



# City of Richmond

## Report to Committee

**To:** Public Works and Transportation Committee

**Date:** September 13, 2011

**From:** John Irving, P.Eng. MPA  
Director, Engineering

**File:** 10-6060-03-01/2011-  
Vol 01

**Re:** **Fat, Oil and Grease (FOG) Management Program Update**

### Staff Recommendation

That the five year Sanitary Pump Station and Forcemain Assessment and Upgrading Program (2012 to 2016) which includes forcemain pressure monitoring, forcemain access installation, forcemain inspection and FOG remediation, be endorsed for submission in the 2012 to 2016 Capital Plan for consideration.

John Irving, P.Eng. MPA  
Director, Engineering  
(604-276-4140)

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<b>ROUTED TO:</b>	<b>CONCURRENCE</b>	<b>CONCURRENCE OF GENERAL MANAGER</b>	
Sewerage and Drainage Community Bylaws	Y <input checked="" type="checkbox"/> N <input type="checkbox"/> Y <input checked="" type="checkbox"/> N <input type="checkbox"/>		
<b>REVIEWED BY TAG</b>	YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>	<b>REVIEWED BY CAO</b>	YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>

## **Staff Report**

### **Origin**

The impacts of fat, oil and grease (FOG) on municipal sanitary sewer collection systems are a growing concern for the City of Richmond and Metro Vancouver. Inspection results from the Gilbert Trunk Sewer and the Lansdowne Forcemain failure are clear indications that FOG is an issue that has a large financial impact on the sanitary sewer utility.

In 2008, Metro Vancouver inspected a segment of the Gilbert Trunk sanitary pipeline that services most of Richmond's urban core and identified significant FOG build-up that is reducing the hydraulic capacity of the pipeline. Through the inspection process, Metro Vancouver also determined that bypass pumping (there is no redundant pipeline for the Gilbert Trunk Sewer) required for pipeline cleaning is prohibitively expensive and Metro Vancouver is currently planning to twin the Gilbert Trunk Main to facilitate future maintenance. The cost of the twinning project is estimated to be over \$60 million.

The Lansdowne Forcemain had three failures in the last two years that were due in part to excessive pressures in the forcemain resulting from FOG build-up. In February 2011, the Lansdowne Forcemain became completely plugged with FOG, resulting in an extensive emergency effort to maintain service to the community. Inability to remove the FOG build up resulted in replacement of the forcemain approximately 20 to 30 years before its planned replacement date.

At the November 22, 2010 Council Meeting, Council adopted the following motion:

“That staff report back on the Grease Management Program in one year.”

At the May 18, 2011 Council Meeting, Council adopted the following motion:

“That staff further investigate initiatives around the elimination of grease in sewer pipes.”

The following is an overview of FOG mitigation measures that are currently being employed by the City and recommendations for improvement.

### **Analysis**

#### **Source of FOG**

FOG in municipal sanitary sewer systems is predominantly food waste dumped “down the drain” either directly or as part of cleaning waste such as dish water. Food service and residential land use sectors contribute to FOG issues. While the food service industry has traditionally been the primary focus of municipal FOG control programs (due to the high volume of food prepared), many jurisdictions are beginning to recognize residential areas as a significant source of FOG.



Attachment 1 contains maps that identify sanitary catchments that have FOG issues based on observation of sanitary pump stations. It also includes gravity mains that have been identified through the City's Sanitary Sewer Inspection Program as having FOG build-up as well as restaurant locations. Staff have identified City Centre as having the highest amount of FOG, followed by the Hamilton and Shellmont areas as second and third highest. These findings indicate that while restaurants remain a primary concern, residential areas in Richmond are creating FOG issues as well.

### **FOG Source Control**

Controlling FOG at the source is a key element in Richmond's FOG mitigation program. Richmond's central source control feature is a requirement for food sector establishments to have and maintain grease traps, as per Drainage, Dyke and Sanitary System Bylaw No. 7551 and the Metro Vancouver Sewer Use Bylaw.

Metro Vancouver's Sewer Use Bylaw Schedule "D" requires all food sector establishments that discharge wastewater containing oil and grease to install and maintain a grease interceptor. Metro Vancouver relies on its member municipalities to enforce this section of their bylaw and does not actively inspect food sector establishments itself.

Drainage, Dyke and Sanitary Sewer System Bylaw No. 7551, does not permit food sector establishments or buildings to discharge FOG into the City sanitary sewer system, reinforcing the Metro Vancouver requirement for grease interceptors. The Building Approvals Division ensures grease interceptors are installed in all new food sector buildings.

The City has approached the food service industry with a two-phased strategy to control FOG. The first phase was dedicated to education, which took place in 2010. The second phase is focused on enforcement and began in January 2011. During the first half of 2011, 193 restaurants were inspected, three of which were found not to have required grease traps installed and have been given 60 days to comply with the bylaw. The remaining restaurants were found to be generally in compliance; however, 35% of the restaurants inspected self clean their grease traps and staff are investigating how these establishments are disposing of grease.

While there has been a high level of compliance with the bylaw observed to date, the enforcement program remains an important tool in the City's FOG mitigation program. It is likely that compliance would diminish if enforcement is reduced or eliminated. Additionally, the current compliance figures are based on inspection of approximately 25% of the food service establishments. It is possible that inspection of the remaining food service establishments will yield a different result. Staff will continue to monitor compliance and will report significant changes in compliance should they be identified.

The enforcement program includes one half-time enforcement officer responsible for inspection of approximately 900 food sector establishments. The part-time officer can inspect approximately half of Richmond's food service businesses within a calendar year. Based on observed compliance rates, this level of enforcement appears sufficient.



Neither the Metro Vancouver Bylaw nor the Richmond Bylaw directly address FOG mitigation measures for the residential sector and the City relies on education as the primary source control tool for private dwellings. FOG education for the residential sector started in 2007 and has included a brochure and a news item on the City web site. The residential FOG education program will be updated to include utility rate inserts, improved FOG information on the City web site and social media tools.

There are anecdotal reports that garburators contribute towards FOG in residential neighbourhoods. However, it is difficult to quantify the impact of garburators, if any, as it is unknown how many homes in Richmond have garburators and/or use them on a regular basis. Staff note that the City's Green Can Program, which collects food waste for composting, has potential to reduce garburator utilization and this issue may become a moot point. The Green Can Program is currently available to single-family residential neighbourhoods and is being tested for multi-family buildings through a pilot program that includes approximately 3,200 townhouse units. The City's Recycling Depot also accepts cooking oil and animal grease from residents for recycling in an effort to discourage disposal of these items down sinks or drains.

### **Pressure Monitoring**

Pressure monitoring in forcemains has the potential to play a significant role in forecasting build-up of FOG and other material in sanitary forcemains. Constrictions due to build-up cause increased pressure in pipeline systems that can be identified through pressure monitoring. Monitoring will facilitate identification of problems in a timeframe that will allow a planned response as opposed to an emergency response. This will effectively reduce public inconvenience and remediation cost. Staff are bringing forward a capital program through the 2012 to 2016 capital budget process that includes sanitary forcemain pressure monitoring for Council's consideration.

### **Inspection and Remediation**

The City currently has a program for closed circuit television (CCTV) inspection of the gravity sewer collection network. This program is primarily intended to identify defects in the gravity pipelines, but also identifies FOG build up. Staff also perform visual inspections at "hot spots" known to have FOG issues as part of the program to maintain gravity system capacity and prevent sanitary sewer overflows. It is estimated that the City spends \$300,000 per year on inspection and cleaning of identified "hot spots".

Sanitary pump stations are inspected and cleaned on a regular basis (approximately every two weeks). Richmond employs industry standard wastewater cleansing velocities in sanitary forcemains designed to prevent build-up of FOG and other solid materials in forcemains. Forcemain inspection is not commonly performed by municipalities provided cleansing velocities are maintained. However, the Lansdowne Forcemain event is proof that forcemain inspection has value, particularly in catchments with known FOG issues. Staff will initiate a forcemain inspection program on a trial basis within existing budgets to determine the requirements and benefits of scheduled forcemain inspection and report the findings to Council.



Should FOG build-up be identified in the sanitary forcemain system, procedures and infrastructure will be required to facilitate FOG removal. Staff has included provisions for FOG remediation work in a program that is being brought forward in the 2012 to 2016 capital budget process for Council's consideration.

### **Chemical Cleaners**

Staff have experimented with adding a number of FOG fighting chemicals and enzymes into the sanitary sewer at pump stations with limited success. In general, the residency time of sewage at sanitary pump station is short and may not allow enough time for the FOG fighting agents to work. Staff have applied for a grant from the Federal Green Municipal Fund for a trial that will mix FOG cleaners into wastewater at the source in representative restaurants. Should the grant be approved and the project proceed, staff will report results of this trial to Council.

### **Financial Impact**

Staff have included capital submissions for 2012 through 2016 for a sanitary pump station and forcemain assessment and upgrading program that will be brought forward for Council's consideration as part of the capital budget process. Installation of pressure monitors, forcemain inspection and forcemain remediation will be included in this program. Table 1 lists the capital budget submissions that are included in the program with their proposed levels of funding.

**Table 1: Sanitary Pump Station and Forcemain Assessment and Upgrading Program Capital Funding Submissions**

<b>Submission ID</b>	<b>Year</b>	<b>Funding Request</b>
4800	2012	\$750,000
4828	2013	\$750,000
4829	2014	\$750,000
4832	2015	\$750,000
4833	2016	\$750,000

### **Conclusion**

The City of Richmond currently has a program in place for controlling FOG in the sanitary sewer system. This program includes both education and enforcement components for source control in food service establishments and FOG mitigation measures for the gravity collection system.

Drainage, Dyke and Sanitary System Bylaw No. 7551 requires food sector establishments to install and maintain grease interceptors. To date, there appears to be a high compliance rate with this

Bylaw. Staff will continue to monitor this sector and will report back to Council any significant change in the level of compliance.

Residential development FOG source control relies on public education and staff recommend additional emphasis on informing the public of the impact of FOG and how they should dispose of food waste. Additionally, the Green Can Program assists in keeping FOG out of sewers by redirecting food waste to compost.

Staff have applied for a Federal Green Municipal Fund grant for a trial program that will mix FOG fighting agents with wastewater at its source in representative restaurants. Adding these agents at the source will allow them more contact time with the FOG, which may improve upon disappointing results from previous trials where these additives were mixed with wastewater in the sanitary pump stations.

Staff are bringing forward capital submissions in the 2012 to 2016 capital budget process for sanitary pump station and forcemain assessment and upgrading for Council's consideration. Should these projects be approved they will include:

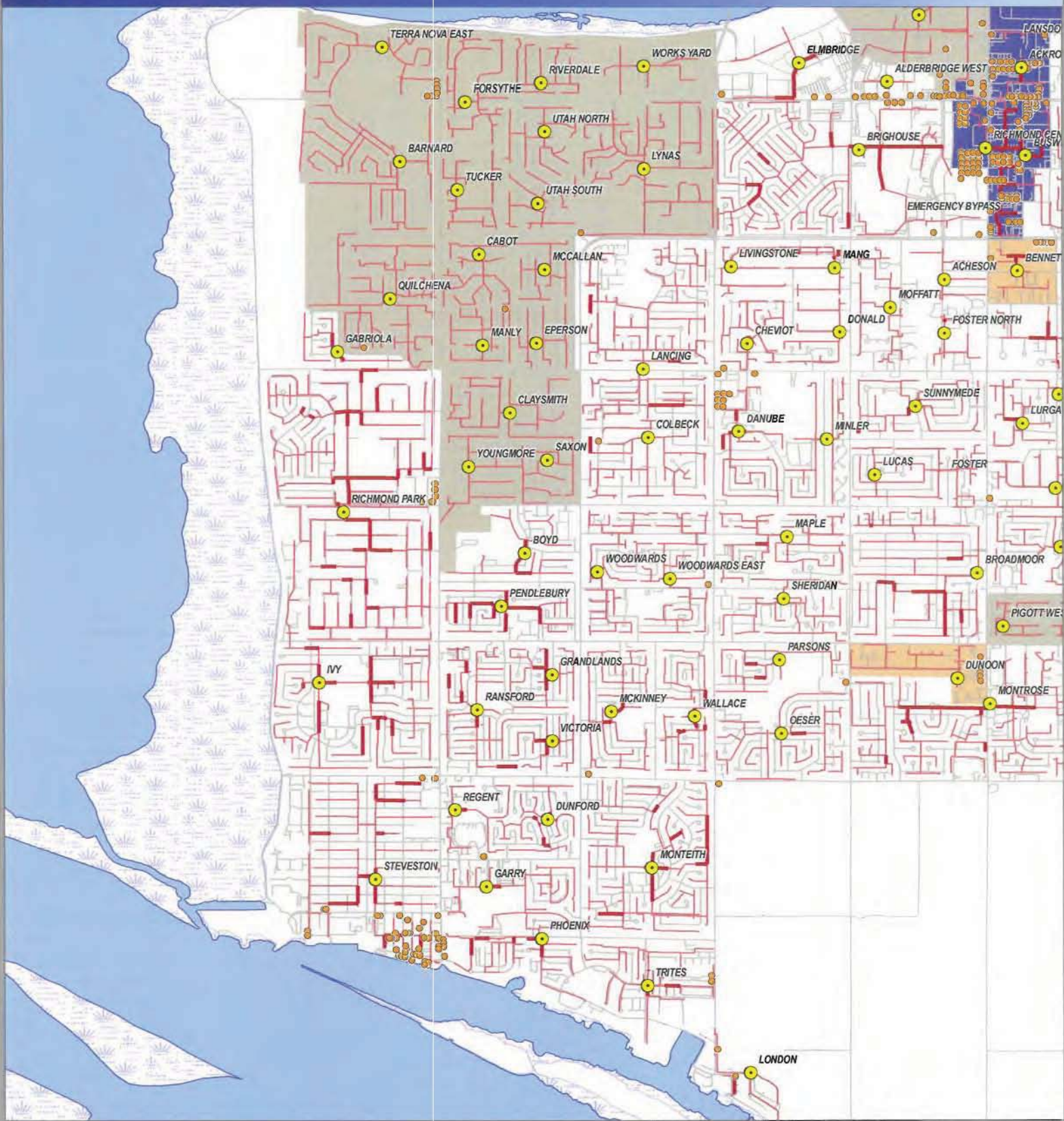
- Installation of pressure monitors to facilitate identification of FOG build-up in forcemains;
- Installation of forcemain access points to facilitate inspection and forcemain cleaning; and
- Remediation of forcemains with identified FOG build-up.



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LLB:llb





## Legend

- Pump Stations
- Food Establishments
- Gravity Mains with FOG
- Gravity Mains
- CCTV Data Not Available

### Catchments with Grease Problems

- Highest Level of FOG
- Second Highest Level of FOG
- Third Highest Level of FOG

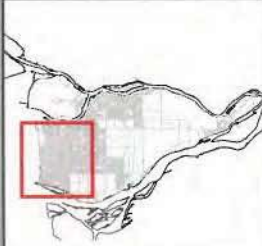
**PWT - 25**

Date Issued: March, 2011  
Map Prepared By: [Name]  
Map Edited By: [Name]

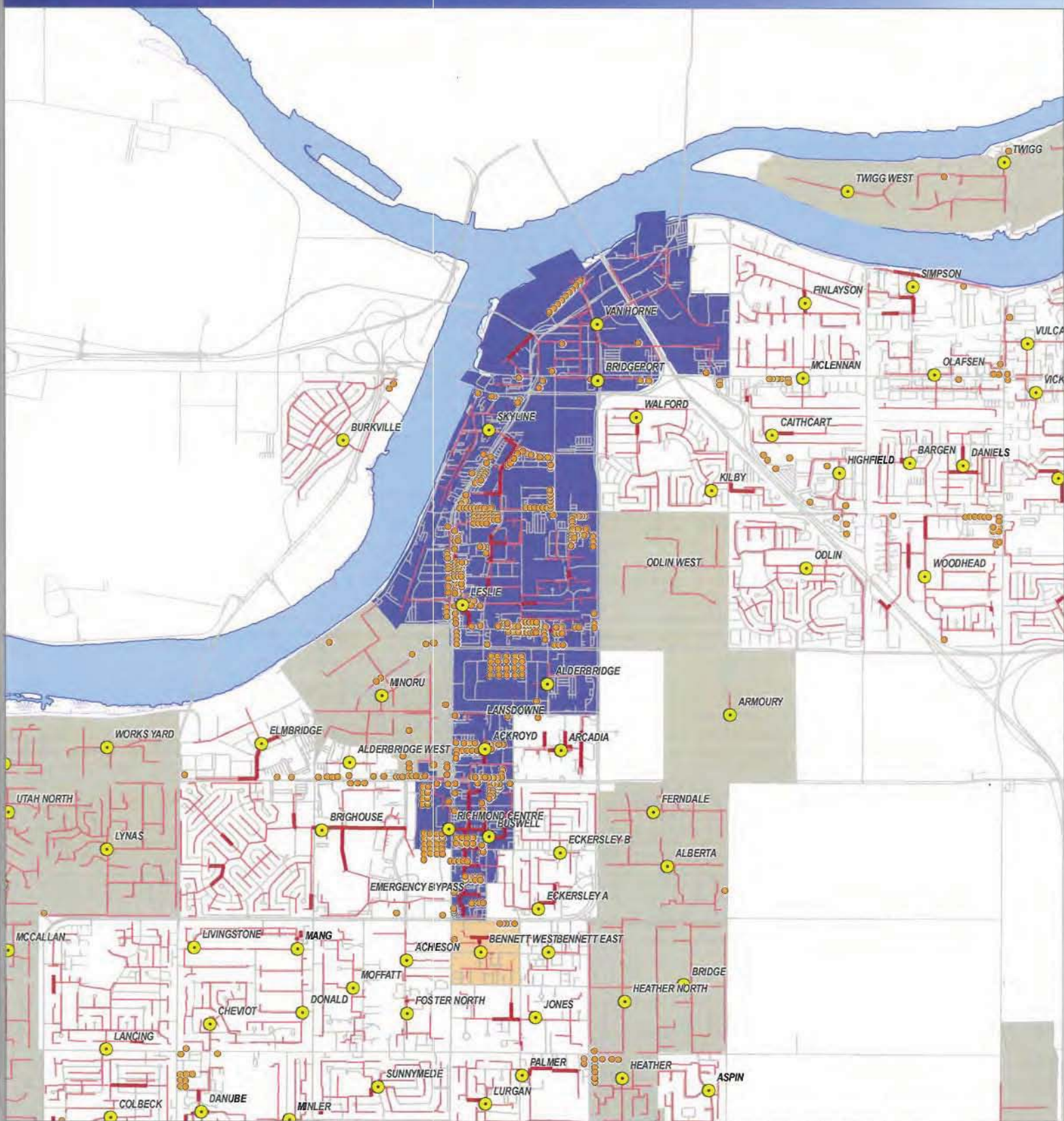
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Meters







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### Catchments with Grease Problems

- Highest Level of FOG
- Second Highest Level of FOG
- Third Highest Level of FOG

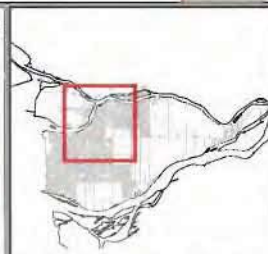
**PWT - 26**

Data Source: Data: March, 2011  
Map Prepared By: Bureau  
Map Edited By: spang

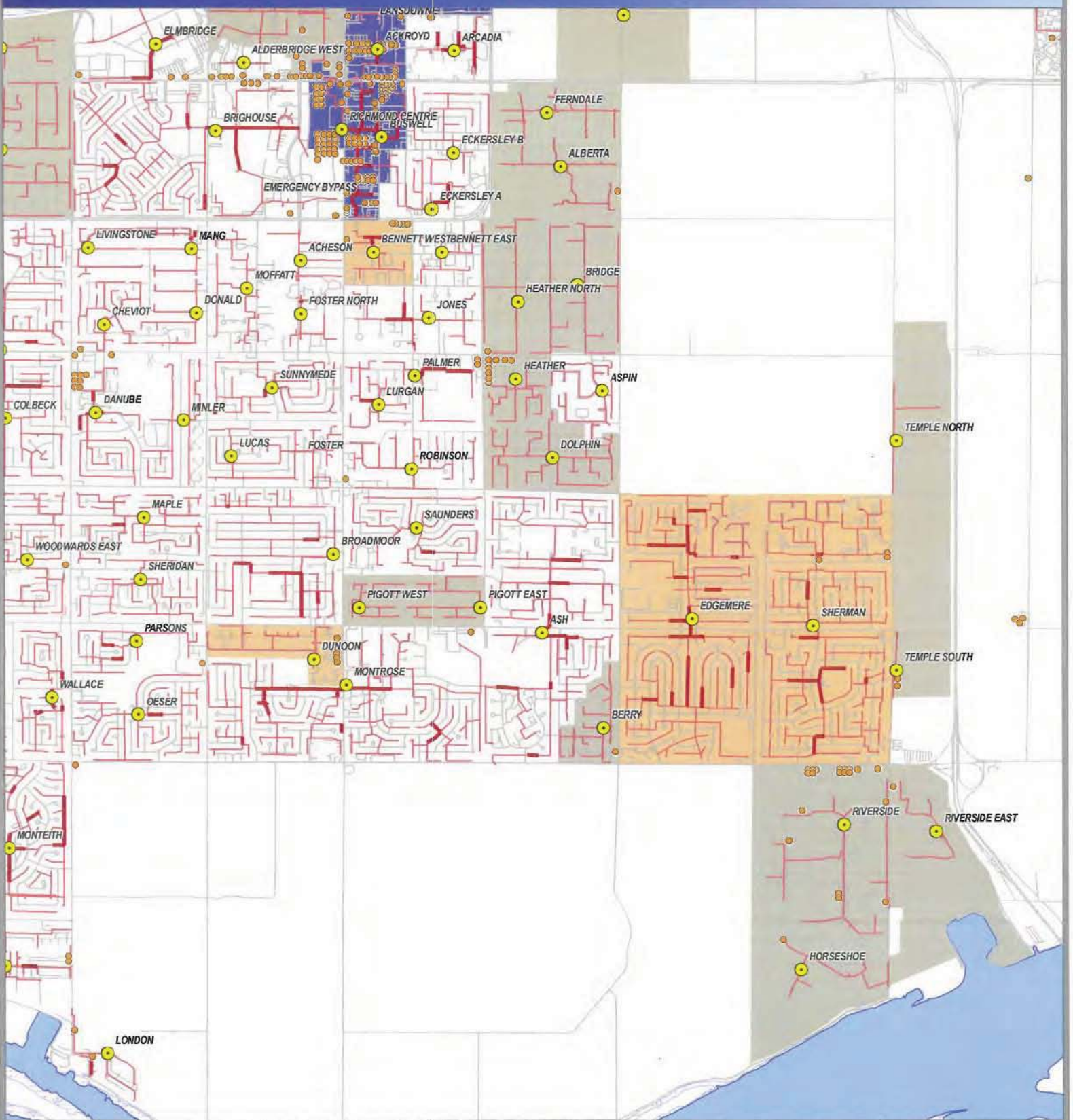
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### Catchments with Grease Problems

- Highest Level of FOG
- Second Highest Level of FOG
- Third Highest Level of FOG

**PWT - 27**

Data Source Date: March, 2011  
Map Prepared By: James  
Map Edited By: spg

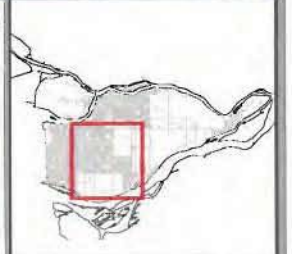
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City of Richmond










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### Catchments with Grease Problems

-  Highest Level of FOG
-  Second Highest Level of FOG
-  Third Highest Level of FOG

**PWT - 28**

Date New report Date: March, 2011  
Map Prepared By: J. Jansen  
Map Edited By: J. Jansen

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