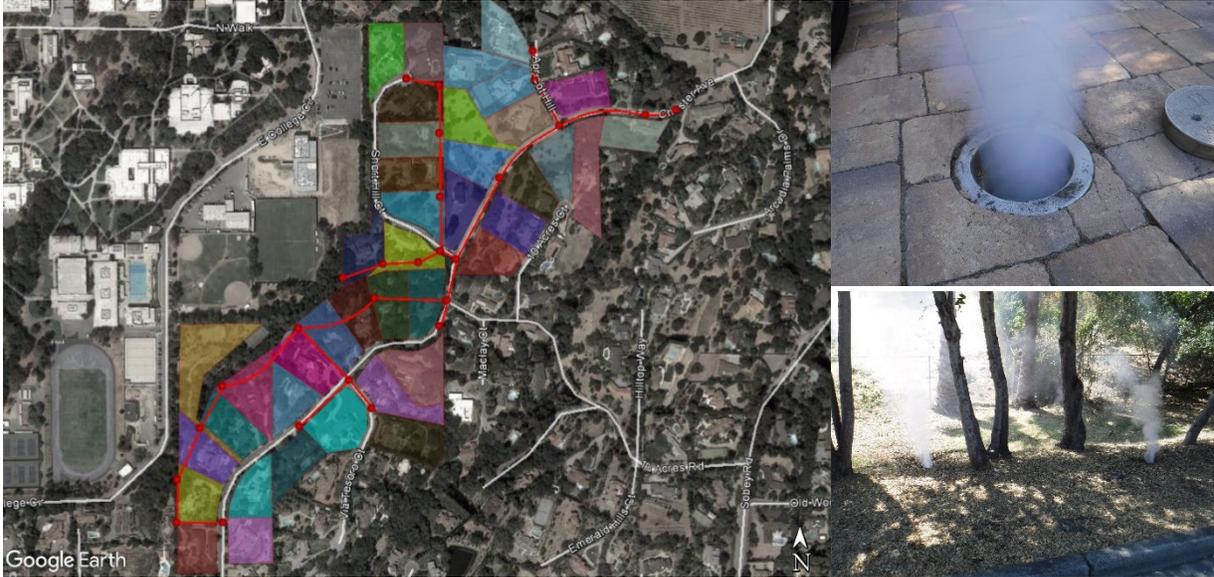


West Valley Sanitation District Sanitary Sewer Smoke Testing



Prepared for:

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Abbreviations and Acronyms

Abbreviations/Acronyms	Definition
CCTV	Closed-Circuit Television
CIP	Capital Improvement Plan
I/I	Inflow and Infiltration
RG	Rain Gauge
SSO	Sanitary Sewer Overflow

Terms and Definitions

Term Definition

Infiltration, groundwater	Groundwater infiltration (GWI) is groundwater that enters the collection system through pipe defects. GWI depends on the depth of the groundwater table above the pipelines as well as the percentage of the system that is submerged. The variation of groundwater levels and subsequent groundwater infiltration rates is seasonal by nature. On a day-to-day basis, groundwater infiltration rates are relatively steady and will not fluctuate greatly.
Infiltration, rainfall-dependent	Rainfall-dependent infiltration (RDI) is similar to groundwater infiltration but occurs as a result of storm water. The storm water percolates into the soil, submerges more of the pipe system, and enters through pipe defects. RDI is the slowest component of storm-related infiltration and inflow, beginning gradually and often lasting 24 hours or longer. The response time depends on the soil permeability and saturation levels.
Inflow	Inflow is defined as water discharged into the sewer system, including private sewer laterals, from direct connections such as downspouts, yard and area drains, holes in manhole covers, cross-connections from storm drains, or catch basins. Inflow creates a peak flow problem in the sewer system and often dictates the required capacity of downstream pipes and transport facilities to carry these peak instantaneous flows. Overflows are often attributable to high inflow rates.
Surcharge	When the flow level is higher than the crown of the pipe, then the pipeline is said to be in a surcharged condition. The pipeline is surcharged when the d/D ratio is greater than 1.0.

Executive Summary

Scope and Purpose

V&A Consulting Engineers, Inc. (V&A) has completed sanitary sewer smoke testing for West Valley Sanitation District (District). Testing was performed on June 19, 2018 in Basin 10 of the District's collection system (Figure ES-1). Flow monitoring was performed in this basin during the 2016 wet weather season as a part of the District's ongoing flow monitoring program. Monitored as Site E10 (see report titled 15-0210 West Valley Sanitation District FM and II Final Rpt'), this basin ranked 2nd in Inflow out of 15 monitored basins during the flow monitoring study.

These results made this basin a good candidate for smoke testing to identify sources of inflow and infiltration. It should be noted that this basin consists of 41 parcels with homes that could be characterized as large and well-maintained. As these homes are fairly large with more bathrooms and other vents than typical single-family homes and the lots are also fairly large, extra efforts were made to check each house for smoke issuing from the roof vents. The general terrain is rolling hills with some of the main pipelines running in the rear of properties. V&A was able to access most of the backyards that had pipelines and/or manholes to check for defects and coverage.

Smoke testing involves forcing non-toxic smoke-filled air into sanitary sewer lines. The smoke exits through openings into the sewer system, such as manholes, building roof vents, and defects. Defects may include catch basins, roof downspouts, basement and foundation drains, all of which may contribute to storm water inflow. Smoke may also locate defects in the pipe or laterals, following a path from the defect and exiting at the ground surface.

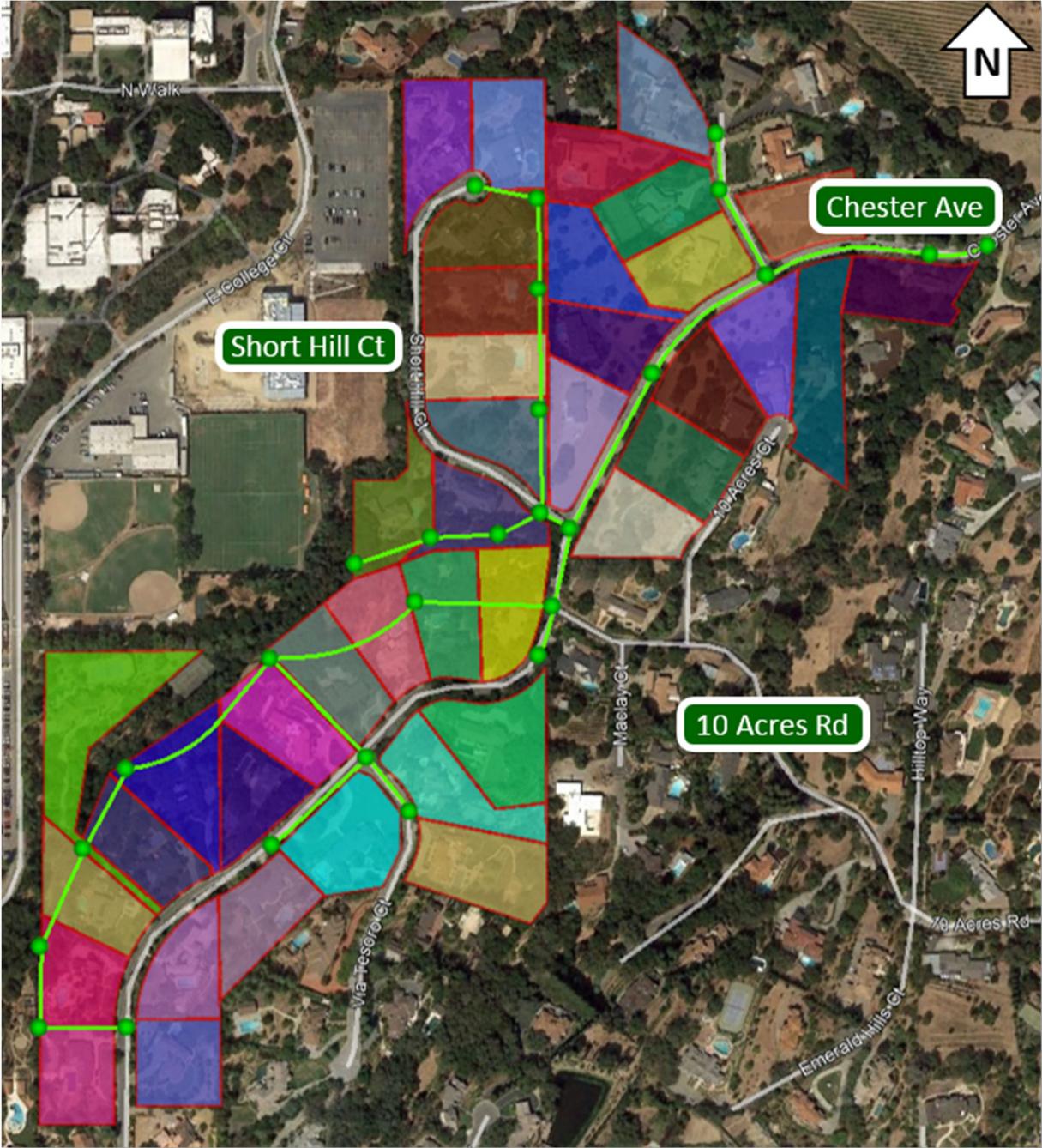


Figure ES-1. Map of Area of Testing

Summary of Findings

Smoke Returns

A total of seven smoke returns were found. Smoke returns were classified as “Severe”, “Moderate” or “Light” per the potential for inflow¹ or infiltration into the collection system. The types and severity of the smoke returns found are summarized in Table ES-1.

Table ES-1. Summary of Smoke Testing Returns

Type of Return	Light	Moderate	Severe	Total
Upper/Lower Lateral	1	0	0	1
Cleanout	0	2	2	4
House w/o smoke*	n/a	n/a	n/a	2
Total	1	2	2	7

* - This return does not have an inflow rating but is recorded because there may still be a defect associated with the lateral.

¹ A “severe” return may be a storm catch basin connected to the sanitary system; a “moderate” return may be an area drain that may drain a flooded parcel; a “light” return may be an above-grade cleanout with a missing cap.