

**SUPPLEMENTAL ENVIRONMENTAL PROJECT –
QUANTIFYING THREAT TO WATER QUALITY FROM
SEWAGE SPILLS FROM PRIVATE PROPERTIES AND
LATERALS AND PROPOSED CONTROL MEASURES IN
THE SANTA ANA REGION OF ORANGE COUNTY**

Prepared for:

Orange County Sanitation District

10844 Ellis Avenue
Fountain Valley, California 92708-7018
Contact: Ann Crafton, SR/WA

Prepared by:

DUDEK
750 Second Street
Encinitas, California 92024
Contact: Steve Jepsen

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**Quantifying Threat to Water Quality from Private Property
and Lateral Sewage Spills
May 2002 through December 2006**

TABLE OF CONTENTS

<u>Section</u>	<u>Page No.</u>
EXECUTIVE SUMMARY	1
PURPOSE.....	3
BACKGROUND	3
DATA ACQUISITION AND ANALYSIS	3
OCHCA Data	4
Region 8 Data	5
EXCLUSIONS.....	7
BEACH CLOSURES.....	7
FINDINGS	8
PATTERNS	12
EXISTING LOCAL PROGRAMS	13
BEST MANAGEMENT PRACTICES.....	14
Educational Outreach.....	15
Fats, Oils and Grease Reduction Program	16
Inspection After An Overflow	18
Public Agency Notification to Property Owners	18
Scheduled Reoccurring Lateral Inspections.....	19
Scheduled Lateral Inspections Based Upon Remodels.....	19
Lateral Inspection Upon the Sale or Transfer of Property	20
Certification Program for Licensed Plumbers	20
Financial Assistance Programs	21
IMPLEMENTATION OF BMPS.....	21
SYNOPSIS	23
APPENDICES.....	26
ACKNOWLEDGEMENT.....	28

Quantifying Threat to Water Quality from Private Property and Lateral Sewage Spills May 2002 through December 2006

LIST OF TABLES

Table 1 Summary of Private Property Spills in Region 8, Orange County May 2002 - December 2006	9
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LIST OF APPENDICES

A	Modified Master Private Property Spills 2002–2006 Sorted by Agency
B	Modified Master Private Property Spills 2002–2006 Sorted by Date
C	Modified Master Private Property Spills 2002–2006 Sorted by Cause
D	Modified Master Private Property Spills 2002–2006 Sorted by Property Type
E	Modified Master Private Property Spills 2002–2006 Sorted by Impact
F	Modified Master Private Property Spills 2002–2006 Sorted by Beach Closure
G	Initial Summary Analysis
H	Region 8 and 9 Orange County Boundary Line
I	City of La Palma Sewer Ordinance
J	Private Property BMP Ranking
K	CR&R Waste & Recycling Services Letter
L	City of Santa Barbara Private Lateral Policy
M	City of Berkeley Private Lateral Policy
N	City of Burlingame Private Lateral Policy
O	City of Pacific Grove Certified Plumbers List

Quantifying Threat to Water Quality from Private Property and Lateral Sewage Spills May 2002 through December 2006

EXECUTIVE SUMMARY

Because of concerns for the potential of private property sewage spills to result in threats to the environment and to the public health as well as economic loss from beach closures, the Santa Ana Regional Water Quality Control Board, Region 8 provided a supplemental environmental projects grant to the Orange County Sanitation District to conduct a study on private property sewage spills. The intent of the study was to determine if the frequency and spill volume from private property spills is a significant threat to the environment. If the threat was considered to be significant, the study would determine best management practices to reduce private property spills and their impact.

The portion of Orange County within Region 8 was chosen for the study. This area was chosen as the dischargers had been under waste discharge requirements imposed by Region 8 since April 26, 2002. The waste discharge requirements required reporting of all sewage spills, public and private, of any volume, to the Santa Ana Regional Water Quality Control Board. These spill reports along with spill reports filed with the Orange County Health Care Agency were the basis for the private property spill study.

To assist in the private property spill study, the Orange County Sanitation District contracted with Dudek Engineering. A committee was formed comprised of individuals from Orange County Sanitation District, Dudek and Ken Theisen of the Santa Ana Regional Water Quality Control Board staff to review the analyzed data, rate the best management practices and ensure the study met the established goals of the supplemental environmental project.

The Santa Ana Regional Water Quality Control Board staff provided spill reports from all of the Region 8 dischargers who reported from May 2002 through December 2006. The Orange County Health Care Agency provided its private property spill reports and beach closure reports from the same geographical area and time period. These reports were analyzed to eliminate duplicates and any spills from public agencies. They were then categorized to determine spill cause, property type, location, impact on receiving waters and resulting beach closures.

Based upon the analyzed data, it was determined that the primary threat from private property spills came from multifamily residential dwellings with grease being the primary cause for these spills. It was also determined that these private property spills result in beach closures at approximately the same rate as public agency spills. The data also indicated that although public agency spills were tending to decline during the study period, private property spills tended to increase. Based upon the analyzed data, the committee determined that private property spills are significant and best management practices for their reduction should be employed.

Quantifying Threat to Water Quality from Private Property and Lateral Sewage Spills May 2002 through December 2006

Nine best management practices were developed to address private property spills. The best management practices were ranked by the committee for their effectiveness in addressing the issue, feasibility and cost. Of the nine, one was considered the most effective and recommended for implementation. This best management practice involves the closed circuit television inspection of the private sewer lateral within a specified number of days following an overflow. The committee recommended the remaining eight best management practices as alternatives for future use. The committee further recommended the best management practices only be applied to multifamily residential dwellings as the potential threat from these spills far exceeds those from single-family residential dwellings. Commercial spills are almost entirely from food service establishments who are currently under fats, oil and grease reduction programs through their local sewerage agencies.

Implementation of the best management practices would initially be voluntary in cooperation with the local sewerage agencies. Should the desired effect not be achieved, the Santa Ana Regional Water Quality Control Board may need to develop waste discharge requirements, similar to those in place for public sewerage agencies, for multifamily residential dwellings to ensure proper maintenance and operation of these private sewer systems, thus reducing the potential for sewage spills.

Quantifying Threat to Water Quality from Private Property and Lateral Sewage Spills May 2002 through December 2006

PURPOSE

The purpose of this private property sewage spills study is to determine the impact that spills had on the environment from May 2002 through December 2006. The Santa Ana Regional Water Quality Control Board, Region 8 initiated the study through a grant issued to the Orange County Sanitation District (OCSD). A private property sewage spill is one that occurs on private property due to a blockage, failure or overflow of the private sewer lateral that serves that property. A sewage spill that occurs on private property due to a blockage or failure of the public sewer system is not a private property sewer spill. Only private property sewage spills were considered for this study.

The study was conducted in two phases. In Phase One, spill data was collected, organized, and analyzed from all reported sewer spills that occurred in Orange County within the jurisdiction of the Region 8 Board. In Phase Two, effective best management practices (BMPs) were developed to reduce private property sewer spills if in Phase One the spills were shown to cause a significant threat to the environment.

BACKGROUND

In May 2002, the Region 8 Board adopted General Waste Discharge Requirements (WDR) for all publicly owned sewage collection systems within Region 8. Based upon the Capacity, Management, Operations and Maintenance (CMOM) regulations adopted by the Environmental Protection Agency, Region 4, the WDR required affected agencies to develop a Sewer System Management Plan (SSMP) and required the reporting of all (public and private) sanitary sewer overflows (SSOs). Reporting timelines and requirements for public spills were based upon the severity of the spill, with private spills being reported on a monthly summary as the agency became aware of them. The WDR did not require the public agencies to take responsibility for private property spills other than to report them if they became aware of them.

The Region 8 WDR was implemented on April 26, 2002, with a new element required approximately every six months. These elements, which constitute the SSMP, included establishing system goals; legal authority; system maintenance program; emergency response plan; a fats, oils and grease reduction program; a system evaluation and capacity assurance program; a communications program; and a dedicated source of funding. The goal was to establish a minimum standard for the operation and maintenance of Region 8 collection systems in Orange County.

DATA ACQUISITION AND ANALYSIS

The Orange County Health Care Agency (OCHCA) and Region 8 provided the data used in this study. To review and analyze the data, a committee was formed with members from OCSD and

Quantifying Threat to Water Quality from Private Property and Lateral Sewage Spills May 2002 through December 2006

Dudek and Ken Theisen from Region 8. Regularly scheduled meetings were held to review progress and make decisions based upon the data received and reviewed.

OCHCA Data

Larry Honeybourne from OCHCA was contacted and asked to provide data on all private property spills reported to the OCHCA from May 2002 through December 2006 within the Region 8 area. OCHCA provided a Microsoft Excel spreadsheet extending from September 27, 1999, to July 24, 2007. The spreadsheet was found to also contain some data from South Orange County, Region 9. A modified spreadsheet was created that only included data from May 2002 through December 2006. Entries that were obviously in Region 9 (San Clemente, Dana Point, Laguna Beach, etc.) were removed. Those entries that were in the service areas of Irvine Ranch Water District (IRWD) and the El Toro Water District (ETWD) were left in, as these agencies have jurisdiction in both Regions 8 and 9. This overlap may account for some of the spill reports from OCHCA that do not appear on either IRWD or ETWD Region 8 spill reports.

The OCHCA spill spreadsheet was also found to have numerous duplicated reports. One entry was repeated four times, and almost all of the entries from the cities of La Habra and La Palma were entered twice. The OCHCA spreadsheet was also incompatible with the reporting format used by most of the Region 8 dischargers. To rectify this, a new spreadsheet was created and patterned after the one used for the Region 8 data. Data records from the OCHCA spreadsheet were cut and pasted into the new spreadsheet. "N/A" was placed in the data fields where data was unavailable from the OCHCA spreadsheet. This spreadsheet was then added to the Master Monthly Report worksheet that is broken down by reporting agency. To eliminate duplicate reports, each data record on the OCHCA spreadsheet was compared to data records on the Master Monthly Report worksheet. Date of spill, spill volumes, spill address, and other pertinent data was compared. If an OCHCA data record in the Master Monthly Report worksheet contained a spill report that was duplicated by another reporting agency, that data record was removed from the OCHCA section of the Master Monthly Report worksheet. The remaining data records in the OCHCA section of the Master Monthly Report worksheet are spill reports reported to the OCHCA but apparently not to Region 8. Of the 310 spill reports on the original OCHCA spreadsheet extending from May 2002 through December 2006, 231 were removed for being duplicate reports or having been reported by another agency in Region 8. Lastly, 79 spill reports remain as not having been reported to Region 8 (several of the spill reports reported to OCHCA may actually be in Region 9 but are close to the boundary between Regions 8 and 9).

In addition to the report submitted by OCHCA, the Beach Closure Reports for years 2002 through 2006 were used to determine how many private property spills resulted in Orange County beach closures. The reports are compiled by the OCHCA and are available online. Upon review of the Beach Closure Reports, several new spills were found that were not listed in either

Quantifying Threat to Water Quality from Private Property and Lateral Sewage Spills May 2002 through December 2006

the reports from the individual agencies of Region 8 or the OCHCA submitted report or that were listed but not marked as private property spills. These spills were added to the data being analyzed and are shown in *Appendix F*.

Region 8 Data

The original data received from Region 8 was insufficient to conduct this study. Due to a major computer failure at the Region 8 office, only about 30% of the data originally sent to the regional office by the Orange County cities and districts was available, and some of that appeared to be corrupted. None of this data was used in this study. To remedy this problem, Region 8 requested that all of the cities and districts in the Orange County portion of Region 8 resubmit their May 2002 through December 2006 summary reports via email to the regional office. Once received, the data was forwarded to Dudek for use in this study.

In 2002, as Region 8 was getting its WDR prepared for adoption, OCSD formed a WDR Steering Committee, comprised of select agency representatives from its member agencies. This group was charged with assisting the WDR permittees in complying with the new order by developing policies, procedures, models, and templates necessary for the development and implementation of the SSMP. To assist in this effort, OCSD developed an Excel spreadsheet that was comprised of 47 different data fields for each spill report or spill record. This spreadsheet satisfied the reporting requirements of the new WDR and was provided as a template for use by OCSD's member agencies. Use of the template was voluntary.

Of the data that was supplied by Region 8 for this study, only about half of the agencies utilized the OCSD template (or some close derivative) for their summary report. Of these, some of the agencies provided a single spreadsheet that summarized all spills from May 2002 through December 2006; others provided individual monthly or yearly reports that had to be summarized. A couple of agencies had locked their spreadsheets or had omitted several months of data. These agencies were contacted, and they provided the missing or unlocked data. For those agencies that chose not to use the OCSD template, or who were not OCSD member agencies, data was provided in Excel, Microsoft Word tables, or single spill reports in Microsoft Word format. Because of this, the data provided was inconsistent between agencies. Some agencies were very detailed in their reporting, while others were very limited in the information provided.

To provide an accurate analysis, data had to be placed into a consistent format. To assist with this, a progress meeting was held at OCSD on November 7, 2007 to discuss the preliminary data and determine the most appropriate data for the study. A modified version of the OCSD template was chosen as the format. The number of data fields was reduced from 47 to 18 to make the data more manageable while eliminating those fields that were not directly related to private property spills. At this meeting, it was also determined that the spills should be categorized based upon

Quantifying Threat to Water Quality from Private Property and Lateral Sewage Spills May 2002 through December 2006

their cause and the type of property involved in the spill. Spill causes consisted of Unknown, Grease, Roots, Debris, Grease and Roots, and Structural. The property types selected were: Unknown, Single-Family Residential, Multifamily Residential, Commercial, and Institutional/Public. Spill causes and property types are further defined in the Appendices section of this report.

To prepare the data for analysis, each agency was given its own folder containing the data provided by Region 8 for that agency. A private property spill spreadsheet was created based upon the 18 chosen data fields, with a copy placed in each agency folder. Each spill record was reviewed to determine if a spill report was private or public. If the “Responsible Party” field indicated that the spill was private, it was categorized as such. If the “Responsible Party” field indicated that the agency was responsible, the remaining data, “Likely Cause of SSO,” “Overflow Cause Detailed Description,” “Remarks,” and other fields were reviewed to determine if the spill was public or private. This was done in a copy of each agency’s spill report so that the original data would remain intact. If the agency already had a summary spreadsheet for all of its spills during the study period, the private property spills were cut and pasted into the new private property spills spreadsheet. If the agency submitted its data by month or year, a single summary spreadsheet was created. Data from that spreadsheet was then cut and pasted into that agency’s private property spreadsheet. If the agency utilized some different format for reporting the private property spills, spill data was extracted and pasted into the private property spreadsheet, trying to match the required data fields as closely as possible. The cut-and-paste method was used to transfer data and reduce the potential of data error due to data reentry.

Midway City Sanitation District (MCSD) submitted its data as individual spill reports in Microsoft Word. Each report was reviewed to determine if it was a private or public spill. Data was extracted from the private property spill reports and entered into the private property spill spreadsheet created for MCSD. Likewise, IRWD's submission utilized Microsoft Word tables that had to be converted into the Excel private property spreadsheet.

Once each agency, including OCHCA, had a populated private property spill spreadsheet that reflected all private property spill reports from that agency, a Master Monthly Report worksheet was created. The Master Monthly Report worksheet contains all of the private property spill records, broken down by agency. The Master Monthly Report worksheet is part of the “MODIFIED MASTER Monthly SSO (Private Property Overflow Only) Reports 2002 to 2006-REVIEWED-7.xls” file included as *Appendix A* of this report and is the basis for the spill analysis that was conducted.

Quantifying Threat to Water Quality from Private Property and Lateral Sewage Spills May 2002 through December 2006

EXCLUSIONS

Certain data was excluded even though it was reported as private property spills. Spills that were caused by construction accidents (e.g., a contractor drilled through or broke the sewer line or failed to remove the bulkhead prior to putting a line in service) were not included in the study. Likewise, spills involving recreational vehicles dumping their holding tanks on public streets or parking lots, or spills involving the vandalism of Port-A-Potties, were omitted. There were less than a dozen of these types of spills reported during the period from May 2002 through December 2006. Spills that were reported in the harbor involving boats and the pump-out facilities were also excluded. BMPs for these types of spills are already in place.

Not all cities and districts that responded to Region 8's request for data are found in the study. The city of Sunset Beach verbally reported that they did not have any spills during the study period. Villa Park verbally reported that they only had one spill during the study period but did not include information about the spill. The city of Yorba Linda is listed in the study but includes no data, as the data they provided only include date, address, and spill volume for six spills, with no indication of the spills being public or private. For this reason, they were all considered to be public spills.

The city of Buena Park and the Garden Grove Sanitary District (GGSD) provided only limited information about their spills. The only data fields provided were spill date, responsible party, whether the spill entered receiving waters, spill volume lost and spill volume recovered. Addresses and other data that appear for these two agencies are actually from the OCHCA's spill reports that were matched during the analysis process. To avoid large areas of blank space on the worksheets, "N/A" was added to denote that the data field was reviewed but no data was present.

The city of Cypress provided data similar to the city of Buena Park and GGSD but included the addresses of its private property spills. The city of Orange also provided an abbreviated report similar to those mentioned but noted probable cause of the spill when it was known.

The study only examines spills that originated on private property. It does not consider spills that occurred in a public system that were a result of the activities of the private property owner. Some examples are grease, debris, or root balls forced into the public system through the cleaning or unblocking of private laterals. There is insufficient data in the reports to comment on the number or volumes released from this type of spill.

BEACH CLOSURES

OCHCA will close beaches that exhibit high bacteria levels caused by sewer spills or stormwater runoff. OCHCA posts information for public viewing on its Orange County Beach Info website (<http://www.ocbeachinfo.com/>) as part of its Ocean Water Protection Program. Annual reports of

Quantifying Threat to Water Quality from Private Property and Lateral Sewage Spills May 2002 through December 2006

beach closures are available on the website from 1999 to present. These reports give a brief description of the reason for the beach closure, the dates of the closures, the number of days the beach was closed, and the beach mile days. Beaches that are closed as a result of sewage spills are normally closed for a minimum of three days. It takes 24 hours to process a water sample. Samples taken the day of the spill are not processed until the next day. If the sample exceeds ocean water quality standards, a second sample is taken that will not complete processing until the next day. The beach will remain closed until the bacteria levels meet ocean water quality standards.

Beach mile days are used by the OCHCA and others as a performance indicator to determine what effect sewage spills and other forms of pollution have on the beneficial use of the Orange County coastline. Beach mile days are a calculation of the linear footage (percent of a mile) of beach that is affected multiplied by the number of days the beach remains closed. For example, if one mile of beach is closed for one day, the result is one beach mile day. The amount of beach that is closed due to a sewage spill depends on several factors. These include: the volume of the spill; where the spill entered the water the geography and location of the beach; ocean currents and tides; OCHCA guidelines, etc. Not all sewage spills result in a beach closure. When a sewage spill is reported to the OCHCA, officials will consider the drainage of the watershed and its course to the ocean, the volume of the spill, the location of spill, OCHCA guidelines, and other factors to determine the probability of the sewage spill impacting the ocean beaches. A sewage spill occurring in a beach city is more likely to result in a beach closure than the same size sewage spill occurring in an inland city.

FINDINGS

Table 1 summarizes the information obtained from the private property spill analysis. The details of each spill are available in the Appendices. The volumes listed in *Table 1* are in gallons and have been rounded to the nearest whole number. Percentages have also been rounded to the nearest whole percent. For the purpose of calculation, when spill volumes were reported as a range, the average of the range was used as the spill volume. If a greater than (>) or less than (<) symbol preceded a spill volume in the spill report, the symbols were omitted and only the spill volume used, as all spill volumes are considered to be estimates.

(Special note: Since not all of the cities and districts utilized the OCSD template or did not account for wash water, it is assumed wash water amounts are included in the amount lost and recovered data.)

Quantifying Threat to Water Quality from Private Property and Lateral Sewage Spills May 2002 through December 2006

Table 1
Summary of Private Property Spills in Region 8, Orange County
May 2002 - December 2006

Approximate number of spills occurring in OC/R-8 5/2002-12/2006	1,403
Number of private property spills (PP) reported (R-8 & OCHCA - minus duplicate reports)	689
Percentage of PP spills to total spills	49%
Total PP spills reported to OCHCA	310
Number of spills reported to OCHCA but not to R-8	79
Number of private property spills reported by year	
2002 (partial)	104
2003	141
2004	113
2005	163
2006	168
Private property spill volumes in gallons	
Total PP spill volume (volume lost + volume recovered + ww lost)	407,078
Spill volume lost	208,254
Spill volume recovered	149,389
Wash water recovered	129,007
Wash water lost	49,435
Private property spill volumes by year in gallons	
Total PP spill volume (volume lost + volume recovered + ww lost)	
2002 (partial)	68,126
2003	104,329
2004	58,406
2005	73,379
2006	102,838
Total private property spill volume lost by year in gallons	
2002 (partial) (volume lost + ww lost)	46,504
2003	78,856
2004	40,713
2005	36,849
2006	54,767

Quantifying Threat to Water Quality from Private Property and Lateral Sewage Spills May 2002 through December 2006

Table 1 (Cont.)

Private property spills that reached surface waters		
Total number of spills to reach surface waters		115
Percent to total number of spills		8%
Total spill volume to reach surface waters in gallons (volume + ww lost)		95,542
Total PP spills to reach surface waters by year	Number	Volume
2002	23	17,331
2003	20	24,686
2004	18	15,613
2005	22	14,067
2006	32	23,845
Private property spills causing a beach closure		
Total number of spills that resulted in a Beach Closure		25
Total spill volume that resulted in a Beach Closure (volume + ww lost)		19,990
Beach Closures by Days and Miles of Impact	Days	BMD
Total number of days closed and beach mile days (BMD).	71	8.97
2002	25	3.00
2003	14	2.90
2004	9	1.00
2005	10	0.38
2006	13	2.07
Private property spills listed by cause		
Total private property spills by cause and volume (lost + recovered)	Number	Volume
Unknown	253	78,808
Grease	240	132,477
Roots	68	73,641
Debris	57	19,783
Grease & Roots	16	14,824
Structural	55	38,115
PP spills involving a grease trap or interceptor	28	5,923
Private property spills by property type		
Total PP spills by property type and volume (lost + recovered)	Number	Volume
Unknown	127	34,297
Single-family	73	2,831
Multifamily	215	208,892
Commercial	268	104,533
Institutional/Public	6	7,090

Quantifying Threat to Water Quality from Private Property and Lateral Sewage Spills May 2002 through December 2006

Table 1 (Cont.)

Private property spills with known causes by property type		
	Number	Percent
Single-family residential		
Known cause	38	53%
Grease	4	11%
Roots	17	45%
Debris	9	24%
Structural	8	21%
Multifamily residential		
Known cause	155	72%
Grease	91	59%
Roots	25	16%
Debris	18	12%
Structural	17	11%
Commercial		
Known cause	205	76%
Grease	147	72%
Roots	14	7%
Debris	20	10%
Structural	24	12%
Private property spill averages		
Private property spill averages in gallons		Volume
Average size private property spill		591
Average size private property spill lost to environment		374
Average amount of sewage recovered per spill		217
Average size PP spill due to unknown cause		311
Average size PP spill due to grease		552
Average size PP spill due to roots		1,083
Average size PP spill due to debris		347
Average size PP spill due to grease & roots		927
Average size PP spill due to structural cause		693
Average size PP spill from a single-family residence		39
Average size PP spill from a multifamily residence		972
Average size PP spill from a commercial establishment		390
Average size PP spill from a institutional/public establishment		1,182
Average amount of spill to reach surface waters		831

Approximately 1,403 spills occurred in Region 8 during the period that the Region 8 WDR was in force. Of these, 689 spills (49%) were reported as private property spills. This does not include approximately a dozen spills that were a result of construction accidents, spills occurring

Quantifying Threat to Water Quality from Private Property and Lateral Sewage Spills May 2002 through December 2006

at the harbor involving vessel pump-out facilities, recreational vehicle dumping, or vandalism involving Port-A-Potties.

The highest number of spills reported was in 2006 (168 spills). The highest spill volume (104,329 gallons) and the highest spill amount to reach surface waters (24,686 gallons) occurred in 2003. Of the spills to reach surface waters, 25 (19,990 gallons) resulted in 8.97 beach mile days and 71 days of beach closures. The highest year for beach closures was 2002 (partial year), with 25 days of closure and 3.00 beach mile days.

The primary cause of private property spills was grease. There were 240 spills that caused a release of 132,477 gallons of wastewater for which grease was the primary cause or a contributing factor. There were 28 spills from grease traps or interceptors which released 5,923 gallons of wastewater. Because the requirement for having properly maintained and inspected grease control devices was not implemented until the latter years of the study period, it is anticipated that spills involving grease control devices should drop as the cities' and districts' grease control programs mature.

The largest overall source of private property spills is multifamily residential units. Although multifamily spills (215) were slightly less than commercial spills (268), the volume of the spills was almost twice as high. Multifamily spills released 208,892 gallons, whereas commercial spills released 104,533 gallons. Single-family units had 73 spills and released 2,831 gallons of wastewater.

As a group, the average size of a private property spill was 591 gallons, with an average of 374 gallons being lost to the environment. However, for those private property spills that were reported to have reached surface waters, the average release was 831 gallons. The average size spill was 39 gallons from a single-family residential unit, 972 gallons from a multifamily unit, and 390 gallons from a commercial establishment. Although the table shows a significant average spill size from institutional/public, the sample size (number of spills) is too small for the data to be considered relevant.

PATTERNS

There were several interesting patterns that emerged as data were analyzed. With most cities and districts, the ratio of private spills to public spills dramatically increased during the study period. OCSD reported a total of 107 spills, of which 66 (62%) were on private property. The same was true for the city of Anaheim, which reported a total of 130 spills, of which 88 (68%) were private property spills. Smaller agencies posted similar numbers; Rossmoor/Los Alamitos Area Sewer District reported 12 total spills, seven of which (58%) were private property spills. For the entire

Quantifying Threat to Water Quality from Private Property and Lateral Sewage Spills May 2002 through December 2006

study period, there were approximately 1,324 spills reported to the Regional Board, of which 608 (excluding OCHCA reported spills), or 46%, were private property spills.

For those cities and districts that were able to determine a cause for their private property spills, the overwhelming factor was grease, with 240 spills in this category. This number increased to 256 spills (59% of the total spills with a known cause) when spills involving grease and roots were included.

During the review of the private property spills, it was common to see the public agencies as the first responder. It was also common to see the public agencies assisting the property owner in the remediation of the spill. This included clearing the blockage, spill cleanup, or assisting the property owner's contractor with the spill remediation.

For cities, it was also common to see the spill turned over to the city's code enforcement officer if there was an apparent code violation. In some cases, citations were issued or other punitive actions taken.

EXISTING LOCAL PROGRAMS

The majority of cities and districts within Region 8 only accept responsibility and ownership for the sewer mains. The lateral that services the individual property, including its connection to the mainline, is the sole responsibility of the property owner in most cases. There are exceptions where the city or district, by policy or practice, has taken responsibility for at least a portion of the private property lateral.

The city of Santa Ana has taken over the responsibility for the lower lateral, which runs from the property line to the mainline within the public right-of-way. Santa Ana will repair or replace defective lower laterals within the public right-of-way.

The city of Huntington Beach, although they have not taken over the ownership, will repair or replace the lower lateral within the public right-of-way if the lateral has collapsed or become defective to the point of not being serviceable. The homeowner retains responsibility for maintenance of the entire lateral.

The city of Newport Beach, like the city of Santa Ana, accepts responsibility for the lower lateral, provided that the property owner installs a cleanout at the property line.

The city of Fullerton will also accept responsibility for maintenance of the lower lateral and will routinely clean it, provided that the lateral is adjacent to a city-owned tree and the property owner installs a cleanout at the property line.

Quantifying Threat to Water Quality from Private Property and Lateral Sewage Spills May 2002 through December 2006

The city of Placentia will, on a case-by-case basis, reimburse property owners for damage done to a private lateral from a city-owned tree, but the city will also remove the offending tree.

The El Toro Water District (ETWD) maintains responsibility for the lower lateral to three feet beyond the property line. ETWD will repair or replace the lower lateral, including the removal of blockages should they occur within the lower lateral.

The newest program to assist homeowners is from the Costa Mesa Sanitary District (CMSD). With its Residential Sewer Lateral and Clean Out Financial Assistance Program, CMSD will pay 50%, up to \$1,800, per residential parcel, to clean the lateral, conduct closed-circuit television (CCTV) investigation of the lateral, install a cleanout, or make necessary lateral repairs.

BEST MANAGEMENT PRACTICES

The intent of the private property spill study was to analyze the effects of private property sewage spills and determine their impact on the environment. If the impact was determined to be significant, then BMPs were to be developed as tools to reduce the occurrence of private property sewage spills. After all the provided spill data had been analyzed, the results were reviewed by the committee and it was determined that the impact of private property spills was significant enough to recommend BMPs. This conclusion was endorsed by Ken Theisen at the March 26, 2008 progress meeting in part because the ratio of private property spills that resulted in beach closures was almost the same as for all spills that resulted in beach closures. Beach closures, in addition to being a serious health risk, have a significant financial impact on Orange County businesses.

There is no intent through the recommendation or development of BMPs to require public agencies (cities, counties or special districts) to accept responsibility for the private property owner's sewer system or to hold public agencies responsible, in any way, for sewer spills that occur in private systems. Current law does not allow public agencies to be liable or accept responsibility for property they do not own. Many cities and districts have ordinances that specifically define the responsibilities of the public agency and the private property owner for the sewer system. The city of La Palma's Ordinance 2007-02 is provided as an example in *Appendix I* and states that the city is responsible for the mainline with the private property owner being responsible for the entire sewer lateral serving the property, including the connection point with the City's mainline.

BMPs are intended to provide cities and districts with additional tools to help operate and maintain the sewage collection system. These BMPs can be of particular importance to cities in the enforcement of their stormwater NPDES (National Pollutant Discharge Elimination System) permits. Because private property spills tend to migrate into the city's stormwater collection

Quantifying Threat to Water Quality from Private Property and Lateral Sewage Spills May 2002 through December 2006

system, these BMPs will offer cities additional tools to help prevent future private property overflows.

Nine BMPs were developed for the committee's consideration. These BMPs are not new; in concept they have all been utilized by different agencies to differing degrees throughout the state. What is new is to not limit the BMPs to one or two, which is the most common practice, but to have all of them developed for future use based upon site-specific conditions. The BMPs would be applied progressively and would target specific property types that present the highest potential for environmental harm. This ensures that the BMPs would have a positive cost/benefit with resources being directed to specific problem areas and not simply spread over the entire community. To this end, the committee determined that the BMPs would initially only target multifamily residential dwellings. The data suggests that multifamily residential dwellings represent the single highest risk of substantial sewer overflows, thus the greatest risk to the environment. A greater emphasis would also be placed upon coastal communities as opposed to inland communities. Private property spills in coastal communities have a greater potential for causing a beach closure than spills occurring in inland communities. At this time, single-family residential dwellings and commercial properties would not be subject to the BMPs unless a city or district felt they needed to impose them on a case-by-case basis. Spills from single-family residential dwellings were determined to be insignificant due to their relatively low (average 39 gallons) volume. The vast majority of commercial spills involved food service establishments. The consensus of the committee is that there are sufficient requirements in the GWDR that implementing additional BMPs for commercial establishments is not necessary at this time.

At the March 26, 2008 progress meeting, the nine proposed BMPs were ranked by the committee. The ranking looked at each BMP's effectiveness, their ability to address the problem, the cost, who would pay the cost, and feasibility. Rankings were ordered from 1 to 5 with 5 being the most desirable and 1 being the least desirable. Rankings were also based upon implementing the BMPs only for multi-family residential dwellings. The rankings established by the committee are in *Appendix J*. The following nine BMPs were reviewed and ranked by the committee with the committee's comments included with each BMP.

Educational Outreach

The educational outreach program would stress the proper use of the sewer system with instruction of what types of material may or may not be disposed of within the sewer system. Although the committee acknowledged the need and benefit of an educational outreach program, it was concluded that for this study, an educational outreach program specifically aimed at private property spills would have a low level of effectiveness. This is primarily due to the time that it takes for educational outreach programs to change the behavior patterns of a targeted community. The California state recycling program is an example of a program that literally took

Quantifying Threat to Water Quality from Private Property and Lateral Sewage Spills May 2002 through December 2006

decades to reach the level of success that it has today. Several of the cities and districts in the study are already conducting educational outreach efforts through their stormwater programs and the communications segment of GWDR. New emphases on pharmaceutical disposal and the current wave of “flushable” products will require the updating of existing educational outreach programs and, in the long term, change the community’s habits of disposing these items through the sewer system.

The educational outreach programs ranked average on addressing the private property spill problem but had one of the lowest cost impacts. This is because once the outreach material is developed it only needs to be periodically updated and reprinted. Dispersion is generally through water bill stuffers or community newsletters, keeping the mailing costs to a minimum. Normally, the agency bears the cost of such outreach programs. Although educational outreach programs ranked high (four out of five) as being feasible, the committee determined that developing an educational outreach program to specifically address private property spills would not achieve the desired results at this time. Educational outreach programs would also be spread over the whole community and not just a specific property type. The committee determined that the initial effort to reduce private property spills should be focused toward the greatest offender, multifamily residential dwellings.

Fats, Oils and Grease Reduction Program

A source control FOG reduction program requires that FOG is kept out of the sewer system by the individual property owner or tenant. This type of a program is utilized by several public agencies throughout the state. These programs stress the use of disposable grease containers or plastic lids for use on small cans for the collection of cooking fats, oils and grease. Once full, the containers are deposited into the trash. Similar to the FOG reduction programs utilized by FSEs, many of these programs also stress the use of strainers in sinks and the disposing of solids in the trash as opposed to using the garbage disposal and the scraping of plates and dry wiping of cooking pots, pans and utensils to remove FOG. OCSD has initiated a pilot FOG reduction program in some of the more densely populated areas of the city of Tustin. This pilot program set up control and study groups to determine the effectiveness of FOG source control by individual property owners. Residents were fully informed of the program objectives and what role they were to play. Each dwelling was given a metal container and ten double-walled, heat resistant Ziploc plastic bags. The property owners were instructed to insert a plastic bag in the metal container and deposit all FOG into the bag. As the bag filled, coffee grounds, kitty litter or some other form of absorbent material was to be added to soak up the liquid. Once filled, the plastic bag was removed from the metal container and deposited into the trash and a new bag inserted into the metal container. Prior to starting the study, OCSD cleaned and video inspected the laterals and sewer lines to establish a base for their evaluation of the pilot project. The study targeted the holiday period extending from November through December. Upon the reinspection

Quantifying Threat to Water Quality from Private Property and Lateral Sewage Spills May 2002 through December 2006

of the laterals and sewer lines there was a marked reduction in FOG buildup in those laterals and lines where the residences were utilizing FOG source control. This kind of program requires voluntary participation by the individual property owner or tenant and does not guarantee success however.

Because FOG is the primary cause of private property spills at multifamily residential dwellings, this BMP rated a five for both effectiveness and addressing the problem. Unfortunately, it is also rated a five for cost even though the cost would be spread among the agencies, property owners and tenants. The FOG reduction program also rated the lowest (1) for feasibility. These negative attributes come from a problem that has recently been revealed by the solid waste haulers and handlers.

In a letter (*Appendix K*) and at both a recent WDR Steering Committee and WDR General Meeting, Mr. Dean Ruffridge, Senior Vice President of CR&R Waste and Recycling Services discussed alleged problems of having FOG deposited in the solid waste stream. Most multifamily residential dwellings utilize three-yard bins for trash. In such cases, all trash, including recyclables, is deposited in the same bin. These bins are emptied into trash trucks for transport to a Material Recovery Facility (MRF) where recyclable materials are separated from the general trash. During transport, the trash is compacted frequently, which could cause FOG containers to break open allowing FOG to leak out onto into the trash, and possibly onto the roadway. Mr. Ruffridge stated that that FOG can damage the trommels and shakers at the MRF requiring significant repairs and maintenance. FOG also contaminates much of the recyclable material it comes in contact with, which could minimize its recyclable value.

Depositing FOG into the general trash may also contrary to AB 939, the Integrated Waste Management Act of 1989. This act sets requirements for the amount of solid waste that must be diverted away from landfills. In a rather unscientific experiment, approximately one cup of used cooking oil was placed in a double-walled Ziploc bag. Kitty litter was added as an absorbent to the cooking oil as the bag was kneaded. It took almost 1½ pounds of kitty litter to absorb the oil to the point where no oil would leak from the bag if the bag were punctured. The impact of such practices on solid waste generation have not been measured scientifically.

For a multifamily FOG reduction program to be most effective, a whole new waste stream would have to be developed where FOG collection containers would be made available, picked up and transported to an appropriate recycler. An alternative to year-round collection of FOG would be a program that established FOG collection sites during the holiday season, Thanksgiving through New Years, with an emphasis on collection of larger amounts of FOG from home turkey fryers and similar devices. Some agencies currently employ this type of a program with centralized FOG collection during the holiday season to allow their residents a simple way to dispose of their used fryer cooking oil.

Quantifying Threat to Water Quality from Private Property and Lateral Sewage Spills May 2002 through December 2006

Inspection After An Overflow

This BMP would require an inspection of the sewer lateral within a specified number of days following a blockage or overflow of the sewer lateral. The inspection would consist of at least a CCTV inspection performed by a licensed plumber with the results of the inspection being made known to the local sewerage agency. No inspection would be required if the sewer lateral backed up due to a malfunction in the public sewer main.

The committee determined this is the most promising of all of the BMPs scoring a five in effectiveness, addressing the problem and feasibility. It also scored a low one and one-half for cost with the cost being borne by the property owner or management company. The inspection would provide current information on the condition of the sewer lateral, whether the cause of the blockage was mitigated and what additional work might be required to ensure the lateral would not experience additional overflows in the future. This BMP would be the first BMP to be implemented, with additional BMPs available only if needed. The city of Santa Barbara has a similar policy (*Appendix L*) but, unlike Santa Barbara, whose policy extends to all properties, this BMP would initially only apply to multifamily dwellings.

This BMP would only be invoked after a private property spill had occurred and would be key to initiating any additional BMPs that might be needed. Only multifamily properties where lack of diligence for maintaining their sewer lateral resulted in a blockage or overflow would be required to comply. If repeat overflows were to occur, the property could be placed under more stringent BMPs, such as scheduled reoccurring inspections.

Public Agency Notification to Property Owners

This BMP would encourage public sewerage agencies to notify property owners or management companies of any maintenance issue (e.g., root balls or significant grease buildup) or structural deficiency (e.g., broken connection to the sewer main) discovered in the private lateral as the public agency is performing its routine CCTV inspections of the public sewer main. The public sewerage agency would notify the property owner within a specified number of days of the discovery and, as appropriate, present the property owner with a digital photograph and written description of the maintenance issue or deficiency. Notification would be by mail, door hanger, or other appropriate means. The private property owner or management company would have a specified number of days to rectify the problem and notify the public sewerage agency of its remediation.

Several agencies, including OCSD, currently provide this as a service to their customers. By working with the property owner, the public agency can avert the potential problem of having root or debris balls pushed into the public system without the public agency's knowledge. This is

Quantifying Threat to Water Quality from Private Property and Lateral Sewage Spills May 2002 through December 2006

a recurring problem for sewerage agencies throughout the state where roots and debris cleaned from a private lateral are pushed into the public main, often resulting in an SSO.

This BMP was ranked by the committee as a five for effectiveness and four and one-half for both addressing the problem and feasibility. Although considered both effective and feasible, the frequency would depend on how often the public agency inspects their sewer mains. Cost was ranked as one-half and would be borne by the agency. The cost ranking was low as most of the expense is considered administrative with most of the expense incurred during the normal sewer line inspection process.

Scheduled Reoccurring Lateral Inspections

This BMP would require that multifamily sewer laterals be routinely inspected based upon a predetermined frequency. Inspections would consist of at least a CCTV inspection by a licensed plumber and provide the local public sewerage agency with proof that the sewer lateral has passed the inspection. For new or replacement laterals, inspections might not be required until the lateral has been in service for a predetermined time period. Laterals less than 3 total pipe joints or 10 feet would be exempt.

The committee determined that this BMP should be an alternate BMP for future implementation if deemed necessary. This BMP is initially intended only for multifamily dwellings and only as needed. The committee ranked the BMP as a five for effectiveness, addressing the problem and feasibility. The cost was ranked at one and one-half with the property owner or management company incurring the expense. The city of Santa Barbara (*Appendix L*) requires that all nonresidential and common interest development properties have scheduled sewer lateral inspection every 10 years.

Scheduled Lateral Inspections Based Upon Remodels

This BMP would require the sewer lateral to be inspected before any remodel of a specified dollar value or the addition of a specified number of square feet of habitable space is finalized, or when a specified number (or more) of new plumbing fixtures are attached to the existing sewer lateral. The cities of Santa Barbara (*Appendix L*) and Berkeley (*Appendix M*) currently have policies requiring sewer lateral inspections during remodels or with the addition of plumbing fixtures for residential or commercial properties.

This BMP is also considered to be an alternate BMP for future implementation for multifamily dwellings. This BMP ranked a four for effectiveness, three for addressing the problem and four and one-half for feasibility. The cost was ranked at one and one-half with the property owner paying all costs. This BMP is considered to have limited impact as typically a remodel for a

Quantifying Threat to Water Quality from Private Property and Lateral Sewage Spills May 2002 through December 2006

multifamily dwelling is a major undertaking and occurs much less frequently than remodels to single-family dwellings.

Lateral Inspection Upon the Sale or Transfer of Property

With this BMP, whenever a multifamily property is sold or title transferred, the property would be subject to a sewer lateral inspection. The inspection would be required if the lateral was over a predetermined age and had not been inspected within a predetermined time period. The sale or transfer of individual units within a complex would not require a sewer lateral inspection. The city of Burlingame (*Appendix N*) currently utilizes a similar policy for all properties within the city.

The committee determined that this BMP be an alternate BMP for possible implementation at a later date. The BMP was ranked a four for effectiveness, a three for addressing the problem and a two for feasibility. Cost was ranked at one and one-half with the property owner absorbing all costs. The low feasibility ranking was due in part to the relatively infrequent (as compared to single-family dwellings) sale or transfer of multifamily complexes.

Certification Program for Licensed Plumbers

For this BMP, public sewerage agencies would develop a certification program and maintain an up-to-date listing of certified licensed plumbers who are acceptable to the public sewerage agency for performing inspections and repairs on private sewer laterals. The certification program would ensure that plumbers have a current license with the state and are aware of any local private lateral programs and their requirements that the local sewerage agency might support. This would not be an endorsement of any plumber, plumbing contractor or plumbing company. It would only be a listing of qualified local area plumbers and intended only to provide property owners a resource for selecting a plumber.

This BMP is considered an alternate BMP for possible implementation at a later date. Overall, the committee ranked this BMP lowest of all nine BMPs. The BMP ranked one for effectiveness, one-half for addressing the problem and three for feasibility. The cost was ranked as two with the agency bearing the cost. The concept is not to have an agency endorse any particular private plumbing contractor(s) but to offer knowledgeable information as to what local contractors are licensed and have the capability and equipment to provide the required service. With multifamily dwellings this has less importance as typically multifamily dwellings are managed by a management company who either has its own staff of professional plumbers or has business arrangements with plumbing contractors they wish to utilize.

Quantifying Threat to Water Quality from Private Property and Lateral Sewage Spills May 2002 through December 2006

There are several cities and districts in the state that do maintain a list of licensed plumbers for their constituents. *Appendix O* is from the city of Pacific Grove and is posted on their website. The city of Laguna Beach indicates they have a similar listing that is available upon request.

Financial Assistance Programs

Financial assistance programs provided by public agencies to assist their constituents have been growing in popularity. Many of these programs have been established to assist the agency in controlling inflow and infiltration (I&I) as defective laterals are a known source of I&I. Some of these programs have been in the form of insurance pools where funds are collected as part of the sewer fee, pooled and then distributed to qualified property owners for the repair or replacement of their sewer laterals. These pooled programs have been very successful in the St. Louis Missouri area. Other programs offer grants or low or no interest loans to assist with lateral repairs or replacement. Most of the financial assistance programs have a maximum amount available and require matching funds from the property owner. Likewise, most are offered as a one-time event for the life of the property and only cover the repair or replacement of the lateral that has been deemed unserviceable. Normally, the public agency does not do the repair or replacement but does oversee the process to ensure the lateral qualifies for replacement and that the work is properly completed. The program initiated by the CMSD is unique in that it not only offers financial assistance for the repair or replacement of the lateral; it also offers financial assistance for the inspection and cleaning of the lateral.

There is at least one private water company, American Water, which offers a nationwide insurance program for both the sewer lateral and the water service line. The city of Anaheim had considered partnering with American Water to offer this benefit to the residence of the city. The project was abandoned when the city determined that there were significant obstacles with this approach. Most of these obstacles related to the state's current insurance laws.

Although the committee ranked this BMP as a five for effectiveness, addressing the problem and cost with the agency funding the program, it was ranked as a one for feasibility. It is also considered an alternative BMP.

IMPLEMENTATION OF BMPS

It is common for public sewerage agencies to take action against a private property owner who has had a sewage spill. There are several instances noted in the spill reports submitted to the Regional Board of public agencies involving code enforcement to correct violations or to recoup costs incurred because of a private property spill. It is believed that the practice of recouping costs associated with private property sewer spills, in addition to reimbursing the public agency, demonstrates to the property owner the importance of maintenance to control costs. Sometimes

Quantifying Threat to Water Quality from Private Property and Lateral Sewage Spills May 2002 through December 2006

even more drastic measures are required. A case in point occurred in the city of Placentia in July 2004. A five-unit multifamily residential dwelling was involved in an intermittent sewage overflow over a period of days where the property owner's efforts to clear the blockage were inadequate. A non-licensed plumber was being used. To ensure the property owner was aware of the seriousness of the situation, the city's Code Compliance Officer began the process of issuing non-habitation orders for inadequate sanitation. This got the property owner's attention who summoned a professional plumbing contractor with the necessary skills and equipment to clear the line. It turns out a ball was lodged in the lateral creating the blockage and resulting spill. The property owner was issued a Notice of Noncompliance.

BMPs are intended to be tools to be used by public sewerage agencies to reduce or prevent private property sewage spills. Of the nine BMPs, the BMP for sewer lateral CCTV inspections after a sewer spill is the only BMP recommended to be implemented at this time. Other BMPs could be implemented at a later date or if additional measures are needed to prevent reoccurring spills from a property. Initially, only multifamily dwellings would be targeted for BMPs. The intent is to not encumber the entire community as the data indicates that the potentially higher spill volumes from multifamily dwellings pose the greatest threat to the environment and to the public health. Implementation of the BMPs would be with the cooperation of the public sewerage agencies. Public agency involvement would be voluntary since public sewerage agencies are not responsible for private property sewage spills. Cities do have the responsibility to protect their stormwater systems and remain compliant with their NPDES Stormwater Permits. Private property sewage spill BMPs could prove very helpful for cities in enforcing their stormwater programs. To implement the BMPs, different actions could be taken as follows:

- Do nothing
- Voluntary implementation of the BMPs
- Regional Board impose waste discharge requirements on private properties

Do Nothing. With this approach the public sewerage agency would simply not enforce or require the private property owner to abide by the BMPs. This approach does not address the problem and may require additional actions to be taken by the Regional Board to protect the environment and public health.

Voluntary Implementation of the BMPs. The public sewerage agencies would voluntarily implement the BMPs within their jurisdictions. The specific BMPs to be implemented would depend upon the public agency as would be the course of action followed for repeat offenders or for expanding the BMPs to additional property types. Different cities or districts may implement different BMPs or combinations of BMPs depending upon their success in reducing or eliminating

Quantifying Threat to Water Quality from Private Property and Lateral Sewage Spills May 2002 through December 2006

private property sewage spills. This would remain voluntary with the public agency not incurring any additional responsibility for private property sewage spills.

Regional Board Involvement. The Regional Board would develop and implement waste discharge requirements for essentially residential dwellings within its jurisdiction. These waste discharge requirements would require essentially residential properties to maintain their private sewer laterals, lift stations and other waste conveying systems consistent with recognized standards. Regular cleaning, inspection, repair, replacement or rehabilitation would be required to ensure the private sewer system remains capable of transporting sewage without an overflow. Design capacity would also be reviewed to ensure that the private system's capacity is adequate for the number of occupants living at the facility. Should an overflow occur, the Regional Board would determine if the private property owner's program was sufficient and enact enforcement as necessary.

SYNOPSIS

Forty-six percent of all sewage spills reported to the Santa Ana Regional Water Quality Control Board, Region 8 from northern Orange County during May 2002 through December 2006 were private property spills. A private property spill is an SSO whose origin is within the private lateral serving a private property and is not caused by any failure in the public sewage collection system. Private property spills are normally of a smaller volume than spills that occur in the public system but still accounted for approximately 407,078 gallons of spilled wastewater during the study period. Although much of the wastewater was recovered, an estimated 95,542 gallons did reach surface waters with an estimated 19,990 gallons causing twenty-five beach closure incidents. In fact, approximately eight percent of all reported private property spills resulted in a beach closure. This is similar to the approximate ten percent of public spills that result in a beach closure. Aside from being a health concern, sewage spills that result in a beach closure have a distinct negative effect upon the Orange County economy. After reviewing the facts, the committee formed to review the information provided in this study determined that private property spills have a significant negative impact upon the environment and BMPs should be developed to assist in reducing or preventing private property spills.

Spill data was received from the Santa Ana Regional Water Quality Control Board, Region 8 and OCHCA. Data from the Regional Board included spill summaries from all but a couple of the districts and cities that operate sewage collection systems in the Orange County portion of Region 8. Spill data from OCHCA likewise provided spill information that was reported to them. Data on beach closures was retrieved from OCHCA's Ocean Water Protection Program website. Since data was being received from multiple agencies and in multiple formats, care had to be taken to compare individual spill locations, dates and volumes to prevent a spill from being entered multiple times. All of the data concentrated on the period from May 2002 through December 2006. This period was selected for study as it was the only period of time when all public agencies in the

Quantifying Threat to Water Quality from Private Property and Lateral Sewage Spills May 2002 through December 2006

Region 8 portion of Orange County were required to report all private property spills in addition to all public spills to the Regional Board.

To better understand the cause and effect of the private property spills occurring in the study area, each spill report was categorized by location, cause, property type, impact on surface waters and whether the spill resulted in a beach closure. Table 1 is an overview of the categorization of the private property spills. By categorizing all private property spills, the property types and causes that presented the highest potential risk to the environment could be identified. Spill locations and volumes that would have the most severe environmental impact were also identified. After analyzing all of the spill data, it was concluded that multi-family residential dwellings presented the greatest threat from private property spills. This is due to their potential to have spills in much greater volumes than the other property types. Although there were slightly more commercial property (predominately food service establishments) sewage spills during the study period, the volume for multi-family residential sewage spills was twice as high. Like commercial property spills, multi-family residential sewage spills are predominately caused by grease buildup in the private lateral. Of the approximate 215 multifamily residential sewage spills, 155 had a listed cause. Grease was the primary or contributing factor to 91 (59%) of all the multifamily spills with a stated cause. Roots were the next largest category with 25 (16%) of the multifamily spills with a listed cause. Debris was listed in 18 (12%) spills with structural defects listed 17 (11%) of the spills with a known cause.

After analyzing the categorized data, the committee determined that single-family residential spills do not represent a significant environmental threat. The average single-family residential sewage spill is approximately 39 gallons as compared to the average multifamily residential spill of 972 gallons. Likewise, commercial property spills were not deemed to be a significant environmental threat at this time. This is because the vast majority of commercial spills involved food service establishments who are now under strict FOG reduction programs as part of the statewide General Waste Discharge Requirements. These commercial properties were under similar if not identical FOG reduction programs when the Region 8 WDR was in effect, but the FOG element of the Region 8 WDR did not become effective until the final months of the Region 8 WDR. Unfortunately, there was insufficient time during the study period, to see any significant effect of the Region 8 WDR FOG reduction programs. It is anticipated that FOG related spills from commercial properties will be drastically reduced as the FOG reduction programs mature.

Categorizing the spill data also provided information on what spill locations were most likely to result in a beach closure. Not surprisingly, even small spills that occur in areas adjacent to the beach will most likely result in a beach closure. Spills occurring at inland locations would need to be progressively larger and with more direct access to tributary waters to result in beach closures.

Quantifying Threat to Water Quality from Private Property and Lateral Sewage Spills May 2002 through December 2006

Because private property spills can result in beach closures that, in addition to creating health concerns, have a negative economic impact upon Orange County economics, nine BMPs were developed to assist public agencies in reducing the frequency and volume of private property sewage spills. The primary target of these BMPs is multifamily residential dwellings. Multifamily residential dwellings were chosen as the data clearly reflects that currently multifamily residential dwellings have the highest potential to affect the environment, especially those units located in the beach communities. Of the nine BMPs, the committee emphasized one BMP. That BMP requires the property owner or management company of a multifamily residential dwelling provide a CCTV inspection of their sewer lateral within a specified number of days following a sewage spill that involved a blockage or defect in the lateral. If the blockage or defect was in the public collection system and only exited the private lateral, an inspection of the lateral is not required. The remaining eight BMPs are considered alternative BMPs that could be used in the future.

Implementation of the BMPs is initially intended to be voluntary in cooperation with the local sewerage agencies. If the voluntary approach is ineffective or is insufficient to address the problem of private property sewage spills, the Regional Water Quality Control Board, Region 8 should be prepared to initiate waste discharge requirements for multifamily residential dwellings. These waste discharge requirements would require multifamily residential properties to clean, inspect, ensure adequate capacity, repair, replace or rehabilitate and maintain their private sewage systems to keep them free from sewage overflows.

The Region 8 portion of Orange County has approximately two to three times the mileage of private property sewage lines compared to publicly owned sewer lines. They are all part of the sewage transport system needed to eliminate wastes generated by the County's inhabitants while protecting the public health, beaches and the environment. Sewage spills are regularly occurring in these private sewer lines. In fact, data indicated a trend during the study period that the reported number of private property spills has been increasing while the reported number of public spills has been decreasing. Total control over the entire sewage collection system from source to treatment cannot be achieved without some means of control over the private lines to ensure their proper maintenance and operation.

Quantifying Threat to Water Quality from Private Property and Lateral Sewage Spills May 2002 through December 2006

APPENDICES

The appendices are the worksheets developed to provide the analysis of the private property spills that occurred in Region 8 from May 2002 through December 2006.

Appendix A is the Master Monthly Report and includes all the data provided relative to all of the private property spills reported. *Appendix A* has all 18 data fields displayed and is broken down alphabetically by reporting agency. For ease of access, the data from OCHCA was amended to the end of this appendix, with its totals included in the final totals.

Appendix B displays all of the private property spill data, including OCHCA, chronologically broken down by calendar year. This appendix shows how the reporting progressed over time.

Appendix C displays all of the private property spill report data chronologically grouped by spill cause. The cause categories are: Unknown (spills whose cause was unknown or not provided), Grease (spills whose cause was grease or grease traps and interceptors), Roots (spills whose cause was to be tree roots), Debris (spills whose cause was various types of debris other than grease or roots), Grease and Roots (spills whose cause was a combination of grease and tree roots), and Structural (spills whose cause was a line break or other structural failure).

Appendix D chronologically lists all private property spills based upon the property type involved. All spill addresses, unless the property type was listed in the report, were reviewed using the satellite feature of Google Maps. The satellite feature presents an aerial photograph of the property assisting in determining the property type. The property types are: Unknown (spill reports are in this category because no address was provided, the wrong or incomplete address was provided, or Google could not find the address), Single-Family (spills involving single-family residences), Multifamily (spills involving multifamily residences, apartments, condo complexes, hotels, motels, and hospitals; condo complexes were a particular problem, as it can not be determined if an individual condominium has its own lateral or shares a lateral with other units in the complex), Commercial (spills involving commercial establishments including restaurants, strip malls, and other retail or manufacturing establishments, other than hotels, motels, or hospitals), and Institutional or Public (spills involving schools or other publicly owned facilities).

Appendix E chronologically lists all private property spills that were reported to have entered receiving waters and is broken down by calendar year.

Appendix F is a listing of all private property spills in Region 8 that resulted in a beach closure. This appendix includes the number of days the beach was closed and the beach mile days for each private property spill that resulted in a beach closure. The beach closure report is compiled

Quantifying Threat to Water Quality from Private Property and Lateral Sewage Spills May 2002 through December 2006

by OCHCA and is available online. Beach mile days are a calculation that includes the number of days a beach is closed and the linear footage (converted to miles) of beach that is affected. Several of the entries on the beach closure report were only found on that report and were added to the other appendices as appropriate. During the study period, only two inland cities (Anaheim and La Habra) had a spill that resulted in a beach closure, whereas even minor spills from beach cities resulted in a beach closure.

Appendix G compares all cities' and districts' total spills to private property spills.

Appendix H is a map showing the boundary between Region 8 and Region 9.

Appendix I is the city of La Palma's sewer ordinance that defines the responsibilities of the public agency and private property owners for the sewage collection system including the private laterals.

Appendix J is the worksheet showing the committee's rankings of the nine BMPs.

Appendix K is a letter from CR&R Waste & Recycling Services outlining the problems with including FOG containers in the comingled solid waste system.

Appendix L lists the current policies utilized by the city of Santa Barbara for inspections after an overflow of a private sewer lateral.

Appendix M is the policy of the city of Berkeley requiring a private lateral inspection due to remodeling or the addition of plumbing fixtures.

Appendix N is the policy of the city of Burlingame that requires private lateral inspections upon sale of the property.

Appendix O is the certified plumbers list from the city of Pacific Grove.

Quantifying Threat to Water Quality from Private Property and Lateral Sewage Spills May 2002 through December 2006

ACKNOWLEDGEMENT

Ken Theisen
California Regional Water Quality Control Board, Santa Ana Region
Staff Environmental Scientist

Nick Arhontes, PE
Orange County Sanitation District
Director of Operations & Maintenance

Patrick McNelly
Orange County Sanitation District
Principal Staff Analyst

Ann Crafton, SR/WA
Orange County Sanitation District
Regional Assets & Property Management

Dindo Carrillo
Orange County Sanitation District
Senior Environmental Specialist

James Colston
Orange County Sanitation District
Environmental Supervisor

Larry Honeybourne
County of Orange Health Care Agency
Water Quality Program Chief

APPENDIX A

Modified Master Private Property Spills 2002–2006
Sorted by Agency

APPENDIX B

Modified Master Private Property Spills 2002–2006
Sorted by Date

APPENDIX C

Modified Master Private Property Spills 2002–2006
Sorted by Cause

APPENDIX D

Modified Master Private Property Spills 2002–2006
Sorted by Property Type

APPENDIX E

Modified Master Private Property Spills 2002–2006
Sorted by Impact

APPENDIX F

Modified Master Private Property Spills 2002–2006
Sorted by Beach Closure

APPENDIX G
Initial Summary Analysis

APPENDIX H

Region 8 and 9 Orange County Boundary Line

APPENDIX I
City of La Palma Sewer Ordinance

APPENDIX J
Private Property BMP Ranking

APPENDIX K
CR&R Waste & Recycling Services Letter

APPENDIX L

City of Santa Barbara Private Lateral Policy

APPENDIX M
City of Berkeley Private Lateral Policy

APPENDIX N

City of Burlingame Private Lateral Policy

APPENDIX O

City of Pacific Grove Certified Plumbers List