City of Burlingame
Wastewater Treatment Facility

Utility Analysis for Wet Weather Bypass of Secondary Treatment "No Feasible Alternatives Analysis"

(Revised November 29, 2012)

During peak wet weather flow events, the City of Burlingame (City) Wastewater Treatment Plant (WWTF) must divert a portion of its primary treated wastewater around the secondary treatment system. The diverted flows are blended with secondary effluent prior to disinfection. Blended flows of 16 million gallons per day (MGD) or less are discharged to the North Bayside System Unit (NBSU) forcemain.[1] Dechlorination and discharge occurs at the NBSU outfall in the Lower San Francisco Bay. Flowrates greater than 16 MGD, are fully treated, disinfected, and dechlorinated at the WWTF and bypassed to the emergency outfall. The City constructed a 1.6 million gallon (MG) stormwater retention basin in 2011 to reduce blending and use of the emergency outfall. The City, and the satellite agencies that own and operate their respective collection systems, implement sewer rehabilitation programs that are reducing the volume of flow sent to the WWTF.

The City has spent $30 million over the past 8 years to reduce infiltration/inflows (I/I) to the collection system, prevent Sanitary Sewer Overflows (SSOs), and to improve wet weather flow handling at the WWTF. As a result of collection system improvements, there has been a 95% reduction in SSOs in the main sewer lines and a 90% reduction in SSOs in the lower laterals. The time to respond to SSOs by City officials has been decreased to 21 minutes. Scheduled Capital Improvement Projects (CIP) over the next 10 years for the WWTF and collection system will total approximately $47 million. When completed, the rehabilitation efforts will further reduce wet weather inflows and the probability of future blending events occurring at the WWTF. As part of the NPDES permit reissuance process, the City is requesting the San Francisco Bay Regional Water Quality Control Board (Regional Water Board) grant approval for the continuation of wet weather diversions and blending based on the information provided in the following paragraphs.

CURRENT TREATMENT SYSTEM AND CAPACITY

The City owns the City of Burlingame WWTF and all aspects of the operation and maintenance of the WWTF is the responsibility of Veolia Water North America West, LLC. The WWTF provides secondary treatment of domestic and commercial wastewater originating from the City of Burlingame, Town of Hillsborough (Town), and the Burlingame Hills Sewer Maintenance District (District). The total population served by the WWTF is approximately 37,000. The treatment plant has an average dry weather design capacity of 5.5 MGD and a peak wet weather flow capacity of 16 MGD.

[1] The Burlingame WWTF is limited to a maximum discharge rate of 16 MGD, as specified in the NBSU Joint Powers Agreement to protect operation of downstream facilities.

The WWTF is part of the North Bayside System Unit (NBSU), a joint powers authority that includes the cities of Burlingame, Millbrae, South San Francisco and San Bruno, and the San Francisco International Airport. Based on the joint use agreement, the WWTF may discharge up to 16 MGD of treated and disinfected effluent through the NBSU forcemain to the South San Francisco and San Bruno Water Quality Control Plant, where the effluent is dechlorinated before being discharged into the NBSU deepwater diffuser in the Lower San Francisco Bay. WWTF operation and discharge water quality are regulated by NPDES Permit No. CA0037788, currently implemented as Order No. R2-2008-0008.

The City of Burlingame has agreements with the Town of Hillsborough[2] and the Burlingame Hills Sewer Maintenance District[3] regarding the maintenance and operations of sanitary sewer lines shared by the agencies and the terms of use for the WWTF.

The Town sends about 52% of its sewage to the City of San Mateo Wastewater Treatment Plant and 48% to the Burlingame WWTF. During the dry season, the Town contributes approximately 0.5 MGD of sewage representing about 16% percent of average dry weather flows to the WWTF.[4] The Town is allowed to discharge sewage into and through Burlingame's sanitary sewer transmission mains, pump stations, WWTF, and outfall pipeline based on the following terms.

- The Town is responsible for paying a pro rata charge for maintenance and operations of the collection system (shared sewage lines that carry both Burlingame and Hillsborough sewage), the sewer treatment plant, and the cost to operate and maintain sewerage systems. Treatment costs are based on the flow and quality of sewage originating from the Town;
- The Town and the City agree to make reasonable efforts to reduce I/I in their collection systems. The City, based on the direction of the Regional Water Board, may set limits on the flow from the Town in order to meet water quality standards.

The District's sewage contribution during the dry season is approximately 0.08 MGD representing 3% of average dry weather flows to the WWTF.[5] The District is allowed to discharge sewage into and through the City's sanitary sewer transmission mains, pump stations, WWTF, and outfall pipeline based on the following terms.

- The District is responsible for paying a portion of the total cost for sewage treatment;
- The District is responsible for paying a portion of the total actual cost of operation and maintenance of the City's collection system (including 15% for overhead and supervision).

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[2] *Agreement between the Town of Hillsborough and the City of Burlingame For Sanitary Sewage Collection, Treatment, and Discharge.* October 2004.
[3] *Resolution Authorizing Execution of an Agreement Between The City of Burlingame and The Burlingame Hills Sewer Maintenance District.* August 1975.
[4] Estimated contribution is based on population served, typical wastewater flows of 83.8 gallons/day per capita, and recent WWTF average dry weather inflows of 3.2 MGD.
[5] Ibid.

Sewage Conveyance Facilities

The Town and the District are considered satellite collection system agencies and own/operate/maintain the sewage conveyance equipment within their jurisdictions. The portion of the Town that drains to the WWTF has approximately 775 connections and 94 miles of sanitary sewer lines. The District has 450 connections and 11 miles of sanitary sewer lines. The City's collection system includes 100 miles of sanitary sewer lines, 4 miles of force mains, and 31 miles of lower laterals. The pipe sizes within the City service area range from 6 to 51 inches in diameter. The City operates 7 sewage pump stations to convey wastewater to the WWTF.

Wastewater Treatment Facilities

The wastewater treatment processes consist of influent screening, grit removal, primary clarification, activated sludge biological treatment, secondary clarification, and disinfection using sodium hypochlorite. In September 2011, a 1.6 MG stormwater retention basin (SWRB) was added to the facility. The volume of the final constructed SWRB was nearly three times the minimum 660,000 gallons required by Order No. R2-2008-0008.[6] The SWRB consists of 4 individual chambers that assist in attenuating influent flow surges. The capacity of the WWTF is 5.5 MGD average dry weather flow (ADWF) and 16 MGD peak wet weather flow (based on the maximum flowrate specified in the NBSU JPA).[7] Treated and disinfected effluent is conveyed through the NBSU forcemain to the South San Francisco and San Bruno Water Quality Control Plant, where the effluent is dechlorinated before being discharged into a shared deepwater diffuser in the Lower San Francisco Bay.

A flow schematic depicting the wastewater treatment processes is presented as **Figure 1.**

[6] Order No. R2-2008-0008, Provision VI.C.6. (Task 1.b.).

[7] The effluent pump capacity is approx. 25 MGD. Since the Burlingame WWTF is the first discharger to the NBSU pipeline, a flowrate of 16 MGD or less must be maintained to enable downstream NBSU members to pump at design capacity and to prevent surcharging at their facilities.

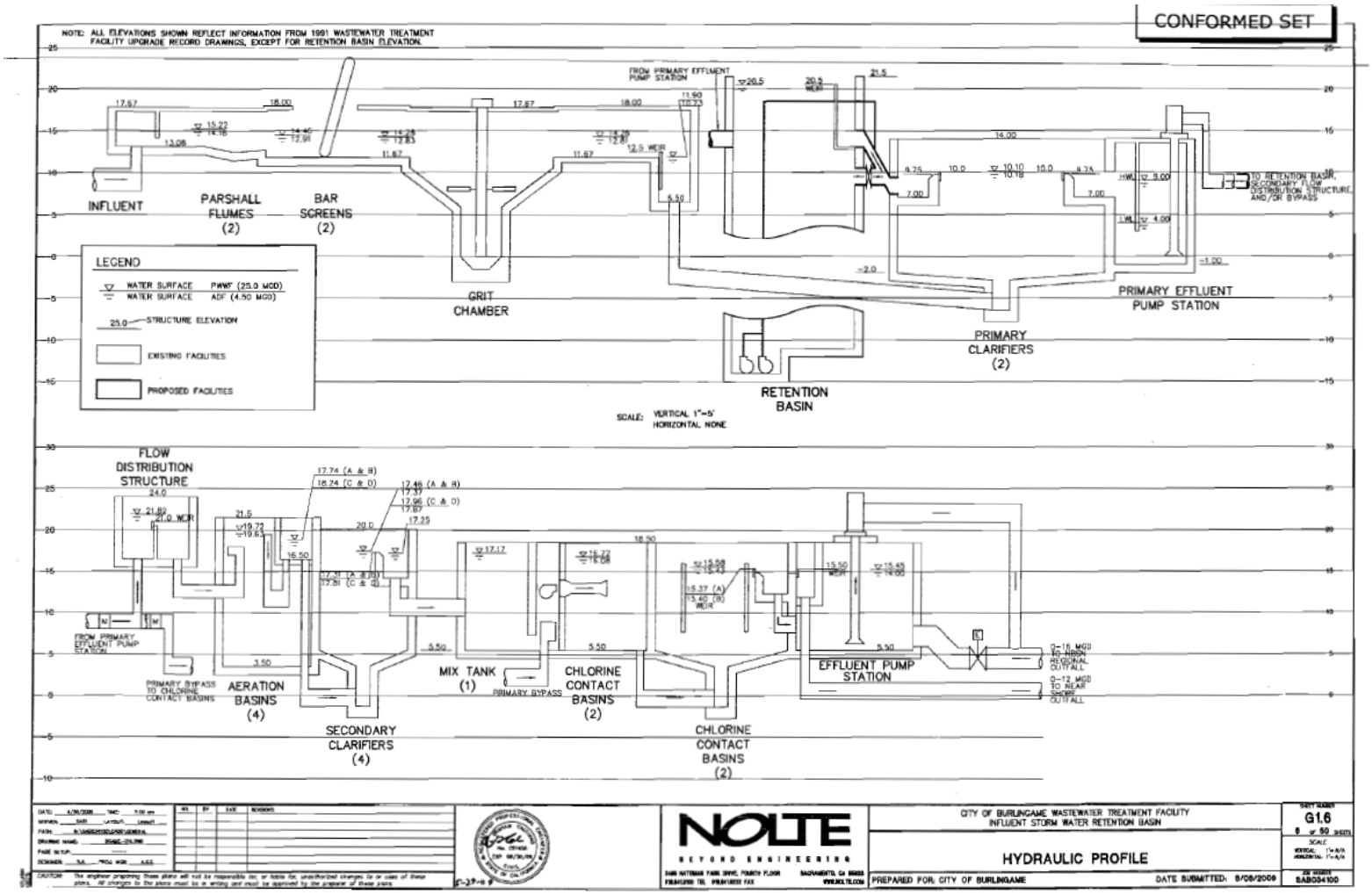

Figure 1. Flow Schematic for the City of Burlingame Wastewater Treatment Facility

CURRENT WET WEATHER FLOW MANAGEMENT

During peak wet weather flow events, diversion and blending procedures are implemented in order to protect operation of the secondary biological treatment system.

After primary treatment (25 MGD capacity), 13 to 15.5 MGD of primary effluent (depending on influent quality) can be treated in the aeration basins and secondary clarifiers. Before any diversions or blending occurs, primary effluent flows above 13 MGD are diverted to on-site temporary storage facilities. These facilities, in order of filling, include an offline primary clarifier, the 1.6 million gallon SWRB, and an offline aeration basin. The SWRB is dewatered when the WWTF can safely reintroduce the stored water into the treatment process. When the temporary storage facilities reach maximum capacity and when flows into the secondary treatment system are in excess of 13 MGD but less than or equal to 16 MGD, the facility blends primary effluent with secondary effluent prior to delivery to the chlorine contact basins. All blended effluent meets secondary treatment standards and is disinfected prior to disposal to the NBSU forcemain. Flowrates greater than 16 MGD receive full primary and secondary treatment, prior to disinfection, dechlorination, and bypass the City's emergency outfall.

ALTERNATIVES ANALYSIS FOR BLENDING REDUCTION

The City evaluated six alternatives to reduce the volume, duration, and occurrence of wet weather blending events:

1. Maintain current approach (conduct scheduled collection system improvements and maximize current on-site storage options at the WWTF);
2. Upgrade secondary capacity at the WWTF;
3. Increase effluent pumping capacity;
4. Reduce I/I contributions to the collection system;
5. Increase storage capacity at the WWTF; and
6. Increase storage capacity within the collection system.

The first alternative is to maintain the current approach identified in planning documents developed by the City and its satellite agencies. Under this approach, the City will follow guidance provided by the "Wastewater Collection System Master Plan" (Brown & Caldwell, 2010) and will maximize available on-site storage options at the WWTF, including the recently constructed SWRB. The Town will follow guidance provided by the "Wastewater Collection System Master Plan Burlingame (North) Sewershed," (Brown &Caldwell, 2011) and the District will follow guidance provided by the "Wastewater Collection System Capacity Assurance Plan and Master Plan Update," (Brown and Caldwell, 2011). The current approach is feasible because the City and satellite agencies have already adopted the planning documents and developed CIPs and management strategies based on this guidance. The current approach is affordable because the City and the satellite agencies have already considered budget issues and ratepayer concerns when identifying the projects to be implemented. This alternative does not require the permanent use of additional land/space for construction, is not

restricted by any legal agreements currently in place, and will continue to reduce the volume, duration, and occurrence of blending events.

The second alternative is to upgrade secondary treatment capacity at the WWTF. However, there is no available land at the WWTF site to accommodate a treatment process expansion. A technical memorandum (TM) on wet weather flow management prepared by Carollo Engineers in 2000 specifically indicated that "Increasing the hydraulic and treatment capacity of the wastewater plant is unfeasible because of site constraints."[8] In addition, recent construction of the SWRB utilized all remaining available land at the WWTF.

The third alternative is to increase the effluent pumping capacity. As stated previously, the WWTF may only discharge up to 16 MGD of treated and disinfected effluent through the NBSU forcemain to the South San Francisco and San Bruno Water Quality Control Plant. Therefore, this alternative is not feasible due to existing legal agreements. Moreover, increasing the effluent pumping capacity would not reduce the volume, duration, or occurrence of wet weather blending events without a corresponding increase in secondary treatment capacity.

The fourth alternative is to achieve additional reductions in I/I contributions to the collection system. This approach is currently being implemented as part of the first alternative. The number and type of collection system rehabilitation projects that will be implemented in the near term (5 years) are limited by budget issues and ratepayer concerns. Further reducing I/I contributions to the collection system (beyond reductions projected from current CIP activities) may be possible, but priority projects and costs will have to be evaluated during the next CIP approval period. The City is already investing $3.7 million per year and therefore this alternative is not affordable at this time or feasible.

The fifth alternative is to increase the storage capacity at the WWTF. As mentioned previously, in September 2011 the City constructed a 1.6 MG SWRB. The City does not have land/space available for additional construction. The wet weather management TM identified the City's only additional option for increasing storage capacity at the WWTF to be an underground storage tank in the parking lot northwest of the WWTF site. The cost for this underground storage basin and related facilities was estimated at $11.5 million, equivalent to$15.5 million in 2012 dollars. Given the limited resources available to the City and the $47 million in high priority projects already identified in the 10-year CIP, this alternative is not affordable or feasible.

The sixth alternative is to increase storage capacity within the collection system. The wet weather management TM evaluated installation of several storage basins in the sewer system at localized areas of high flows. However, the alternative was not recommended due to "the general lack of space in the City of Burlingame."[9] Also, increasing storage within the collection system may cause surcharging "because the system is already operating beyond its capacity and there appears to be no available volume in the sewers

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[8] Carollo Engineers. *US Filter Burlingame Wastewater Treatment Facility Study Technical Memorandum No. 3 Wet Weather Flow Management*. June 2000.
[9] Ibid.

for additional storage of wet weather flow."[10] Given that the system is already operating beyond its capacity, there is a high probability that surcharging will result SSOs. Increasing the size of existing pipes for the sole purpose of increasing storage capacity within the collection system may cause flow velocities to fall below critical levels during dry weather causing odors and corrosion. The City and the satellite agencies have already identified high priority collection system rehabilitation projects and will implement these projects as part of their CIPs or other flow management strategies. These projects have considered operational needs and constraints when selecting pipe size. As a result, increasing storage within the collection system is not considered feasible.

Table 1 provides a summary of the alternatives assessment. The first alternative (Maintain Current Approach) is the only alternative identified by the City as completely feasible. The fourth alternative (Additional I/I Reductions) is identified as partially feasible and additional I/I control options will be considered during the next CIP approval process. The remaining alternatives are identified as unfeasible.

[10] Ibid.

Table 1. City of Burlingame WWTF Alternatives Assessment Matrix

Alternative	Affordable Costs?	Available Land/Space for Construction?	City/Agency Budgetary Issues and Ratepayer Concerns?	Existing Legal Agreements allow the Activity?	Impact on Volume, Duration, Occurrence of Blending Events?	Other Possible Impacts/Benefits	Conclusions
#1 - Maintain Current Approach (ongoing collection system improvements, maximize use of new SWRB and other on-site storage options)	Costs are high but not prohibitive.	Additional land/space for construction is not necessary.	Concerns exist but are not overwhelming.	Yes	Would reduce volume, duration, and occurrence of blending events but not completely eliminate the need to blend.	Collection system improvements will reduce the risk of SSOs.	Alternative is feasible.
#2 - Upgrade Secondary Capacity at WWTF	Costs not evaluated because of site constraints.	No	Budgetary issues and ratepayer concerns not evaluated because of site constraints.	Yes	Would reduce volume, duration, and occurrence of blending events. Degree of impact would depend on capacity added.	None	Alternative not feasible due to site constraints.
#3 - Increase Effluent Pumping Capacity	Yes	Additional land/space for construction is not necessary.	No	No. Per the City's agreement with the other members of the NBSU, the City may only discharge up to 16 MGD.	None	None	Alternative not feasible due to legal agreements preventing the action.

Alternative	Affordable Costs?	Available Land/Space for Construction?	City/Agency Budgetary Issues and Ratepayer Concerns?	Existing Legal Agreements allow the Activity?	Impact on Volume, Duration, Occurrence of Blending Events?	Other Possible Impacts/Benefits	Conclusions
#4 - Additional Reduction of I/I Contributions to Collection System	Possibly, but priority projects and costs will have to be evaluated during the next CIP approval period	Additional land/space for construction is not necessary.	Concerns exist, but may be addressed through CIP budgeting process.	Yes; however, the City is only responsible for reducing I/I from its own collection system and may only set limits on the amount of flow that it receives from the Town and District.	Would reduce volume, duration, and occurrence of blending events but not completely eliminate the need to blend.	Reduces the risk of SSOs.	Alternative is partially feasible.
#5 - Increase Storage Capacity at WWTF	No	No. Additional storage capacity would need to be constructed underground.	Yes	Yes	Would reduce volume, duration, and occurrence of blending events. Degree of impact would depend on volume constructed.	Possible negative environmental impacts due to construction.	Alternative is not feasible due to high costs associated with underground construction.

Alternative	Affordable Costs?	Available Land/Space for Construction?	City/Agency Budgetary Issues and Ratepayer Concerns?	Existing Legal Agreements allow the Activity?	Impact on Volume, Duration, Occurrence of Blending Events?	Other Possible Impacts/Benefits	Conclusions
#6 - Increase Storage Capacity in Collection System	No	No	Budgetary issues and ratepayer concerns not evaluated because of site constraints.	Yes	Would reduce volume, duration, and occurrence of blending events. Degree of impact would depend on capacity added.	Holding sewage in the collection system may increase surcharging and the risk of SSOs. The collection system is currently near capacity during wet weather events. Upsizing the system may cause flow velocities during dry weather to fall below critical levels.	Alternative not feasible due to site constraints.

NO FEASIBLE ALTERNATIVES ANALYSIS

The following analysis is conducted to comply with Provision VI.C.7. (Task 5) of Order No. R2-2008-0008 and 40 CFR 122.41(m)(4)(i)(A)-(C), and to demonstrate that the WWTF has no feasible alternatives to its system of diverting and blending peak wet weather flows. The requests outlined in items *a* through *k* below were excerpted from the proposed EPA policy entitled "*NPDES Requirements for Peak Wet Weather Discharges from POTW Treatment Plants Serving Separate Sanitary Sewer System Collection Systems" (January 2006).*

a. Document current treatment plant design capacity for all treatment units, the maximum flow that can be processed through those units, and the feasibility of increasing treatment capacity and related costs;

The information presented in **Table 2** documents the existing treatment capacity for the WWTF. The process capacity of the secondary treatment system is managed by operations staff to avoid hydraulic overload of the activated sludge process and associated solids inventory washout. Depending on primary effluent quality, as much as 15.5 MGD may be processed through the aeration basins and secondary clarifiers. However, the secondary treatment system can reliably handle a maximum of 13 MGD. The WWTF staff operates the secondary system in order to process as much flow as possible. Construction of additional treatment facilities and storage units are not feasible due to the limited space available at the WWTF.

Table 2. Existing Capacity of the City of Burlingame WWTF

Treatment Unit	Hydraulic Capacity (MGD)	Process Capacity (MGD)
Parshall Flumes	31.8	n/a
Fine Screen Bars	26	26
Primary Clarifiers	30	25
Aeration Basins	15.5	13 to 15.5
Secondary Clarifiers	15.5	13 to 15.5
Chlorine Contact Basin	20	n/a
Effluent Pump Station	>16.0	n/a
Stormwater Retention Basin (SWRB)	1.6 MG	n/a

n/a – Not applicable

b. Estimate the frequency, duration, and volume of current wet weather diversions, and evaluate alternatives to reduce the frequency, duration, and volume of such occurrences and related costs;

Wet weather diversions and blending have occurred six times since adoption of the current NPDES permit (January 2008). The date, volume of blended effluent, and associated rainfall conditions are detailed for each blending event in **Table 3**. During

this period, wet weather diversions occurred approximately 1.2 times a year with an average of 1.96 million gallons (MG) of blended effluent produced during each event. The largest blending event (3.5 MG) occurred on January 4, 2008. During this event, the influent flow rate stayed above 13 MGD for approximately 7 hours. The occurrence of blending events and the average volume of blended effluent have decreased markedly from previous NPDES permit terms. From 2002 to 2006, Burlingame WWTF had 3.7 blending events per year with an average volume of 2.85 MG of blended effluent produced per event.

Table 3. Blending Events at the City of Burlingame WWTF (January 2008 to Present)

Date	Blended Volume (MG)	Storm Event 48-hr Total Rainfall (Inches)	Storm Event 24-hr Total Rainfall (Inches)
1/4/2008	3.478	3.2	2.5
1/5/2008	1.308	3.2	0.7
1/25/2008	3.067	2.7	2.4
2/15/2009	0.619	2.6	2.2
12/19/2010	0.874	2.2	1.0
3/24/2011	2.403	2.5	2.05
Avg. # of Blending Events/yr = 1.2	**Avg. Volume Blended = 1.96**	**Avg. 48-hr Total Rainfall = 2.73**	**Avg. 24-hr Total Rainfall = 1.81**

Wet weather bypasses to the emergency outfall occurred four times since adoption of the current NPDES permit (January 2008), and since the construction of the new $6.5 million SWRB, no effluent has gone to the emergency outfall since March 24, 2011. The dates and volumes of discharge at the emergency outfall are detailed in **Table 4.** The outfall is only utilized when the effluent flow rate exceeds 16 MG and all storm water storage capacity has been exhausted. All effluent bypassed to the emergency outfall is fully treated (not blended), disinfected, and dechlorinated prior to discharge.

Table 4. Use of City of Burlingame WWTF Emergency Outfall (January 2008 to Present)

Date	Discharged Volume (MG)
1/4/2008	1.902
1/25/2008	2.156
12/19/2010	0.2
3/24/2011	2.225
Avg. # of events/yr = 0.8	**Avg. vol. discharged = 1.62**

With construction of the $6.5 million SWRB and recent capital improvements that are reducing inflow and infiltration (I/I) in the collection system, no wet weather blending events or emergency outfall use have occurred since March 24, 2011. The need to blend or bypass flows to the emergency outfall is expected only during

extreme wet weather events. Continued maintenance and repair of the service area's collection systems and inter-process improvements at the WWTF will further reduce the need for blending and diversions.

The City has set a target of inspecting, rehabilitating, and/or replacing 2 miles of collection system pipe per year. Since 2007, the City has spent over $14 million on the inspection, rehabilitation, and repair of its collection system. The City will continue to fund collection system improvements by at least $4 million per year.

The City follows guidance provided in its "Wastewater Collection System Master Plan," prepared by Brown & Caldwell (2010) when making collection system improvements. The Master Plan was based on a study of the entire collection system and includes a recommendation for a 5-year top priority capital improvement project (CIP) plan and a 10-year mid priority CIP plan.

The Town of Hillsborough has also completed a Collection System Master Plan and is currently utilizing the plan to identify CIP and collection system improvements.

The Burlingame Hills Sewer Maintenance District has a much smaller collection system when compared to the City and Town, and has completed closed circuit television (CCTV) inspections of its entire collection system. The District is now using information from the CCTV inspections for prioritizing collection system rehabilitation projects.

c. Estimate the potential for future peak wet weather diversions based on information such as predicted weather patterns, population growth, and treatment plant and collection system changes (e.g.; upgrades, extensions, deterioration) and evaluate options for reducing diversions based on these variables;

Due to the unpredictability of long term weather forecasts, the City anticipates that weather patterns will remain consistent to what has been seen in the region over the past several years. Storm events that produce greater than 2–inches of rain in a 48-hour period are correlated with inflows to the WWTF of greater than 13 MGD. Use of the SWRB has reduced the amount of wet weather diversions by allowing short influent flow surges to be stored on-site and then processed using full secondary treatment.

Population in the three service areas (City of Burlingame, Town of Hillsborough, and Burlingame Hills) is approximately 37,000. Growth in these areas is expected to be stable because the region is almost completely built out. It is not expected in the near- or long-term future that the WWTF will require a treatment capacity expansion in order to handle greater baseline wastewater flows from its service areas. The California Department of Finance provides regular updates on interim population projections for the counties in California. All three of the service areas are located in

San Mateo County. When compared to 2010 population estimates, the entire San Mateo County is projected to increase its population 4.45% by 2020.[11]

Due to the infeasibility of adding further storage at the WWTF and the projection that population growth will remain stable in the service areas, the reduction in wet weather diversions will rely on improvement of WWTF storage management during wet weather events and reductions in I/I from the collection systems. As outlined in **section g**, the City and the satellite service areas are committed to improving their collection systems, and are currently implementing wastewater collection system Master Plans.

d. Assess existing storage within the collection system or on-site and options for enhanced utilization or expansion (taking into account physical and technological considerations) of storage to reduce the frequency, duration, and volume of peak wet weather diversions and the related costs;

Existing storage in the collection system is very limited and is not a viable option for storage of wet weather flows. The WWTF currently maximizes storage at its facility by maintaining available volume in an off-line aeration basin and primary clarifier. In September 2011, the City added use of the 1.6 MG SWRB to its WWTF operations at a cost of $6.5 million.

Depending on influent flow conditions, WWTF staff has been able to maximize the hydraulic loading of the aeration and secondary clarification systems up to 15.5 MGD. The process flow management strategies have helped to reduce the occurrence of wet weather diversions. Although hydraulic loading of 15.5 MGD has been successfully achieved, the secondary system is highly dependent on how well the activated sludge system reacts to increased loads. If the activated sludge system starts to become overwhelmed, the staff initiates diversions protect against a wash-out of biological mass or loss of function at the WWTF. Otherwise, SCADA set points are used to automatically begin diversion of influent flow into the SWRB.

e. Assess other ways to reduce peak wet weather flow volumes, such as limiting collection system extensions or slug loadings from indirect dischargers;

Due to the stable population growth in the service area and the lack of available land for new developments, the WWTF does not expect an appreciable number of new connections to be made in the near- and long-term future. There are no significant or categorical industrial users within the City of Burlingame and satellite service areas, so slug flows from indirect dischargers are unlikely.

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[11] California Department of Finance. *Interim Population Projections for California and its Counties 2010-2050*. Retrieved August 27, 2012, from http://www.dof.ca.gov/research/demographic/reports/projections/interim/view.php.

To reduce I/I and prevent SSOs in the collection system, the City has adopted and implemented several municipal codes governing private sewer laterals and requiring the installation of backwater reduction devices.

- Ordinance No. 1329 (Municipal Code Section 15.12.110; Private Sewer Lateral and Testing Procedure and Requirements) was adopted on July 7, 1986 and became effective August 7, 1986. Ordinance No. 1329 was further modified by Ordinance No. 1623 on March 23, 2000. The ordinances require that private laterals to the collection system be tested (Water Exfiltration or Air Test) and repaired prior to the sale of the property if the building was constructed 25 years or more before the date of sale. Additionally, any buildings with the addition of two or more plumbing fixtures must also have its laterals tested.
- Ordinance No. 1723 (Municipal Code Ordinance Section 15.12.110; Sewer Backwater Ordinance) requires that all property owners protect their property from possible sewer back-ups by installing drainage ejection devices or backwater valves and backwater relief devices.

The Town of Hillsborough has adopted a similar municipal code that regulates private laterals within the Town limits.

- Ordinance No. 702 was approved on June 12, 2012 which amends Chapter 13.32 of the Town municipal code. The Town is now authorized to inspect private laterals (at Town cost) and will provide property owners with financial assistance when repairing defective private sewer laterals. To implement the new terms, the Town will systematically begin smoke or dye testing to identify private laterals that are failing. Additionally, private laterals will be addressed whenever the Town begins rehabilitation or repair work on main lines connecting private laterals to the collection system. It is the responsibility of the property owner to correct any private laterals that are found to be insufficient.

f. Evaluate technologies (such as supplemental biological treatment, physical chemical treatment, ballasted flocculation, deep bed filtration, or membrane technology) that are or could be used to provide additional treatment to peak wet weather flows or peak wet weather diversions at the POTW treatment plant and the costs of implementing those technologies;

The WWTF completed upgrades to its facility during the previous NPDES permit period. The City invested $10 million to improve its treatment systems, biosolids handling and dewatering, and cogeneration facilities. Due to the limited space at the facility, further improvements to the facility may be cost-prohibitive.

g. Evaluate the extent to which the permittee is maximizing its ability to reduce I/I throughout the entire collection system (i.e., not only the portions operated by the utility, but also portions operated by any

municipal satellite community), including the use of existing legal authorities, potential improvement in the timing or quality of such efforts, and options for obtaining or expanding legal authorities to reduce I/I from satellite collection systems;

The City and its satellite agencies are Permitees under the Statewide General Permit for Sanitary Sewer Systems (Order No. 2006-003-DWQ) and are implementing their Sanitary Sewer Management Plans (SSMPs) according to the permit conditions.

The satellite agencies provide financial support to the City of Burlingame for improvements to the shared sewer collection and conveyance systems (see section entitled "**Current Treatment System and Capacity**"). Within the agreement with the Town of Hillsborough, the City reserves the right to reduce the flows allowed from the Town if excessive I/I in its collection system is found to be causing the WWTF to not meet water quality standards.

City of Burlingame

Since 2007, the City has conducted six collection system rehabilitation projects at a total of cost of more than $14 million:

- 2007: Burlingame Subdivision Sewer Rehabilitation, Phase 2.
    - $2 million
- 2008: California Drive/Oak Grove Sewer Rehabilitation, Phase 1.
    - $2.5 million
- 2009: California Drive/Oak Grove Sewer Rehabilitation, Phase 2.
    - $2.5 million
- 2010: 2009 City-wide Sewer Rehabilitation Program
    - $2 million
- 2011: 2010 City-wide Sewer Rehabilitation Program
    - $2 million
- 2012: Sanchez Bypass and Neighborhood Sewer Rehab, Phase 1.
    - $2.5 million

The City plans to several collection system improvements projects through 2018. These projects include:

- 2013 (Scheduled):
    - Sanchez Bypass and Neighborhood Sewer Rehab, Phase 2.
    - Sanchez Bypass and Neighborhood Sewer Rehab, Phase 3 & 4.
    - Burlingame Streetscape Project (Burlingame Ave.)
    - Estimated Cost**:** $3.7 million

- 2014 (Scheduled): 5-year top CIP priority projects described in the City's Wastewater Collection System Master Plan with additional City-wide sewer rehabilitation.
    - Estimated Cost**:** TBD.
- 2015 – 2018 (Scheduled): Neighborhood Sewer Rehabilitation (to be determined) and Special I/I Reduction Projects
    - Approximately 2-3 miles of sewer mains, manholes, and lower laterals to be rehabilitation every year.
    - Estimated Cost: Approximately $3-4.5 million per year.

Town of Hillsborough

The Town worked on the following capital improvement projects during 2011:

- Sewer Cleaning and Video Inspection (Phase A) - This project consisted of the cleaning and video inspection of approximately 34,732 LF (6.6 miles) of sewer mains. This project also included a total of 24 Grade 5 point repairs totaling 224 LF of pipe replacement. The total cost of this project was $184,962.
- Sewer Cleaning and Video Inspection (Phase B) - This project consists of the cleaning and video inspection of approximately 25,306 LF (4.8 miles) of sewer mains. This project also includes a total of 12 Grade 5 point repairs totaling 66 LF of pipe replacement. The cost of this project was $86,170.
- Sewer Cleaning and Video Inspection (Phase C) - This project consists of the cleaning and video inspection of approximately 38,189 LF (7 .2 miles) of sewer mains. This project also included a total of 62 Grade 5 point repairs totaling 532 LF of pipe replacement. The cost of this project was $483,926.

The Town continuously enforces the Municipal Code requirements for sewer lateral inspections. The Code requires private property owners to video inspect and repair their private laterals from their houses to mains at time of title transfers. The Town also requires property owners (that apply for building permits for substantial improvements to their homes) to inspect and repair their laterals. In 2012, over 120 private laterals were inspected and over 50 laterals have been required to be repaired or replaced as part of this program.

The Town also launched a sewer video inspection reimbursement program in 2009 as part of their approved Supplemental Environmental Project (SEP). Through the reimbursement program, the Town encourages private property owners to inspect their private laterals and replace the lines as advised by the Town upon review of the inspection tapes. The program provides monetary incentives to private owners who enrolled in the program including free video inspection and $500 reimbursement for those who replace their entire lateral. Over 300 private laterals have been

successfully inspected and 78% of those inspected were recommended to be repaired or replaced. Over 110 laterals have been replaced totaling approximately 7,300 LF. A total of $56,000 has been paid by the Town as reimbursements or grants to property owners who replaced their entire lateral.

The Town prepared the "Flow Monitoring and Modeling Report and Collection System Master Plan" for all tributary systems leading to the WWTF. Following the completion of the Collection System Master Plan, the Town developed a proposed five year CIP. This proposed CIP plan relates to Fiscal Year (FY) 2012-13 through FY 2016-17. The following is a list of projects that are planned in the next five years to resolve capacity deficiencies and reduce sources of I/I in the collection system:

- Ralston/Pepper Ave. Hydraulic Capacity Improvements - This project consists of upgrades for capacity deficiencies of approximately 3,000 LF of main line replacement. This project is estimated to cost $4.4 million.
- Priority Basins I/I Rehabilitation Program – This project consists of basin rehabilitation projects that are planned on approximately two year cycles. This project will be followed by additional flow monitoring studies to measure the effectiveness of the basin rehabilitation projects. This program is estimated to cost $13.9 million over the next five years for improvements throughout the Town's collection system.
- Sewer System Repair Grade 4 & 5 Defects Project - The Town has budgeted for a project to resolve all outstanding Grade 4 and 5 defects found during the video inspection projects. This project is planned for FY 2012-13 through 2013-14 and is estimated to cost $1.5 million.
- Smoke Testing and Video Inspection (Laterals) - Priority Basins- The Town is planning to implement a Smoke Testing program to reduce sources of I/I Town-wide. These projects are anticipated annually one year in advance of any future basin rehabilitation projects. The program is estimated to cost $900,000 over the next five years.

The Town recently amended its Municipal Code to include rehabilitation of lower laterals as part of each sewer main rehabilitation project. The Town will provide incentives to the homeowners to encourage the replacement of the upper laterals during the basin rehabilitation projects. The Town's efforts to replace the lower laterals and provide incentives to the homeowners in priority basins are anticipated to be an effective tool to continue to reduce I/I throughout the collection system.

Burlingame Hills Sewer Maintenance District

The District completed CCTV inspections in 2008, 2009, and 2010. Thirty-one reaches, totaling 4,960 feet, were inspected and structural or maintenance defects were identified on 23 reaches. Defects were corrected through cleaning or repair on six reaches since inspection, including the replacement of 240 LF of pipe during 2009 and 19 spot repairs during 2009 and 2010. As of June 2012, the District has completed CCTV inspections of the entire collection system (approximately 35,000

LF) and will perform spot repairs or replacement of reaches with broken/hole or multiple fractures defects that are PACP Condition Grade 4 or 5. The defect severity will dictate the rehabilitation schedule.

h. Evaluate peak flow reductions obtainable through implementation of existing Capacity, Management, Operations, and Maintenance (C-MOM) programs and potential improvements in the timing or enhancement of those programs and related costs; or, if no such program exists, reductions obtainable through the development and implementation of a C-MOM program and the related costs;

The City and its satellite agencies do not have documented C-MOM programs, they follow either their wastewater collection system master plans or Sewer System Management Plans (SSMPs). These programs are discussed in **items b and g** and include on-going repair, replacement, rehabilitation, cleaning, and maintenance projects that each collection system will conduct to reduce I/I, and thus, reduce the need for wet weather diversions.

i. Assess the community's ability to fund the peak wet weather flow improvements discussed in the utility analysis, taking into consideration: current sewer rates, planned rate increases, and the costs, schedules, anticipated financial impacts to the community of other planned water and wastewater expenditures, and other relevant factors impacting the utility's rate base, using as a guide EPA's CSP Guidance for Financial Capability Assessment and Schedule Development, EPA 832-B-97-004;

The City of Burlingame and Burlingame Hills share the same sewer rate structure. The current rates, as of January 1, 2012, are presented in **Table 5**.

Table 5. City of Burlingame and Burlingame Hills Current Sewer Rates

Sewer Rates (per 1,000 gallons of water usage)	
Residential (Jan-Apr)	$12.25
Multi Unit	$11.45
Light Commercial	$13.53
Heavy Commercial	$21.97
Food Related	$32.59

The Town of Hillsborough bills its citizens a flat annual sewer rate. The current rates, as of July 1, 2011, are presented in **Table 6**.

Table 6. Town of Hillsborough Current Sewer Rates

	Annual Sewer Rate
Residential	$1,774
Hillsborough Racquet Club	$2,484
Cal Trans Rest Stop	$4,435
Crystal Springs Upland School	$13,482
Burlingame Country Club	$26,787
Crystal Spring Golf Club	$11,354
Hillsborough School District	$16,676
Nueva School	$4,612

Planned or recent rate increases and other relevant factors impacting rates for the City and its satellite service areas are described in the following sections.

City of Burlingame

The City has a Sewer Enterprise Fund that is utilized for salaries and benefits, operating expenses, and capital outlay. The City charges a sewer service fee to its satellite service areas. That fee is embedded in the sewer service charge that each satellite entity bills to its customers. The City's sewer rates are 100% usage-based. An average single family residence pays the equivalent of $50.48 per month. The City Council is currently considering if increasing capital improvement costs for its sewerage system will warrant a rate increase in 2012.

Using the EPA's Combined Sewer Overflow (CSO) Guidance for Financial Capability Assessment and Schedule Development, EPA 832-B-97-004 as a guideline, the following information was prepared for the City's service area:

1. Total annual wastewater and SSO control cost per household as a percent of median household income: $ 50.48 /mo. x 12 mos/yr ÷ $74,154 (median household income) x 100% = 0.82%
2. Bond ratings: AA+
3. Unemployment rate: 4.9 %[12]
4. Median household income: $74,154 +/- $6,467 [13]
5. Property tax revenue collection rate (City of Burlingame): 102.08%[14]
6. Property tax revenues as a percent of full market property value (City of Burlingame): 0.145 %

[12] Based on May 2012 Bureau of Labor Statistics Data (http://www.bls.gov/lau/#data)

[13] U.S. Census – Median Income for Burlingame (http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml)

[14] Greater than 100% because the City utilizes the Teeter Plan.

Town of Hillsborough

The Town's current annual sewer residential fee is $1,898 (effective July 1, 2012) with a 7% annual increase through FY 2015-16 (to reach a maximum annual charge of $2,325).

Using the EPA's CSO Guidance for Financial Capability Assessment and Schedule Development, EPA 832-B-97-004 as a guideline, the following information was prepared for the Town's service area:

1. Total annual wastewater and SSO control cost per household as a percent of median household income: $158.17/mo. x 12 mos/yr ÷ $209,231 (median household income) x 100% = 0.91%
2. Bond ratings: AA+ (Fitch) and AAA (Standard and Poor's)
3. Unemployment rate (Countywide statistics): 7.4 %
4. Median household income: $209,231
5. Property tax revenue collection rate (Countywide statistics): 99.15%
6. Property tax revenues as a percent of full market property value (Countywide statistics): 1.02%

Burlingame Hills Sewer Maintenance District

The District increased the sewer service rate per equivalent residential unit (ERU) from $812 in FY 2007-08 to $950 per ERU in FY 2008-09 to $1,150 per ERU in FYs 2009-10 and 2010-11 to $1,595 per ERU in FY 2011-12. The District's current annual sewer residential fee for FY 2012-13 remains at $1,595. The District will evaluate this rate during FY 2012-13 to determine if an increase is necessary.

Using the EPA's CSO Guidance for Financial Capability Assessment and Schedule Development, EPA 832-B-97-004 as a guideline, the following information was prepared for the Town's service area:

1. Total annual wastewater and SSO control cost per household as a percent of median household income: $132.92/mo. x 12 mos/yr ÷ $85,648 (median household income) x 100% = 1.86%
2. Bond ratings: Aa3 (Moody's) and AA (Standard and Poor's)
3. Unemployment rate (Countywide statistics): 7.4 %
4. Median household income (Countywide statistics): $85,648
5. Property tax revenue collection rate (Countywide statistics): 99.15%
6. Property tax revenues as a percent of full market property value (Countywide statistics): 1.02%

j. Propose a protocol for monitoring the recombined flow at least once daily during diversions for all parameters for which the POTW treatment plant has daily effluent limitations or other requirements (e.g., monitoring only requirements) and ensures appropriate representative monitoring for other monitoring requirements of the permit, the total volume diverted, and the duration of the peak wet weather diversion event; and

The City of Burlingame currently adheres to its Wet Weather Standard Operation Procedures (SOPs) for dealing with high influent flows during wet weather events. The document details steps for preparing for an anticipated storm event, the appropriate facility and treatment responses for increasing influent flows, when to use blending and/or emergency outfall discharges , and the required reporting and monitoring when blending and emergency outfall discharges occur.

As specified the San Francisco Bay Regional Standard Provisions and Monitoring and Reporting Requirements,[15] composite samples are collected at the effluent compliance point for the length of the blending event in 24-hour or less increments. Grab samples are collected daily at the effluent compliance points for the length of the blending event. The composite and grab samples are preserved and properly retained for future analysis. An aliquot of the composite sample is analyzed immediately for total suspended solids (TSS). An aliquot of the grab sample is analyzed immediately for Fecal Coliform and enterococcus. If the TSS result exceeds 45 mg/L, the retained samples are analyzed for all constituents with effluent limits except oil and grease, mercury, dioxin-TEQ, and acute/chronic toxicity. All retained samples comply with holding time requirements. The SCADA system will continuously monitor and record flow, pH, and chlorine residual for the duration of the blending event. Once a year, the retained samples for one approved blending event are analyzed for all constituents with effluent limits, except oil and grease, mercury, dioxin-TEQ, and acute/chronic toxicity.

k. Project the POTW treatment plant effluent improvements and other improvements in the collection system and the treatment plant performance that could be expected should the technologies, practices, and/or other measures discussed in the utility analysis be implemented.

The City and the satellite agencies are currently implementing their respective capital replacement programs which are expected to significantly reduce the volume of I/I and the probability of wet-weather blending events. The details of these plans are discussed in **items b and g** of the preceding analysis.

Upgrades to the current WWTF are not planned due to the limited space available at the plant. Additionally, the WWTF completed significant upgrades to its facility during the current NDPES permit period. This includes the addition of a 1.6 MG

[15] NPDES Permit Attachment G, Order No. R2-2010-0054.

SWRB, which has been proven to be an effective tool in reducing blending events and use of the emergency outfall during extreme wet weather events.

The City anticipates that by continuing I/I reduction efforts in the WWTF service area, improving wet weather storage management at the WWTF, and improving internal processes at the WWTF, the need for blending and discharge from the emergency outfall will be reduced in the future.

CONCLUSIONS

Peak wet weather flow diversions are needed at the City of Burlingame WWTF to protect operation of the existing secondary treatment system. Flowrates above 13 MGD, the reliable process capacity of the secondary system, may cause diversion and blending of primary and secondary effluent prior to disinfection and disposal. Limiting flows through the secondary system ensures the microbial population remains constant and is critical in preventing the exceedance of permit limits for total suspended solids, Biochemical Oxygen Demand (BOD), and indicator bacteria concentrations.

During wet weather events, the WWTF is run at peak secondary treatment capacity, producing the highest quality effluent that is possible under existing conditions. The WWTF operations staff strives to minimize peak wet weather flow diversions and use of the emergency outfall. Important collection system rehabilitation efforts are underway and will continue to take place as part of the capital improvement/replacement programs for the City of Burlingame, the Burlingame Hills Sewer Maintenance District, and the Town of Hillsborough. These improvements will not completely eliminate I/I in the collection system, but they are expected to significantly reduce wet weather diversions and bypasses to the emergency outfall. Based on the findings presented in this analysis, the City is requesting approval in the reissued NPDES permit to utilize wet weather blending and bypasses during very large storm events.

The City has assessed possible alternatives for reducing the volume, duration, and occurrence of peak wet weather flow diversions. The results of this assessment indicate the City should maintain its current approach to reduce wet weather blending (conduct collection system improvements and use available on-site storage options at the WWTF). The City proposes to implement the actions listed in **Table 7** during the upcoming NPDES permit term.

Table 7. Tasks to Improve Wet Weather Management and Reduce Blending

Task	Targeted Completion Date
The City will, in cooperation with the satellite agencies, develop a comprehensive Wet Weather Improvement Plan that establishes measurable goals to minimize blending due to wet weather events. At a minimum, the City will undertake the following specific projects identified in the 2011 Collection System Master Plan: • Sanchez Bypass and Neighborhood Sewer Rehab (Phase 2, 3, 4) • Burlingame Streetscape Project (Burlingame Ave.) • 2014 CIP Priority Projects • 2015-2018 Neighborhood Sewer Rehabilitation Projects • 2015-2018 Special I/I Reduction Projects	[within 6 months of permit effective date]
The City will submit a Wet Weather Improvement Program Progress Report. This report will evaluate and report on the implementation and effectiveness of its Wet Weather Improvement Plan annually.	Annually with Annual Self Monitoring Report
The City will report any trends in the number and length of private sewer laterals replaced or repaired, and significant changes to existing private sewer lateral programs by the satellite agencies. The City will submit this report as part of the Wet Weather Improvement Program Progress Report.	Annually with Annual Self Monitoring Report
The City will monitor, or otherwise estimate, flows from satellite agencies collection systems to quantify the I/I attributable to each agency. The City will submit this report as part of the Wet Weather Improvement Program Progress Report.	Annually with Annual Self Monitoring Report
The City will request information from all satellite agencies regarding existing and future capital improvement activities intended to reduce I/I. The City will annually report the information it receives and encourage additional activities, if appropriate. The City will describe its efforts to encourage improvement in its reports. The City will submit this report as part of the Wet Weather Improvement Program Progress Report.	Annually with Annual Self Monitoring Report
If the City seeks to continue to bypass peak wet weather flows around the secondary treatment units based on 40 CFR 122.41(m)(4)(i)(A)-(C) past the upcoming permit term, the City will conduct another No Feasible Alternatives Analysis. The analysis will account for efforts by satellite agencies to reduce I/I to the extent that information is available. In addressing these elements, the No Feasible Alternatives Analysis will specifically contain an alternatives analysis for blending reduction to evaluate strategies to further reduce blending. The City will select feasible actions based on factors including, but not limited to, the need to blend (considering the effectiveness of the collection system and treatment plant improvement projects), the foreseeable impact on the need to blend, and estimated costs relative to the City's ability to finance the costs. The No Feasible Alternatives Analysis will include a feasible timeline for steps leading to implementation of the preferred alternative strategy.	With Report of Waste Discharge [due 6 months before permit expiration]