process. These biological filters will reduce the levels of disinfection by-product (DBP) precursors and ozone related by-products, and reduce the ability of microorganisms to re-grow in the distribution system.

The existing media at the Diemer Plant was originally placed in the west filters in 1969 and in the east filters in 1979. Based on media sampling conducted in 2004, high levels of manganese have accumulated over time on the Diemer filter anthracite media. In addition, historic filter

surveillances indicate that the effective sizes of filter sand media were all larger than the acceptable range to sustain optimal filter performance. To prevent further accumulation of manganese in the filters, the Diemer Plant switched from ferric chloride to alum coagulation in late 2004.

A number of tests have been conducted to evaluate methods to either remove the manganese from the filter media or to control the manganese release to acceptable levels. Replacement of the filter media coupled with switching coagulants from ferric chloride to alum is the only proven method to remove manganese without unacceptably constraining Plant operations.

To avoid manganese release problems and to improve filter performance at the Diemer Plant, staff recommends replacing the existing anthracite and sand filter media in all 48 filters with new anthracite and sand. This step will also provide the benefit of replacing older, out-of-specification media with new media that meets current size and uniformity specifications. Media will be replaced in stages so as not to interfere with the Plant operations, significantly limit Plant capacity, or obstruct Diemer ORP construction activities.

Diemer East Washwater Tank Roof Refurbishment

The Diemer East Washwater Tank is a cylindrical welded steel structure with a diameter of 60 feet and a height of 80 feet, holding approximately 1.5 million gallons of filtered water. The carbon steel tank is lined and coated for corrosion protection. It was erected in 1962.

Water from the tank is used to backwash the Plant's eastside filters. Backwashing is an essential step in the filtration process to cleanse the filters. A small portion of the Plant's filtered water is pumped into and stored in the Plant's washwater tanks, from which it is released by gravity to backwash dirty filters on demand. An external inspection of the East Washwater Tank conducted in December 2008 by Metropolitan staff identified several areas of coating failure, with exposed bare metal in some areas. Most of the failed coating is on the roof and stairs. A 3/8-inch diameter hole in the roof and significantly reduced roof-plate thickness suggested likely internal coating failure as well.

A comprehensive interior inspection of the East Washwater Tank was conducted in April 2009. In addition to the exterior coating failures, accelerated corrosion has taken place throughout the interior steel roof supports and I-beams, and coating failures and/or disbonding were observed in the headspace zone. The interior lining below the normal water surface appears to be in good condition. Interior coating failures at the East Washwater Tank could be attributed to insufficient ventilation within the tank that allows moisture to accumulate under the bottom of roof beams. The combination of chlorine vapor, heat and moisture in the tank's headspace likely creates the corrosive environment. Accelerated corrosion may lead to structural weakness, additional coating failures, and potential operational limitations that may require the tank to be taken out of service for repairs. Water production at the Diemer Plant could then be limited depending on the raw water quality and backwash requirements to achieve satisfactory filter performance.

To mitigate the failed coatings and roof structural damage, and to maintain reliability of the Plant, staff recommends installation of additional openings in the East Washwater Tank's roof to improve ventilation and to dissipate moist chlorine vapor in the headspace; local repairs of failed coatings; and repair or replacement of corroded structural elements. The corrosive environment in the tank's headspace is expected to be minimized after ventilation improvements are completed and after the Plant's conversion to biological filtration, when the filtered water pumped into the tank will no longer be continuously chlorinated.

3. Analysis

Addendum No. 5 provides an analysis of whether the Diemer Filter Media Replacement and Diemer East Washwater Tank Roof Refurbishment modifications would substantially increase the significant air quality impacts that were identified in the Final EIR (attached).

Emissions associated with simultaneous construction of projects associated with the ORP, and the Filter Media Replacement and East Washwater Tank Roof Refurbishment modifications are consistent with the findings of the Final EIR and Subsequent EIR

4. Basis for Preparation of Addendum and Findings

Section 15164(a) of the State CEQA Guidelines states "The lead agency or a responsible agency shall prepare an addendum to a previously certified EIR if some changes or additions are necessary but none of the conditions described in Section 15162 calling for preparation of a subsequent EIR have occurred."

The proposed modification to the original project would not result in a substantial change in the physical environment. As a Lead Agency for the proposed modifications, Metropolitan is issuing this addendum in accordance with the State CEQA Guidelines (Section 15164). The modifications described herein are not considered to 1) constitute a substantial change in the ORP as originally proposed, 2) lead to substantial changes in the circumstances under which the ORP is undertaken, or 3) constitute new information of substantial importance. Accordingly, an addendum was prepared as opposed to a subsequent environmental impact report.

5. Incorporation by Reference

The following documents were used in the preparation of this Addendum, and are incorporated herein by reference, consistent with Section 15150 of the State CEQA Guidelines:

- Final EIR for the Improvements Project, February 2000
- Final Supplemental EIR, August 2002
- Final Subsequent EIR, March 2006
- Addenda Nos. 1, 2, and 4 to the FEIR, respectively, November 2001, February 2004, and June 2009
- Addendum No. 3 to the Subsequent EIR, June 2008

David Clark
Signature

7/22/09
Date

DAVID CLARK
Printed Name

UNIT MANAGER, ENGR. SVS. PLANNING
Title

Air Quality Technical Report

for the

Robert B. Diemer Facility
Filter Media Replacement Project
And East Washwater Tank Roof Refurbishment

Submitted To:

Helix Environmental Planning, Inc.
7578 El Cajon Blvd., Suite 200
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June 24, 2009

Table of Contents

1.0 Introduction

This report presents an assessment of potential air quality impacts associated with the Filter Media Replacement Project and East Washwater Tank Project at the Robert B. Diemer Treatment Plant. The projects are proposed as part of the Robert B. Diemer Treatment Plant Improvements Project, which was addressed in the 2001 Robert B. Diemer Treatment Plant Improvements Project Final Environmental Impact Report (FEIR), 2002 Final Supplemental EIR, and 2006 Final Subsequent EIR (SEIR). The purpose of the Filter Media Replacement Project is to replace the existing anthracite filter media and up to two inches of sand in all 48 of Diemer's filters with new anthracite media and sand. This is required due to manganese buildup on the existing media which, after switching to biological filters in 2012, as part of the ozone disinfection operations, will result in the release of the manganese into the finished water. Manganese will result in elevated turbidity and unacceptable color. The filter media will be replaced in stages so as not to interfere with the plant operations, significantly limit plant capacity, or obstruct Diemer Oxidation Retrofit Project (ORP) construction activities. In addition, this analysis addresses refurbishment of the roof of the East Washwater Tank. The purpose of the East Washwater Tank Roof Refurbishment Project is to mitigate the failed coatings and roof structural damage, through installation of additional openings in the tank's roof to improve ventilation and dissipate moist chlorine vapor in the headspace, local repairs of failed coatings, and repair or replacement of corroded structural elements. It is assumed that the construction of the East Washwater Tank Roof Refurbishment Project would occur at roughly the same time as the Filter Media Replacement Project, between February and August 2010.

This Air Quality Technical Report includes an evaluation of existing conditions in the project vicinity, an assessment of potential impacts associated with project construction, and an evaluation of project operational impacts.

2.0 Existing Conditions

The following section provides information about the existing air quality regulatory framework, climate, air pollutants and sources.

2.1 Regulatory Framework

The project is in the jurisdiction of the South Coast Air Quality Management District (SCAQMD). The SCAQMD has jurisdiction over an area of approximately 10,743 square miles, consisting of the four-county South Coast Air Basin (SCAB), the Mojave Desert Air Basin (MDAB) and the Riverside County portions of the Salton Sea Air Basin (SSAB). The project is located within the SCAB.

2.1.1 Federal Regulations

Air quality is defined by ambient air concentrations of specific pollutants identified by the United States Environmental Protection Agency (EPA) to be of concern with respect to health and welfare of the general public. The EPA is responsible for enforcing the Federal Clean Air Act (CAA) of 1970 and its 1977 and 1990 Amendments. The CAA required the EPA to establish National Ambient Air Quality Standards (NAAQS), which identify concentrations of pollutants in the ambient air below which no adverse effects on the public health and welfare are anticipated. In response, the EPA established both primary and secondary standards for seven pollutants (called "criteria" pollutants). The seven pollutants regulated under the NAAQS are as follows: ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), respirable particulate matter (or particulate matter with an aerodynamic diameter of 10 microns or less, PM_{10}), fine particulate matter (or particulate matter with an aerodynamic diameter of 2.5 microns or less, $PM_{2.5}$), sulfur dioxide (SO_2), and lead (Pb). Primary standards are designed to protect human health with an adequate margin of safety. Secondary standards are designed to protect property and the public welfare from air pollutants in the atmosphere. Areas that do not meet the NAAQS for a particular pollutant are considered to be "nonattainment areas" for that pollutant. The South Coast Air Basin (SCAB) has been designated as a severe nonattainment area for the NAAQS for O_3, a serious nonattainment area for PM_{10}, a nonattainment area for $PM_{2.5}$, and a maintenance area for CO.

The following specific descriptions of health effects for each of the criteria air pollutants associated with project construction and operations are based on EPA (EPA 2007a) and the California Air Resources Board (ARB) (ARB 2005).

Ozone. O_3 is considered a photochemical oxidant, which is a chemical that is formed when reactive organic gases (ROG) and oxides of nitrogen (NOx), both by-products of combustion, react in the presence of ultraviolet light. O_3 is considered a respiratory irritant and prolonged exposure can reduce lung function, aggravate asthma and increase susceptibility to respiratory infections. Children and those with existing respiratory diseases are at greatest risk from exposure to O_3.

Carbon Monoxide. CO is a product of combustion, and the main source of CO in the SCAB is from motor vehicle exhaust. CO is an odorless, colorless gas. CO affects red blood cells in the body by binding to hemoglobin and reducing the amount of oxygen that can be carried to the body's organs and tissues. CO can cause health effects to those with cardiovascular disease, and can also affect mental alertness and vision.

Nitrogen Dioxide. NO_2 is also a by-product of fuel combustion, and is formed both directly as a product of combustion and in the atmosphere through the reaction of nitrogen oxide (NO) with oxygen. NO_2 is a respiratory irritant and may affect those with existing respiratory illness, including asthma. NO_2 can also increase the risk of respiratory illness.

Respirable Particulate Matter and Fine Particulate Matter. Respirable particulate matter, or PM_{10}, refers to particulate matter with an aerodynamic diameter of 10 microns or less. Fine particulate matter, or $PM_{2.5}$, refers to particulate matter with an aerodynamic diameter of 2.5 microns or less. Particulate matter in this size range has been determined to have the potential to lodge in the lungs and contribute to respiratory problems. PM_{10} and $PM_{2.5}$ arise from a variety of sources, including road dust, diesel exhaust, combustion, tire and brake wear, construction operations and windblown dust. PM_{10} and $PM_{2.5}$ can increase susceptibility to respiratory infections and can aggravate existing respiratory diseases such as asthma and chronic bronchitis. $PM_{2.5}$ is considered to have the potential to lodge deeper in the lungs.

Sulfur dioxide. SO_2 is a colorless, reactive gas that is produced from the burning of sulfur-containing fuels such as coal and oil, and by other industrial processes. Generally, the highest concentrations of SO_2 are found near large industrial sources. SO_2 is a respiratory irritant that can cause narrowing of the airways leading to wheezing and shortness of breath. Long-term exposure to SO_2 can cause respiratory illness and aggravate existing cardiovascular disease.

Lead. Pb in the atmosphere occurs as particulate matter. Pb has historically been emitted from vehicles combusting leaded gasoline, as well as from industrial sources. With the phase-out of leaded gasoline, large manufacturing facilities are the sources of the largest amounts of lead emissions. Pb has the potential to cause gastrointestinal, central nervous system, kidney and blood diseases upon prolonged exposure. Pb is also classified as a probable human carcinogen.

2.1.2 State Regulations

California Clean Air Act. The California Clean Air Act was signed into law on September 30, 1988, and became effective on January 1, 1989. The Act requires that local air districts implement regulations to reduce emissions from mobile sources through the adoption and enforcement of transportation control measures. The California Clean Air Act required local air districts to implement a Best Available Control Technology rule and to require emission offsets for nonattainment pollutants.

The ARB is the state regulatory agency with authority to enforce regulations to both achieve and maintain air quality in the state. The ARB is responsible for the development, adoption, and enforcement of the state's motor vehicle emissions program, as well as the adoption of the California Ambient Air Quality Standards (CAAQS). The ARB also reviews operations and programs of the local air districts, and requires each air district with jurisdiction over a nonattainment area to develop its own strategy for achieving the NAAQS and CAAQS. The CAA allows states to adopt ambient air quality standards and other regulations provided they are at least as stringent as federal standards. The ARB has established the more stringent CAAQS for the six criteria pollutants through the California Clean Air Act of 1988, and also has established CAAQS for additional pollutants, including sulfates, hydrogen sulfide, vinyl chloride and visibility-reducing particles. The SCAB is currently classified as

a nonattainment area under the CAAQS for O_3, $PM_{10,}$ and $PM_{2.5}$. It should be noted that the ARB does not differentiate between attainment of the 1-hour and 8-hour CAAQS for O_3; therefore, if an air basin records exceedances of either standard the area is considered a nonattainment area for the CAAQS for O_3. The SCAB has recorded exceedances of both the 1-hour and 8-hour CAAQS for O_3. The following specific descriptions of health effects for the additional California criteria air pollutants are based on the ARB (ARB 2009).

Sulfates. Sulfates are the fully oxidized ionic form of sulfur. In California, emissions of sulfur compounds occur primarily from the combustion of petroleum-derived fuels (e.g., gasoline and diesel fuel) that contain sulfur. This sulfur is oxidized to sulfur dioxide (SO_2) during the combustion process and subsequently converted to sulfate compounds in the atmosphere. The conversion of SO_2 to sulfates takes place comparatively rapidly and completely in urban areas of California due to regional meteorological features. The ARB's sulfates standard is designed to prevent aggravation of respiratory symptoms. Effects of sulfate exposure at levels above the standard include a decrease in ventilatory function, aggravation of asthmatic symptoms and an increased risk of cardio-pulmonary disease. Sulfates are particularly effective in degrading visibility, and due to fact that they are usually acidic, can harm ecosystems and damage materials and property.

Hydrogen Sulfide. H_2S is a colorless gas with the odor of rotten eggs. It is formed during bacterial decomposition of sulfur-containing organic substances. Also, it can be present in sewer gas and some natural gas, and can be emitted as the result of geothermal energy exploitation. Breathing H_2S at levels above the standard would result in exposure to a very disagreeable odor. In 1984, an ARB committee concluded that the ambient standard for H_2S is adequate to protect public health and to significantly reduce odor annoyance.

Vinyl Chloride. Vinyl chloride, a chlorinated hydrocarbon, is a colorless gas with a mild, sweet odor. Most vinyl chloride is used to make polyvinyl chloride (PVC) plastic and vinyl products. Vinyl chloride has been detected near landfills, sewage plants and hazardous waste sites, due to microbial breakdown of chlorinated solvents. Short-term exposure to high levels of vinyl chloride in air causes central nervous system effects, such as dizziness, drowsiness and headaches. Long-term exposure to vinyl chloride through inhalation and oral exposure causes liver damage. Cancer is a major concern

from exposure to vinyl chloride via inhalation. Vinyl chloride exposure has been shown to increase the risk of angiosarcoma, a rare form of liver cancer, in humans.

Visibility Reducing Particles. Visibility-reducing particles consist of suspended particulate matter, which is a complex mixture of tiny particles that consists of dry solid fragments, solid cores with liquid coatings, and small droplets of liquid. These particles vary greatly in shape, size and chemical composition, and can be made up of many different materials such as metals, soot, soil, dust, and salt. The CAAQS is intended to limit the frequency and severity of visibility impairment due to regional haze. A separate standard for visibility-reducing particles that is applicable only in the Lake Tahoe Air Basin is based on reduction in scenic quality.

Table 1 presents a summary of the ambient air quality standards adopted by the federal and California Clean Air Acts.

Table 1
Ambient Air Quality Standards

POLLUTANT	AVERAGE TIME	CALIFORNIA STANDARDS		NATIONAL STANDARDS		
		Concentration	Measurement Method	Primary	Secondary	Measurement Method
Ozone (O_3)	1 hour	0.09 ppm (180 µg/m^3)	Ultraviolet Photometry	0.12 ppm (235 µg/m^3)	0.12 ppm (235 µg/m^3)	Ethylene Chemiluminescence
	8 hour	0.070 ppm (137 µg/m^3)		0.075 ppm (147 µg/m^3)	0.075 ppm (147 µg/m^3)	
Carbon Monoxide (CO)	8 hours	9.0 ppm (10 mg/m^3)	Non-Dispersive Infrared Spectroscopy (NDIR)	9 ppm (10 mg/m^3)	None	Non-Dispersive Infrared Spectroscopy (NDIR)
	1 hour	20 ppm (23 mg/m^3)		35 ppm (40 mg/m^3)		
Nitrogen Dioxide (NO_2)	Annual Average	0.030 ppm (56 µg/m^3)	Gas Phase Chemiluminescence	0.053 ppm (100 µg/m^3)	0.053 ppm (100 µg/m^3)	Gas Phase Chemiluminescence
	1 hour	0.18 ppm (338 µg/m^3)		--	--	
Sulfur Dioxide (SO_2)	Annual Average	--	Ultraviolet Fluorescence	0.03 ppm (80 µg/m^3)	--	Pararosaniline
	24 hours	0.04 ppm (105 µg/m^3)		0.14 ppm (365 µg/m^3)	--	
	3 hours	--		--	0.5 ppm (1300 µg/m^3)	
	1 hour	0.25 ppm (655 µg/m^3)		--	--	
Respirable Particulate Matter (PM_{10})	24 hours	50 µg/m^3	Gravimetric or Beta Attenuation	150 µg/m^3	150 µg/m^3	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	20 µg/m^3		--	--	
Fine Particulate Matter ($PM_{2.5}$)	Annual Arithmetic Mean	12 µg/m^3	Gravimetric or Beta Attenuation	15 µg/m^3	15 µg/m^3	Inertial Separation and Gravimetric Analysis
	24 hours	--		35 µg/m^3	35 µg/m^3	
Sulfates	24 hours	25 µg/m^3	Ion Chromatography	--	--	--
Lead (Pb)	30-day Average	1.5 µg/m^3	Atomic Absorption	--	--	Atomic Absorption
	Calendar Quarter	--		1.5 µg/m^3	1.5 µg/m^3	
	3-month Rolling Average	--		.15 µg/m^3	.15 µg/m^3	
Hydrogen Sulfide (H_2S)	1 hour	0.03 ppm (42 µg/m^3)	Ultraviolet Fluorescence	--	--	--
Vinyl Chloride	24 hours	0.010 ppm (26 µg/m^3)	Gas Chromatography	--	--	--

ppm= parts per million
µg/m^3 = micrograms per cubic meter
mg/m^3= milligrams per cubic meter
Source: California Air Resources Board 2009

The attainment status of the SCAB for each of the criteria pollutants described above is summarized in Table 2.

Table 2
South Coast Air Basin
Attainment Classification for Criteria Pollutants

Pollutant	CAAQS Attainment Classification	NAAQS Attainment Classification
Ozone	Nonattainment	Severe Nonattainment
CO	Attainment	Maintenance
NO_2	Attainment	Attainment
SO_2	Attainment	Attainment
PM_{10}	Nonattainment	Serious Nonattainment
$PM_{2.5}$	Nonattainment	Nonattainment
Lead	Attainment	Attainment
Sulfates	Attainment	N/A
Hydrogen Sulfide	Unclassified	N/A
Vinyl Chloride	Unclassified	N/A

Toxic Air Contaminants. In 1983, the California Legislature enacted a program to identify the health effects of Toxic Air Contaminants (TACs) and to reduce exposure to these contaminants to protect the public health (AB 1807: Health and Safety Code sections 39650-39674). The Legislature established a two-step process to address the potential health effects from TACs. The first step is the risk assessment (or identification) phase. The second step is the risk management (or control) phase of the process.

The State of California has identified diesel particulate matter as a TAC. Diesel particulate matter is emitted from on- and off-road vehicles that utilize diesel as fuel. Following identification of diesel particulate matter as a TAC in 1998, the ARB has worked on developing strategies and regulations aimed at reducing the emissions and associated risk from diesel particulate matter. The overall strategy for achieving these reductions is found in the *Risk Reduction Plan to Reduce Particulate Matter from Diesel-Fueled Engines and Vehicles* (State of California 2000). A stated goal of the plan is to reduce the cancer risk statewide arising from exposure to diesel particulate matter by 75 percent by 2010 and by 85 percent by 2020. The *Risk Reduction Plan* contains the following three components:

- New regulatory standards for all new on-road, off-road and stationary diesel-fueled engines and vehicles to reduce diesel particulate matter emissions by about 90 percent overall from current levels;
- New retrofit requirements for existing on-road, off-road and stationary diesel-fueled engines and vehicles where determined to be technically feasible and cost-effective; and
- New Phase 2 diesel fuel regulations to reduce the sulfur content levels of diesel fuel to no more than 15 ppm to provide the quality of diesel fuel needed by the advanced diesel particulate matter emission controls.

A number of programs and strategies to reduce diesel particulate matter are in place or are in the process of being developed as part of the ARB's Diesel Risk Reduction Program. Some of these programs and strategies include those that would apply to construction and operation of the Robert B. Diemer Treatment Plant Improvements Project, including regulations governing emissions from offroad construction equipment and on-road heavy-duty trucks

2.1.3 Local Regulations

The SCAQMD has the primary responsibility for the development and implementation of rules and regulations designed to attain the NAAQS and CAAQS, as well as the permitting of new or modified sources, development of air quality management plans, and adoption and enforcement of air pollution regulations within the SCAB. The SCAQMD is responsible for developing air quality management plans designed to attain and maintain the ambient air quality standards. The most recent air quality management plan adopted by the SCAQMD for the SCAB is the 2007 Air Quality Management Plan (AQMP) (SCAQMD 2007), which was adopted by the SCAQMD Governing Board on June 1, 2007. The 2007 AQMP focuses on strategies for attainment and maintenance of the ozone and $PM_{2.5}$ standards. The AQMP proposes attainment of the Federal $PM_{2.5}$ standards through a focused control of sulfur oxides (SOx), directly-emitted $PM_{2.5}$, and nitrogen oxides (NOx) supplemented with ROG by 2015. The AQMP's strategy to attain and maintain the 8-hour ozone standard builds upon the control strategy designed for $PM_{2.5}$, augmented with additional NOx and ROG reductions. The proposed ozone attainment date is 2024, assuming a bump-up to a nonattainment classification of extreme is

approved by the U.S. EPA. The control strategies proposed in the 2007 AQMP focus on emissions of $PM_{2.5}$ and ozone precursors, and identify precursor emissions as the key source of $PM_{2.5}$ in the atmosphere, as opposed to directly emitted $PM_{2.5}$.

2.2 Climate and Meteorology

The project site is located in the SCAB. The climate of the SCAB is dominated by a semi-permanent high pressure cell located over the Pacific Ocean. This cell influences the direction of prevailing winds (westerly to northwesterly) and maintains clear skies for much of the year. Figure 1 provides a graphic representation of the prevailing winds in the project vicinity, as measured in Anaheim, which is the closest meteorological station to the Robert B. Diemer facility. The high pressure cell also creates two types of temperature inversions that may act to degrade local air quality.

Subsidence inversions occur during the warmer months as descending air associated with the Pacific high pressure cell comes into contact with cool marine air. The boundary between the two layers of air creates a temperature inversion that traps pollutants. The other type of inversion, a radiation inversion, develops on winter nights when air near the ground cools by heat radiation and air aloft remains warm. The shallow inversion layer formed between these two air masses also can trap pollutants. As the pollutants become more concentrated in the atmosphere, photochemical reactions occur that produce ozone, commonly known as smog.

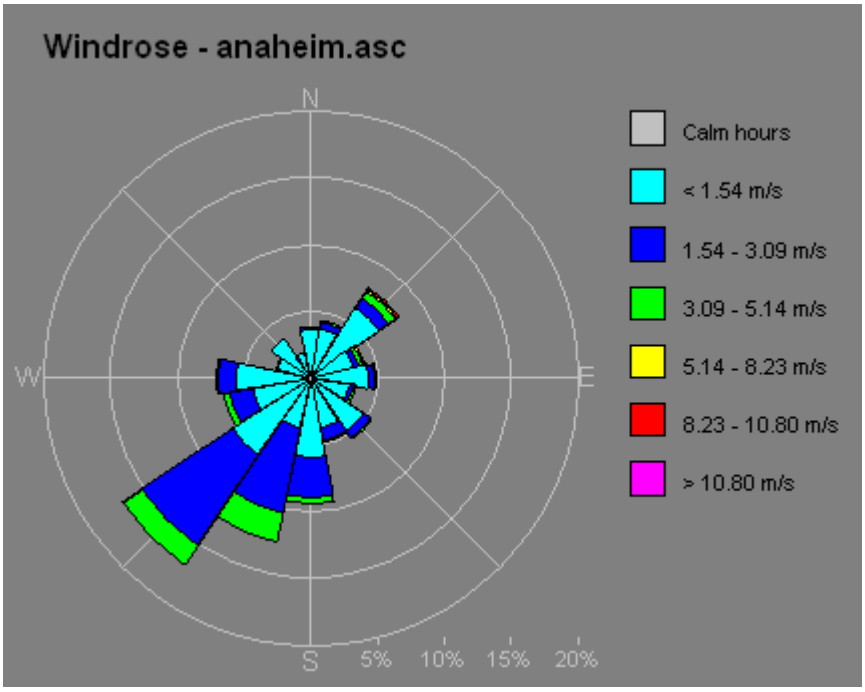

Figure 1. Wind Rose – Anaheim Meteorological Monitoring Station

2.3 Background Air Quality

The SCAQMD operates a network of ambient air monitoring stations throughout the SCAB. The purpose of the monitoring stations is to measure ambient concentrations of the pollutants and determine whether the ambient air quality meets the CAAQS and the NAAQS. The closest ambient air quality monitoring station to the project is the La Habra monitoring station, which measures O_3, CO, and NO_2. The closest monitoring station that measures particulate matter is the Anaheim monitoring station, which measures all pollutants except SOx. SOx is not considered to be an air quality issue within the SCAB. Background ambient air quality data from 2006 through 2008 for criteria pollutants measured at the La Habra and Anaheim monitoring stations are presented in Table 3. Ambient air quality was compared to the most stringent of either the CAAQS or NAAQS. In all cases, CAAQS were the most stringent. These data indicate that the area is in compliance with both CAAQS and NAAQS for CO, NO_2, lead, sulfates, and SO_2. The state 8-hour CO standard was not exceeded during this three-year period. The maximum measured concentrations of NO_2 each year were less than the 0.25-ppm one-hour state standard and the national annual standard. The SO_2 concentrations were below state and national standards during this period.

It should be noted that the 8-hour federal ozone standard was lowered in 2008 from 0.08 ppm to 0.075 ppm. Exceedances of the California 24-hour PM_{10} and $PM_{2.5}$ standards were measured in 2007 during the southern California fire events. The data from the monitoring station indicates that air quality is in attainment of all other air quality standards.

Table 3
Ambient Background Concentrations
(ppm unless otherwise indicated)

Pollutant	Averaging Time	2006	2007	2008	Most Stringent Ambient Air Quality Standard	Monitoring Station
Ozone	8 hour	0.114	0.107	0.084	0.070	La Habra
	1 hour	0.146	0.152	0.104	0.09	La Habra
PM_{10}[1]	Annual	33.3 µg/m^3	38.6 µg/m^3	28.6 µg/m^3	20 µg/m^3	Anaheim
	24 hour	104 µg/m^3	489 µg/m^3	61 µg/m^3	50 µg/m^3	Anaheim
$PM_{2.5}$[1]	Annual	14.0 µg/m^3	14.4 µg/m^3	12.0 µg/m^3	12 µg/m^3	Anaheim
	24 hour	56.2 µg/m^3	79.4 µg/m^3	39.4 µg/m^3	35 µg/m^3	Anaheim
NO_2	Annual	0.022	0.021	0.021	0.030	La Habra
	1 hour	0.091	0.083	0.081	0.18	La Habra
CO	8 hour	2.87	2.86	2.96	9.0	La Habra
	1 hour	6.0	6.3	4.7	20	La Habra

[1]The maximum particulate matter measurements occurred in 2007 during the southern California fire events.
[2]Secondary NAAQS
Source: www.arb.ca.gov/aqd/aqd.htm (Measurements of all pollutants at La Habra and Anaheim stations)
www.epa.gov/air/data/monvals.html (1-hour CO and annual $PM_{2.5}$)

3.0 Thresholds of Significance

The Robert B. Diemer Treatment Plant Improvements Project Final Environmental Impact Report (FEIR), Final Supplemental EIR and Final SEIR evaluated air quality impacts associated with the construction of improvements proposed for the larger project. The Filter Media Replacement and East Washwater Tank Roof Refurbishment Projects would be part of the Diemer plant improvements, and air emissions were evaluated on the basis of whether they would exceed the maximum daily emissions projected in the SEIR.

4.0 Impacts

The proposed Filter Media Replacement and East Washwater Tank Roof Refurbishment Projects have the potential for air quality impacts that are mainly confined to the construction phase of the projects. Operational impacts for the projects would not differ from existing operational emissions and would be attributable to inspection and maintenance activities. The analysis of potential air quality impacts therefore focuses on construction.

Emissions associated with the Robert B. Diemer Treatment Plant Improvements Project were evaluated and disclosed in the Subsequent EIR for the Diemer Plant Improvements dated January 2006. These emissions have been disclosed to the public in accordance with the requirements of CEQA.

The Subsequent EIR emissions are shown in Table 4.

Table 4
Maximum Daily Emissions
Subsequent EIR
Lbs/day

	CO	ROG	NOx	PM_{10}
Subsequent EIR	516.29	130.33	1704.01	276.57

As discussed in Section 1.0, it is anticipated that the Filter Media Replacement and East Washwater Tank Roof Refurbishment Projects would take place in 2010. Other construction projects associated

with the Robert B. Diemer Treatment Plant Improvements Project that would occur during the same time period would be portions of the ORP, including the following:

- Ozone Contactor and Ozone Building
- Ozone Electrical Facility and Major Ductwork
- Ozone LOX
- Rejection Tunnel

Assuming these projects would occur at the same time as the Filter Media Replacement and East Washwater Tank Roof Refurbishment Projects, maximum daily emissions are presented in Table 5.

Table 5
Maximum Daily Simultaneous Emissions
Lbs/day

Project	CO	ROG	NOx	PM_{10}
Ozone Contactor and Ozone Building	45.50	10.65	89.09	10.48
Ozone Electric Facility and Major Duct	54.89	18.89	242.96	8.53
Ozone LOX	30.92	9.99	107.14	6.80
Rejection Tunnel	30.60	8.37	66.59	10.89
Filter Replacement	52.04	13.72	174.61	7.35
East Washwater Tank	28.47	8.66	111.68	4.60
Total	**242.42**	**70.28**	**792.07**	**48.65**
SEIR Emissions	**516.29**	**130.33**	**1704.01**	**276.57**
Above SEIR?	**No**	**No**	**No**	**No**

As shown in Table 5, emissions of all criteria pollutants would be below the maximum daily emissions disclosed in the SEIR. However, because the site is located in a non-attainment area for ozone and PM_{10}, emissions of ozone precursor NOx would result in a significant impact because they exceed the SCAQMD significance threshold of 100 lbs/day. Emissions of CO, ROG, and PM_{10} do not exceed their SCAQMD significance thresholds of 550 lbs/day, 75 lbs/day, and 150 lbs/day, respectively. This analysis therefore does not change the conclusions reached in the SEIR that the Robert B. Diemer Treatment Plant Improvements Project would result in significant impacts due to emissions of NOx.

5.0 Cumulative Emissions

In addition to the projects associated with the ORP, the North Access Road could be constructed at the same time as these projects. The North Access Road was evaluated in a separate EIR and was not part of the SEIR that was prepared for the Robert B. Diemer Treatment Plant Improvements Project, but its emissions could contribute to overall cumulative emissions in the air basin. Emissions associated with the construction of the ORP projects, North Access Road, and Filter Media Replacement and East Washwater Tank Roof Refurbishment Projects are presented in Table 6.

Table 6
Cumulative Daily Emissions
Lbs/day

Project	CO	ROG	NOx	PM_{10}
Ozone Contactor and Ozone Building	45.50	10.65	89.09	10.48
Ozone Electric Facility and Major Duct	54.89	18.89	242.96	8.53
Ozone LOX	30.92	9.99	107.14	6.80
Rejection Tunnel	30.60	8.37	66.59	10.89
North Access Road	105.69	24.77	263.54	35.76
Filter Replacement	52.04	13.72	174.61	7.35
East Washwater Tank	28.47	8.66	111.68	4.60
Total	**348.11**	**95.05**	**1055.61**	**84.41**

As shown in Table 6, emissions of ozone precursors ROG and NOx would result in a significant impact because they exceed the SCAQMD significance thresholds of 75 lbs/day for ROG and 100 lbs/day for NOx. Emissions of CO and PM_{10} do not exceed their SCAQMD significance thresholds of 550 lbs/day and 150 lbs/day, respectively. Thus the simultaneous construction of the ORP, the North Access Road, Filter Media Replacement Project, and the East Washwater Tank Roof Refurbishment Project could result in a cumulatively significant impact for ozone precursors.

6.0 Summary and Conclusions

In summary, the proposed projects would mainly result in emissions of air pollutants during project construction. The air quality impact analysis evaluated the potential for adverse impacts to the ambient air quality due to construction and operational emissions. Construction emissions would include emissions associated with fugitive dust, heavy construction equipment and construction workers commuting to and from the site. The projects would employ those mitigation measures identified in the FEIR and SEIR, including dust control measures such as watering to control PM_{10} emissions during construction, and minimization of NOx emissions. Mitigation measures identified in the FEIR and SEIR and contained in the project's Mitigation Monitoring and Reporting Program would remain unchanged. The emissions associated with the Filter Replacement and East Washwater Tank Roof Refurbishment Projects, when combined with other simultaneous projects associated with the Robert B. Diemer Treatment Plant Improvements Project, would result in a temporary significant impact to air quality due to emissions of NOx. Emissions associated with simultaneous construction of projects associated with the ORP, North Access Road, and the Filter Media Replacement and East Washwater Tank Roof Refurbishment Projects would result in a cumulatively significant impact for ozone precursors. These impacts are significant and unmitigable, but are consistent with the findings of the FEIR and SEIR.

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