Town of Los Altos Hills
Sanitary Sewer Collection System Progress Report
Contract Year 2016

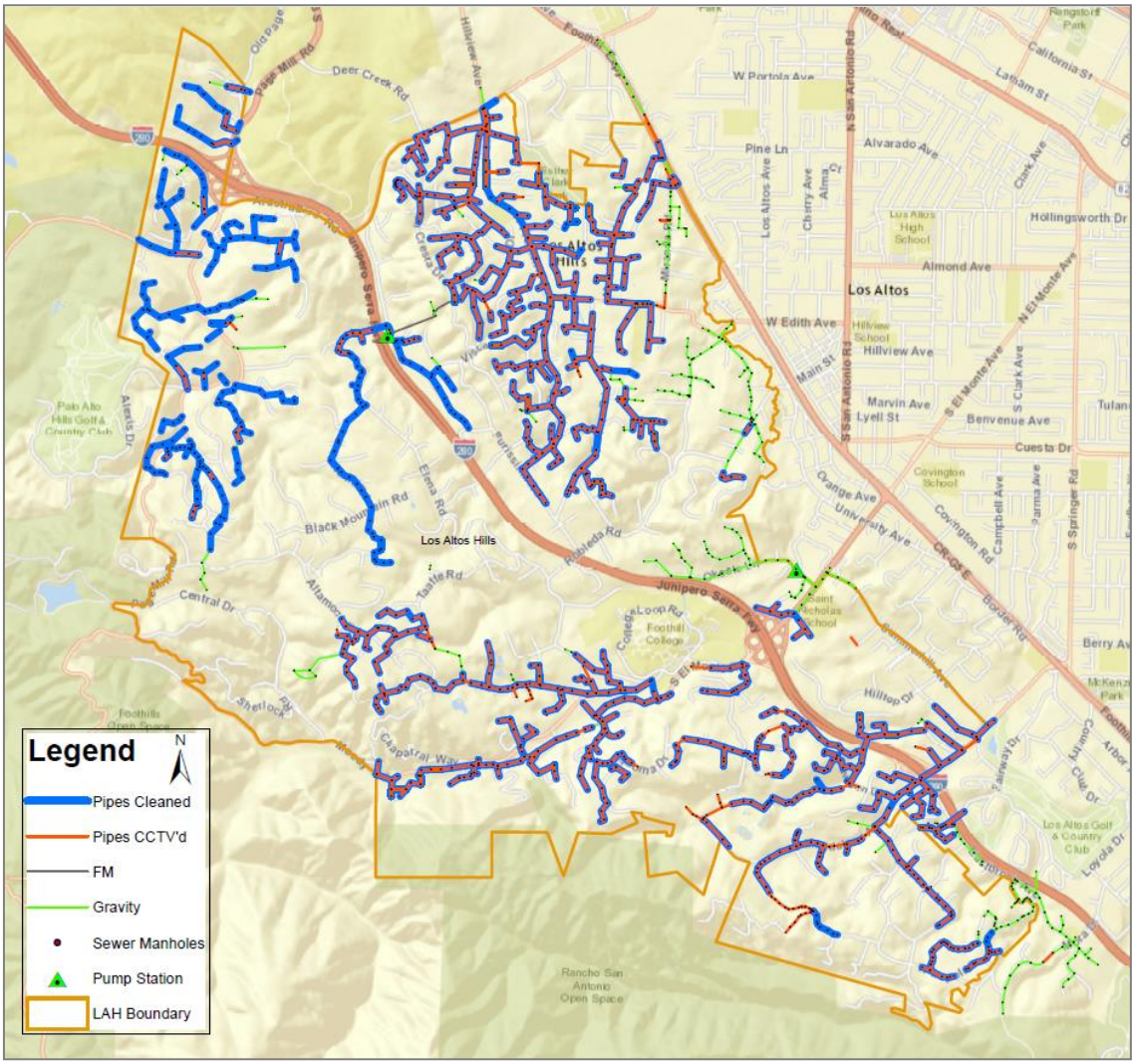
Reporting Month: January 2017
Report Date: April 20, 2017

I. INTRODUCTION

Figure 1 shows the Town of Los Altos Hills sewer system, including a summary of pipes cleaned and inspected from August 1, 2014 through the current period.

- Area served: 8.8 square miles
- Miles of sewer pipelines: 56.13
- Number of residential parcels: 1,773
- Number of non-residential connections: 8

Figure 1. Town of Los Altos Hills Sewer System



II. PUBLIC WORKS DIRECTOR/CITY ENGINEER HIGHLIGHTS

In June 2014, the City Council authorized the City Manager to execute an agreement with West Bay Sanitary District (West Bay) to provide operation and maintenance services as well as emergency overflow response services to the Town's sewer collection system.

In June 2015, West Bay's contract with the Town was extended for another three years. The extension was authorized to provide maintenance consistency and budget predictability for the Town. West Bay is scheduled to complete one full round of cleaning of the entire sewer system by the end of the third contract year (July 2017), and one full round of CCTV inspection in the fourth contract year.

a. Sewer System Maintenance Highlights

There were no significant issues noted during this month's cleaning operations. West Bay performed routine maintenance operations at both the Purissima and O'Keefe pump stations. One unscheduled repair was performed at the Purissima pump station due to a dry pit pump failure. This pump failure caused a short that led to failure of the overload unit and soft starter. The pump was replaced on the same day while the overload unit and soft starter were replaced on the following day

During CCTV inspections, West Bay marked one pipe with a structural grade 3 defect (described by NASSCO PACP as likely requiring action after 10 years) and one pipe with a structural grade 5 defect (described by NASSCO PACP as likely requiring action within 1 to 5 years) for follow up. Follow up will involve either repair/rehabilitation under a future capital improvement program (CIP), or pipe patch by West Bay under their current maintenance contract.

All structural defects observed through October 2016 that were not addressed by previous CIP projects are being reviewed using the Town's CIP development process. This process begins by evaluating the system as a whole using the risk model. Data from the risk model is further inspected to refine project recommendations. For example, some defects, such as infiltration, appear as moderate O&M defects and may require review outside of the risk model along with severe structural defects. Also, the original dataset may include anomalies and errors that can be identified through the review of risk model results. When these anomalies are corrected manually, pipes that are not otherwise identified by the risk model may require inclusion on the CIP list. Further, pipes with severe structural grade 5 defects, but with lower consequences of failure, may have a lower risk score that is overridden during CIP development. Finally, some defects observed after October 2016, including defects that were observed during the current reporting period, are being considered on a case by case basis for repair as part of the 2018 CIP.

During this month there was one reported SSO that resulted in 1400 gallons of overflow. The overflow occurred from a manhole in an easement by 27161 Fremont Road and was caused by root intrusion. This SSO is discussed further, under "SSO Review".

A summary of completed sewer maintenance tasks is provided in Table 1 on the following page. More detailed information is provided later in this report, and is also shown in the attached maps.

Table 1. Summary of Completed Tasks (Current Contract Year August 2016 – July 2017)

Task	Month of January 2017	Contract Year to Date	Compare to One Year Goal[1]
Sewer Cleaning • 36-month and 24-month Schedule • High Frequency (12- and 6-month) • Other, Unscheduled Cleaning	• 0.63 mile • 1.33 mile • 0 miles	• 3.99 mile • 5.51 mile • 0 miles	37.17% of Goal (50% of Time Elapsed)
Pump Station • Preventive Maintenance • Unscheduled repairs	• 4X • 1X	• 24× • 4X	50% of Goal
CCTV Inspection • Routine Schedule (30 mos) • Other Unscheduled CCTV	• 1.24 mile • 0 mile	• 6.62 mile • 0 mile	37.63% of Goal
SSO Response • No. of SSOs – Sewer Main	• 1	• 1	N/A

Cleaning

Figure 2a shows pipe cleaning progress for previous (PREV) and current (CURR) contract years. The previous contract years are a consolidation of the first and second contract years. Since August 1, 2014, 78.04 percent of the Town's collection system pipes have been cleaned. The progress chart includes information regarding pipes that have been cleaned more than once due to their inclusion on the High Frequency schedule. Percentages are based on the number of pipe segments cleaned excluding repeat cleaning. Calculating percentages using the number of pipes is a more consistent approach than using pipe lengths, due to differences between existing records and field observations.

Figure 2b shows cleaning results for the Town's pipes for the current contract year only. These cleaning results represent 16.12 percent of the system. During the current contract year, 50.20 percent of the cleaned pipes had roots, 15.26 percent had debris, 3.21 percent had grease, and 31.33 percent were clear.

[1] Performance is based on annual targets. Monthly comparisons are provided for reference only.

Figure 2a. Cleaning Progress as of January 31, 2017.

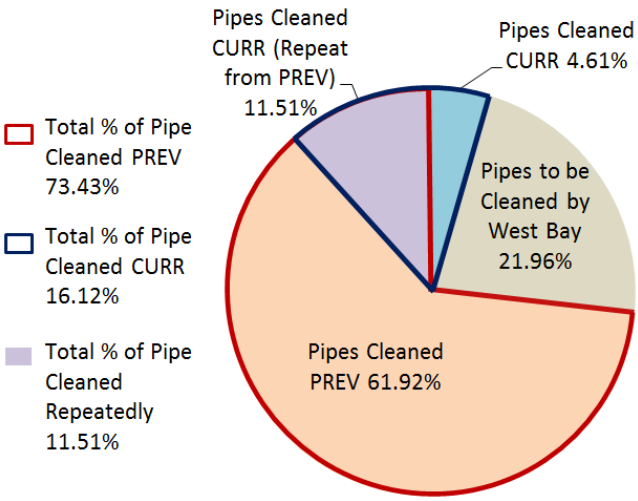
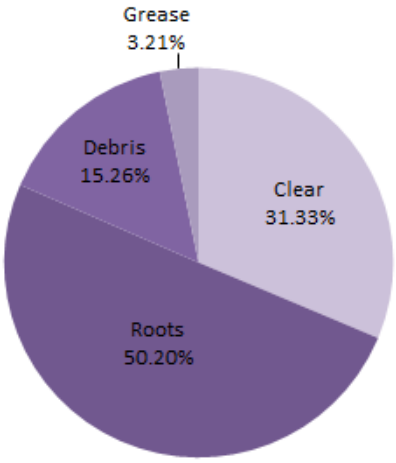


Figure 2b. Cleaning Results for the Current Year to Date. (Chart represents 16.12% of system).



Prior to hiring West Bay, the Town did not have an aggressive and structured sewer pipe cleaning program. As a result, a portion of West Bay's cleaning activities includes removal of roots, grease, and debris from pre-contract years. After West Bay completes one entire system cleaning, maintenance needs are expected to improve. The Town expects to finish a system cleaning by the end of the current contract year.

During the first contract year, from August 2014 through July 2015, West Bay focused on cleaning pipes that had high numbers of SSOs. During the second contract year, from August 2015 through July 2016, West Bay began performing maintenance operations one sewer "branch" or drainage area at a time. This approach continues in the current contract year. Cleaning results from the combined previous contract years, and also cleaning results to date, are summarized in Tables 2 and 3. Although the percentage of roots in the current contract year is higher than the previous contract years, the severity of roots encountered by West Bay this current contract year is lower compared to the previous years.

High frequency pipe cleaning and chemical root control are two measures the Town is implementing to help to maintain its system. Additionally, the ongoing CIP that aims to replace the most structurally deficient pipes will also aid in addressing issues within the system. Some of the pipes with the worst structural defects also contribute to the presence of debris and roots in the system.

Table 2. Cleaning Results PER CONTRACT YEAR by Percent of Pipe Segments

Pipe Cleaning Result	Previous Contract Years 1 & 2 (73.43% of System Cleaned)	Current Contract Year (16.12% of System Cleaned)
Clear	31.10%	31.33%
Roots	23.82%	50.20%
Debris	43.46%	15.26%
Other	1.62%	3.21%
Total	100% of Cleaned Pipes	100% of Cleaned Pipes

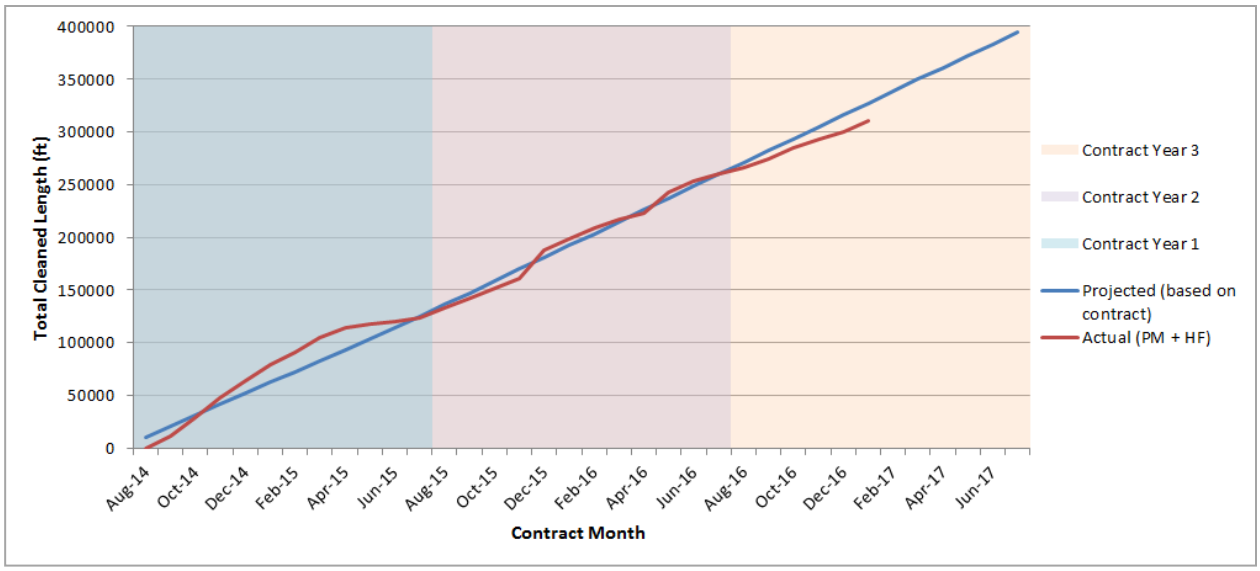
Note: The sum of the previous contract year percentage (73.43%) and current contract year (16.12%) is not the total percentage of pipe cleaned in the system to date. There is an 11.51% overlap between the 3 contract years because of the pipes that have been cleaned more than once due to the High Frequency cleaning schedule.

Table 3. Cleaning Results TO DATE by Percent of Pipe Segments

Pipe Cleaning Result	Progress Since August 1, 2014
Clear	31.14%
Roots	27.91%
Debris	39.09%
Other	1.86%
Total	100% of Cleaned Pipes

Figure 3 shows West Bay's cleaning progress since they started maintaining the Town's sanitary sewer collection system in August 2014. West Bay has been effective in meeting each completed contract year's total goal for cleaning footage, and have developed a plan that completes all sewer "branches" by June 2017, followed by cleaning of all remaining uncleaned pipe segments by July 31, 2017.

Figure 3. West Bay Cleaning Progress

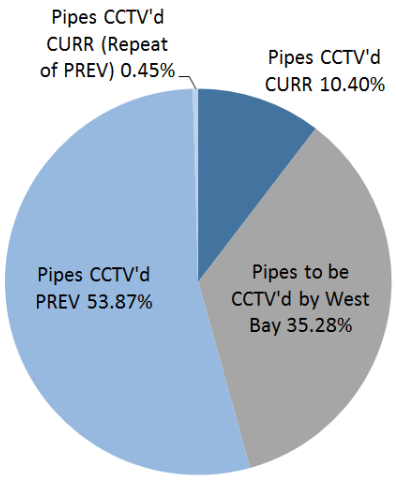


Note: PM = Preventive Maintenance; HF = High Frequency

CCTV Inspection

Figure 4 shows the progress of West Bay's CCTV inspection of the Town's system. For consistency, percentages shown are based on the number of pipe segments inspected rather than pipe length. As of January 31, 2017, 64.72 percent of the system had been inspected. Of the 64.72 percent, 10.40 percent was inspected during the current contract year. The remaining 35.28 percent of pipes in the system will be inspected during the current contract year and fourth contract year.

Figure 4. CCTV Inspection Results as of January 31, 2017.



As part of West Bay's CCTV process, pipes with NASSCO PACP Grade 4 or 5 Operations and Maintenance (O&M) defects are placed on the hot spot list. Pipes on the hot spot list receive a more frequent cleaning schedule of 12 and 6 months. Cleaning these pipes more frequently is intended to help address these O&M defects in order to minimize maintenance-related blockages and SSOs. Pipes with Grade 4 or 5 O&M defects will remain on the hot spot list until the O&M issue in question is resolved. West Bay upload the hot spot list to Lucity approximately monthly.

Figures 5a and 5b show structural and O&M defects found during the current contract year. These charts reflect results for 10.85 percent of the system.

During this period, 66.67 percent of inspected pipes had no structural defects, 26.55 percent had Grade 3 or lower structural defects, and 6.78 percent had Grade 5 structural defects. There were no Grade 4 defects reported during this month.

Figure 5a. CCTV Inspection Results CURR January 2017 (Structural). (Chart represents 10.40% of system).

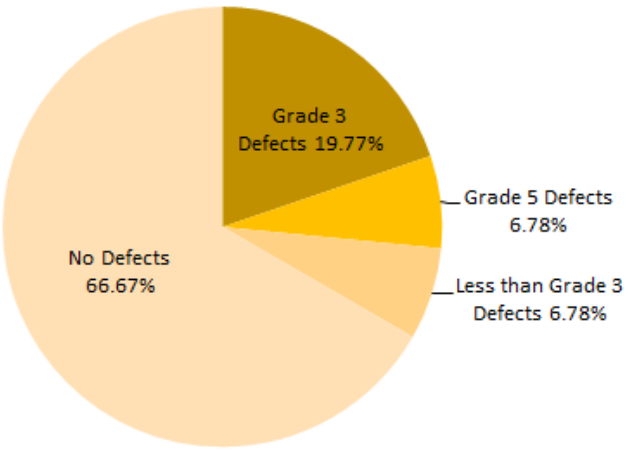
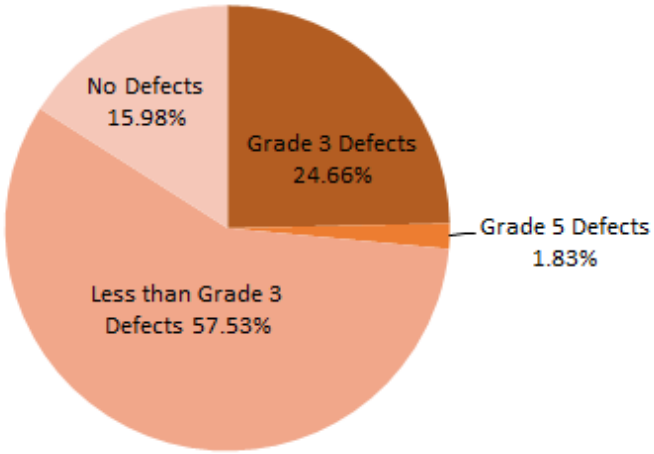


Figure 5b. CCTV Inspection Results CURR January 2017 (O&M). (Chart represents 10.40% of system).



From the pipes inspected in the current contract year, 1.83 percent had NASSCO PACP O&M Grade 5 defects. In addition, 82.19 percent of the inspected pipes had O&M Grade 3 or lower defects. This group excludes the 15.98 percent of pipes with no O&M defects.

West Bay is continuing to CCTV pipes in Branch 2 of the system have not been inspected. After this Branch is completed, they will begin inspecting the remaining, uninspected system pipes. In addition, West Bay has continued to provide field follow-up notes to the Town as part of the CCTV process. These field notes are being used to help evaluate and refine Risk Model results, and to develop the Capital Improvement Program. The CIP addresses the most critical pipes with Grade 4 and 5 structural issues, as well as other pipes with problematic Grade 3 defects. Example Grade 3 defects that are addressed through the CIP may include infiltration, sags, and pipes with multiple joint offsets and defects.

The observed CCTV Structural and O&M defects are summarized in Tables 4 through 7. During the first year of West Bay's contract, video inspection was prioritized for lines with known issues (based on existing maintenance records and the Town's understanding of the system) and incomplete inspections. This approach helped identify pipes that needed more immediate repair and rehabilitation. In addition, the approach helped identify pipes that require more frequent maintenance.

Table 4. Structural CCTV Results PER CONTRACT YEAR by Percent of Pipe Segments

Pipe Structural Grade	Previous Contract Years 1 & 2 (54.32% of System CCTV'd)	Current Contract Year (10.40% of System CCTV'd)
Grade 5	4.34%	6.78%
Grade 4	0.44%	0%
Grade 3 or Less	95.22% includes 61.96% with no defects	93.22% includes 66.67% with no defects
Total	100% of CCTV'd Pipes	100% of CCTV'd Pipes

Table 5. O&M CCTV Results PER CONTRACT YEAR by Percent of Pipe Segments

Pipe O&M Grade	Previous Contract Years 1 & 2 (54.32% of System CCTV'd)	Current Contract Year (10.40% of System CCTV'd)
Grade 5	4.27%	1.83%
Grade 4	0.81%	0%
Grade 3 or Less	94.92% includes 30.90% with no defects	98.17% includes 15.98% with no defects
Total	100% of CCTV'd Pipes	100% of CCTV'd Pipes

Table 6. Structural CCTV Results TO DATE by Percent Pipe Segments

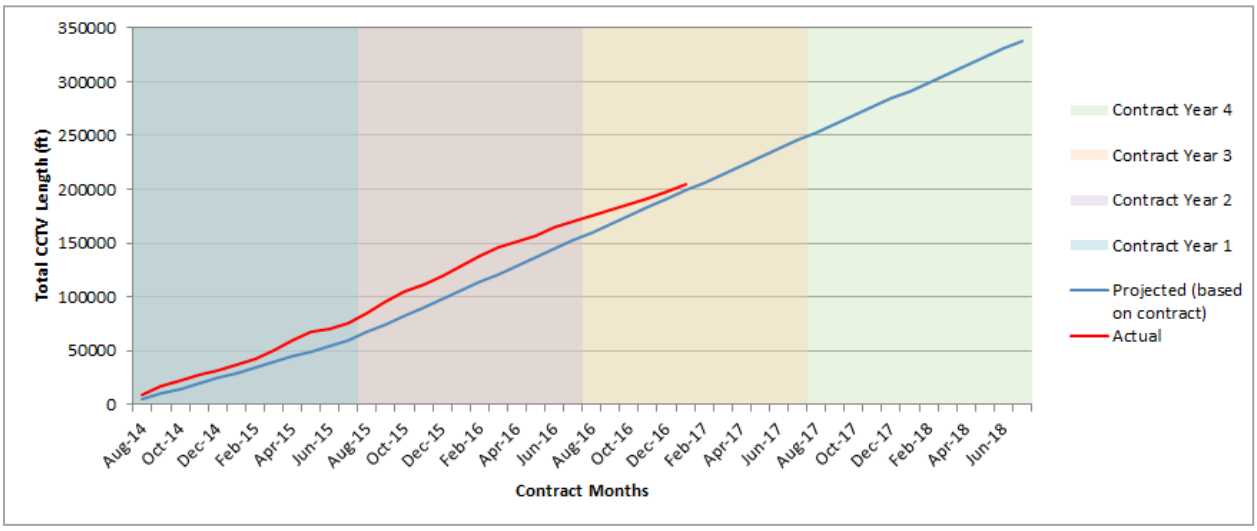
Pipe Structural Grade	Previous Contract Years (1 & 2) and Current Contract Year (64.72% of System CCTV'd)
Grade 5	4.74%
Grade 4	0.37%
Grade 3 or Less	94.89% (includes 62.73% with no defects)
Total	100% of CCTV'd Pipes

Table 7. O&M CCTV Results TO DATE by Percent Pipe Segments

Pipe O&M Grade	Previous Contract Years (1 &2) and Current Contract Year (64.72% of System CCTV'd)
Grade 5	3.88%
Grade 4	0.67%
Grade 3 or Less	95.45% (includes 28.46% with no defects)
Total	100% of CCTV'd Pipes

Figure 6 shows West Bay's CCTV progress since they began maintaining the Town's sanitary sewer collection system in August 2014. West Bay has consistently exceeded the cumulative CCTV inspection goal required by previous and current contract years.

Figure 6. West Bay CCTV Progress



Pump Station Maintenance

This month, West Bay conducted routine maintenance at Purissima and O'Keefe pump stations. At the Purissima station, the dry pit pump for Pump #2 failed and caused a short that led to failure of the overload unit and soft starter. West Bay removed the failed pump and replaced it with a rebuilt pump on the same day. West Bay also installed a new overload unit and soft starter on the following day. The failed pump was delivered to the Los Altos Hills equipment yard, is being rebuilt, and will be held in storage as a backup pump.

SSO Review

Table 8 shows SSOs to date by cause. During this month, there was one Category 1 SSO reported in the Town's Sewer Collection System. The overflow occurred at an easement area at 27161 Fremont Road. An estimated volume of 1400 gallons of sewage spilled that reached the nearby Barron Creek. The overflow was due to root intrusion within the sewer pipe that caused the manhole to overflow. West Bay crew responded to the SSO but was unable to contain and recover the amount of sewage spilled. Cleanup was performed within the easement area after the overflow. In response to this SSO, West Bay will review CCTV data and determine the appropriate maintenance frequency of the sewer pipe to address root intrusion.

In the 2 years since West Bay started maintaining the Town's collection system, the Town has reduced the number of sanitary sewer SSOs. There have been 12 SSOs since West Bay began sewer maintenance operations in August 2014, with the majority of these SSOs occurring in the early part of the contract, before significant cleaning could be achieved. This is a significant improvement compared to the 40 SSOs in the 3 years prior to West Bay's involvement. The Town's effort to proactively implement a structured sewer system maintenance program has been the key to reducing SSOs.

Table 8. SSOs to January 31, 2017, by Cause

Cause of SSO	2017	2016	2015	2014	2013	2012
Root Intrusion	1	1	5	16	9	10
Debris	0	0	1	1	2	0
Grease	0	0	0	0	0	0
Structural	0	0	0	1	0	1
Pump Station Failure	0	0	0	0	0	1
Other	0	0	1	0	1	2
Total SSOs/yr	**1**	**1**	**7**	**18**	**12**	**14**

Attachment I include maps providing additional information on cleaning and CCTV inspection results, and SSOs.

b. Summary of Meetings Held during Reporting Month

During this month, VWHA held a conference call with West Bay staff to discuss progress of maintenance operations and questions regarding the CMMS. LAH and VWHA staff also discussed various sewer-related issues, and a presentation was made at the January 25 City Council meeting.

c. Computerized Maintenance Management System (CMMS) Updates

During the reporting month, routine cleaning and CCTV inspection results were added to the CMMS.

d. Geographic Information System (GIS) and Progress on Manhole Data Collection

In December 2016, the GIS database was updated to match the Lucity CMMS database. In 2017, VWHA began requesting updated GIS data from West Bay on a quarterly basis.

VWHA is in the process of adding recently-acquired manhole rim and invert elevations into the most current GIS layer, for use by WBSD, the Town, and the Town's Hydraulic Modeling Consultant.

e. Maintenance Planning

West Bay has continued to implement the agreed maintenance plan from previous discussions with the Town and VWHA. West Bay continues to clean and CCTV remaining pipes in system Branches 2 and 5. After these branches are complete, West Bay will finish cleaning uncleaned pipes within the remaining system by the end of the contract year.

f. Other

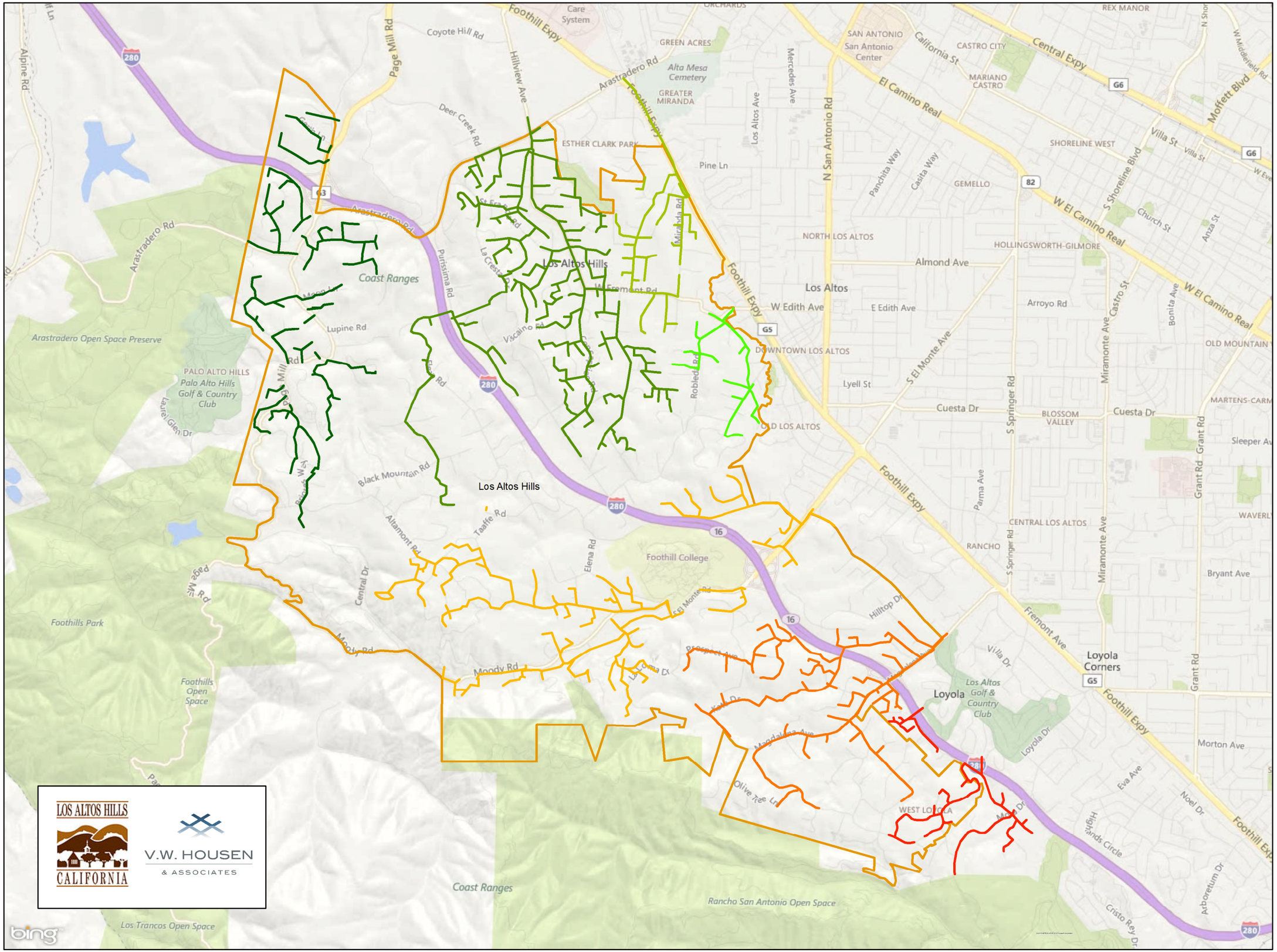
Table 9 provides updates on the progress of the Town's sewer system management activities that are completed in addition to operations, maintenance, and SSO response.

Table 9. Staff Support Activities Summary of Progress

Staff Support Activities	Progress and Comments	Future Milestones	Date Scheduled	Date Completed
Sewer System Management Plan	• SSMP update was completed and adopted by Council. No formal actions will be required for the next five years, other than the SSMP audit to be completed every two years.	• Biennial audit	• May 2018	
2016 and 2017 Sewer CIPs	• The Town's risk model has been completed for the 2016 CIP, and was updated during this reporting period for use in developing the 2017 CIP. • The City Council awarded the construction contract for the 2016 CIP on May 19, 2016. • Town staff anticipate bidding the 2017 CIP projects in the first quarter of 2017.	• Project Construction for 2016 CIP • Project Definition for 2017 CIP.	• In Progress	• In Progress
Cleaning and CCTV programs	• West Bay continues to perform cleaning and CCTV of the remaining pipes of the system.	• Complete Year 3 Contract	• July 31, 2017	• In Progress
2015-16 Hot Spot program	• West Bay continues to upload High Frequency schedule in Lucity on a regular basis.	• Upload all High Frequency Schedules in Lucity.	• Ongoing	• In Progress
Sanitary Sewer Master Plan	• West Bay collected MH data during the prior contract year, and will continue this work over the next several months. Master Plan development will occur concurrently with data collection. • V&A has completed collection of rainfall and flow data. VWHA and Town staff are finalizing estimates for average flow allocations to be assigned to EDUs flowing to the cities of Los Altos and Palo Alto. • Flow calculation results were completed by VWHA and are now being reviewed by the Town. • Woodward & Curran (W&C) provided details on the required water billing and parcel data; reviewed and imported available manhole data and flow meter data to the model; and reviewed network connectivity and identified preliminary trunk	• Master Plan RFP • Average Flow Calculation Results • Hydraulic Model calibration	• September 2016 • FM results will be integrated into the Master Plan Report. • June 2017	• Completed • Completed • In Progress

Staff Support Activities	Progress and Comments	Future Milestones	Date Scheduled	Date Completed
	network for model.			
Root Control Program	• Staff are reviewing root-related maintenance data to determine whether a root control contract should be implemented in Summer 2017.	• Possible contract in summer 2017	• TBD as needed.	• In Progress

Town of Los Altos Hills
Sanitary Sewer Collection System Map
Sewer Basins (Branches)



LOS ALTOS HILLS CALIFORNIA

V.W. HOUSEN & ASSOCIATES

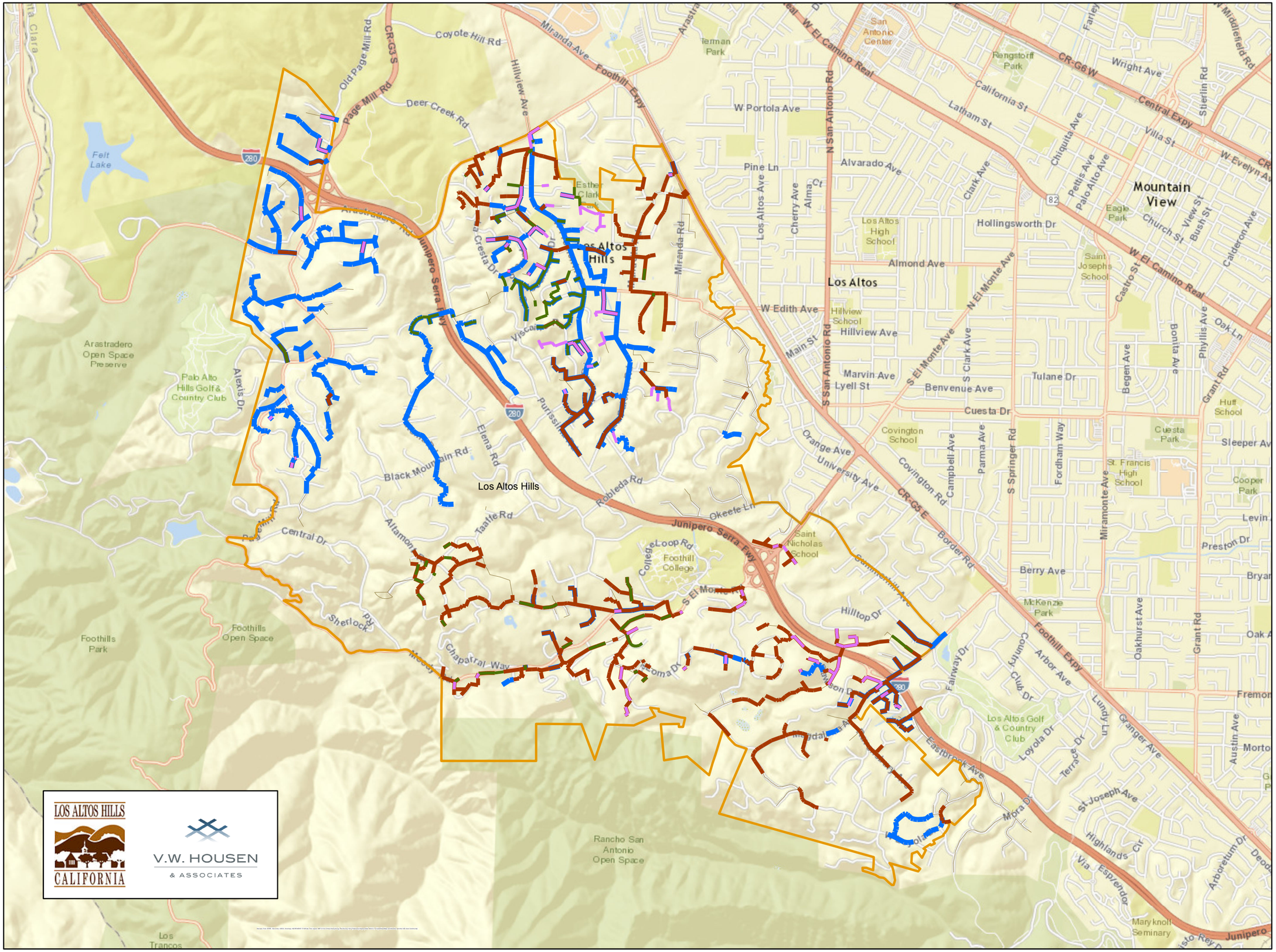
N

0 1,250 2,500 Feet

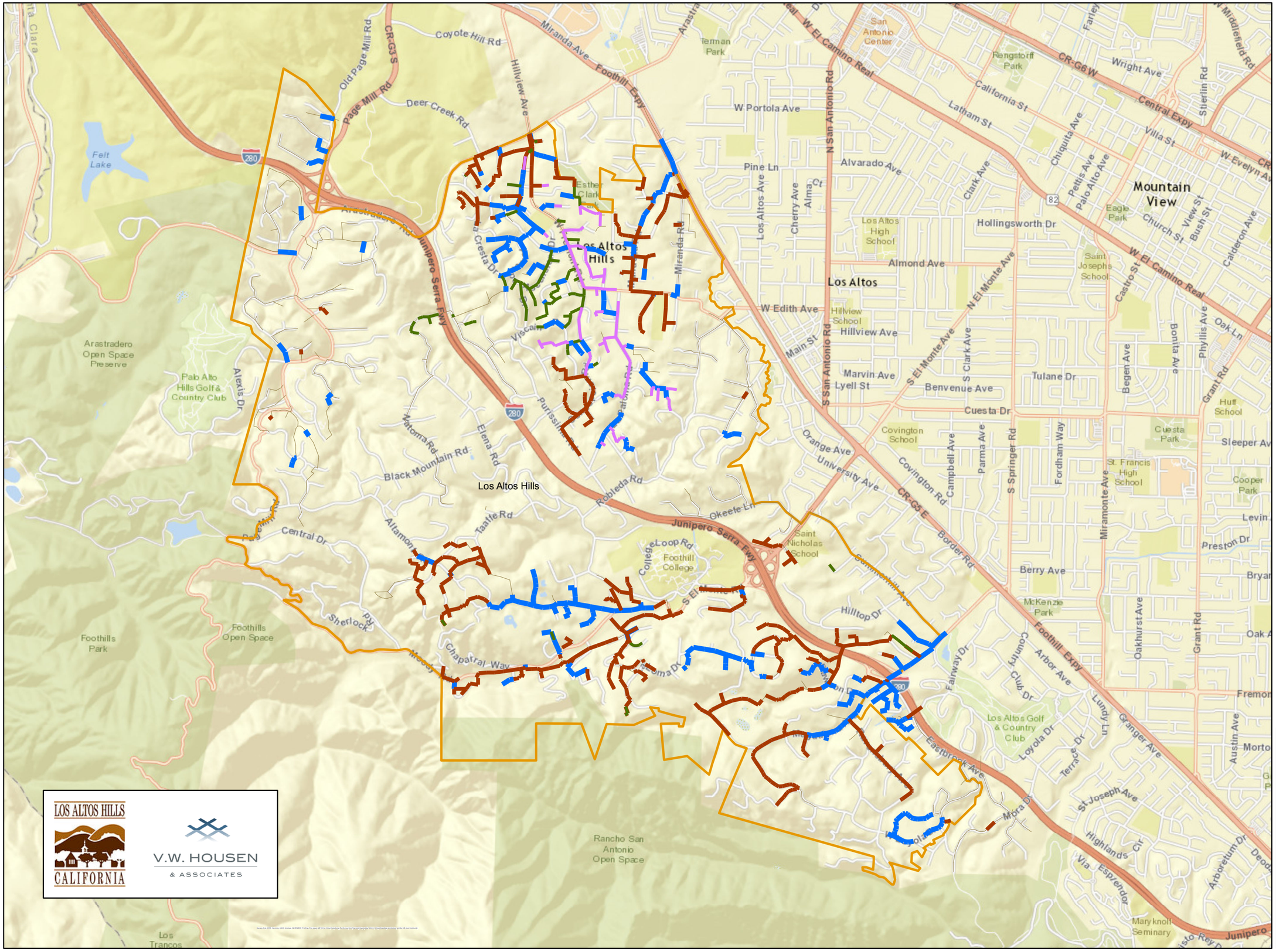
Legend

- Branch 1
- Branch 2
- Branch 3
- Branch 4
- Branch 5
- Branch 6
- Branch 7
- LAH Boundary

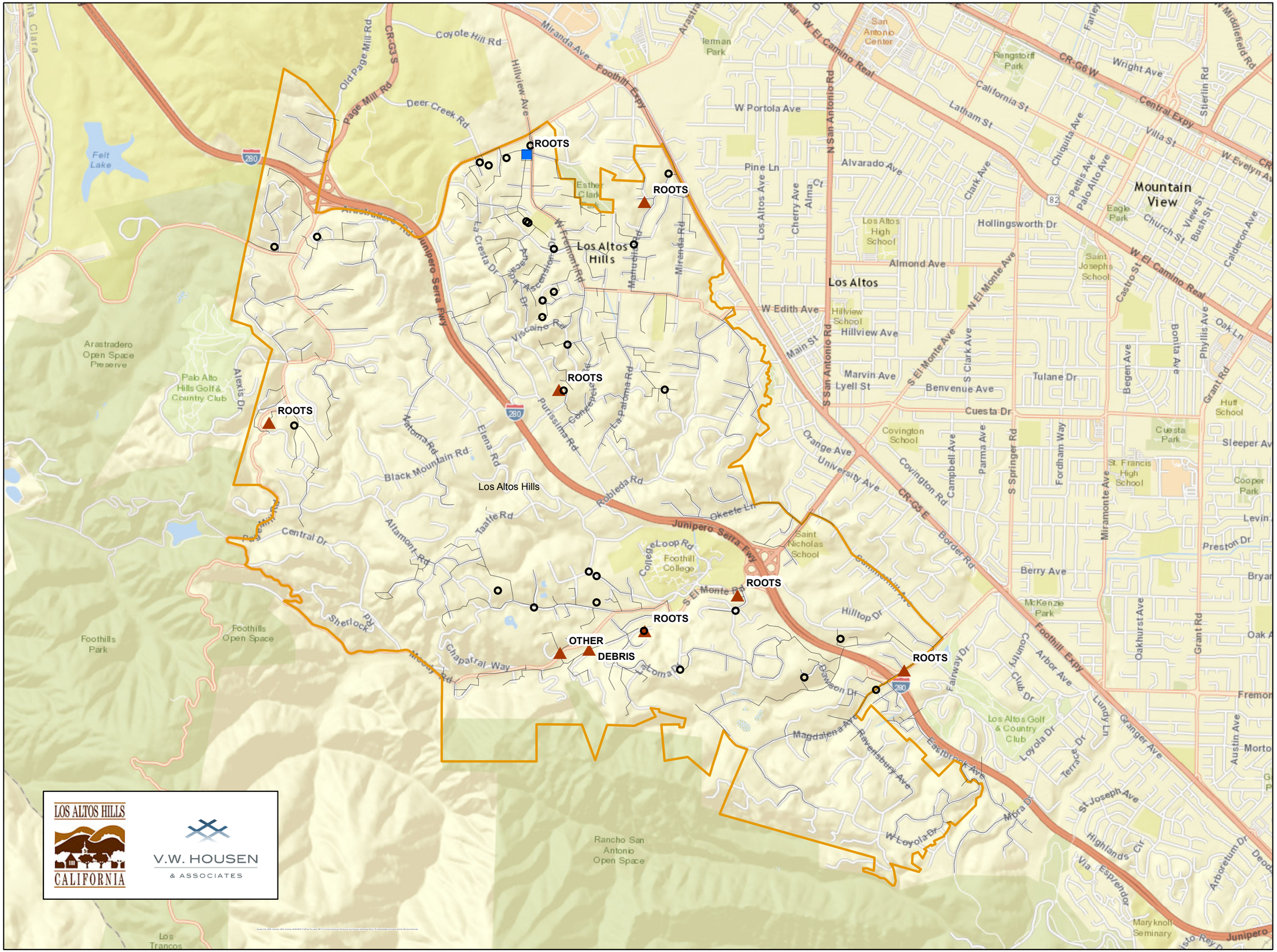
Town of Los Altos Hills
Sanitary Sewer Collection System Map
Pipes Cleaned from Aug 2014 - Jan 2017



Town of Los Altos Hills
Sanitary Sewer Collection System Map
Pipes CCTV'd from Aug 2014 - Jan 2017


Los Altos Hills
Los Altos
Mountain View
Foothill College
Felt Lake
Arastradero Open Space Preserve
Palo Alto Hills Golf & Country Club
Foothills Park
Foothills Open Space
Rancho San Antonio Open Space
Los Altos Golf & Country Club
Junipero Serra Fwy
Foothill Expy
Central Expy
W El Camino Real
Page Mill Rd
Coyote Hill Rd
Deer Creek Rd
Miranda Ave
Hillview Ave
Arastradero Rd
Black Mountain Rd
Robleda Rd
Taaffe Rd
Central Dr
Sherlock Rd
Chapparal Way
Viscaino
Purissima
Altamont
Elena Rd
Alexis Dr
Vista Cresta Dr
Los Altos Ave
Cherry Ave
Alma Ct
N San Antonio Rd
S San Antonio Rd
W Portola Ave
Pine Ln
Alvarado Ave
Almond Ave
W Edith Ave
Hillview Ave
Main St
Marvin Ave
Lyell St
S El Monte Ave
N El Monte Ave
Benvenue Ave
Cuesta Dr
Tulane Dr
Orange Ave
University Ave
Covington Rd
Campbell Ave
Parma Ave
S Springer Rd
Fordham Way
Miramonte Ave
Begen Ave
Bonita Ave
Castro St
Phyllis Ave
Grant Rd
Oak Ln
Sleeper Av
Cooper Park
Levin
Preston Dr
Bryan
Berry Ave
McKenzie Park
Hilltop Dr
Summerhill Ave
Fairway Dr
Country Club Dr
Arbor Ave
Lundy Ln
Granger Ave
Loyola Dr
Terrace Dr
Eastbrook Ave
Mora Dr
St Joseph Ave
Highlands Cir
Via Espiendor
Arboretum Dr
Oakhurst Ave
Austin Ave
Fremon
Morto
Juniper
Deod
Cuesta Park
Huff School
St. Francis High School
Saint Joseph's School
Los Altos High School
Hillview School
Covington School
Saint Nicholas School
Esther Clark Park
Rengstorff Park
Eagle Park
Maryknoll Seminary
San Antonio Center
Los Trancos
Wright Ave
Villa St
W Evelyn Av
Church St
View St
Bush St
Calderon Ave
Stierlin Rd
Middlefield Rd
Fairley
California St
Latham St
Clark Ave
Chiquita Ave
Pettis Ave
Palo Alto Ave
Hollingsworth Dr
Saint Joseph Ave
Cuesta Park
Cooper Park
Huff School
Sleeper Av
Levin
Preston Dr
Bryan
Oak A
Fremon
Morto
Deod
Juniper
Oak Ln
Grant Rd
Phyllis Ave
Bonita Ave
Begen Ave
Castro St
Calderon Ave
Stierlin Rd
Middlefield Rd

Town of Los Altos Hills
Sanitary Sewer Collection System Map
SSOs from 2013 - January 2017



N

0 1,250 2,500 Feet

Legend

- 2017 SSO Cat 1
- 2015-2016 SSOs (all Cat 3)
- 2013-2014 SSOs
- Sewer Pipeline
- LAH Boundary