Carmel Area Wastewater District

Data Science Services for Collection System Gravity Main Cleaning Optimization

DATA ASSESSMENT TASKS 1-8

ANALYTICS AND IMPLEMENTATION TASKS 9-11

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Abbreviations and Acronyms

Abbreviations/Acronyms............Definition

CA ....Condition Assessment

CAPEX ....Capital Expenditures

CCTV ....Closed-Circuit Television System

CIP ....Capital Improvement Plan

CIPP ....Cured-in-Place Pipe

CIWQS ....California Integrated Water Quality System Project—website for reporting of SSO events in California[1]

CMMS ....Computer Management and Maintenance System

COF ....Consequence of Failure

CS ....Collection System

CSV ....Comma-separated values

DB..Database

GDB...Geodatabase

GIS ....Geographic Information System

GM ....Gravity Main, also referred to as Gravity Sewer Main in the collection system

ID ....Identifier

IQR ....Interquartile range—the middle 50% of values on a box plot

LOF..Likelihood of Failure (aka "need-for-cleaning" in this report)

OPEX ....Operating Expenses

QA/QC ....Quality Assurance/Quality Control

SQL ....Structured Query Language

SSO ....Sanitary Sewer Overflow, sewer spill (as of June 2023 the state of California refers to SSOs as "spills" but this report uses "SSOs")

TSV..Tab-separated values

V&A ....V&A Consulting Engineers, Inc.

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[1] https://ciwqs.waterboards.ca.gov/ciwqs/readOnly/PublicReportSSOServlet?reportAction=criteria&reportId=sso_main

Glossary

Glossary	Meaning
Access Database	Microsoft Access database
ANALYTICS	The ANALYTICS phase of V&A's data science services
Box Plot	A standard statistical tool to analyze data sets. To understand how to read the distribution box plots and the variance in the data: https://en.wikipedia.org/wiki/Box_plot
CCTV Data	Condition Assessment data collected with a CCTV camera
Clean	For a condition assessment rating, any segment with "clear" ratings in all categories is designated "clean"
Cleaning Data	Condition Assessment data collected during the gravity main cleaning process
CMMS Data	Data from a computerized maintenance management system database
Condition Assessment	The condition of an asset at a point in time, which may be either operational condition (i.e., cleanliness) or structural condition
DATA Assessment	The DATA Assessment phase of V&As data science services
Dirty	For a Condition Assessment rating, a segment with any "light," "moderate," or "heavy" rating is designated dirty (dirty is the opposite of clean)
Failure Data	Data regarding day/time and type of asset failure—in the case of gravity sewer mains, this is an SSO (spill)
Hot Spot	Gravity Sewer Main segment that is on a high-frequency cleaning schedule
IMPLEMENTATION	The IMPLEMENTATION phase of V&A's data science services
Join or Joined data	Two or more data sets that share a common asset ID
Nearest neighbor	Data science technique for assuming anomalous or missing values in GIS by inheriting the asset attribute in question from its adjacent or closest asset with similar characteristics---typically applied to gravity main segment values for installation year, material and diameter
Orphaned segment	A gravity main segment that is not digitally connected to the rest of the collection system in GIS
Segment	A gravity main pipe that has a unique ID and runs between two adjacent manholes
SmartCover	The device/sensor sold by the company SmartCover which is installed on the underside of a manhole
Outlier	A standard statistical term used when analyzing box plots. Outliers are data points more than 1.5 times below or above the interquartile range (IQR). These are data points outside of 2.689 standard deviations. The extreme low or high data points in a box plot distribution

Executive Summary

Scope and Purpose

In 2019, V&A Consulting Engineers, Inc. (V&A) launched a data science service line focused on supporting our clients who are responsible for collection system operations and maintenance (O&M). This service is designed to help V&A's clients to cost-effectively leverage data and machine learning in order to optimize maintenance and capital expenditures on gravity sewer mains. V&A's Data Science service deliverables are broken into three discreet phases: DATA, ANALYTICS, and IMPLEMENTATION. The completion of all three phases sets Carmel Area Wastewater District ("CAWD") on the path of continuous, incremental, data driven efficiency improvement of its gravity main cleaning and maintenance programs.[2]

CAWD is responsible for the O&M of 82 miles (1,875 segments) of gravity sewer mains and would like to improve its cleaning efficiency through better utilization of their existing data sources. CAWD serves a population of approximately 17,000 in a 5.0 square mile service area with 6,401 residential connections, 376 commmercial/industrial connections and five institutional customers.

V&A's complete Data Science service is delivered in three phases: 1) DATA Assessment, 2) ANALYTICS and 3) IMPLEMENTATION. Key outcomes of each phase are:

DATA Assessment Summary (tasks 1-8)

Phase goals: GIS accuracy and completeness summary (relative to gravity main segments), joining of GIS data with maintenance records from CAWD's CMMS, gravity main segment level summary of cleaning and CCTV inspections to plan (is every gravity main segment cleaned as often as stated in your SSMP), data quality and fitness for advanced analytics summary, best practice data improvements and recommendations.

ANALYTICS Goals (task 9)

Phase goals: with available gravity main segment and condition data, machine learning models predicting need-for-cleaning ("LOF") and SSO risk for each individual gravity main segment are developed.

IMPLEMENTATION Goals (tasks 10-11)

Phase goals: predictions from the ANALYTICS phase along with gravity main segment cleaning and CCTV histories are combined into a gravity main segment cleaning frequency planning spreadsheet tool. Using this tool, recommendations are made for segments that need immediate attention, need to be moved to High Frequency cleaning and may be candidates for less frequent cleaning.

Implementation also includes suggested future/roadmap data science applications for CAWD, such as: Consequence of Failure ("COF") as determined by CAWD can be coupled with V&A's quantified LOF

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[2] For more information about V&A's Data Science service, visit https://www.vaengineering.com/data-science

predictions to enable risk-based gravity main cleaning prioritization.

Summary, Conclusion and Recommendations

1 DATA Assessment

CAWD has a very large quantity of high-quality data that enables machine learning analytics for purposes of optimizing gravity main segment cleaning frequencies, root foaming and SmartCover locations. All of the data sources shown in this DATA Assessment summary were analyzed and cleaned, then were joined with each gravity main segment asset ID from CAWD's GIS file (the asset database of record).
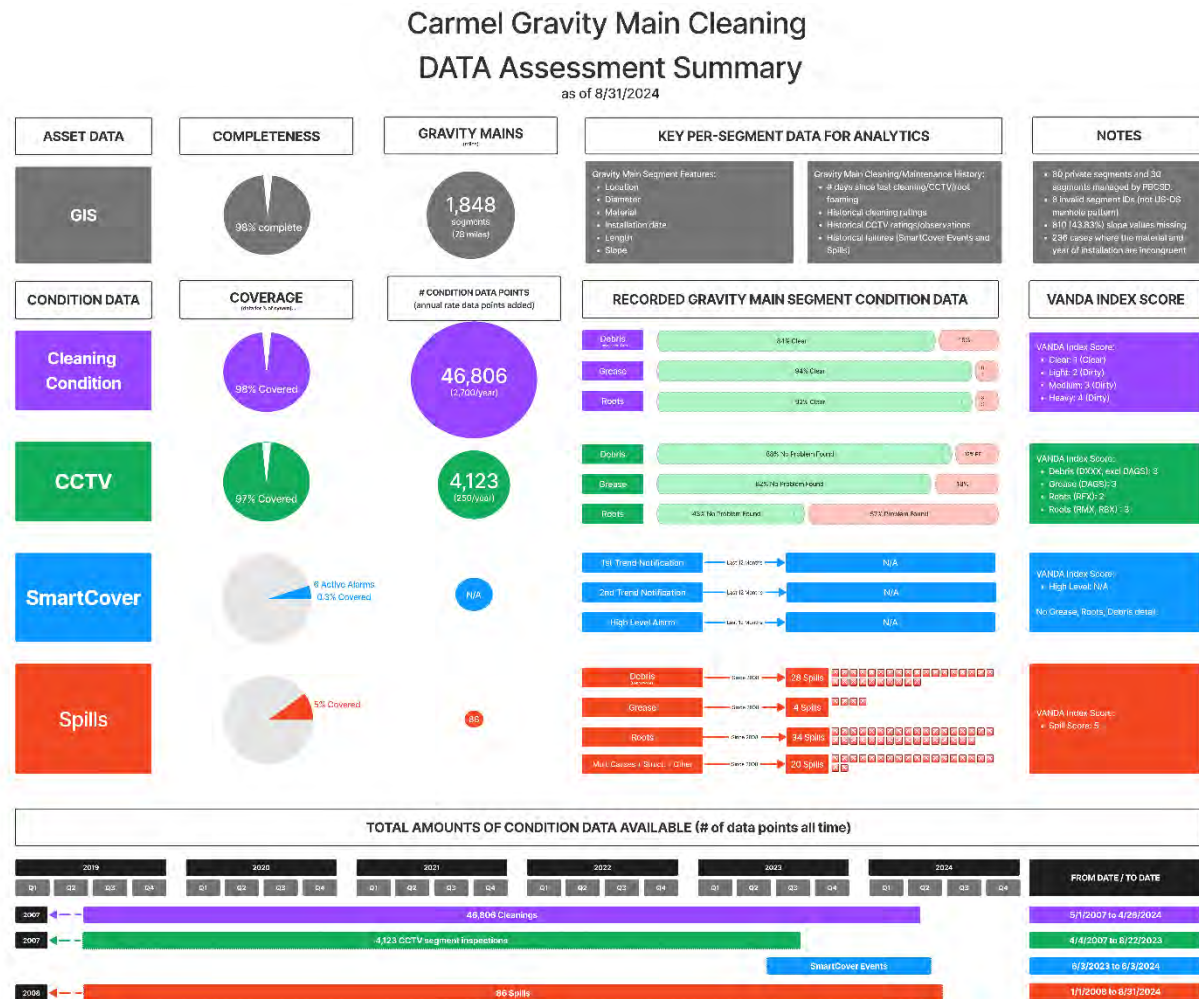
Figure ES 1: CAWD DATA Assessment Summary.

- With the joined data from this DATA Assessment summary, there is evidence that the category 2 spill on segment S622-S616 could have been anticipated and avoided with more frequent cleaning. See 1.3.4

2 ANALYTICS

Using all available and joined condition data from 2014 on, V&A created two machine learning models predicting need-for-cleaning (characterized as LOF) for each gravity main segment on a scale of 1-5. A prediction of 1 meaning that the model predicts an observation for roots, grease or debris (sand, grit or gravel) of "clear", 2 meaning a predicted observation of "light", 3 "medium or moderate", 4 "heavy". Grade of 5 is assigned to a sewer spill. Each predicted LOF is a value with two decimal places (i.e. 1.XX to 5.0).

For a regression prediction such as this (predicting a decimal number between 1-5) it is best practice to develop two machine learning models with high measured accuracy and average the two results. V&A's chosen two machine learning models for this are random forest regressor and gradient boost regressor.

V&A's predicted LOF values have been mapped and visualized for trends and geographic concentrations.

V&A's predicted LOF values have also been inserted into a spreadsheet with the joined data from the DATA Assessment. This spreadsheet is the CAWD Gravity Main Segment cleaning and maintenance frequency decision making tool which is used for making recommended adjustments in the IMPLEMENTATION section.

3 IMPLEMENTATION

3.1.1 Top priority gravity main segments, clean or CCTV asap
- There are 39 gravity main segments with no recorded data from cleaning or CCTV inspection—these segments should be investigated asap

- There are 14 gravity main segments that have not been cleaned or CCTV inspected in the past two years which V&A's machine model predicts have high LOF—these segments should be investigated and considered for addition to a High Frequency cleaning schedule

3.1.2 Segments recommended for High Frequency cleaning
- There are 56 gravity main segments that V&A's analysis and LOF prediction model suggest should be moved to High Frequency cleaning—these should be investigated and confirmed by CAWD

3.2 Regular Frequency cleaning discussion, recommendations for less cleaning
- There are 327 gravity main segments (17%) currently being cleaned or CCTV inspected more frequently than once every 24 months, which V&A recommends for consideration of being moved to 24, 30 or even 36-month cleaning frequency

3.3 SmartCover location analysis and recommendations
- V&A has made some recommendations for SmartCover location based on segments that have high LOF prediction in spite of being cleaned or inspected at High Frequency

3.4 Root foaming analysis and recommendations
- V&A has made some root foaming recommendations based on gravity main segments that have high LOF for roots coupled with low LOF risk for grease and debris (grit, sand or gravel)

3.5 Total cleaning resource requirements planning tool
- CAWD currently cleans approximately 110 miles of gravity main segments per year—V&A has developed a resource planning spreadsheet where total cleaning resource availability can be summarized for any segment cleaning frequency adjustments

3.6 Best practice recommendations

- V&A is recommending adjustments to CAWD's number of cleaning frequencies (currently 14, recommended five)

3.7 Data science futures and roadmap

- After recommendations in this report are discussed and incrementally adopted, consequence of failure can be added as another consideration for gravity main segment cleaning prioritization

- Risk-based gravity main cleaning, where each gravity main segment is cleaned at or before its LOF prediction exceeds a determined level can be adopted in the coming months or years

1 DATA Assessment— tasks 1-8

1.1 Gravity Main GIS Data

The gravity main GIS data establishes the baseline characteristics of each gravity main segment. Location, diameter, installation date, length and slope of each gravity main segment are the key variables that data analytics can be built on. These segment parameters are strongly correlating variables for a pipe segment's potential to accumulate FOG, Roots, Debris (in the case of Carmel this is gravel, sand or grit). Other data from assets adjacent to the gravity mains (laterals, manholes) is considered only for its ability to improve the accuracy or completeness of the gravity main segment data sets.

1.1.1 Gravity mains

This project uses the following GIS data for geographic information regarding the gravity sewer main segments:

- Source: CAWD_WebGIS_v6.gdb (GeoDataBase)
    - File type: GeoDataBase
    - Received on: 5/30/2024
    - *Active_Assets*: 2,006 manholes
    - *Force_Mains:* 34 for mains (8 miles)
    - *Mains:* 1,960 gravity mains (84 miles)

20240530 - CAWD_WebGIS_v6
—— Forced_Mains
—— Mains
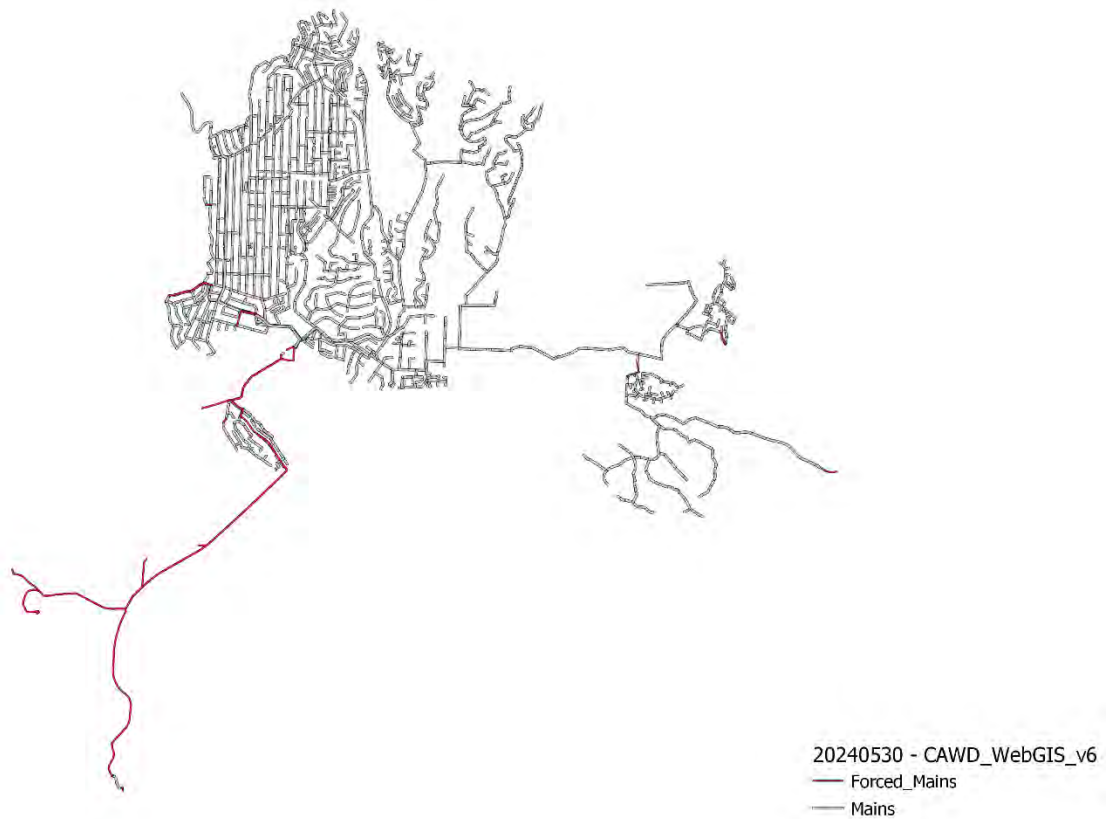
Figure 1-1: Map of Carmel collection system.

- Columns excluded because of nulls (1): ASBUILT_DA (99.95%)

- Columns excluded because of unique value (0):

- Columns discarded (9): ['UP_INVELEV', 'DN_INVELEV', 'UP_INVDPTH', 'DN_INVDPTH', 'GlobalID', 'ASBUILT', 'ASBUILT_LI', 'Length', 'SHAPE_Length']

- Columns renamed (14): {'NAME': 'asset_id', 'UP_STRUCT': 'us_mh', 'DN_STRUCT': 'ds_mh', 'st_length_': 'length_ft', 'DIAMETER': 'diameter_in', 'MATERIAL': 'material', 'YEARBUILT': 'inst_year', 'Slope': 'slope', 'BASIN': 'basin', 'FLOW_BASIN': 'flow_basin', 'CUSTAGENCY': 'agency', 'INSTRUCTS': 'instructs', 'COMMENTS': 'comments', 'geometry': 'geometry'}

- Key columns:
  - *Asset ID*: NAME (asset_id)
  - *Length*: st_length_ (length_ft)
  - *Diameter*: DIAMETER (diameter_in)
  - *Material*: MATERIAL (material)
  - *Install Year*: YEARBUILT (inst_year)
  - *Slope*: Slope (slope)
  - *Hotspot*: Missing column

- There are 80 private segments, and 32 segments managed by PBCSD—these are excluded from the analysis

- Net summary of gravity main segments for analysis:
  - Total raw segments: 1,960
  - Discarded because of agency (private or PBCSD): 112
  - Discarded because of missing gravity main segment asset ID: 0
  - Duplicates merged: 0
  - Selected segments: 1,960 – 112 = 1,848 segments for analysis
- Gravity main segment asset IDs with mismatches between asset ID and adjoining manholes:

Table 1-1: Gravity main segments with IDs mismatched to adjacent manholes.

Gravity Main Segment Asset ID	us_mh	ds_mh
GRIZZLY-Y401c	Y501	Y401
N831-0846	N831	0846
N903-0968	N903	0968
New Main	R806	R807
Q506-Q509	Q506	Q519
R524-R535	R535	R524
R640-R642	R640	5642
S703-S705	S705	S703

1.1.1.1 Gravity main segment diameters analysis

This section analyzes the completeness and quality of the gravity main segment diameters in the GIS file.

- Null/invalid pipe segment diameter entries: 22 (1.19%)
  - Missing/invalid segment diameter values were estimated using nearest neighbor technique

Table 1-2: Distribution of gravity main segment diameters.

Diameter (in) - Values

	Count	Percentage
4	1	0.05%
5	1	0.05%
6	1447	78.30%
8	238	12.88%
10	71	3.84%
12	49	2.65%
15	16	0.87%
16	1	0.05%
18	5	0.27%
24	10	0.54%
27	9	0.49%
	0	0.00%

Conclusion: the gravity main segment pipe diameter data is of sufficient quality for data science analysis.

1.1.1.2 Gravity main segment material analysis

This section analyzes the completeness and quality of the gravity main segment materials in the GIS file.

- Null/unknown/invalid materials: 23 (1.24%)

Table 1-3: Material distribution of gravity main segments, raw data.

Material - Raw Values

	Count	Percentage
VCP	1234	66.77%
PVC	379	20.51%
CIPP/VCP	101	5.47%
HDPE	38	2.06%
Truss	19	1.03%
CIP	17	0.92%
CIPP/ACP	15	0.81%
UNK	12	0.65%
STL	11	0.60%
	10	0.54%
VCP/PVC	9	0.49%
cccc	1	0.05%
DIP	1	0.05%
TRUSS	1	0.05%

- Materials were aggregated as follows:
  - CIP➔"CIPP"
  - CIPP/ACP➔"CIPP"
  - CIPP/VCP➔"CIPP"
  - DIP➔"DUCTILE IRON"
  - HDPE➔"HDPE"
  - OTHER➔"OTHER"
  - PVC➔"PVC"
  - STL➔"STEEL"
  - TRUSS➔"TRUSS"
  - Truss➔"TRUSS"
  - VCP➔"VCP"
  - VCP/PVC➔"VCP/PVC?"

Table 1-4: Material distribution of gravity main segments, aggregated data.

Material - Normalized Values

	Count	Percentage
VCP	1248	67.53%
PVC	382	20.67%
CIPP	133	7.20%
HDPE	38	2.06%
TRUSS	25	1.35%
STEEL	12	0.65%
VCP/PVC?	9	0.49%
DUCTILE IRON	1	0.05%

Summary: the gravity main segment material data is of sufficient quality for data science analysis.

1.1.1.3 Gravity main segment installation date

This section analyzes the completeness and quality of the gravity main segment installation dates in the GIS file.

- Number of invalid or null entries: 59 (3.19%)
  - Invalid/null values can be estimated with nearest neighbor technique
- Mean installation year: 1961

The breakdown of gravity main segment installation years and materials are summarized below:
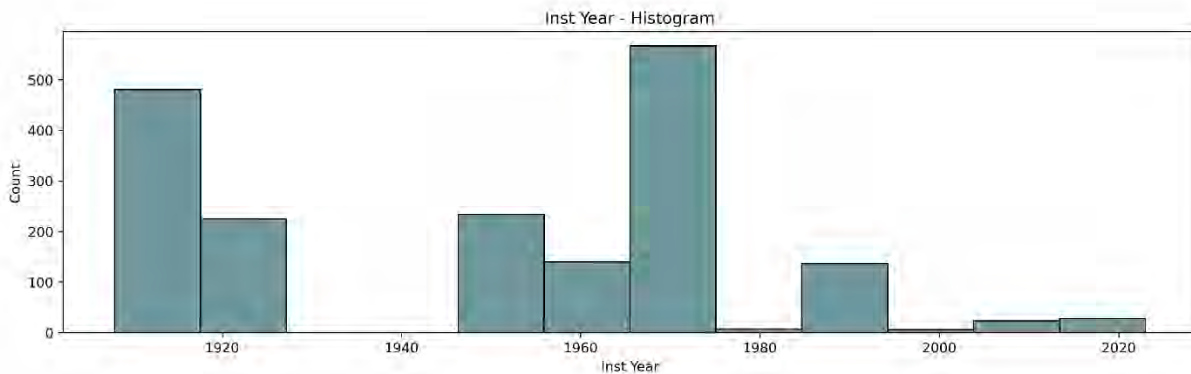
Figure 1-2: Gravity main segment installation years, count histogram.

Inst Year - Map
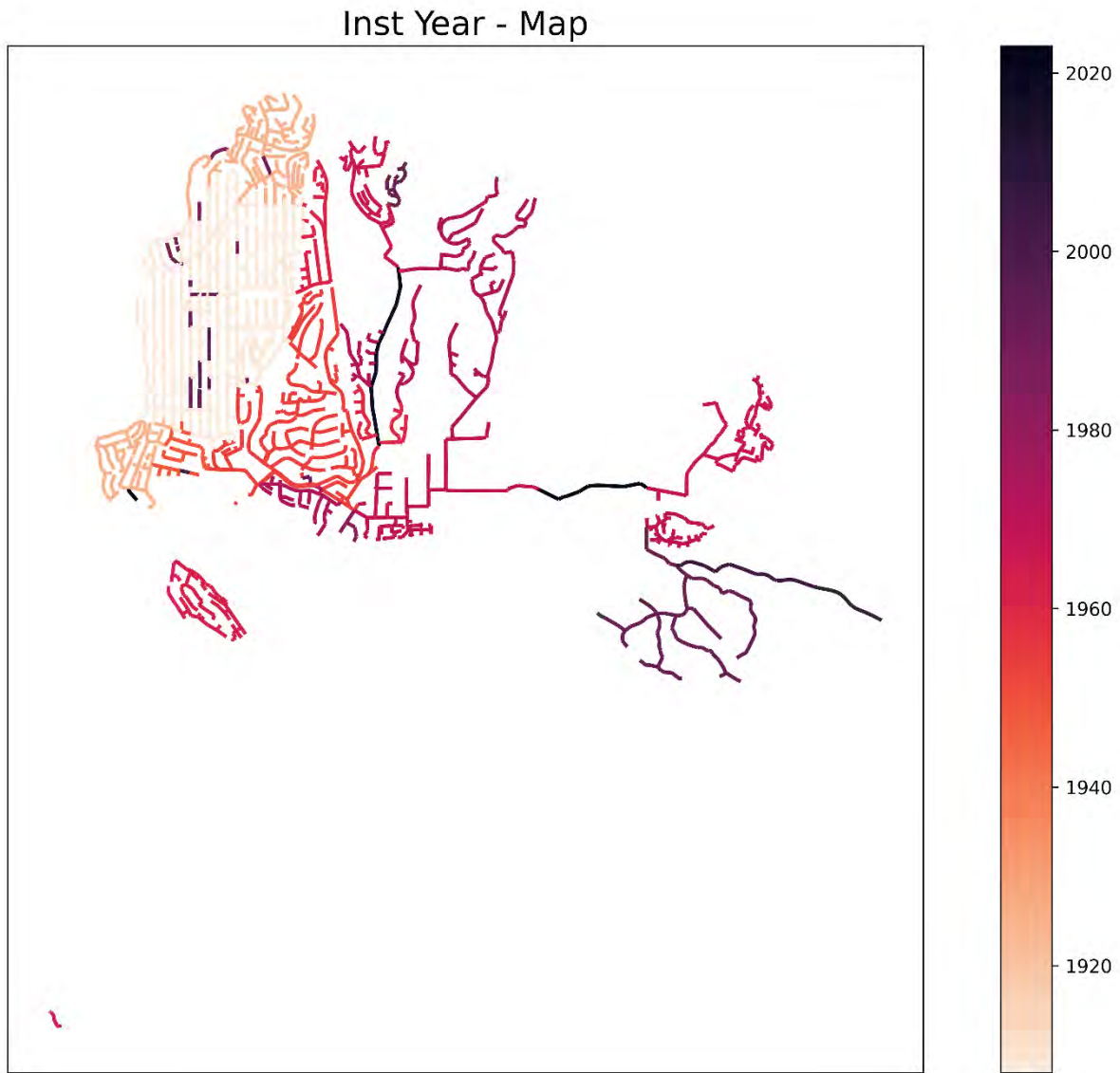
Figure 1-3: Colored map with original segment installation years.
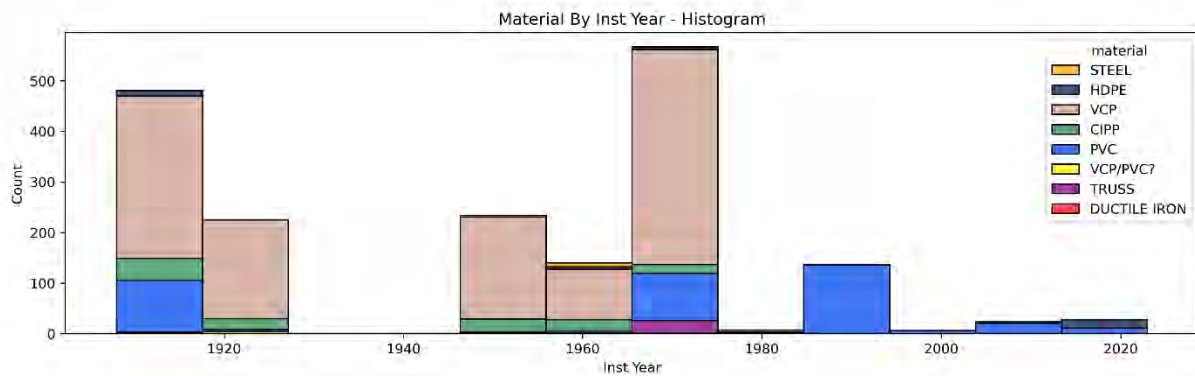
Figure 1-4: Gravity main segment installation years and materials, count histogram.

▪ <u>Summary:</u> the PVC pipes installed prior to 1910 are suspicious

The following 103 PVC gravity main segments showed installation years as 1908—since the earliest _possible_ installation year for PVC is around 1920, these will be assumed to be from 1985 (per discussion with CAWD 7/9/2024).

▪ 'N610-N611', 'N611-O609', 'N620-O659', 'N630-N631', 'N631-N632', 'N632-N633', 'N633-N634', 'N655-N659', 'N761-O716', 'O609-06148', 'O610-0614', '06105-0698', '06108-06109', 'O611-06144', '06110-06115', '06114-06115', '06115-06116', '06116-06119', '06119-06120', '06120-06121', '06121-P656', '06129-06144', '06133-0639', '06134-06149', '06137-06138', '06138-0654', '06139-06138', '0614-0615', '06144-06148', '06145-06146', '06146-0614', '06148-0610', '06149-06133', '0615-0616', '0616-0617', '0617-0619', '0618-0619', '0619-0620', '0620-0621', '0621-0622', '0622-0623', '0623-0604', '0631-06133', '0636-0634', '0637-0638', '0639-0642', '0642-0644', '0643-0644', '0644-0647', '0645-0646', '0646-0647', '0647-0648', '0648-0650', '0649-0650', '0650-0623', '0659-0660', '0668-P606', '0669-0670', '0670-P613', '0676-0677', '0677-P628', '0688-06141', '0697-0698', '0704-06112', 'P502-P503', 'P503-SCENIC & 8TH', 'P606-P608', 'P608-P610', 'P610-P612', 'P612-Q605', 'P613-P614', 'P614-P615', 'P615-P616', 'P630-P633', 'P633-P634', 'P634-Q648', 'P643-Q663', 'P648-P649', 'P649-P650', 'P650-P651', 'P651-Q677', 'P656-P683', 'P683-P648', 'P709-P710', 'Q606-Q607', 'Q607-Q608', 'Q6109-Q6108', 'Q6151-Q657', 'Q621-P616', 'Q622-Q623', 'Q623-Q624', 'Q624-Q626', 'Q643-Q635', 'Q651-Q652', 'Q652-Q653', 'Q657-Q648', 'Q658-Q6152', 'Q660-Q661', 'Q661-Q662', 'Q664-Q665', 'Q677-Q678', 'Q678-Q679', 'Q681-Q682'

Figure 1-5: Map of PVC segments installed prior to 1920.

Additionally, 133 CIPP segments with installations years before are assumed to be 1985.

The result of these two assumptions is the following histogram for segment installation year and material:
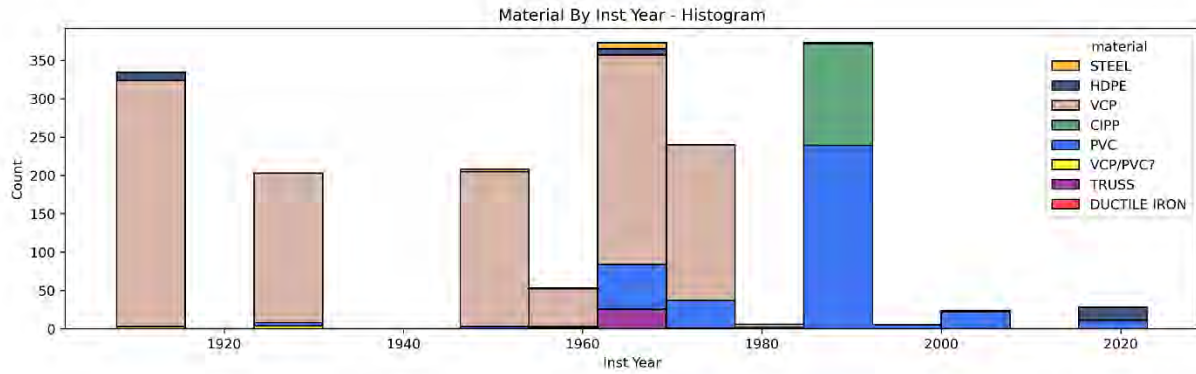
Figure 1-6: Gravity main segment installation years and materials with CIPP and PVC assumptions.

1.1.1.4 Gravity main segment lengths

This section analyzes the segment lengths of the gravity main segments.

- There are no segments with Null value for length

- Mean segment length: 221 feet

- Total length:
  - Raw file: 83.30 miles
  - Processed file: 77.57 miles operated and maintained
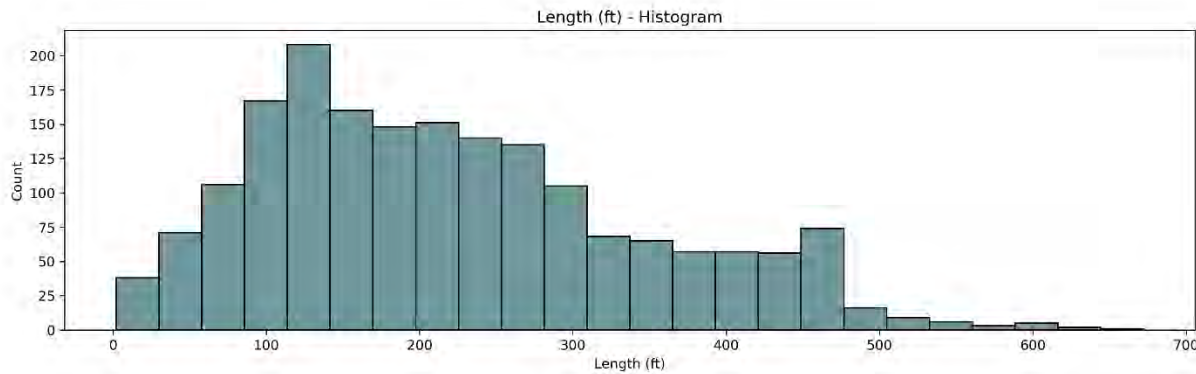
Figure 1-7: Histogram on gravity main segment lengths, by count.
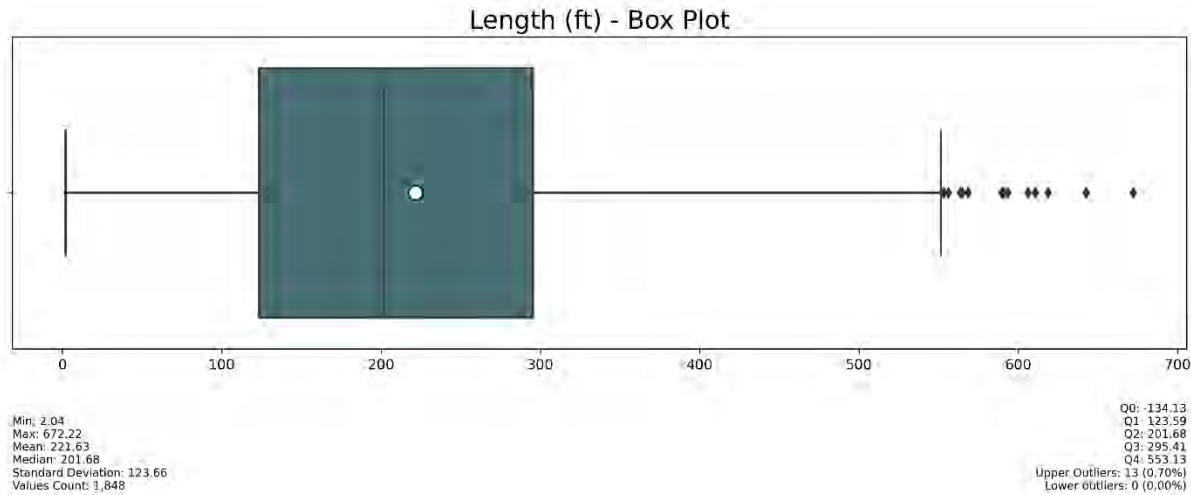
Figure 1-8: Box plot distribution of gravity main segment lengths.

Conclusion: the gravity main segment length data is of sufficient quality for data science analysis.

1.1.1.5 Gravity main segment slope

This section analyzes the slope data of the gravity main segments. Slope is a helpful variable for predicting accumulation of FOG and Debris (grit, rags, debris) in gravity main segments.

▪ Null values: 810 (43.83%)

▪ Negative values: 2 (0.1%)

▪ Max: 1,395 (error)

Summary: gravity main segment slope data is not going to be useful for cleaning analysis

1.1.1.6 Other gravity main segment issues and observations

1.1.1.6.1 Basins and Flow Basins

There are 11 basins and 10 flow basins.

Table 1-5: CAWD basin values.

Basin - Values

	Count	Percentage
R709	479	25.92%
R809	416	22.51%
R822	234	12.66%
Q679	228	12.34%
Q631	204	11.04%
N609	91	4.92%
Q672	72	3.90%
R663	49	2.65%
R621	48	2.60%
Q649	22	1.19%
1972	5	0.27%

Table 1-6: CAWD flow basins.

Flow Basin - Values

	Count	Percentage
Mission Basin	479	25.92%
Valley Basin	416	22.51%
Hatton Basin	239	12.93%
Paradise Park Basin	228	12.34%
Beach Basin	204	11.04%
Carmel Wood Basin	91	4.92%
Midtown Basin	72	3.90%
Walker Basin	49	2.65%
Santa Lucia Basin	48	2.60%
Downtown Basin	22	1.19%

1.1.1.7 Gravity main segment summary

For gravity main segments the important variables are diameter, material, installation year, length, and slope. CAWD's data sets for these variables are high quality with the noted exceptions of the PVC segment materials with installation dates prior to 1920, the CIPP segments with installation dates prior to 1985, and the slope data.

The complete spreadsheet of CAWD GIS data that will be used for further analysis is embedded here.

CAWD gravity main
segment GIS data with

Embedded Spreadsheet 1: CAWD Gravity Main Segment GIS data for analytics.

1.1.2 Laterals

Data on service laterals that connect to gravity main segments can be helpful for estimating missing gravity main installation years. However, given the near completeness of the gravity main installation year data set, lateral data will not be included in analysis.

1.1.3 Manholes

Manhole data can be of assistance for estimating missing installation years of gravity mains. However as noted above, CAWD's gravity main installation year data is near complete, so this analysis is unnecessary.

1.2 Gravity Main Cleaning Maintenance and Condition Data Summary

1.2.1 Cleaning summary

This project initially used the data transferred on 5/30/2024. Analysis showed that this data was missing some of the cleaning data, so a second set of data was transferred on 7/30/2024.

- Sources: carmel data july 30.xlsx

- Received on: 7/30/2024

- Total Cleanings: 49,017

  - 424 records are complete duplicates

  - 39 records have duplicate segment asset ID, date and cleaning ratings

  - 116 records have duplicate segment asset ID and date

  - Five records are missing the segment asset ID

  - 83 rows of cleaning records that are missing the date

  - Net: 48,350 cleaning/maintenance records for analysis

- First Cleaning: 2/9/2000 (from 2000-2006 there are only 72 cleaning records)

- Last Cleaning: 4/26/2024

- Unique Asset IDs: 1,888

- Cleaning Ratings Categories: sand, grit, gravel, grease, roots, odor

- Cleaning Ratings Severities: *NONE, LIGHT, MEDIUM, HEAVY*

CAWD complete
duplicate gravity main

Embedded Spreadsheet 2: 424 cleaning records that are complete duplicates.

39 cleaning records
with duplicate segmer

Embedded Spreadsheet 3: 39 cleaning records with duplicate segment ID date and ratings.

116 cleaning records
with duplicate asset ID

Embedded Spreadsheet 4: 116 cleanings records with duplicate ID and date.

Discussion with CAWD in September 2024 revealed that any gravity main cleaning records with "route" value (column C) as "Route XX" (X is a number 1-9) are root foamings, not cleanings. 1,544 rows have been separated out as root foaming not clearning.

With those exclusions the total number of valid cleaning records is 46,806.

Total cleaning records in full file: 49,017

- Discarded because duplicates: 579

- Discarded because segment ID missing: 5

- Discarded because cleaning date missing: 83

- Considered separately because they are root foamings not cleanings: 1,544

- Net: 46,806 gravity main cleaning records

CAWD gravity main
segment cleaning rec

Embedded Spreadsheet 5: CAWD gravity main segment cleaning records for analysis.

1.2.1.1 Gravity main segments cleaned by year, by month

CAWD has very good cleaning records back to 2007 with an average of about 2,800 segment cleanings per year—however there are only 88 cleaning records with condition observations between February 2000 and April 2007.

Table 1-7: Gravity main segment cleanings for analysis, count by month.

GM Cleanings - Cleanings By Year-Month - Matrix

Month	1	2	3	4	5	6	7	8	9	10	11	12
Year												
2007	-	-	-	-	216	161	167	217	300	260	132	208
2008	205	99	232	236	305	245	154	204	302	222	253	119
2009	185	159	273	232	185	270	185	92	250	173	200	247
2010	215	215	435	346	267	497	289	377	321	357	281	254
2011	405	273	340	375	242	211	204	318	360	274	277	237
2012	353	186	259	233	228	296	168	301	167	202	150	245
2013	299	251	273	264	218	148	277	299	98	342	108	163
2014	284	273	245	287	209	254	260	218	215	401	255	90
2015	153	226	240	234	140	262	231	202	259	218	289	243
2016	476	278	318	220	195	178	350	295	344	189	237	206
2017	202	168	354	183	239	248	281	299	188	211	306	277
2018	214	330	203	258	254	248	201	253	216	225	293	416
2019	248	209	119	152	250	183	192	185	161	385	193	187
2020	311	216	191	217	124	172	241	232	161	315	329	289
2021	219	268	165	254	222	229	159	194	170	296	325	141
2022	220	155	218	166	192	325	245	198	254	123	277	227
2023	162	228	233	193	190	270	139	309	137	268	322	210
2024	110	125	119	117	-	-	-	-	-	-	-	-

1.2.1.2 Gravity main segments missing anticipated cleaning history

1.2.1.2.1 Gravity main segments with no cleaning history

The following 42 gravity main segments (2.27%) have no cleaning history.

- ' -R6PS_3' 'M768-M767' 'N635-O651' 'N791-N796' 'N794-N791' 'N831-0846' 'N903-0968' 'New Main' 'O6120-06135' 'O6134-06149' 'O6149-06133' 'O709-0708' 'O750-0751' 'O822-0824' 'O9101-0911' 'O960-09101' 'P502-P503' 'P503-SCENIC & 8TH' 'Q506-Q509' 'Q520-BAY & SCENIC' 'Q6150-Q637' 'Q635-Q6150' 'Q913-Q914' 'Q914-Q915' 'Q915-Q916' 'Q916-Q917' 'Q917-Q918' 'Q918-R913' 'R1004-R1005' 'R1124-R1154' 'R1154-R1126' 'R524-R535' 'R640-R642' 'R667-R6PS_2' 'R754-R760' 'R761-R768' 'R775-R778' 'S1046-S1047' 'S1047-HACIENDA' 'S606-CARMELMEADOWS_1' 'Y401-Y402' 'Y402-HIGHLANDS'
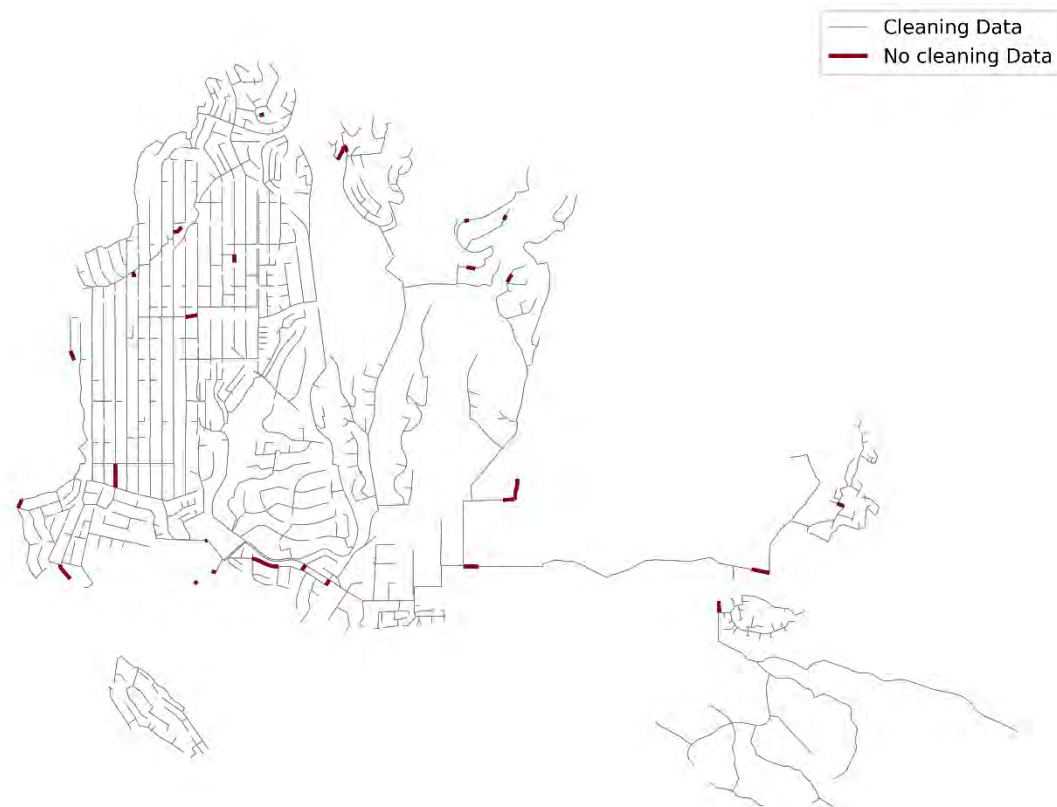
Figure 1-9: Gravity main segments with NO cleaning history.

Gravity main segments with NO cle

Embedded Spreadsheet 6: Gravity main segments with NO cleaning history.

1.2.1.3 Gravity mains cleaned but missing from GIS

There are 37 gravity main cleaning records with a segment asset ID not found in GIS. Some of these issues stem from confusing "0" (zero) with the letter "o". Details are in the spreadsheet that follows.

- N903-0968➔N903-0968

- N831-0846➔N831-0846

Gravity main segment
cleaning records with

Embedded Spreadsheet 7: Segment cleaning records with asset ID not found in GIS.

1.2.1.4 Segment cleaning frequency in cleaning records

The cleaning records file received has a "Frequency" column (column O). These values appear to be in months and vary between 1-30. V&A looked at the values in column O and totaled the number of cleanings with that designated frequency along with the average number of months for the prior and subsequent cleaning.

Frequency value in column O	Total Cleanings	Previous Cleaning Average (Months)	Next Cleaning Average (Months)
1	16,786	5.803	6.544
3	1,459	3.437	3.201
4	226	3.584	4.212
5	516	6.993	6.819
6	3,086	7.208	7.119
7	1,334	7.710	7.436
8	18,767	7.538	7.733
9	184	11.139	11.419
10	57	7.445	6.090
12	1,490	14.539	13.820
14	18	8.103	2.200
15	144	14.651	17.626
18	148	20.207	20.245
24	625	28.675	25.818
30	40	31.913	32.997

The frequency numbers 3-30 do seem to represent "planned frequency" in months. The cleaning records with frequency 1 in column O look very suspicious—it's possible that 1 is the default value, or that 1 sometimes represents months and sometimes represents years?

In CAWD's SSMP it says that gravity main segment cleaning frequencies fall into one of two categories:

- High Frequency: up to once every three months frequency
- Regular Frequency: six up to 24 (in reality 30) months frequency

For the most recent cleaning of each segment, the cleaning frequencies in column O are as follows:

Table 1-8: Segment cleaning frequency in column O, most recent cleaning each segment.

	Count	Percentage
1	6	0.32%
3	43	2.33%
4	23	1.24%
5	24	1.30%
6	4	0.22%
7	12	0.65%
8	1148	62.12%
9	54	2.92%
10	18	0.97%
12	203	10.98%
14	9	0.49%
18	30	1.62%
24	202	10.93%
30	20	1.08%
	52	2.81%

Using the guidelines in the SSMP, with the most recent cleaning of each segment yields the following summary for High Frequency and Regular Frequency cleaning:

Table 1-9: Estimated breakdown of High Frequency vs Regular Frequency cleaning segment count, percentage.

Frequency Category - Values

	Count	Percentage
High Frequency	49	2.65%
Regular Frequency	1747	94.53%
None	52	2.81%

Cleaning Frequency Categories - Map
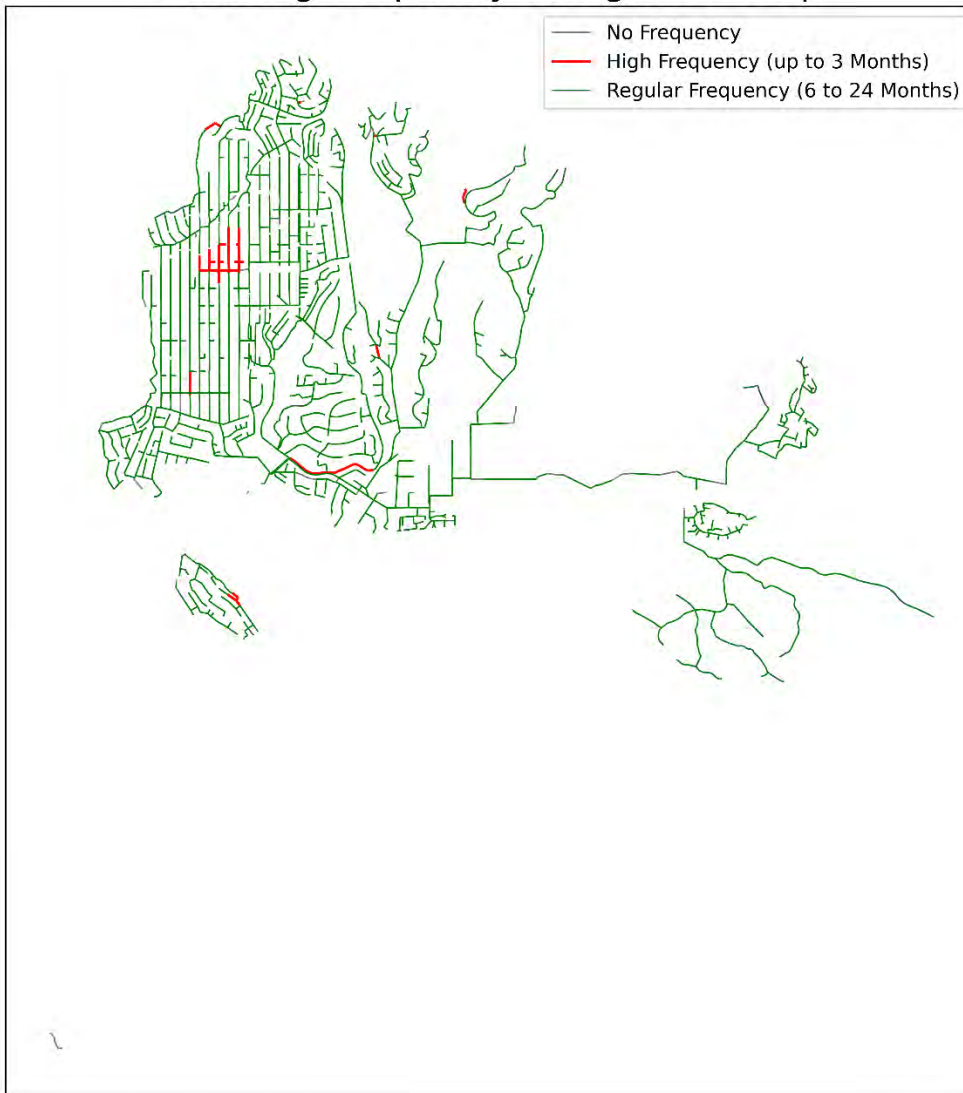
Cleaning Frequency Categories:
High Frequency: 49 (2.65%)
Regular Frequency: 1,747 (94.53%)
None: 52 (2.81%)

Figure 1-10: Map of High and Regular segment cleaning frequencies.

1.2.2 Condition assessment data gathered during cleaning

There are six categories of cleaning condition data recorded by CAWD: Grease, Roots, Gravel, Sand, Grit and Odor.

V&A does not include Odor data in the analysis for predicting LOF (need-for cleaning) because odor is not directly related to gravity main spills. Gravel, Sand and Grit are aggregated into one category as Debris by V&A.

Each of these category entries has one of four possible severities: None (clear), Light, Moderate, Heavy.

These severities are mapped to: Clear (score of 1), Light (2), Moderate (2), Heavy (3).

For the data set covering gravity main cleanings between 5/1/2007 and 4/26/2024 the observation %'s are as follows:

Table 1-10: Observations during gravity main cleaning, % of category severities, 5/1/2007 and 4/26/2024.

GM Cleanings Ratings - Value Counts

Rating	Grease	Roots	Gravel Sand Grit	Odor
1	93.65%	91.58%	83.69%	97.35%
2	2.45%	5.19%	5.85%	1.31%
3	2.70%	2.48%	6.92%	0.95%
4	1.19%	0.75%	3.54%	0.40%

1.2.2.1 Trends, consistency of cleaning condition data gathered over time

1.2.2.1.1 Consistency of gathered data over time

For historical condition assessment data to be useful as the basis of predictive analytics it is important that the data be recorded consistently over time. A visual assessment is possible, looking for consistent ratings and gradual increases/decreases over time. The following figures show the condition rating trends from 5/1/2007 and 4/26/2024 and from 2014 to 4/26/2024.

Table 1-11: Grease ratings by year, 2007–2024.

Grease - Ratings Distribution By Year

Year Grease	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
1	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	79.49%	81.33%	99.71%	100.00%	100.00%	99.86%	88.50%	94.74%	95.37%	92.70%	93.81%	90.28%	93.20%	96.72%	92.32%	92.38%	90.96%	96.39%
2	-	-	-	-	-	-	-	9.84%	5.32%	0.24%				6.79%	2.90%	2.74%	3.19%	2.81%	2.94%	2.38%	0.95%	1.75%	2.31%	1.85%	2.12%
3	-	-	-	-	-	-	-	7.51%	11.02%	0.04%			0.14%	4.20%	1.98%	1.52%	2.75%	2.23%	3.69%	2.82%	1.60%	3.90%	2.88%	4.34%	0.64%
4	-	-	-	-	-	-	-	3.16%	2.33%					0.51%	0.39%	0.37%	1.36%	1.35%	3.08%	1.60%	0.72%	2.03%	2.43%	2.84%	0.85%
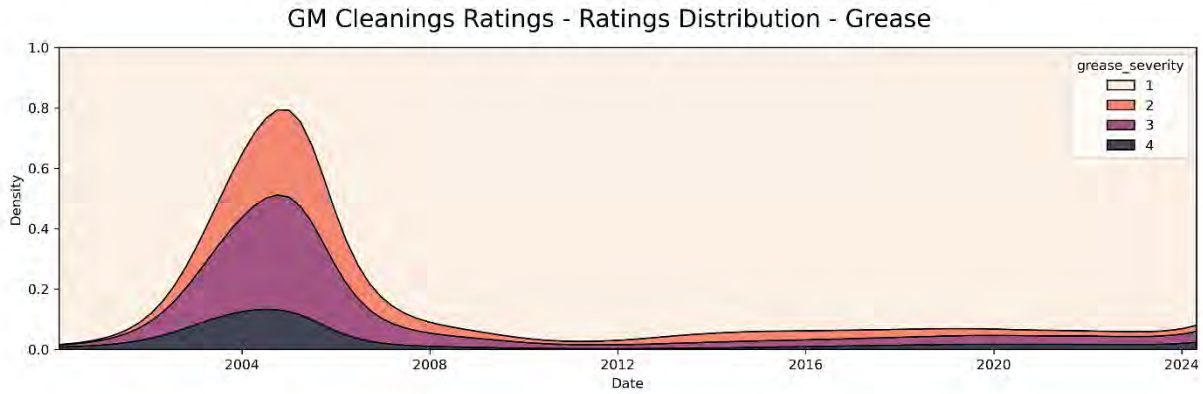
Figure 1-11: Mean cleaning data ratings for grease 5/1/2007—4/26/2024.
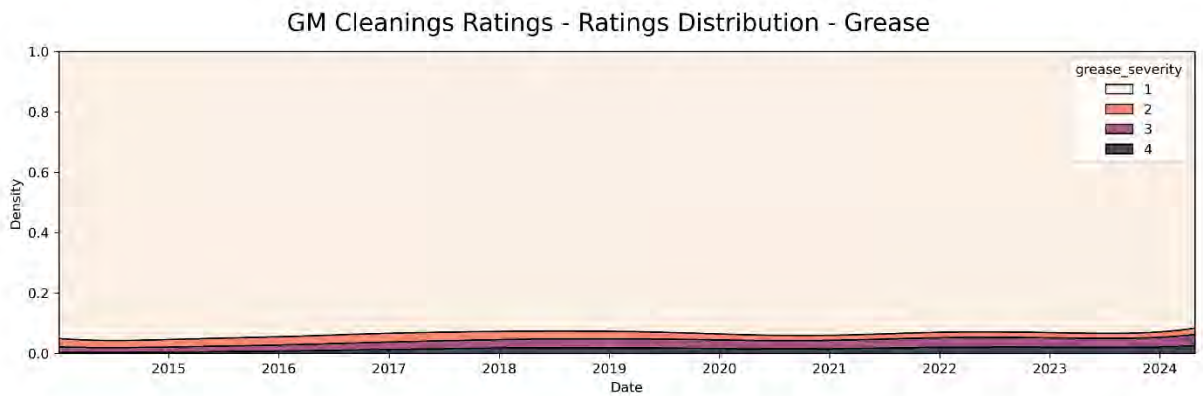
Figure 1-12: Mean cleaning data ratings for grease 1/1/2014—4/26/2024.

Table 1-12: Roots ratings by year, 2007–2024.

Year Roots	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
1	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	82.41%	79.31%	99.71%	100.00%	100.00%	99.84%	70.22%	88.34%	92.88%	90.60%	93.61%	89.53%	90.34%	94.36%	92.95%	90.60%	92.15%	95.33%
2	-	-	-	-	-	-	-	11.15%	8.23%	0.08%	-	-	0.14%	20.51%	7.52%	5.04%	6.96%	4.50%	6.60%	6.63%	3.97%	4.50%	4.42%	4.26%	1.27%
3	-	-	-	-	-	-	-	4.83%	9.08%	0.20%	-	-	0.04%	7.92%	3.50%	1.59%	2.14%	1.49%	2.94%	1.82%	1.41%	1.91%	3.57%	2.80%	1.27%
4	-	-	-	-	-	-	-	1.61%	3.38%	-	-	-	0.18%	1.35%	0.64%	0.48%	0.31%	0.41%	0.93%	1.21%	0.27%	0.64%	1.42%	0.79%	2.12%
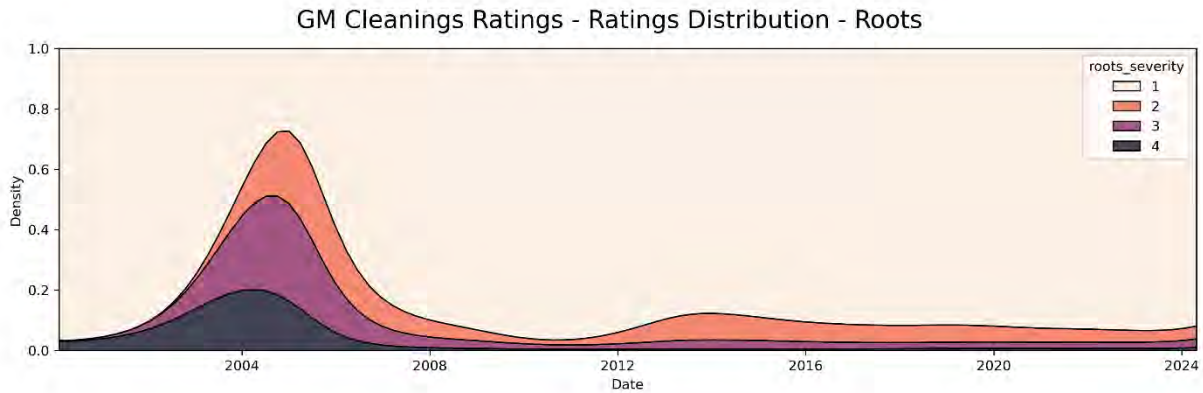
Figure 1-13: Mean cleaning data ratings for roots 5/1/2007-4/26/2024.
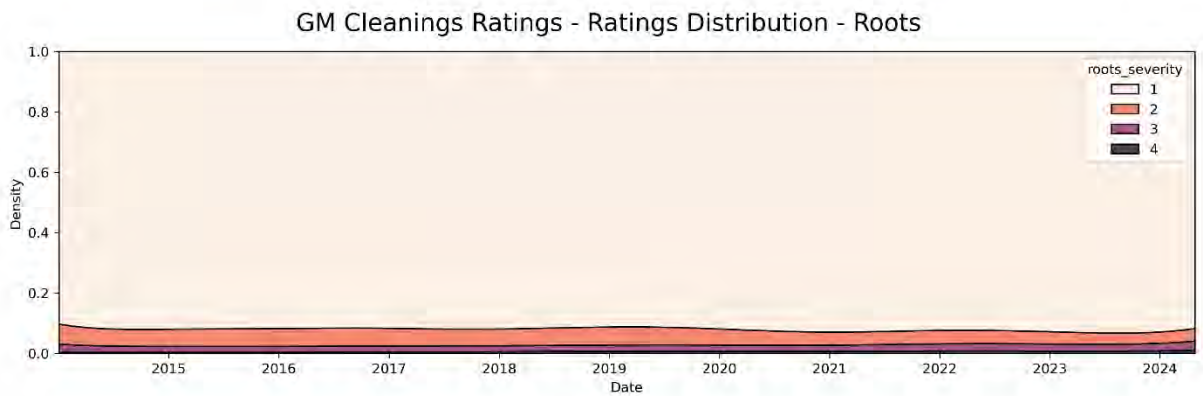
Figure 1-14: Mean cleaning data ratings for roots 1/1/2024-4/26/2024.

Table 1-13: Debris ratings by year 2007–2024.

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Gravel Sand Grit																									
1	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	49.25%	54.70%	99.02%	100.00%	100.00%	98.21%	63.69%	87.60%	89.10%	79.67%	81.73%	79.78%	79.68%	89.97%	81.37%	81.84%	79.01%	95.75%
2	-	-	-	-	-	-	-	15.62%	15.14%	-	-	-	1.29%	20.07%	5.58%	5.38%	7.81%	7.44%	5.67%	6.63%	2.90%	5.25%	4.54%	4.26%	1.49%
3	-	-	-	-	-	-	-	19.62%	21.82%	0.69%	-	-	0.50%	14.20%	5.83%	4.93%	7.71%	7.61%	7.53%	8.23%	4.65%	9.59%	6.12%	9.98%	2.34%
4	-	-	-	-	-	-	-	15.50%	8.35%	0.29%	-	-	-	2.04%	0.99%	0.59%	4.82%	3.21%	7.03%	5.46%	2.48%	3.78%	7.50%	6.75%	0.42%
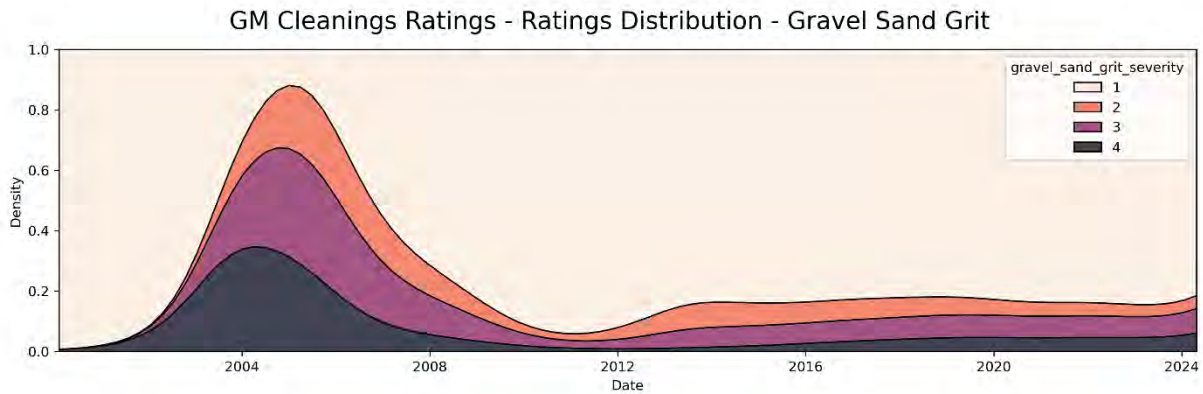
Figure 1-15: Mean cleaning data ratings for debris 5/1/2007—4/26/2024.
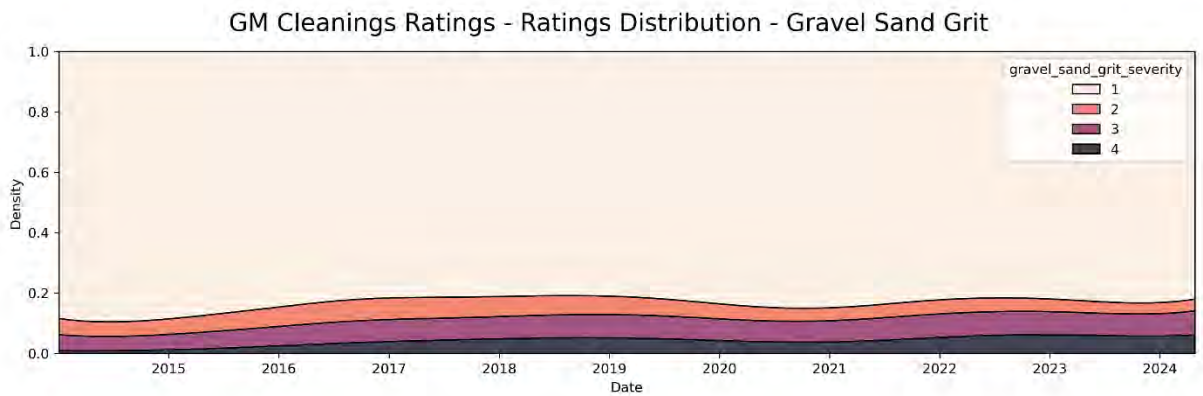
Figure 1-16: Mean cleaning data ratings for debris 1/1/2014—4/26/2024.

Table 1-14: Odor ratings by year 2007–2024.

Odor - Ratings Distribution By Year

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Odor																									
1	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	98.24%	70.99%	97.39%	98.89%	96.40%	98.21%	99.03%	98.87%	99.08%	99.48%	98.95%	99.29%	100.00%
2	-	-	-	-	-	-	-	-	-	-	-	-	1.22%	16.64%	1.10%	0.44%	1.12%	0.37%	0.14%	0.22%	0.11%	0.28%	0.32%	0.32%	
3	-	-	-	-	-	-	-	-	-	-	-	-	0.50%	10.29%	1.02%	0.33%	1.09%	0.74%	0.22%	0.65%	0.34%	0.12%	0.57%	0.32%	
4	-	-	-	-	-	-	-	-	-	-	-	-	0.04%	2.08%	0.49%	0.33%	1.39%	0.68%	0.61%	0.26%	0.46%	0.12%	0.16%	0.08%	
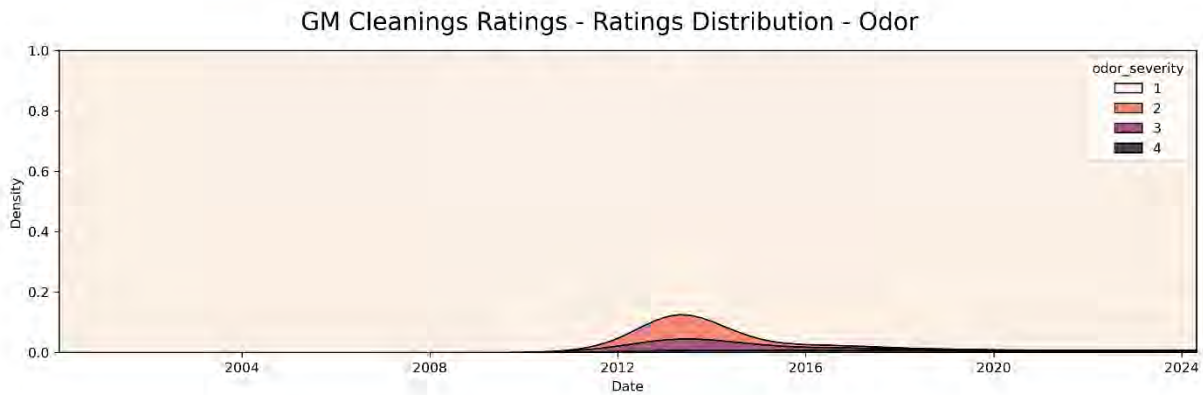
Figure 1-17: Mean cleaning data ratings for odor 5/1/2007—4/26/2024.
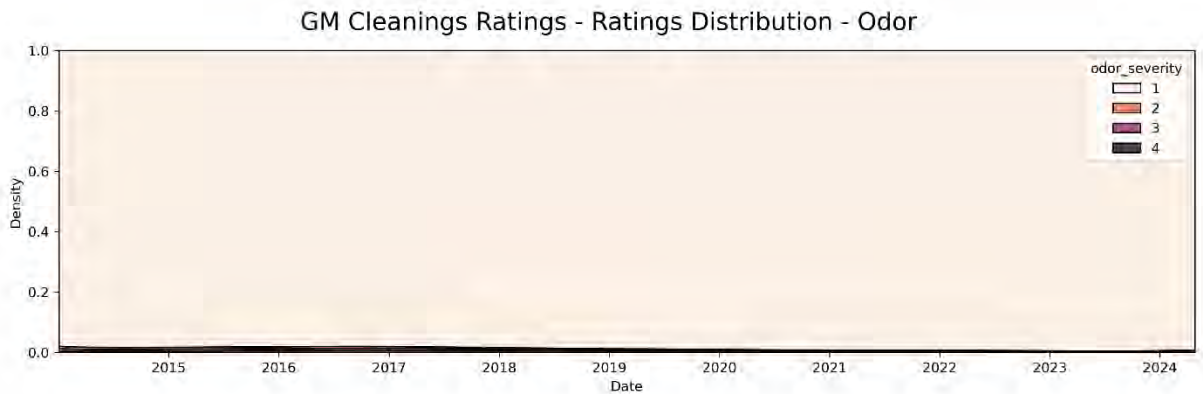
Figure 1-18: Mean cleaning data ratings for odor 1/1/2014—4/26/2024.

Conclusion: the cleaning condition data is the MOST consistent since 2014, and quantity of data prior to 2014 is very limited. Therefore, only records from 2014 will be considered for detailed predictions.

1.2.2.2   Analysis of clean & dirty gravity main segments %'s

If we define a "clean" gravity main segment as one that has all "clear" ratings for grease, roots, sand grit and gravel during a gravity main cleaning, and an operational "dirty" gravity main segment as one having any non-clear rating in either the grease, roots, sand, grit or gravel category during cleaning, the following tables show the % of CAWD's clean and dirty cleaning condition ratings for the time period 1/1/2014—4/26/2024.

Table 1-15: % of cleaned gravity main segments that were operationally (grease, debris, roots only) "clean", by year (2014—2024).

GM Cleanings Ratings Since 2014 - Operational Clean & Dirty By Calendar Year

Calendar Year	Operational Clean	Operational Dirty
2014	76.47%	23.53%
2015	80.94%	19.06%
2016	69.11%	30.89%
2017	72.77%	27.23%
2018	66.48%	33.52%
2019	67.33%	32.67%
2020	82.84%	17.16%
2021	71.30%	28.70%
2022	70.04%	29.96%
2023	67.44%	32.56%
2024	88.11%	11.89%

GM Cleanings Ratings Since 2014 - Operational Clean & Dirty Distribution by Year-Month
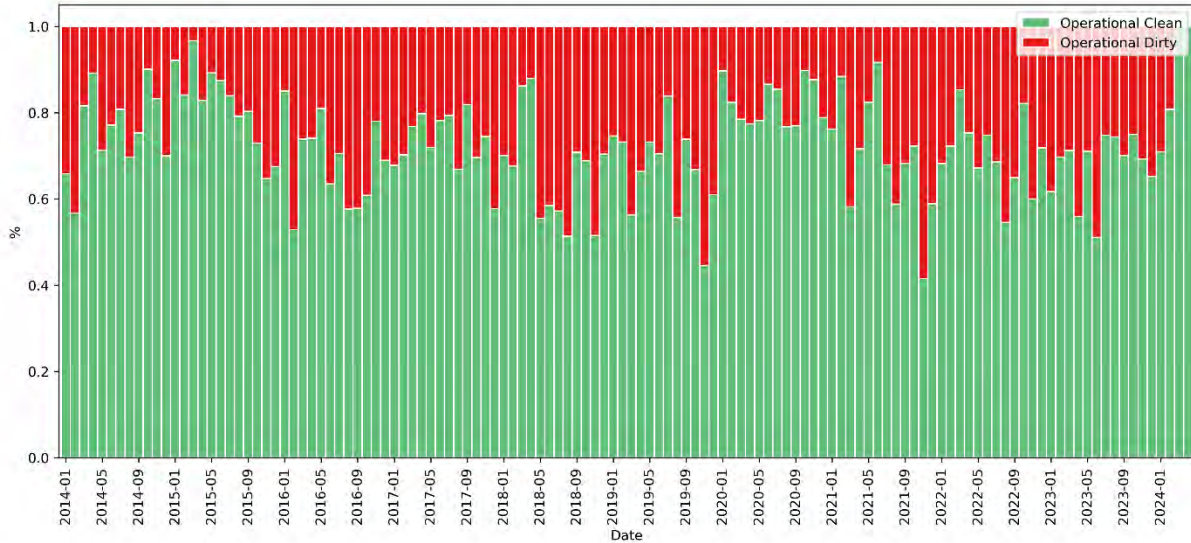
Figure 1-19: % of cleaned gravity main segments that were operationally "clean", by year (2014—2024).

The high percentage of segments that are clear during cleaning suggests that there are some potential efficiency gains. V&A's experience with other collection systems in California suggests that only approximately 50% or less of the gravity main segments should be clear when cleaned.

1.2.2.3 Geographic concentrations of cleaning condition ratings
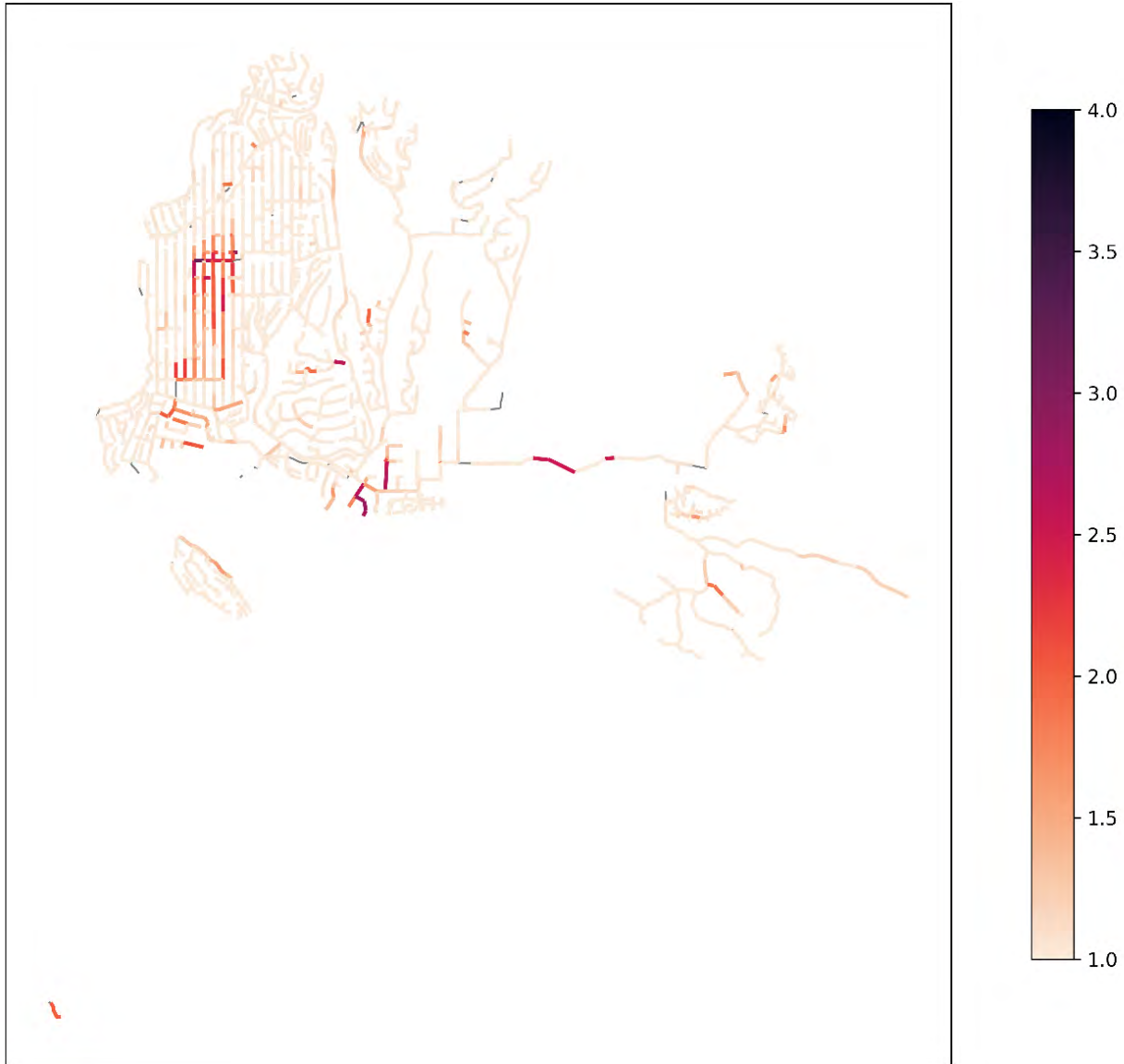
Figure 1-20: Map of mean ratings for grease since 2014.
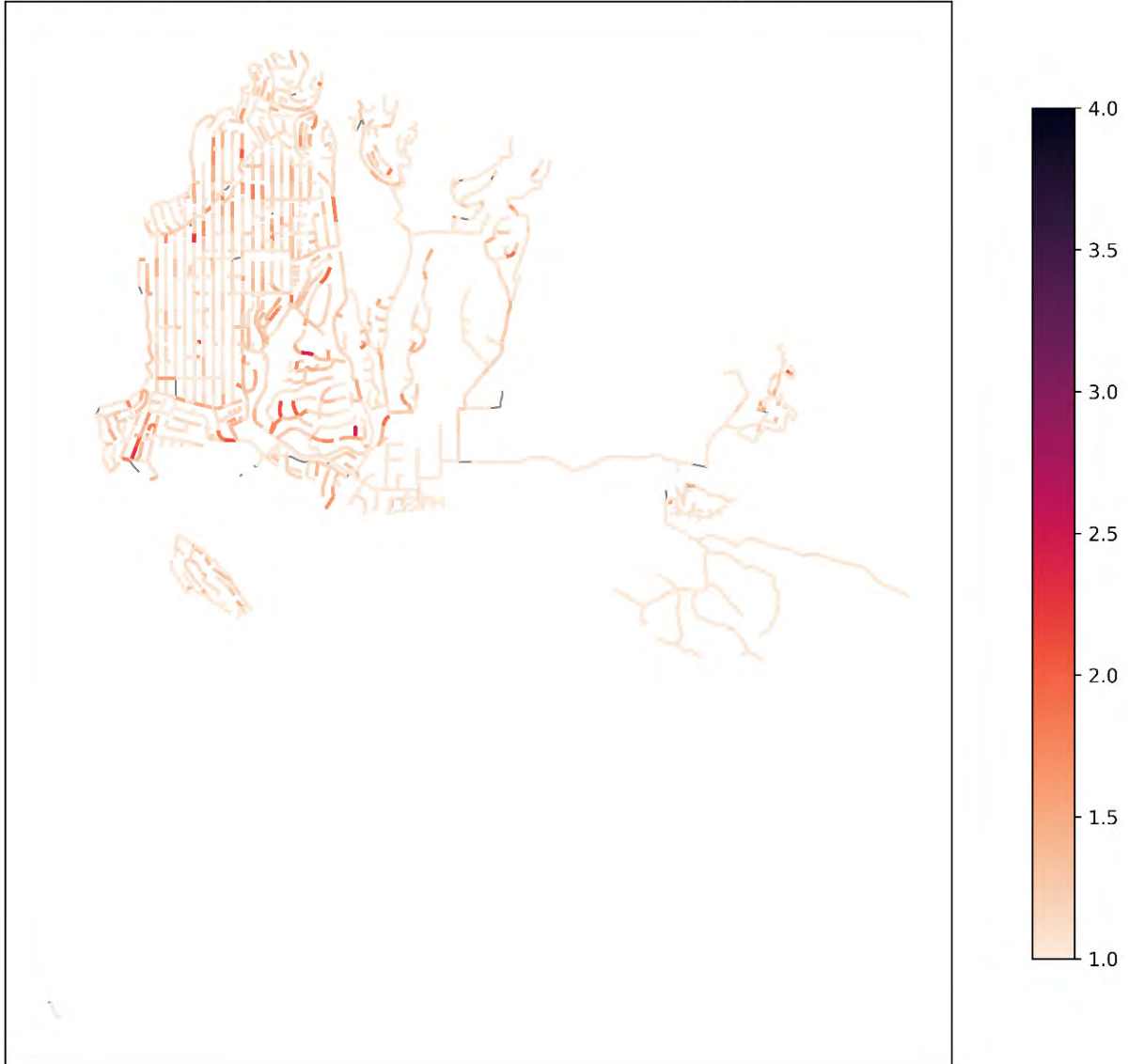
Figure 1-21: Map of mean ratings for roots since 2014.
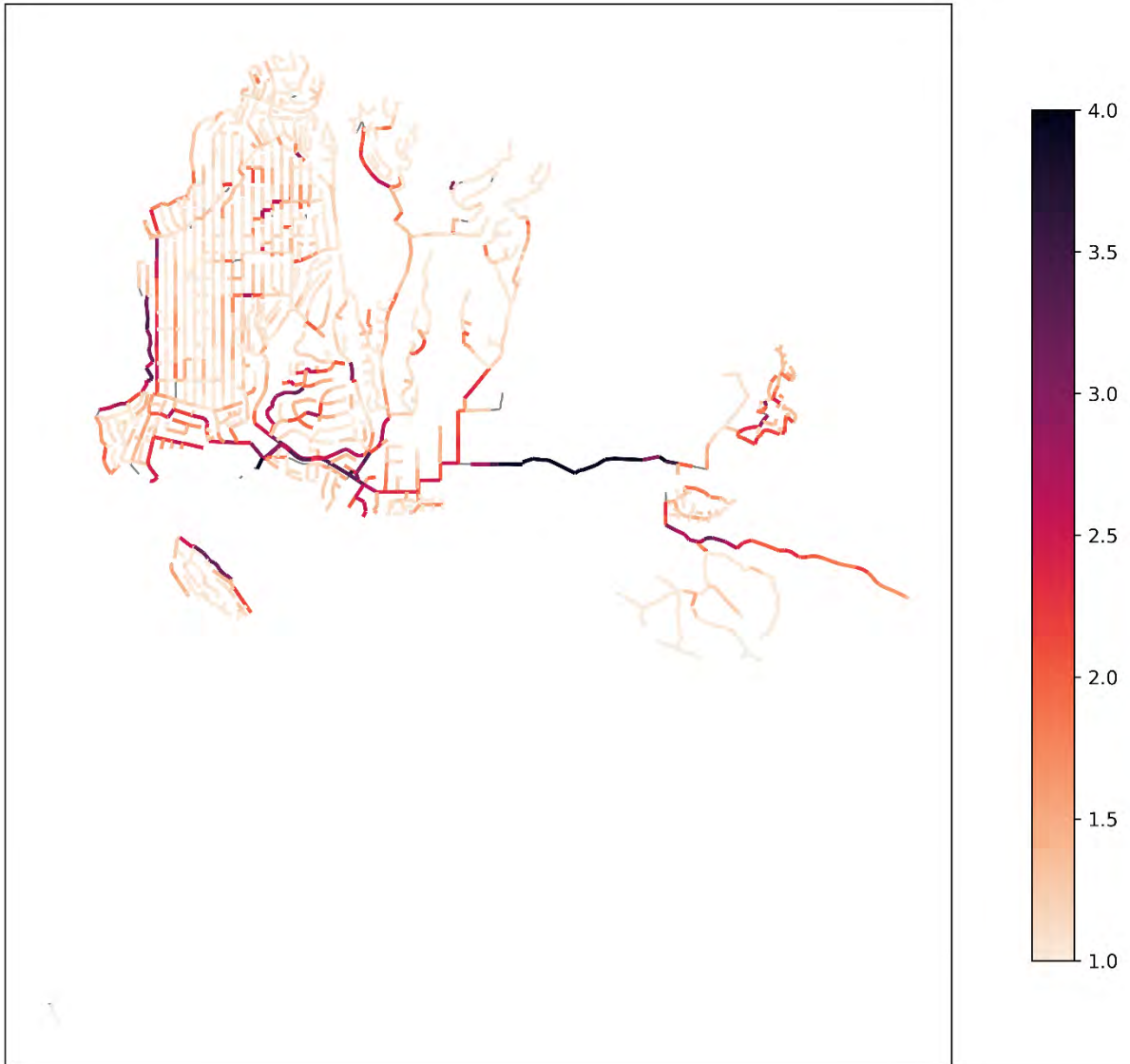
Figure 1-22: Map of mean ratings for debris (sand, grit or gravel) since 2014.
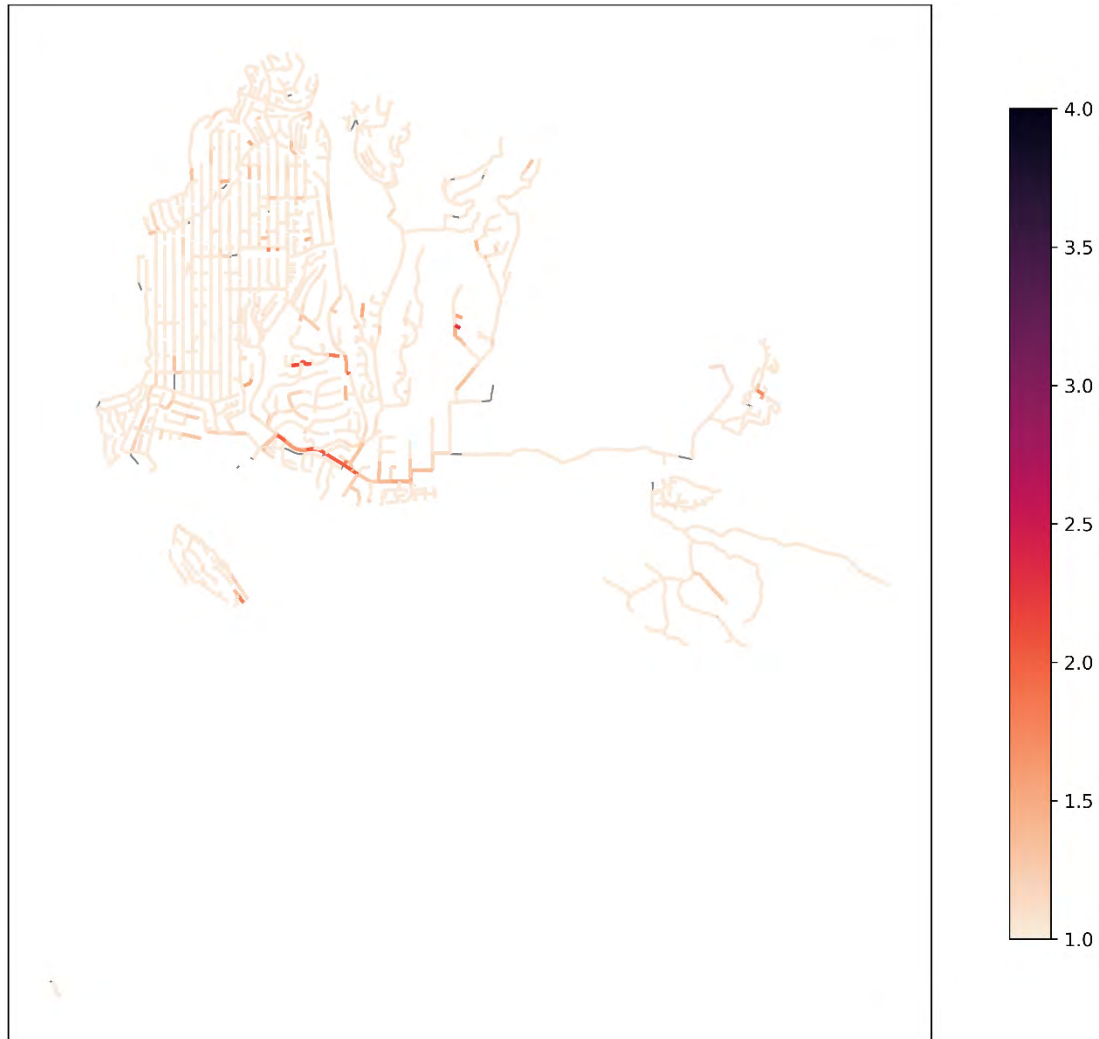
Figure 1-23: Map of mean ratings for odor since 2014.

1.2.2.4 Gravity main cleaning condition data summary

CAWD has been gathering very good data for grease, roots, debris (sand, gravel or grit) and odor condition during the gravity main cleaning process since 2014.

1.3 Other Gravity Main Condition Assessment Data

1.3.1 Condition assessment: CCTV data

The CCTV condition assessment data delivered to V&A is as follows:

- File Names:
    - CAWD PACP 11-28-17.accdb (Access DB)
    - ICOM3 PAPC Scores 1-1-2007 to 12-31-2014.xls (Excel)
    - ICOM3 PACP Scores 1-1-2015 to Present.xls (Excel)

- All received on: 5/30/2024
- Access DB:
  - Total CCTVs: 879
  - First CCTV: 4/20/2013
  - Last CCTV: 8/18/2017
- Excel Files:
  - Total CCTVs: 4,401
  - First CCTV: 4/4/2007
  - Last CCTV: 8/22/2023

The Access database stores only a subset of the dataset and the dates. The excel files covering April 2007 through August 2023 will be processed and analyzed.

Table 1-16: Number of CCTV inspection records in excel files and access db.

Year	Excel Files	Access DB	Difference
2007	177	0	177
2008	289	0	289
2009	346	0	346
2010	250	0	250
2011	162	0	162
2012	203	0	203
2013	441	403	38
2014	152	146	6
2015	34	34	0
2016	184	183	1
2017	134	131	3
2018	128	0	128
2019	155	0	155
2020	596	0	596
2021	737	0	737
2022	383	0	383
2023	30	0	30

After duplicates and records with missing segment IDs are removed, there are 4,123 valid CCTV inspections between 4/4/2007 and 8/22/2023.

Table 1-17: Gravity main segment count CCTV inspected, by year, percentage, miles.

CCTVs - GMs CCTVd By Calendar Year

Calendar Year	GMs CCTVd Count	GMs CCTVd %	Miles CCTVd	Miles CCTVd %
2007	160	8.66%	7.83	10.09%
2008	278	15.04%	14.72	18.98%
2009	320	17.32%	14.44	18.62%
2010	232	12.55%	9.45	12.18%
2011	149	8.06%	6.57	8.48%
2012	177	9.58%	8.16	10.52%
2013	354	19.16%	12.60	16.24%
2014	129	6.98%	3.95	5.09%
2015	27	1.46%	1.40	1.80%
2016	166	8.98%	6.76	8.71%
2017	116	6.28%	5.34	6.89%
2018	115	6.22%	5.58	7.20%
2019	142	7.68%	7.35	9.47%
2020	534	28.90%	22.70	29.26%
2021	661	35.77%	26.17	33.74%
2022	341	18.45%	12.68	16.35%
2023	24	1.30%	1.29	1.66%

1.3.1.1 Gravity main segments with no CCTV data

There are 51 segments (2.76%) with no CCTV data in the records.

- ' -R6PS_3' 'GRIZZLY-Y401c' 'M767-M780' 'M768-M767' 'N635-0651' 'N7126-N7114' 'N7127-N7108' 'N791-N796' 'N794-N791' 'N831-0846' 'N845-0841' 'N903-0968' 'New Main' '06134-06149' '06149-06133' '0709-0708' '0822-0824' '09101-0911' '0960-09101' 'P502-P503' 'P503-SCENIC & 8TH' 'Q506-Q509' 'Q508-Q517' 'Q520-BAY & SCENIC' 'Q6150-Q637' 'Q635-Q6150' 'Q658-Q6152' 'Q802-Q871' 'Q913-Q914' 'Q914-Q915' 'Q915-Q916' 'Q916-Q917' 'Q917-Q918' 'Q918-R913' 'R1004-R1005' 'R1124-R1154' 'R1154-R1126' 'R524-R535' 'R640-R642' 'R667-R6PS_2' 'R761-R768' 'R775-R778' 'R794-R667' 'S1046-S1047' 'S1047-HACIENDA' 'S606-CARMELMEADOWS_1' 'S608-S618' 'S616-S608' 'T648-T602' 'Y401-Y402' 'Y402-HIGHLANDS'

CCTVs - No CCTV Data
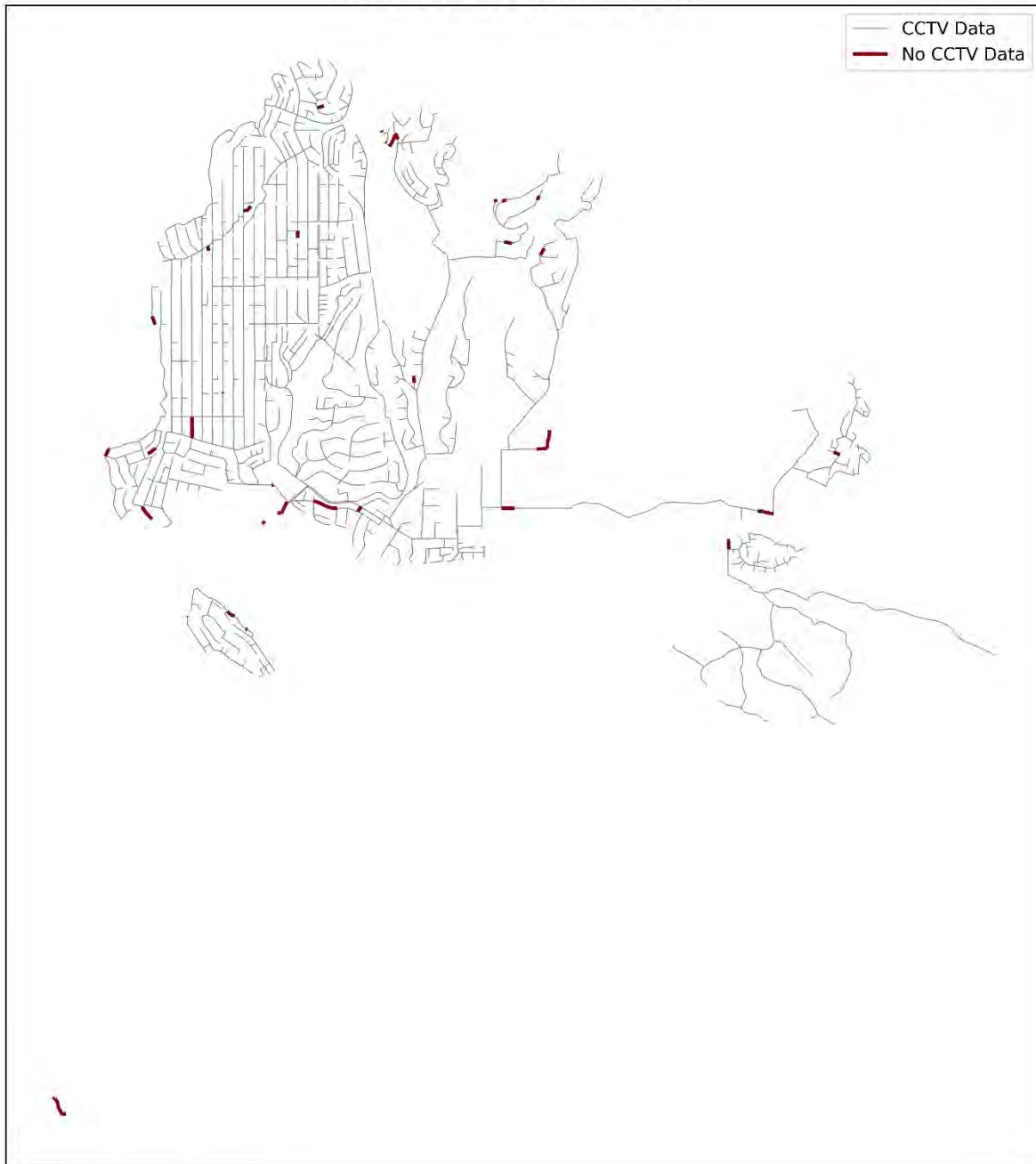
CCTV data: 1,797 (97.24%)
No CCTV data: 51 (2.76%)

Figure 1-24: Gravity main segments with no CCTV data.

Gravity main
segments with no CCT

Embedded Spreadsheet 8: Gravity main segments with no CCTV data.

1.3.1.2 CCTV inspection records with gravity main segment asset ID not found in GIS

There are 37 CCTV inspection records with a segment ID not found in GIS.

CCTV records with
gravity main segment

Embedded Spreadsheet 9: CCTV records with gravity main segment asset ID not found in GIS.

1.3.2 Condition assessment: SmartCover data

SmartCover data information received:

- Six CSV files

- Five SmartCover locations for water levels above bottom (inches):
    - Hatton Canyon - MH ID: Q803
    - Lower Pescadero - MH ID: N609
    - Calle Easement Downstream - MH ID: S615
    - Calle_Easement_Upstream - MH ID: T648
    - Rio Park - MH ID: R794

- One SmartCover location for hydrogen sulfide ppm level:
    - Mariposa Court - MH ID: 2 (there is no manhole with ID 2)

The SmartCover data covers the time period 6/3/2023 through 6/3/2024.

SmartCover Alarms - Map
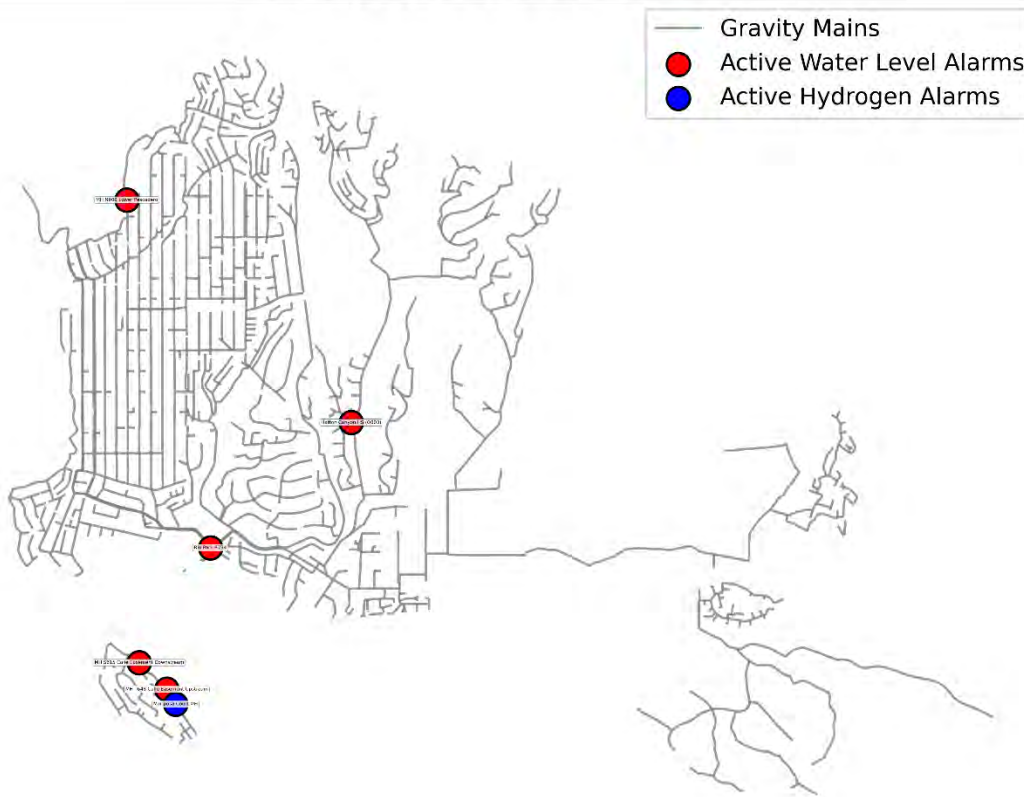
Figure 1-25: Map of SmartCover locations.

Level ranges for each SmartCover sensor in the time period are as follows:
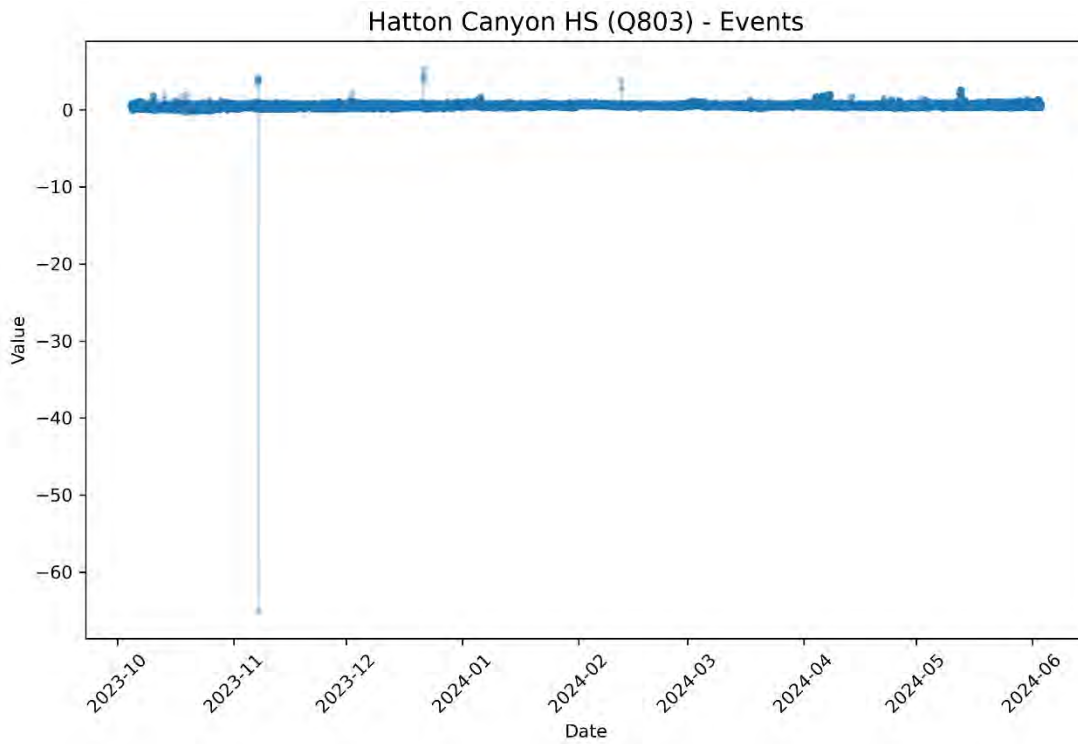
Figure 1-26: Hatton Canyon SmartCover level range.
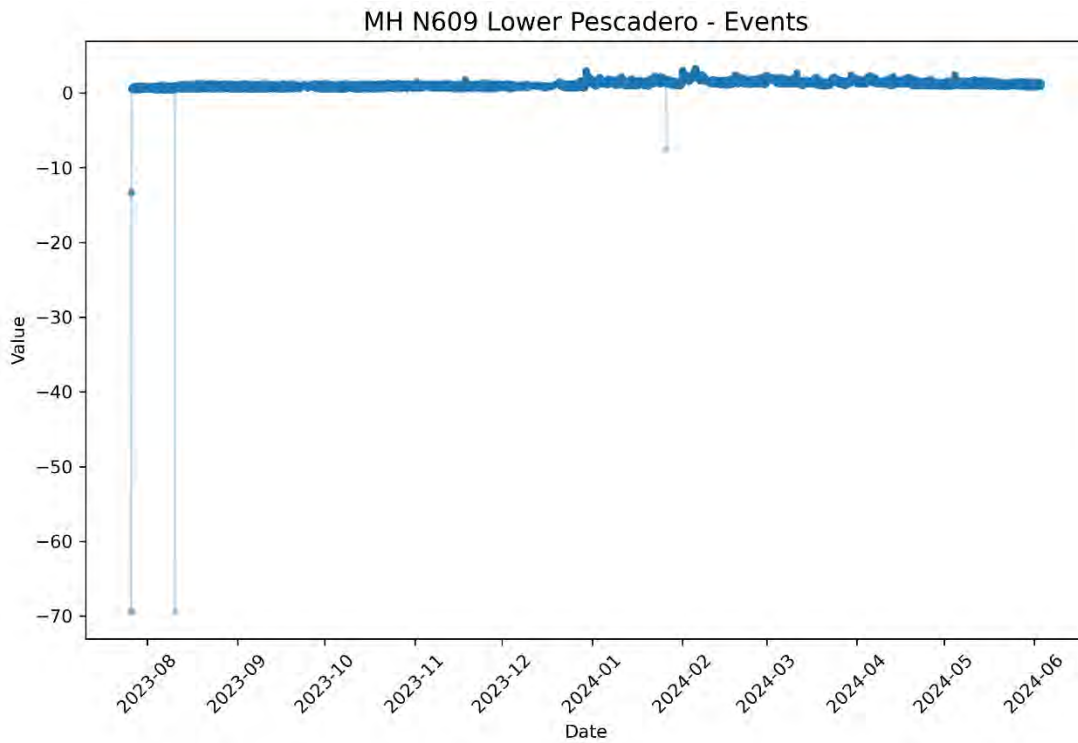
Figure 1-27: Lower Pescadero SmartCover level range.
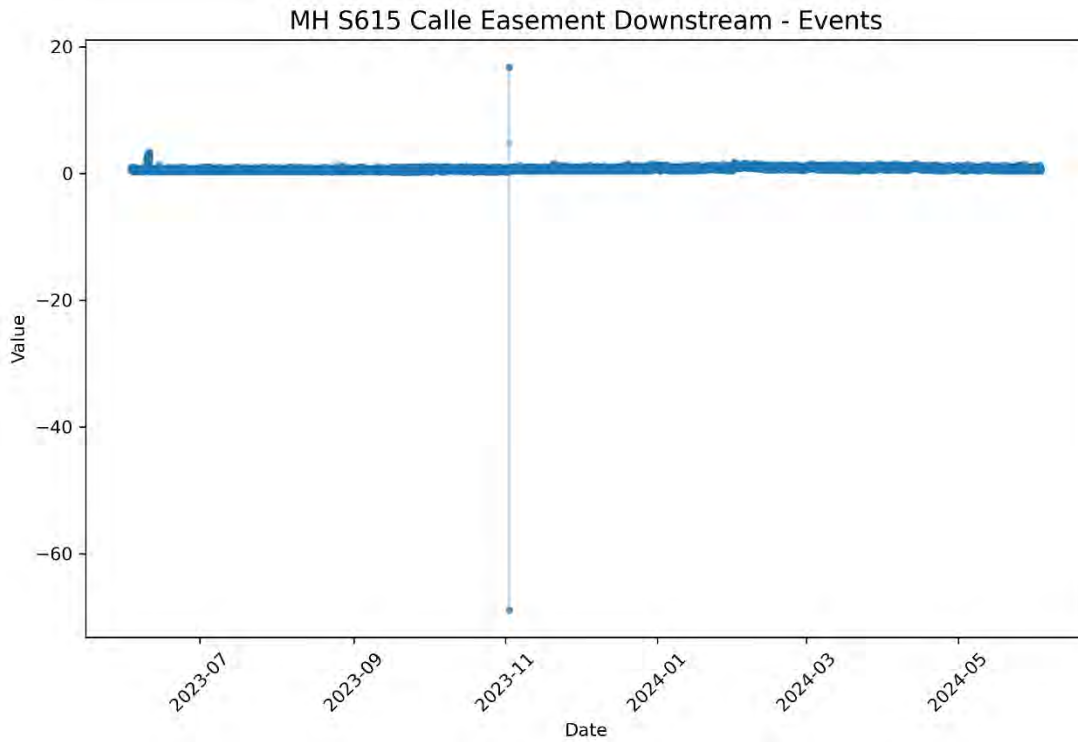
Figure 1-28: Calle Easement Downstream SmartCover level range.
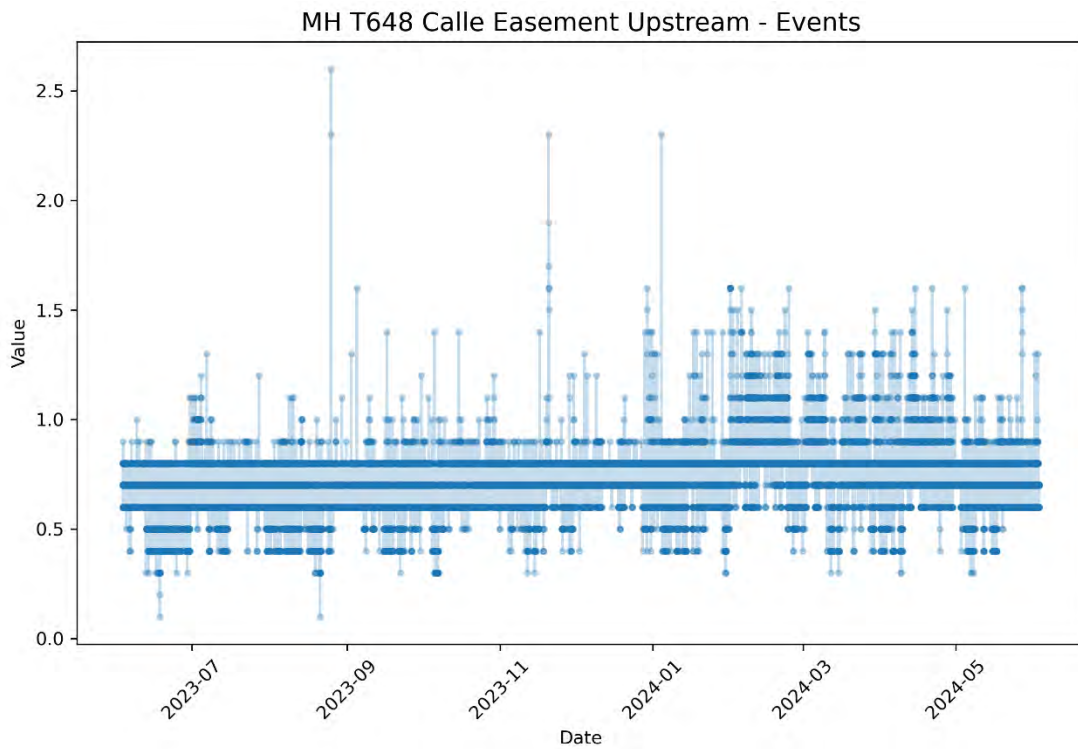
Figure 1-29: Calle Easement Upstream SmartCover level range.
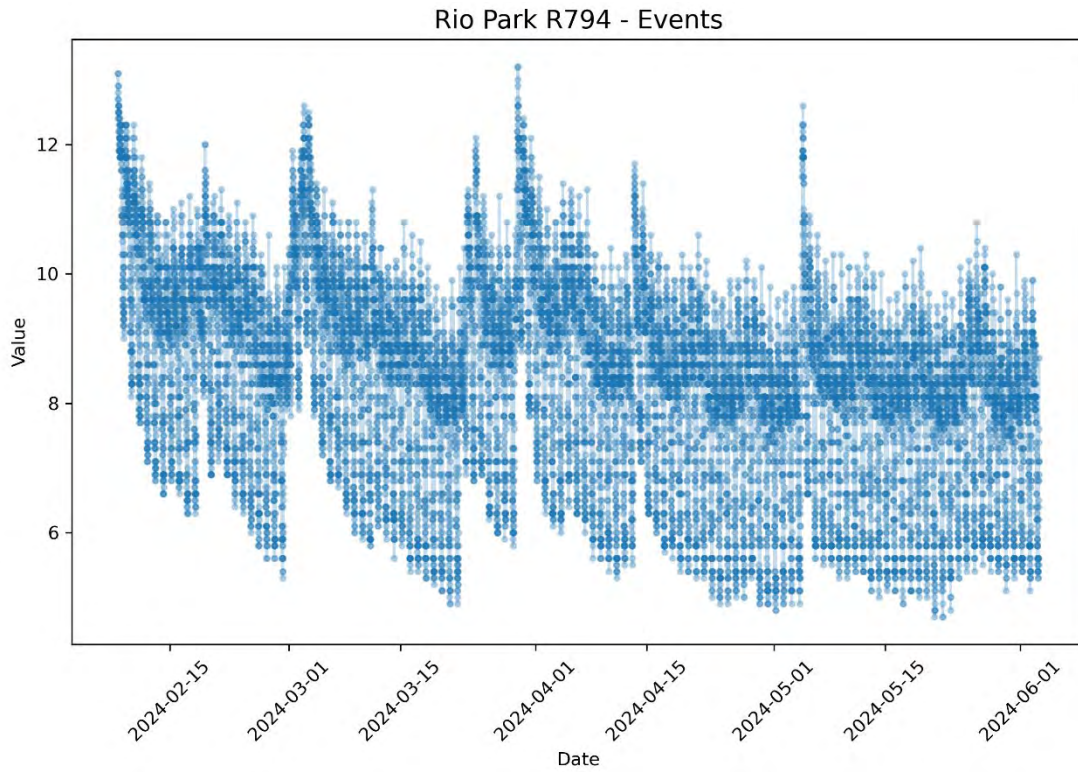
Figure 1-30: Rio Park SmartCover level range.
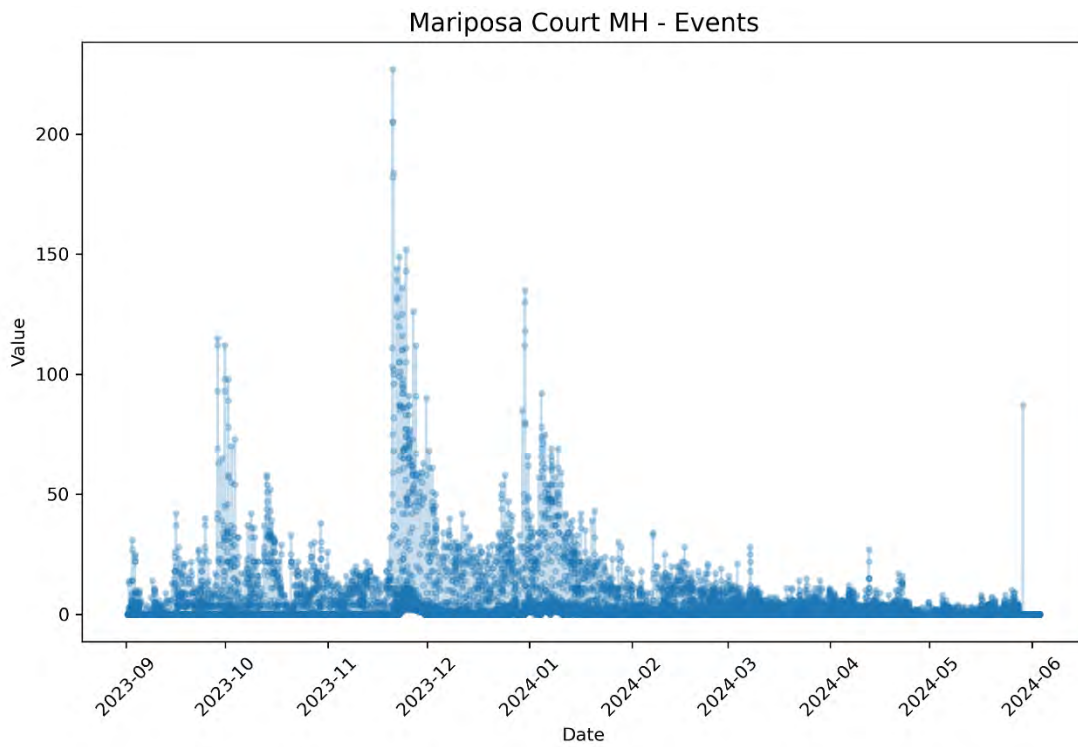
Figure 1-31: Mariposa Court SmartCover hydrogen level range.

1.3.3 Condition assessment: SL-RAT data

SL-RAT condition assessment/screen of gravity mains is not currently utilized by CAWD.

1.3.4 Failure data: SSOs
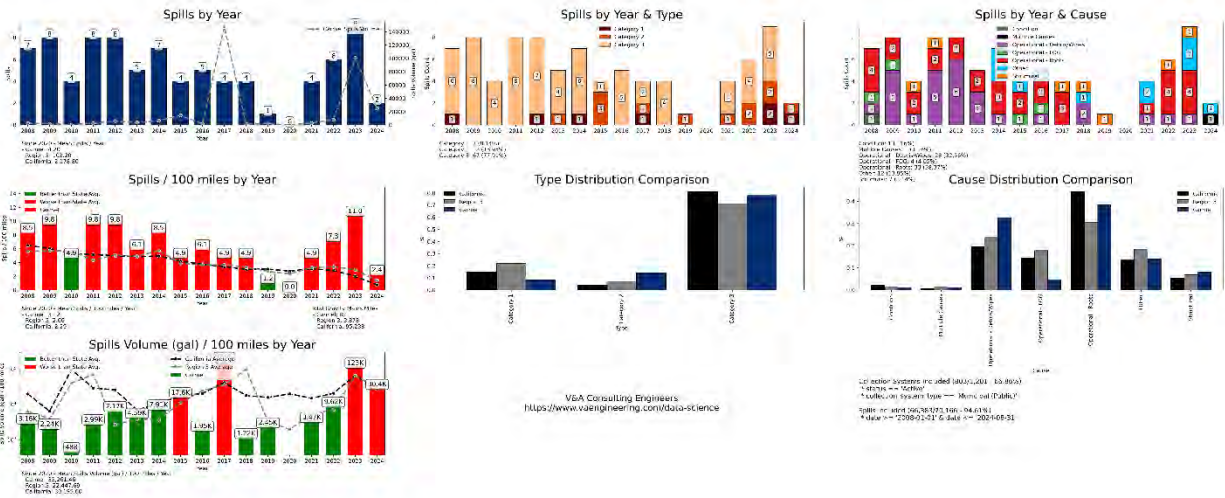
Figure 1-32: CAWD all sewer spills through 8/31/2024.

The most recent spill occurred on 8/5/2024:

- Category 2

- Cause: sag in mainline

- Gravity main segment asset ID: S622-S616

This segment has a track record for having high observations of gravel, sand or grit. Historic cleaning records for this segment are (1=clear, 2=light, 3=moderate, 4=high) as follows:

Table 1-18: Cleaning records for segment S622-S616.

Key Features

Length: 115ft	Diameter: 6in	Material: STEEL
Install Year: 1962	Slope: nan	Hotspot: True

GM Cleanings Ratings

Asset ID	Date	Grease	Roots	Gravel Sand Grit	Odor
S622-S616	2000-09-07	1	1	1	1
S622-S616	2007-05-23	1	1	4	1
S622-S616	2008-08-07	1	1	1	1
S622-S616	2009-05-27	1	1	1	1
S622-S616	2010-10-18	1	1	1	1
S622-S616	2011-09-14	1	1	1	1
S622-S616	2012-09-26	1	1	1	1
S622-S616	2013-05-15	3	1	3	1
S622-S616	2013-10-24	2	1	3	1
S622-S616	2014-05-01	3	1	4	1
S622-S616	2014-11-13	1	1	3	1
S622-S616	2015-07-08	1	1	3	1
S622-S616	2016-02-03	1	1	4	1
S622-S616	2016-08-09	1	1	3	1
S622-S616	2017-03-15	1	1	3	1
S622-S616	2017-07-10	1	1	2	1
S622-S616	2017-12-20	1	1	3	1
S622-S616	2018-07-03	4	1	4	1
S622-S616	2018-12-05	3	1	4	1
S622-S616	2019-02-25	1	1	3	1
S622-S616	2019-06-26	3	1	3	1
S622-S616	2019-11-19	1	1	4	1
S622-S616	2020-05-27	1	1	3	1
S622-S616	2020-11-17	1	1	4	1
S622-S616	2021-05-12	1	1	1	1
S622-S616	2022-06-14	3	1	4	1
S622-S616	2022-12-24	1	1	3	1
S622-S616	2023-11-02	1	1	4	1

Here are the cleaning records for the four segments upstream of S622-S616:

Table 1-19: Cleaning records T601-S622–upstream of spill.

T601-S622

Key Features

Length: 116ft	Diameter: 6in	Material: STEEL
Install Year: 1962	Slope: nan	Hotspot: True

GM Cleanings Ratings

Asset ID	Date	Grease	Roots	Gravel Sand Grit	Odor
T601-S622	2007-05-23	1	2	1	1
T601-S622	2008-08-07	3	1	1	1
T601-S622	2010-10-18	1	1	1	1
T601-S622	2011-09-14	1	1	1	1
T601-S622	2012-09-26	1	1	1	1
T601-S622	2013-05-15	3	1	3	1
T601-S622	2013-10-24	1	1	3	1
T601-S622	2014-05-01	3	1	4	1
T601-S622	2014-11-13	1	1	1	1
T601-S622	2015-07-08	1	1	3	1
T601-S622	2016-02-03	1	1	4	1
T601-S622	2016-08-09	1	1	3	1
T601-S622	2017-03-15	1	1	3	1
T601-S622	2017-07-10	1	1	2	1
T601-S622	2017-12-20	1	1	3	1
T601-S622	2018-07-03	4	1	4	1
T601-S622	2018-12-05	3	1	4	1
T601-S622	2019-06-26	1	1	3	1
T601-S622	2019-11-19	1	1	4	1
T601-S622	2020-05-27	1	1	3	1
T601-S622	2020-11-17	1	1	4	1
T601-S622	2021-05-12	1	1	1	1
T601-S622	2022-06-14	3	1	4	1
T601-S622	2022-12-24	1	1	3	1
T601-S622	2023-11-02	4	1	4	1

Table 1-20: Cleaning records T602-T601–upstream of spill.

T602-T601

Key Features

Length: 184ft	Diameter: 6in	Material: STEEL
Install Year: 1962	Slope: nan	Hotspot: True

GM Cleanings Ratings

Asset ID	Date	Grease	Roots	Gravel Sand Grit	Odor
T602-T601	2012-06-19	1	1	1	1
T602-T601	2013-05-15	1	1	1	1
T602-T601	2013-10-24	1	1	3	1
T602-T601	2014-05-01	3	1	4	1
T602-T601	2014-11-13	1	1	3	1
T602-T601	2015-07-14	1	1	3	1
T602-T601	2016-02-03	1	1	4	1
T602-T601	2016-08-09	1	1	3	1
T602-T601	2017-03-15	1	1	1	1
T602-T601	2017-07-10	1	1	2	1
T602-T601	2017-12-20	1	1	3	1
T602-T601	2018-07-03	3	1	4	1
T602-T601	2018-12-05	3	1	4	1
T602-T601	2019-06-26	1	1	3	1
T602-T601	2019-11-19	1	1	4	1
T602-T601	2020-05-27	1	1	3	1
T602-T601	2020-11-17	1	1	4	1
T602-T601	2021-05-12	1	1	1	1
T602-T601	2022-06-14	3	1	4	1
T602-T601	2022-12-24	1	1	3	1
T602-T601	2023-11-02	4	1	4	1

Table 1-21: Cleaning history segment T648-T602, upstream of spill.

T648-T602

Key Features

| Length: 47ft | Diameter: 6in | Material: STEEL |
| Install Year: 1962 | Slope: nan | Hotspot: True |

GM Cleanings Ratings

Asset ID	Date	Grease	Roots	Gravel Sand Grit	Odor
T648-T602	2012-06-19	1	1	1	1
T648-T602	2013-05-15	1	1	1	1
T648-T602	2013-10-24	1	1	3	1
T648-T602	2014-05-01	3	1	4	1
T648-T602	2014-11-13	1	1	3	1
T648-T602	2015-07-14	1	1	3	1
T648-T602	2016-02-03	1	1	4	1
T648-T602	2016-08-09	1	1	3	1
T648-T602	2017-03-16	1	1	1	1
T648-T602	2017-07-10	1	1	2	1
T648-T602	2017-12-20	1	1	3	1
T648-T602	2018-07-03	1	1	4	1
T648-T602	2018-12-05	3	1	4	1
T648-T602	2019-06-26	1	1	3	1
T648-T602	2019-11-19	1	1	4	1
T648-T602	2020-05-27	1	1	3	1
T648-T602	2020-11-17	1	1	4	1
T648-T602	2021-05-12	1	1	1	1
T648-T602	2022-06-14	3	1	4	1
T648-T602	2022-12-24	1	1	3	1
T648-T602	2023-11-02	4	1	4	1

Table 1-22: Cleaning history segment T603-T648, upstream of spill.

T603-T648

Key Features

Length: 183ft	Diameter: 6in	Material: STEEL
Install Year: 1962	Slope: nan	Hotspot: True

GM Cleanings Ratings

Asset ID	Date	Grease	Roots	Gravel Sand Grit	Odor
T603-T648	2012-06-19	1	1	1	1
T603-T648	2013-05-15	1	1	1	1
T603-T648	2013-10-24	1	1	3	1
T603-T648	2014-05-01	3	1	4	1
T603-T648	2014-11-13	1	1	2	1
T603-T648	2015-07-14	1	1	3	1
T603-T648	2016-02-03	1	1	4	1
T603-T648	2016-08-09	1	1	3	1
T603-T648	2017-03-16	1	1	1	1
T603-T648	2017-07-10	1	1	2	1
T603-T648	2017-12-20	1	1	3	1
T603-T648	2018-07-03	1	1	4	1
T603-T648	2018-12-05	3	1	4	1
T603-T648	2019-06-26	1	1	1	1
T603-T648	2019-11-19	1	1	4	1
T603-T648	2020-05-27	1	1	3	1
T603-T648	2020-11-17	1	1	4	1
T603-T648	2021-05-12	1	1	1	1
T603-T648	2022-06-14	3	1	4	1
T603-T648	2022-12-24	1	1	3	1
T603-T648	2023-06-14	1	1	4	1
T603-T648	2023-08-25	1	1	4	1
T603-T648	2023-11-02	2	1	4	1
T603-T648	2024-01-04	1	1	1	1

Here are the cleaning records of the three gravity main segments downstream from this spill:

Table 1-23: Cleaning history segment S616-S608, downstream of spill.

S616-S608

Key Features

Length: 121ft	Diameter: 6in	Material: STEEL
Install Year: 1962	Slope: nan	Hotspot: True

GM Cleanings Ratings

Asset ID	Date	Grease	Roots	Gravel Sand Grit	Odor
S616-S608	2003-07-14	1	1	1	1
S616-S608	2005-04-08	1	1	1	1
S616-S608	2007-05-23	1	1	4	1
S616-S608	2008-08-07	1	1	1	1
S616-S608	2009-05-27	1	1	1	1
S616-S608	2010-10-18	1	1	1	1
S616-S608	2011-09-14	1	1	1	1
S616-S608	2012-09-26	1	1	1	1
S616-S608	2013-05-15	3	1	3	1
S616-S608	2013-10-24	2	1	3	1
S616-S608	2014-05-01	3	1	4	1
S616-S608	2014-11-13	1	1	3	1
S616-S608	2015-07-08	1	1	3	1
S616-S608	2016-02-03	1	1	4	1
S616-S608	2016-08-09	1	1	3	1
S616-S608	2017-03-15	1	1	3	1
S616-S608	2017-07-10	1	1	2	1
S616-S608	2017-12-20	1	1	3	1
S616-S608	2018-07-03	4	1	4	1
S616-S608	2018-12-05	1	1	4	1
S616-S608	2019-02-25	1	1	3	1
S616-S608	2019-06-26	3	1	3	1
S616-S608	2019-11-19	1	1	4	1
S616-S608	2020-05-27	1	1	3	1
S616-S608	2020-11-17	1	1	4	1
S616-S608	2021-05-12	1	1	1	1
S616-S608	2022-06-14	3	1	4	1
S616-S608	2022-12-24	1	1	3	1
S616-S608	2023-11-02	1	1	4	1

Table 1-24: Cleaning history segment S618-S615, downstream of spill.

S618-S615

Key Features

Length: 182ft	Diameter: 6in	Material: STEEL
Install Year: 1962	Slope: nan	Hotspot: True

GM Cleanings Ratings

Asset ID	Date	Grease	Roots	Gravel Sand Grit	Odor
S618-S615	2007-05-23	1	1	3	1
S618-S615	2008-08-07	1	1	3	1
S618-S615	2009-05-27	1	1	1	1
S618-S615	2011-09-14	1	1	1	1
S618-S615	2012-09-26	1	1	1	1
S618-S615	2013-05-15	1	1	4	1
S618-S615	2013-10-24	1	1	3	1
S618-S615	2014-05-01	3	1	4	1
S618-S615	2014-11-13	1	1	3	1
S618-S615	2015-07-08	1	1	3	1
S618-S615	2016-02-03	1	1	4	1
S618-S615	2016-08-09	1	1	3	1
S618-S615	2017-03-15	1	1	3	1
S618-S615	2017-07-10	1	1	2	1
S618-S615	2017-12-07	1	1	2	1
S618-S615	2017-12-20	1	1	3	1
S618-S615	2018-07-03	1	1	4	1
S618-S615	2018-12-05	1	1	4	1
S618-S615	2019-02-25	1	1	3	1
S618-S615	2019-06-26	1	1	3	1
S618-S615	2019-11-19	1	1	4	1
S618-S615	2020-05-27	1	1	3	1
S618-S615	2020-11-17	1	1	4	1
S618-S615	2021-05-12	1	1	1	1
S618-S615	2022-06-14	3	1	4	1
S618-S615	2022-12-24	1	1	3	1
S618-S615	2023-11-02	1	1	4	1

Table 1-25: Cleaning history segment S615-S609, downstream of spill.

S615-S609

Key Features

Length: 301ft	Diameter: 6in	Material: VCP
Install Year: 1962	Slope: nan	Hotspot: True

GM Cleanings Ratings

Asset ID	Date	Grease	Roots	Gravel Sand Grit	Odor
S615-S609	2007-05-23	1	1	3	1
S615-S609	2008-05-12	1	1	1	1
S615-S609	2008-08-07	1	1	2	1
S615-S609	2009-05-27	1	1	1	1
S615-S609	2010-10-18	1	1	1	1
S615-S609	2011-09-14	1	1	1	1
S615-S609	2012-01-18	1	1	1	1
S615-S609	2012-09-26	1	1	1	1
S615-S609	2013-05-15	1	1	3	1
S615-S609	2013-10-24	1	1	3	1
S615-S609	2014-01-15	1	1	3	1
S615-S609	2014-05-01	3	1	4	1
S615-S609	2014-11-13	1	1	3	1
S615-S609	2015-07-08	1	1	3	1
S615-S609	2016-02-03	1	1	4	1
S615-S609	2016-08-09	1	1	3	1
S615-S609	2017-03-15	1	1	3	1
S615-S609	2017-07-10	1	1	2	1
S615-S609	2017-12-07	1	1	2	1
S615-S609	2017-12-20	1	1	3	1
S615-S609	2018-07-03	1	1	4	1
S615-S609	2018-12-05	1	1	4	1
S615-S609	2019-02-25	1	1	3	1
S615-S609	2019-06-26	1	1	3	1
S615-S609	2019-11-19	1	1	4	1
S615-S609	2020-05-27	1	1	3	1
S615-S609	2020-11-17	1	1	4	1
S615-S609	2021-05-12	1	1	1	1
S615-S609	2021-10-27	1	1	4	1
S615-S609	2022-06-14	3	1	4	1
S615-S609	2022-12-24	1	1	3	1
S615-S609	2023-11-02	1	1	4	1

Conclusion: analysis of these cleaning records suggests that there is evidence that S622-S616 should be on the most frequent High Frequency cleaning schedule (one or three months).

1.4   Other Gravity Main Maintenance Data

1.4.1 Root foaming maintenance

Generally, root foaming maintenance should eliminate roots in a gravity main segment for up to two years.

Root foaming location prioritization could be determined by observations of roots in either CCTV data or cleaning condition data and resultant high LOF predictions for roots.

For Carmel's root foaming history and locations, V&A received the following Excel files:

- File Name: ICOM Root Foaming History.xls
- Received on: 5/30/2024
- Total Root Foamings: 1,548
- First Root Foaming: 10/21/2014
- Last Root Foaming: 11/30/2023
- Unique Asset IDs: 524

There are six gravity main segment IDs in the root foaming records that do not exist in GIS:

- 'S1046-HACIENDA', 'P502-SCENIC & 8TH', 'M745-M746', 'R762-R768', 'R775-R776', 'R776-R778'

Table 1-26: Count of segments root foamed, by calendar year.

Roots Maintenance - Maintenance By Calendar Year - Table

Calendar Year	Total Maintenance	Total Miles
2014	160	7.51
2015	0	0.00
2016	340	15.17
2017	0	0.00
2018	322	15.16
2019	156	7.45
2020	176	7.55
2021	133	6.31
2022	133	5.82
2023	127	6.41

Roots Maintenance - Maintenance Count - Bins - Map
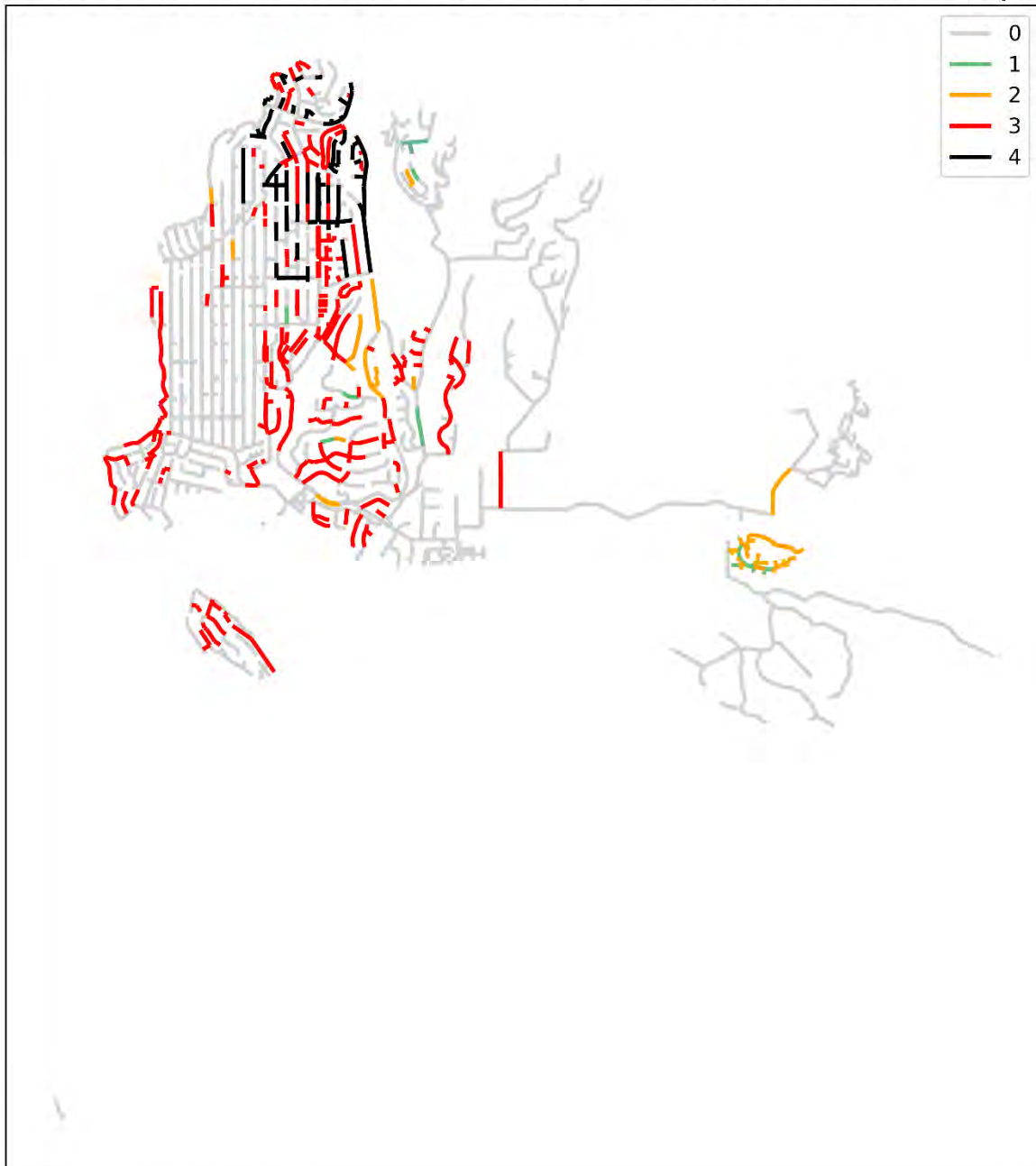
Maintenance Count - Bins
0: 1,330 (71.97%)
1: 23 (1.24%)
2: 80 (4.33%)
3: 312 (16.88%)
4: 103 (5.57%)

Figure 1-33: Locations of root foaming, count, since 2014.

1.5 Gravity Main Data Assessment Summary

To aggregate condition data, the data from CCTV inspections and spills need to be normalized to the 1-5 scale used for cleaning conditions. The table below shows V&A's method for this. The spill conversions are specific to each spill.

Table 1-27: CCTV and spill data conversion table to 1-5 scale.

Condition Type	Condition Code/Category	Debris	Grease	Roots	Mean	Max
CCTV	DXXX (excl. DAGS)	3	1	1	1.7	3
CCTV	DAGS	1	3	1	1.7	3
CCTV	RFX	1	1	2	1.3	2
CCTV	RMX/RBX	1	1	3	1.7	3
Spill	Cause = Operational - Roots	2	2	5	3.0	5
Spill	Cause = Operational - Debris/Wipes	5	2	2	3.0	5
Spill	Cause = Operational - FOG	2	5	2	3.0	5
Spill	Cause = Other / Structural / Multiple Causes	3	3	3	3.0	3

For example, any DAGS observation in a CCTV inspection is converted to a "moderate" observation of grease in a cleaning observation.

The summary of available CAWD data for analytics is as follows:

The large amount (46,806 data points) of cleaning condition data, coupled with the 4,123 of CCTV condition data points enables sophisticated analytics for analysis of the 1,848 gravity main segments and their need for cleaning.

as of 8/31/2024
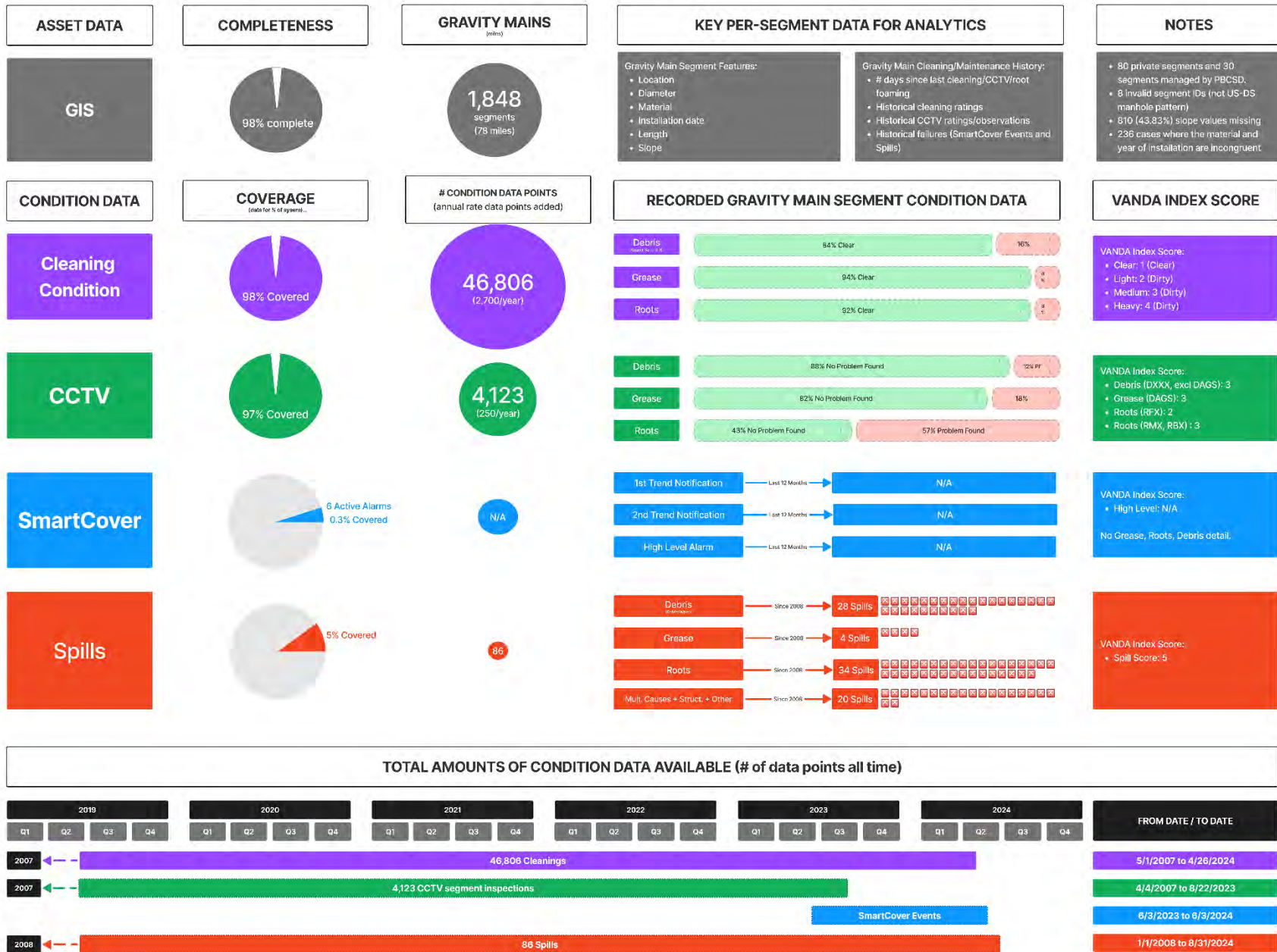
Figure 1-34: CAWD Gravity Main DATA Assessment Summary.

2 ANALYTICS—task 9

2.1   LOF predictions using machine learning

V&A created machine learning models to predict the need-for-cleaning effective 10/1/2024, using all condition data from 1/1/2014 on. This need-for-cleaning is characterized as "LOF" and generates a predicted VANDA condition rating between 1.XX-5 for that date.

VANDA rating predictions were generated for Roots, Grease and Debris (sand, grit or gravel). With the ultimate goal being to optimize maintenance of the gravity main segments, which includes not just cleaning but also root foaming and the locations of SmartCovers, this breakdown gives good direction.

Gravity main cleaning takes care of all conditions—roots, debris and grease. For debris and grease the only method of maintenance is cleaning.

For roots, if the main reason the gravity main segment needs maintenance is because of roots, root foaming is an option (although there is often required cleaning of segments before and after root foam application depending on the root foaming process used).

For a regression prediction such as this (predicting a number between 1-5) it is best practice to deploy two machine learning models with high measured accuracy and average the two results. V&A's chosen two machine learning models for this are random forest regressor and gradient boost regressor.

Machine learning models are not deterministic, but rather are probabilistic. These predicted VANDA ratings give the "most likely" future VANDA rating but are not deterministically guaranteed. These types of predictions give excellent guidance for broad prioritization of a large number of assets (in this case the 1,848 gravity main segments with at least one condition data point) but should not be relied upon for any high consequence asset where the consequence of failure/spill is catastrophic.

To consider the distribution of VANDA rating predictions for individual gravity main segments V&A utilizes box plots. Box plots are helpful for understanding the overall need-for-cleaning but also for identifying gravity main segments that have very high or very low LOF (need-for-cleaning) as observed by having lower or upper end statistical outlier VANDA rating predictions. These outlier predictions provide the basis for analyzing which gravity main segments need more frequent cleaning or can have less frequent cleaning with minimal risk.

To corroborate V&A's VANDA rating predictions and the gravity main cleaning frequency adjustments generated by this high and low outlier predicted LOF analysis, V&A uses CAWD's own cleaning history and observed condition data points. These cleaning histories and observed condition data points are detailed in the appropriate section or Appendix.

Box plot distributions for grease, roots and debris are shown here. These will be further analyzed for specific segment recommendations in section 3 (task 10).
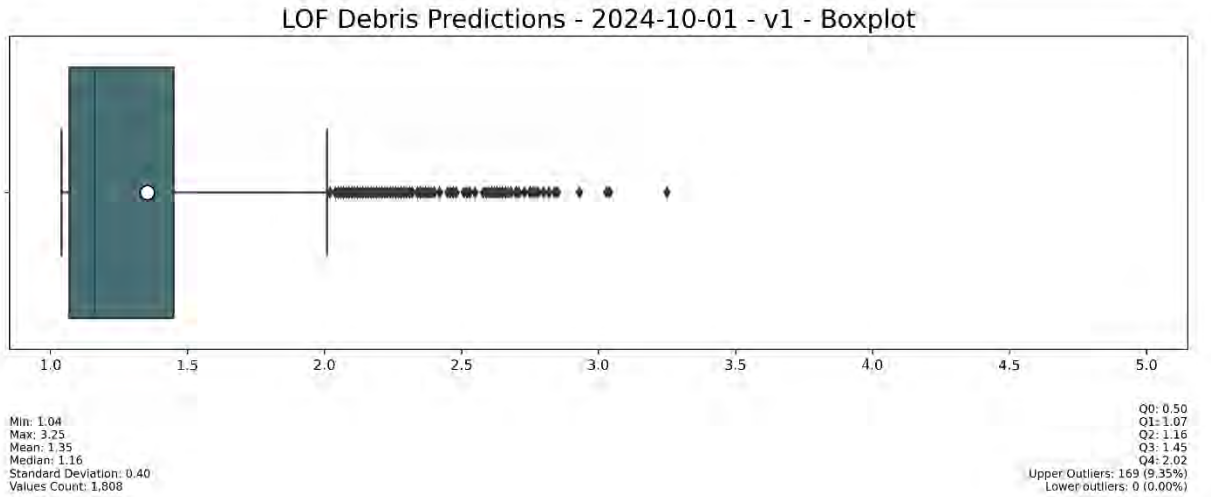
Figure 2-1: Box plot distribution of predicted LOF ratings for Debris (sand, grit or gravel).
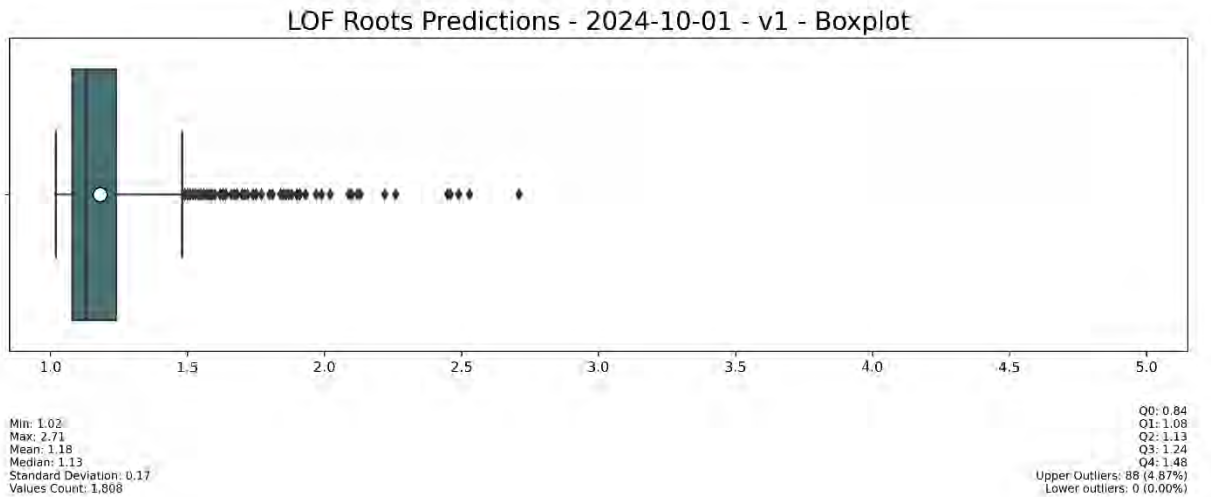
Figure 2-2: Box plot distribution of predicted LOF ratings for Roots ratings.
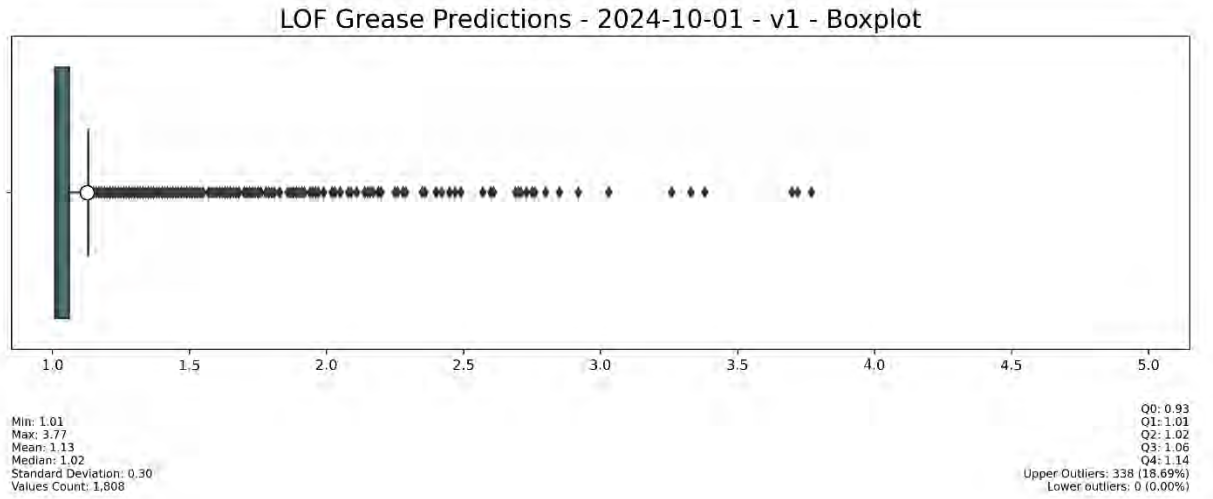
Figure 2-3: Box plot distribution of predicted LOF ratings for Grease ratings.
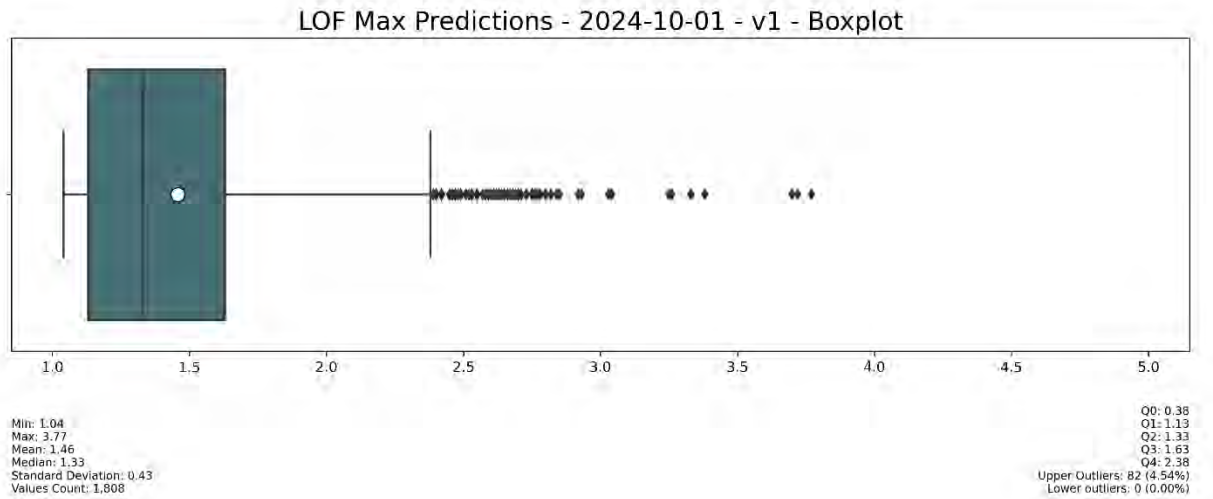
Figure 2-4: Box plot distribution of predicted LOF ratings for Max ratings (highest of roots, debris or grease rating for each segment).

The following maps show per-segment predictions rounded to the nearest integer for each of the same categories (debris, roots, grease individually, then a max rating for the highest of the three categories).
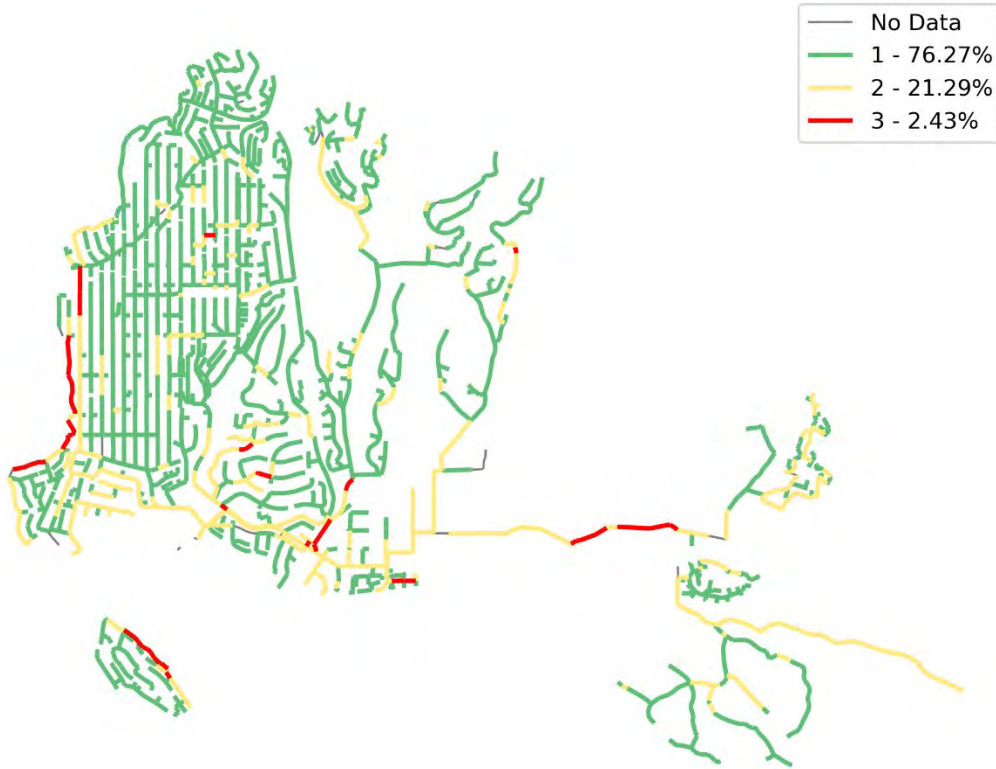
Figure 2-5: Map of LOF predictions per segment, for debris (sand, grit or gravel) only.
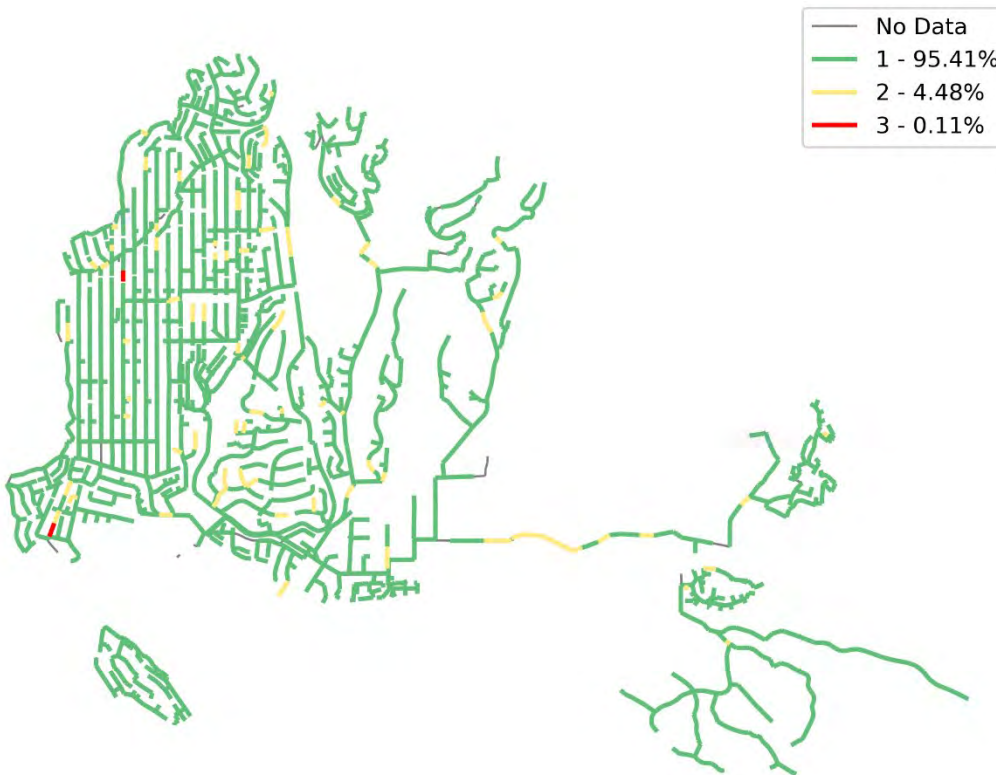
Figure 2-6: Map of LOF predictions per segment, for roots only.
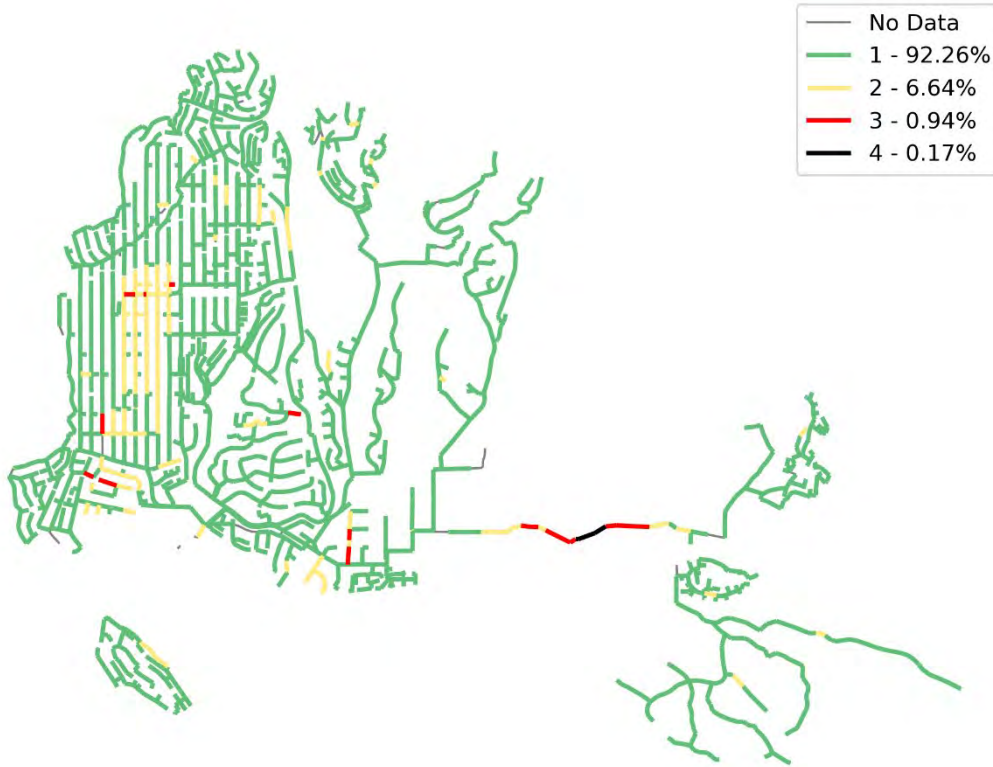
Figure 2-7: Map of LOF predictions per segment, for grease only.
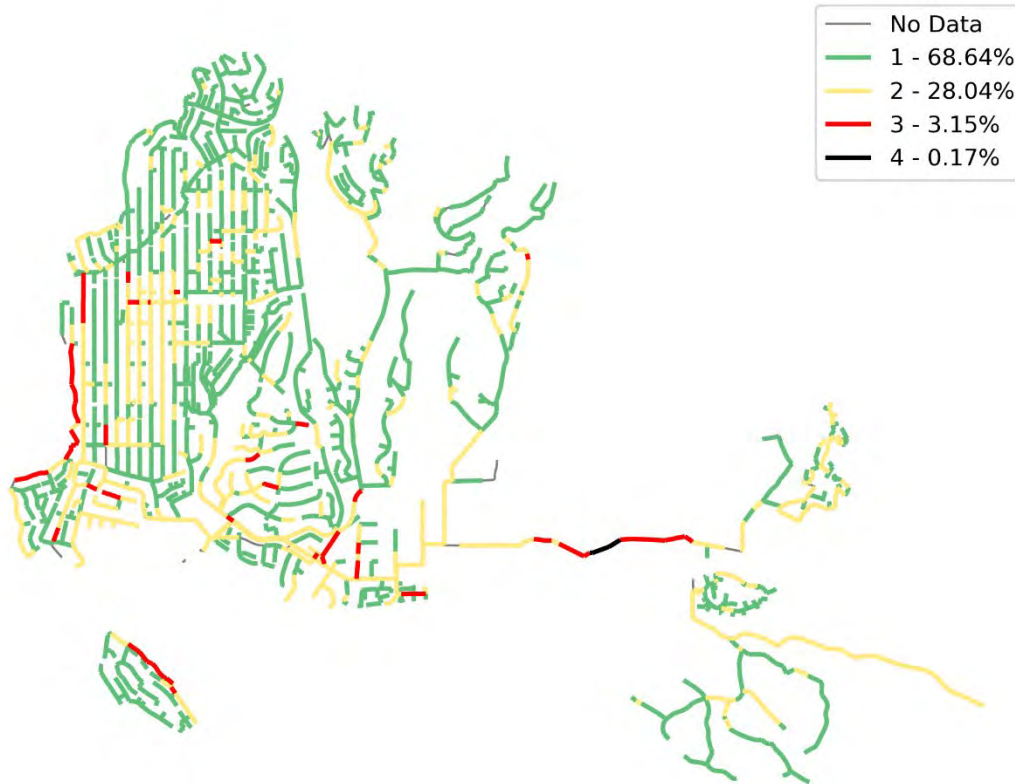
Figure 2-8: Map of LOF predictions per segment, for debris, roots or grease.

2.2 LOF prediction spreadsheet with segment cleaning histories

The following spreadsheet summarizes V&A's LOF predictions for each gravity main segment, along with each segment's GIS characteristics and cleaning/condition history. Filtered versions of this spreadsheet are the primary tool for the cleaning frequency recommendations that follow.

CAWD LOF
predictions with segm

Embedded Spreadsheet 10: Gravity main segment LOF predictions with GIS data and cleaning history.

3 IMPLEMENTATION— tasks 10-11

3.1 Segment cleaning priority analysis

3.1.1 Top priority, clean or CCTV asap

3.1.1.1 Neglected gravity main segments, no cleaning or CCTV record in data

There are 39 segments with no cleaning record in the data, and which also have no CCTV inspection record in the data. The data is "blind" to the status of these segments. CAWD should check the status of these segments as soon as possible.

- "O6149-O6133", "Q914-Q915", "Q6150-Q637", "S1047-HACIENDA", "S1046-S1047", "N903-O968", "Q520-BAY & SCENIC", "N794-N791", "N831-O846", "M768-M767", "Y402-HIGHLANDS", "R524-R535", "O960-O9101", "S606-CARMELMEADOWS_1", "Q916-Q917", "O6134-O6149", "R667-R6PS_2", "R1124-R1154", "O822-O824", "O9101-O911", "New Main", "Q913-Q914", "R775-R778", "R1004-R1005", "R1154-R1126", "R761-R768", " -R6PS_3", "Q918-R913", "N635-O651", "Q915-Q916", "Y401-Y402", "Q506-Q509", "R640-R642", "P503-SCENIC & 8TH", "Q917-Q918", "P502-P503", "Q635-Q6150", "N791-N796", "O709-O708"

![Excel icon]

 39 segments with no
cleaning record or CC

Embedded Spreadsheet 11: Top priority segments for CAWD w no cleaning or CCTV record.

3.1.1.2 Segments not cleaned in past two years with high LOF predictions

There are 14 segments (.75%) that have not been cleaned or CCTV inspected in two or more years, and which have a LOF prediction equal to or greater than 2.5 (meaning "moderate" or higher LOF prediction). These should be analyzed and potentially added to the High Frequency cleaning list.

- R1014-R901, R901-R902,R902-R903, R903-R904, R914-R907, R1008-R1009, R1010-R1011, S836-S837, R1012-R1014, R1011-R1012, R904-R905, R906-R914, S831-S836, R1009-R1010

![Excel icon]

Gravity main
segments with no dat

Embedded Spreadsheet 12: Segments with high LOF predictions and no data past two years.

12 of these 14 segments are located in the Valley Basin.

Here are the cleaning and CCTV inspection records for each of these segments:

Table 3-1: Cleaning and CCTV histories for 14 segments with high LOF and no data past two years.

R901-R902

LOF Predictions – 2024-10-01

Max Prediction: 3.72 (Upper Outlier)

Debris Prediction: 2.80 (Upper Outlier)
Grease Prediction: 3.72 (Upper Outlier)
Roots Prediction: 1.46 (Highest)

Key Features

| Length: 388ft | Diameter: 15in | Material: PVC | Install Year: 2022 |
| Slope: 0.0 | Hotspot: N/A | Basin: R809 | Flow Basin: Valley Basin |

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
R901-R902	2017-08-08	CCTV	3.0	1.0	1.0
R901-R902	2017-08-09	Cleaning	4.0	1.0	1.0

R1014-R901

LOF Predictions – 2024-10-01

Max Prediction: 3.77 (Upper Outlier)

Debris Prediction: 2.64 (Upper Outlier)
Grease Prediction: 3.77 (Upper Outlier)
Roots Prediction: 1.55 (Upper Outlier)

Key Features

| Length: 293ft | Diameter: 15in | Material: PVC | Install Year: 2022 |
| Slope: 0.0 | Hotspot: N/A | Basin: R809 | Flow Basin: Valley Basin |

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
R1014-R901	2017-08-09	CCTV	3.0	1.0	1.0
R1014-R901	2017-08-10	Cleaning	4.0	1.0	1.0

R1012-R1014

LOF Predictions – 2024-10-01

Max Prediction: 2.71 (Upper Outlier)

Debris Prediction: 2.36 (Upper Outlier)
Grease Prediction: 2.71 (Upper Outlier)
Roots Prediction: 1.26 (Highest)

Key Features

| Length: 245ft | Diameter: 15in | Material: PVC | Install Year: 2022 |
| Slope: nan | Hotspot: N/A | Basin: R809 | Flow Basin: Valley Basin |

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
R1012-R1014	2017-08-07	CCTV	3.0	3.0	1.0
R1012-R1014	2017-08-09	Cleaning	4.0	4.0	1.0
R1012-R1014	2017-08-09	CCTV	3.0	1.0	1.0
R1012-R1014	2021-08-26	Cleaning	4.0	1.0	1.0

R1011-R1012

LOF Predictions - 2024-10-01

Max Prediction: 2.70 (Upper Outlier)

Debris Prediction: 2.60 (Upper Outlier)
Grease Prediction: 2.70 (Upper Outlier)
Roots Prediction: 1.44 (Highest)

Key Features

| Length: 435ft | Diameter: 15in | Material: PVC | Install Year: 2022 |
| Slope: 0.0 | Hotspot: N/A | Basin: R809 | Flow Basin: Valley Basin |

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
R1011-R1012	2017-08-07	CCTV	3.0	3.0	1.0
R1011-R1012	2017-08-09	Cleaning	4.0	1.0	1.0
R1011-R1012	2017-08-09	CCTV	3.0	3.0	1.0

R1010-R1011

LOF Predictions - 2024-10-01

Max Prediction: 2.80 (Upper Outlier)

Debris Prediction: 2.61 (Upper Outlier)
Grease Prediction: 2.80 (Upper Outlier)
Roots Prediction: 1.54 (Upper Outlier)

Key Features

| Length: 317ft | Diameter: 15in | Material: PVC | Install Year: 2022 |
| Slope: 0.0 | Hotspot: N/A | Basin: R809 | Flow Basin: Valley Basin |

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
R1010-R1011	2017-08-07	CCTV	3.0	3.0	1.0
R1010-R1011	2017-08-23	Cleaning	4.0	1.0	1.0

R1009-R1010

LOF Predictions - 2024-10-01

Max Prediction: 2.51 (Upper Outlier)

Debris Prediction: 2.51 (Upper Outlier)
Grease Prediction: 1.88 (Upper Outlier)
Roots Prediction: 1.46 (Highest)

Key Features

| Length: 444ft | Diameter: 15in | Material: PVC | Install Year: 2022 |
| Slope: 0.0 | Hotspot: N/A | Basin: R809 | Flow Basin: Valley Basin |

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
R1009-R1010	2017-08-07	CCTV	3.0	1.0	1.0
R1009-R1010	2017-08-09	Cleaning	3.0	1.0	1.0

R1008-R1009

LOF Predictions - 2024-10-01

Max Prediction: 2.82 (Upper Outlier)

Debris Prediction: 2.82 (Upper Outlier)
Grease Prediction: 1.02 (Medium)
Roots Prediction: 1.26 (Highest)

Key Features

| Length: 203ft | Diameter: 15in | Material: PVC | Install Year: 2022 |
| Slope: 0.0 | Hotspot: N/A | Basin: R809 | Flow Basin: Valley Basin |

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
R1008-R1009	2017-07-18	Cleaning	4.0	1.0	1.0
R1008-R1009	2017-07-18	CCTV	3.0	1.0	1.0
R1008-R1009	2021-07-08	Cleaning	4.0	1.0	1.0
R1008-R1009	2022-02-04	CCTV	1.0	1.0	1.0

S836-S837

LOF Predictions - 2024-10-01

Max Prediction: 2.78 (Upper Outlier)

Debris Prediction: 2.78 (Upper Outlier)
Grease Prediction: 1.28 (Upper Outlier)
Roots Prediction: 1.13 (Medium)

Key Features

| Length: 277ft | Diameter: 6in | Material: PVC | Install Year: 1969 |
| Slope: 0.01 | Hotspot: N/A | Basin: R709 | Flow Basin: Mission Basin |

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
S836-S837	2015-04-20	Cleaning	1.0	1.0	1.0
S836-S837	2016-11-03	Cleaning	1.0	1.0	1.0
S836-S837	2019-05-23	Cleaning	1.0	1.0	1.0
S836-S837	2020-12-10	CCTV	3.0	3.0	1.0
S836-S837	2022-06-01	Cleaning	3.0	1.0	1.0

S831-S836

LOF Predictions - 2024-10-01

Max Prediction: 2.52 (Upper Outlier)

Debris Prediction: 2.52 (Upper Outlier)
Grease Prediction: 1.23 (Upper Outlier)
Roots Prediction: 1.13 (Medium)

Key Features

| Length: 268ft | Diameter: 6in | Material: PVC | Install Year: 1969 |
| Slope: 0.01 | Hotspot: N/A | Basin: R709 | Flow Basin: Mission Basin |

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
S831-S836	2015-04-20	Cleaning	1.0	1.0	1.0
S831-S836	2016-11-03	Cleaning	1.0	1.0	1.0
S831-S836	2019-05-23	Cleaning	1.0	1.0	1.0
S831-S836	2020-12-10	CCTV	1.0	3.0	1.0
S831-S836	2022-06-01	Cleaning	4.0	1.0	1.0

R914-R907

LOF Predictions - 2024-10-01

Max Prediction: 2.85 (Upper Outlier)

Debris Prediction: 2.00 (Highest)
Grease Prediction: 2.85 (Upper Outlier)
Roots Prediction: 1.53 (Upper Outlier)

Key Features

| Length: 227ft | Diameter: 10in | Material: TRUSS | Install Year: 1969 |
| Slope: 0.0 | Hotspot: N/A | Basin: R809 | Flow Basin: Valley Basin |

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
R914-R907	2017-08-10	Cleaning	4.0	1.0	1.0
R914-R907	2017-08-10	CCTV	3.0	1.0	1.0
R914-R907	2018-06-29	Cleaning	4.0	4.0	1.0
R914-R907	2018-06-29	CCTV	3.0	3.0	1.0

R906-R914

LOF Predictions - 2024-10-01

Max Prediction: 2.60 (Upper Outlier)

Debris Prediction: 2.37 (Upper Outlier)
Grease Prediction: 2.60 (Upper Outlier)
Roots Prediction: 1.72 (Upper Outlier)

Key Features

| Length: 168ft | Diameter: 10in | Material: TRUSS | Install Year: 1969 |
| Slope: 0.0 | Hotspot: N/A | Basin: R809 | Flow Basin: Valley Basin |

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
R906-R914	2017-08-08	CCTV	3.0	1.0	1.0
R906-R914	2017-08-14	Cleaning	4.0	1.0	1.0
R906-R914	2018-06-29	Cleaning	4.0	4.0	1.0
R906-R914	2018-06-29	CCTV	1.0	1.0	1.0

R904-R905

LOF Predictions - 2024-10-01

Max Prediction: 2.69 (Upper Outlier)

Debris Prediction: 2.27 (Upper Outlier)
Grease Prediction: 2.69 (Upper Outlier)
Roots Prediction: 1.51 (Upper Outlier)

Key Features

| Length: 618ft | Diameter: 15in | Material: PVC | Install Year: 2022 |
| Slope: 0.0 | Hotspot: N/A | Basin: R809 | Flow Basin: Valley Basin |

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
R904-R905	2017-08-08	CCTV	3.0	3.0	1.0
R904-R905	2017-08-09	Cleaning	4.0	1.0	1.0
R904-R905	2018-06-29	Cleaning	4.0	4.0	1.0

R903-R904

LOF Predictions - 2024-10-01

Max Prediction: 3.38 (Upper Outlier)

Debris Prediction: 2.59 (Upper Outlier)
Grease Prediction: 3.38 (Upper Outlier)
Roots Prediction: 1.58 (Upper Outlier)

Key Features

| Length: 144ft | Diameter: 15in | Material: PVC | Install Year: 2022 |
| Slope: 0.0 | Hotspot: N/A | Basin: R809 | Flow Basin: Valley Basin |

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
R903-R904	2017-08-08	CCTV	3.0	3.0	1.0
R903-R904	2017-08-09	Cleaning	4.0	1.0	1.0

R902-R903

LOF Predictions - 2024-10-01

Max Prediction: 3.70 (Upper Outlier)

Debris Prediction: 2.71 (Upper Outlier)
Grease Prediction: 3.70 (Upper Outlier)
Roots Prediction: 1.62 (Upper Outlier)

Key Features

| Length: 66ft | Diameter: 15in | Material: PVC | Install Year: 2022 |
| Slope: 0.0 | Hotspot: N/A | Basin: R809 | Flow Basin: Valley Basin |

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
R902-R903	2017-08-08	CCTV	3.0	1.0	1.0
R902-R903	2017-08-09	Cleaning	4.0	1.0	1.0

3.1.2 High Frequency cleaning analysis and recommendations

There are an additional 56 gravity main segments (3% of all segments) that have "upper outlier" high predicted LOF. These should be considered and analyzed for inclusion in CAWD's high frequency cleaning schedules.

Segments recommended for hig

Embedded Spreadsheet 13: Segments recommended for consideration of High Frequency cleaning.

Cleaning history cards for each of these 56 segments are attached in Risk-based gravity main cleaning and maintenance

V&A's proposed path in this report is for incremental adoption of recommendations to make some gravity main segments higher or lower priorities than they currently are. For this approach V&A's LOF predictions are based on an effective date of 10/1/2014.

A future approach would be to move to risk-based gravity main cleaning and maintenance. For a risk-based approach V&A and CAWD would discuss and agree on a tolerable level of risk and clean or maintain gravity main segments before that level of risk is reached or exceeded. For example, a goal might be to clean or maintain all gravity main segments before a level of medium/moderate (a predicted LOF of 3.0) was reached or exceeded for grease, roots or debris (grit, sand, gravel). This approach would require frequent monitoring and adjustment.

3.2 Regular Frequency cleaning analysis and recommendations—opportunities to clean less

Remaining gravity main segments not previously addressed in this section can be sorted from highest to lowest predicted LOF for regular cleaning frequency prioritization.

All CAWD gravity
main segments sorted

Embedded Spreadsheet 14: All gravity main segments ranked from highest to lowest predicted LOF.

Sorting of this spreadsheet becomes a decision making tool for increasing or lowering gravity main segment cleaning frequencies.

To identify candidate segments that are currently being cleaned more frequently than necessary V&A proposes the following sort of this spreadsheet:

▪ In column Q select only the segments that have been cleaned two or more times since July 2022 (more frequently than once every 24 months)

▪ In columns AD, AK, AR, AY and BE (Last Max observation for each of the last five cleanings or CCTV inspections) all set to 1 only ("clear")

This sort yields 327 segments (17%) that are currently being cleaned or inspected more often than once every 24 months, but are candidates for 24 month (or even 30 or 36) cleaning frequency.

▪ Sort column K (V&A's LOF prediction) from lowest to highest to further prioritize this list of candidate segments

CAWD gravity main
segments for less freq

Embedded Spreadsheet 15: Candidate segments for less cleaning.

3.3 Smartcover location analysis and recommendations

If SmartCovers are to be located at locations where very frequent cleaning alone does not guarantee

avoidance of a sewer spill, V&A's suggested approach is as follows:

- Prioritize locations where, despite frequent cleaning, there is still a very high predicted LOF
  - A Max LOF prediction that is an Upper Outlier
  - And the segments have been cleaned five or more times in the past two years

There are 12 segments that meet these criteria:

- R854-S802
- 06103-06104
- 0681-0677
- R847-R854
- 0688-06141
- T603-T648
- R841-R853
- T608-T604
- 0677-P628
- S712-S711
- P667-P659
- 06141-0681

12 segments for
SmartCover considera

Embedded Spreadsheet 16: 12 segments for SmartCover location consideration.

The cleaning histories for these 12 segments is as follows:

R841-R853

R847-R854

LOF Predictions - 2024-10-01

Max Prediction: 2.75 (Upper Outlier)

Debris Prediction: 1.75 (Highest)
Grease Prediction: 2.75 (Upper Outlier)
Roots Prediction: 1.07 (Lowest)

LOF Predictions - 2024-10-01

Max Prediction: 2.85 (Upper Outlier)

Debris Prediction: 1.41 (Medium)
Grease Prediction: 2.85 (Upper Outlier)
Roots Prediction: 1.04 (Lowest)

Key Features

Length: 244ft	Diameter: 8in	Material: VCP	Install Year: 1969
Slope: nan	Hotspot: N/A	Basin: R709	Flow Basin: Mission Basin

Key Features

Length: 37ft	Diameter: 8in	Material: VCP	Install Year: 1969
Slope: nan	Hotspot: N/A	Basin: R709	Flow Basin: Mission Basin

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
R841-R853	2014-02-11	Cleaning	2.0	2.0	1.0
R841-R853	2014-08-04	Cleaning	1.0	1.0	1.0
R841-R853	2015-04-15	Cleaning	1.0	1.0	1.0
R841-R853	2015-07-28	Cleaning	1.0	1.0	1.0
R841-R853	2015-11-19	Cleaning	3.0	3.0	1.0
R841-R853	2016-05-18	Cleaning	1.0	1.0	1.0
R841-R853	2016-07-27	Cleaning	1.0	1.0	1.0
R841-R853	2016-12-12	Cleaning	1.0	3.0	1.0
R841-R853	2017-04-05	Cleaning	1.0	1.0	1.0
R841-R853	2017-07-13	Cleaning	1.0	1.0	1.0
R841-R853	2017-11-22	Cleaning	1.0	4.0	1.0
R841-R853	2017-12-04	Cleaning	1.0	4.0	1.0
R841-R853	2018-05-23	Cleaning	2.0	3.0	1.0
R841-R853	2018-08-16	Cleaning	4.0	4.0	1.0
R841-R853	2018-11-26	Cleaning	1.0	4.0	1.0
R841-R853	2019-08-07	Cleaning	1.0	4.0	1.0
R841-R853	2019-12-12	Cleaning	1.0	4.0	1.0
R841-R853	2020-03-23	Cleaning	1.0	4.0	1.0
R841-R853	2021-02-01	Cleaning	1.0	1.0	1.0
R841-R853	2021-04-14	Cleaning	1.0	1.0	1.0
R841-R853	2021-08-09	Cleaning	1.0	1.0	1.0
R841-R853	2021-08-19	Cleaning	3.0	1.0	1.0
R841-R853	2021-11-04	Cleaning	3.0	4.0	1.0
R841-R853	2022-01-25	Cleaning	1.0	4.0	1.0
R841-R853	2022-03-02	CCTV	1.0	3.0	2.0
R841-R853	2022-06-07	Cleaning	3.0	4.0	1.0
R841-R853	2022-08-10	Cleaning	2.0	2.0	1.0
R841-R853	2022-11-16	Cleaning	1.0	4.0	1.0
R841-R853	2023-05-30	Cleaning	2.0	4.0	1.0
R841-R853	2023-08-11	Cleaning	4.0	1.0	1.0
R841-R853	2023-12-27	Cleaning	2.0	4.0	1.0

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
R847-R854	2014-02-11	Cleaning	1.0	1.0	1.0
R847-R854	2014-08-01	Cleaning	1.0	1.0	1.0
R847-R854	2015-04-14	Cleaning	1.0	1.0	1.0
R847-R854	2015-07-28	Cleaning	2.0	2.0	1.0
R847-R854	2015-11-19	Cleaning	3.0	4.0	1.0
R847-R854	2016-05-18	Cleaning	1.0	1.0	1.0
R847-R854	2016-07-26	Cleaning	3.0	1.0	1.0
R847-R854	2016-12-12	Cleaning	1.0	1.0	1.0
R847-R854	2017-04-05	Cleaning	1.0	1.0	1.0
R847-R854	2017-07-12	Cleaning	2.0	3.0	1.0
R847-R854	2017-11-22	Cleaning	1.0	4.0	1.0
R847-R854	2017-12-04	Cleaning	1.0	4.0	1.0
R847-R854	2018-05-23	Cleaning	2.0	3.0	1.0
R847-R854	2018-08-16	Cleaning	4.0	4.0	1.0
R847-R854	2018-11-26	Cleaning	1.0	4.0	1.0
R847-R854	2019-08-07	Cleaning	1.0	4.0	1.0
R847-R854	2019-12-12	Cleaning	1.0	4.0	1.0
R847-R854	2020-03-23	Cleaning	1.0	4.0	1.0
R847-R854	2021-02-01	Cleaning	1.0	1.0	1.0
R847-R854	2021-04-14	Cleaning	3.0	3.0	1.0
R847-R854	2021-08-09	Cleaning	1.0	1.0	1.0
R847-R854	2021-08-19	Cleaning	3.0	1.0	1.0
R847-R854	2021-11-04	Cleaning	3.0	4.0	1.0
R847-R854	2022-01-25	Cleaning	1.0	4.0	1.0
R847-R854	2022-03-02	CCTV	1.0	3.0	2.0
R847-R854	2022-06-07	Cleaning	3.0	4.0	1.0
R847-R854	2022-08-10	Cleaning	2.0	2.0	1.0
R847-R854	2022-11-15	Cleaning	1.0	3.0	1.0
R847-R854	2023-05-30	Cleaning	2.0	4.0	1.0
R847-R854	2023-08-09	Cleaning	1.0	1.0	1.0
R847-R854	2023-12-27	Cleaning	2.0	4.0	1.0

R854-S802

LOF Predictions - 2024-10-01

Max Prediction: 3.33 (Upper Outlier)

Debris Prediction: 1.70 (Highest)

Grease Prediction: 3.33 (Upper Outlier)

Roots Prediction: 1.04 (Lowest)

Key Features

Length: 370ft	Diameter: 8in	Material: VCP	Install Year: 1969
Slope: nan	Hotspot: N/A	Basin: R709	Flow Basin: Mission Basin

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
R854-S802	2014-02-11	Cleaning	3.0	3.0	1.0
R854-S802	2014-07-02	Cleaning	3.0	1.0	1.0
R854-S802	2014-08-01	Cleaning	1.0	1.0	1.0
R854-S802	2015-04-14	Cleaning	1.0	1.0	1.0
R854-S802	2015-07-28	Cleaning	2.0	2.0	1.0
R854-S802	2015-11-19	Cleaning	1.0	4.0	1.0
R854-S802	2016-05-18	Cleaning	1.0	1.0	1.0
R854-S802	2016-07-26	Cleaning	3.0	1.0	1.0
R854-S802	2016-08-22	Cleaning	3.0	3.0	1.0
R854-S802	2016-08-23	Cleaning	3.0	3.0	1.0
R854-S802	2016-12-12	Cleaning	1.0	1.0	1.0
R854-S802	2017-04-05	Cleaning	1.0	1.0	1.0
R854-S802	2017-07-12	Cleaning	2.0	3.0	1.0
R854-S802	2017-11-22	Cleaning	1.0	4.0	1.0
R854-S802	2017-12-04	Cleaning	1.0	4.0	1.0
R854-S802	2018-05-23	Cleaning	2.0	3.0	1.0
R854-S802	2018-08-16	Cleaning	4.0	4.0	1.0
R854-S802	2018-10-30	Cleaning	1.0	3.0	1.0
R854-S802	2018-11-26	Cleaning	1.0	4.0	1.0
R854-S802	2019-08-07	Cleaning	1.0	4.0	1.0
R854-S802	2019-12-12	Cleaning	1.0	4.0	1.0
R854-S802	2020-03-23	Cleaning	1.0	4.0	1.0
R854-S802	2021-02-01	Cleaning	1.0	1.0	1.0
R854-S802	2021-04-22	Cleaning	1.0	1.0	1.0
R854-S802	2021-08-09	Cleaning	1.0	1.0	1.0
R854-S802	2021-08-19	Cleaning	3.0	1.0	1.0
R854-S802	2021-11-04	Cleaning	3.0	4.0	1.0
R854-S802	2022-01-28	Cleaning	1.0	1.0	1.0
R854-S802	2022-03-02	CCTV	1.0	3.0	2.0
R854-S802	2022-06-07	Cleaning	3.0	4.0	1.0
R854-S802	2022-08-10	Cleaning	3.0	3.0	1.0
R854-S802	2022-09-08	Cleaning	3.0	3.0	1.0
R854-S802	2022-11-15	Cleaning	1.0	3.0	1.0
R854-S802	2023-01-31	Cleaning	1.0	4.0	1.0
R854-S802	2023-05-30	Cleaning	2.0	4.0	1.0
R854-S802	2023-08-09	Cleaning	4.0	4.0	1.0
R854-S802	2023-12-27	Cleaning	2.0	4.0	1.0

S712-S711

LOF Predictions - 2024-10-01

Max Prediction: 2.49 (Upper Outlier)

Debris Prediction: 2.10 (Upper Outlier)

Grease Prediction: 2.49 (Upper Outlier)

Roots Prediction: 1.06 (Lowest)

Key Features

Length: 159ft	Diameter: 8in	Material: CIPP	Install Year: 1985
Slope: 0.05	Hotspot: N/A	Basin: R709	Flow Basin: Mission Basin

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
S712-S711	2014-02-11	Cleaning	2.0	2.0	1.0
S712-S711	2014-08-01	Cleaning	3.0	3.0	1.0
S712-S711	2015-04-14	Cleaning	1.0	1.0	1.0
S712-S711	2015-07-27	Cleaning	3.0	3.0	1.0
S712-S711	2015-11-19	Cleaning	2.0	2.0	1.0
S712-S711	2016-02-09	Cleaning	2.0	2.0	1.0
S712-S711	2016-03-30	Cleaning	1.0	1.0	1.0
S712-S711	2016-05-16	Cleaning	3.0	3.0	1.0
S712-S711	2016-07-26	Cleaning	3.0	3.0	1.0
S712-S711	2016-12-06	Cleaning	2.0	2.0	1.0
S712-S711	2017-04-05	Cleaning	1.0	1.0	1.0
S712-S711	2017-07-12	Cleaning	1.0	3.0	1.0
S712-S711	2017-11-22	Cleaning	1.0	4.0	1.0
S712-S711	2017-12-04	Cleaning	1.0	1.0	1.0
S712-S711	2018-05-22	Cleaning	3.0	3.0	1.0
S712-S711	2018-08-16	Cleaning	3.0	4.0	1.0
S712-S711	2018-11-20	Cleaning	4.0	4.0	1.0
S712-S711	2019-08-06	Cleaning	3.0	4.0	1.0
S712-S711	2019-12-12	Cleaning	3.0	4.0	1.0
S712-S711	2020-03-23	Cleaning	1.0	3.0	1.0
S712-S711	2021-01-25	Cleaning	2.0	2.0	1.0
S712-S711	2021-02-01	Cleaning	3.0	3.0	1.0
S712-S711	2021-04-22	Cleaning	1.0	1.0	1.0
S712-S711	2021-08-03	Cleaning	1.0	4.0	1.0
S712-S711	2021-11-04	Cleaning	4.0	4.0	1.0
S712-S711	2022-01-25	Cleaning	3.0	3.0	1.0
S712-S711	2022-03-09	CCTV	1.0	3.0	1.0
S712-S711	2022-03-10	CCTV	1.0	1.0	1.0
S712-S711	2022-06-06	Cleaning	4.0	4.0	1.0
S712-S711	2022-08-10	Cleaning	4.0	4.0	1.0
S712-S711	2022-11-17	Cleaning	4.0	3.0	1.0
S712-S711	2023-05-30	Cleaning	4.0	3.0	1.0
S712-S711	2023-08-25	Cleaning	1.0	1.0	1.0
S712-S711	2023-12-27	Cleaning	3.0	3.0	1.0

T603-T648

LOF Predictions - 2024-10-01

Max Prediction: 2.76 (Upper Outlier)

Debris Prediction: 2.76 (Upper Outlier)

Grease Prediction: 1.52 (Upper Outlier)

Roots Prediction: 1.06 (Lowest)

Key Features

Length: 183ft	Diameter: 6in	Material: STEEL	Install Year: 1962
Slope: nan	Hotspot: N/A	Basin: R709	Flow Basin: Mission Basin

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
T603-T648	2014-05-01	Cleaning	4.0	3.0	1.0
T603-T648	2014-11-13	Cleaning	3.0	1.0	1.0
T603-T648	2015-07-14	Cleaning	3.0	1.0	1.0
T603-T648	2016-02-03	Cleaning	4.0	1.0	1.0
T603-T648	2016-08-09	Cleaning	3.0	1.0	1.0
T603-T648	2017-03-16	Cleaning	1.0	1.0	1.0
T603-T648	2017-07-10	Cleaning	2.0	1.0	1.0
T603-T648	2017-12-20	Cleaning	3.0	1.0	1.0
T603-T648	2018-07-03	Cleaning	4.0	1.0	1.0
T603-T648	2018-12-05	Cleaning	4.0	3.0	1.0
T603-T648	2019-06-26	Cleaning	1.0	1.0	1.0
T603-T648	2019-11-19	Cleaning	4.0	1.0	1.0
T603-T648	2020-05-27	Cleaning	3.0	1.0	1.0
T603-T648	2020-11-17	Cleaning	4.0	1.0	1.0
T603-T648	2021-05-12	Cleaning	1.0	1.0	1.0
T603-T648	2022-06-10	Spill	5.0	2.0	2.0
T603-T648	2022-06-14	Cleaning	4.0	3.0	1.0
T603-T648	2022-12-24	Cleaning	3.0	1.0	1.0
T603-T648	2023-06-14	Cleaning	4.0	1.0	1.0
T603-T648	2023-08-25	Cleaning	4.0	1.0	1.0
T603-T648	2023-11-02	Cleaning	4.0	2.0	1.0
T603-T648	2024-01-04	Cleaning	1.0	1.0	1.0

T608-T604

LOF Predictions - 2024-10-01

Max Prediction: 2.53 (Upper Outlier)

Debris Prediction: 2.53 (Upper Outlier)

Grease Prediction: 1.01 (Medium)

Roots Prediction: 1.10 (Medium)

Key Features

| Length: 159ft | Diameter: 6in | Material: VCP | Install Year: 1962 |
| Slope: 0.02 | Hotspot: N/A | Basin: R709 | Flow Basin: Mission Basin |

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
T608-T604	2014-01-06	Cleaning	1.0	1.0	1.0
T608-T604	2014-04-30	Cleaning	1.0	1.0	1.0
T608-T604	2014-11-19	Cleaning	1.0	1.0	1.0
T608-T604	2015-07-14	Cleaning	1.0	1.0	1.0
T608-T604	2016-02-01	Cleaning	1.0	1.0	1.0
T608-T604	2016-04-12	CCTV	1.0	1.0	2.0
T608-T604	2016-08-24	Cleaning	2.0	1.0	1.0
T608-T604	2017-01-11	Cleaning	2.0	1.0	1.0
T608-T604	2017-04-11	Cleaning	1.0	1.0	1.0
T608-T604	2017-12-18	Cleaning	1.0	1.0	1.0
T608-T604	2018-06-28	Cleaning	1.0	1.0	1.0
T608-T604	2019-02-20	Cleaning	1.0	1.0	1.0
T608-T604	2019-10-17	Cleaning	1.0	1.0	1.0
T608-T604	2020-08-11	Cleaning	1.0	1.0	1.0
T608-T604	2021-02-19	Cleaning	1.0	1.0	1.0
T608-T604	2021-08-11	Cleaning	1.0	1.0	4.0
T608-T604	2021-10-26	Cleaning	1.0	1.0	1.0
T608-T604	2022-01-10	CCTV	3.0	3.0	2.0
T608-T604	2022-06-08	Cleaning	3.0	1.0	1.0
T608-T604	2023-02-16	Spill	5.0	2.0	2.0
T608-T604	2023-03-22	Cleaning	1.0	1.0	1.0
T608-T604	2023-06-14	Cleaning	4.0	1.0	1.0
T608-T604	2023-08-25	Cleaning	1.0	1.0	1.0
T608-T604	2023-11-16	Cleaning	1.0	1.0	1.0
T608-T604	2024-01-04	Cleaning	3.0	1.0	1.0

O677-P628

LOF Predictions - 2024-10-01

Max Prediction: 2.49 (Upper Outlier)

Debris Prediction: 1.04 (Lowest)

Grease Prediction: 2.49 (Upper Outlier)

Roots Prediction: 1.19 (Medium)

Key Features

| Length: 460ft | Diameter: 8in | Material: PVC | Install Year: 1985 |
| Slope: 0.03 | Hotspot: N/A | Basin: Q649 | Flow Basin: Downtown Basin |

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
O677-P628	2014-02-10	Cleaning	1.0	1.0	3.0
O677-P628	2014-04-22	Cleaning	1.0	2.0	1.0
O677-P628	2014-06-10	Cleaning	1.0	2.0	1.0
O677-P628	2014-07-31	Cleaning	1.0	1.0	1.0
O677-P628	2014-11-24	Cleaning	1.0	1.0	1.0
O677-P628	2015-01-27	Cleaning	1.0	4.0	1.0
O677-P628	2015-04-06	Cleaning	1.0	2.0	1.0
O677-P628	2015-07-27	Cleaning	1.0	4.0	1.0
O677-P628	2015-09-01	Cleaning	1.0	2.0	1.0
O677-P628	2015-11-17	Cleaning	1.0	3.0	1.0
O677-P628	2016-03-08	Cleaning	1.0	4.0	1.0
O677-P628	2016-05-16	Cleaning	1.0	1.0	3.0
O677-P628	2016-07-25	Cleaning	1.0	3.0	1.0
O677-P628	2016-10-12	Cleaning	1.0	4.0	1.0
O677-P628	2016-12-05	Cleaning	1.0	2.0	1.0
O677-P628	2016-12-06	Cleaning	1.0	4.0	1.0
O677-P628	2017-03-29	Cleaning	1.0	3.0	1.0
O677-P628	2017-04-03	Cleaning	1.0	3.0	1.0
O677-P628	2017-05-18	Cleaning	1.0	2.0	1.0
O677-P628	2017-07-06	Cleaning	1.0	1.0	1.0
O677-P628	2017-08-09	Cleaning	1.0	3.0	1.0
O677-P628	2017-11-21	Cleaning	1.0	4.0	1.0
O677-P628	2017-11-28	Cleaning	1.0	3.0	1.0
O677-P628	2018-01-31	Cleaning	1.0	1.0	1.0
O677-P628	2018-05-15	Cleaning	1.0	4.0	1.0
O677-P628	2018-08-13	Cleaning	1.0	4.0	1.0
O677-P628	2018-08-28	Cleaning	1.0	2.0	1.0
O677-P628	2018-11-19	Cleaning	1.0	3.0	1.0
O677-P628	2019-04-30	Cleaning	1.0	3.0	1.0
O677-P628	2019-08-01	Cleaning	1.0	3.0	1.0
O677-P628	2019-10-01	CCTV	1.0	3.0	1.0
O677-P628	2019-11-25	Cleaning	1.0	2.0	1.0
O677-P628	2020-02-03	Cleaning	1.0	1.0	1.0
O677-P628	2020-07-30	Cleaning	1.0	1.0	1.0
O677-P628	2020-09-29	Cleaning	1.0	3.0	1.0
O677-P628	2021-03-29	Cleaning	1.0	1.0	1.0
O677-P628	2021-04-23	Cleaning	1.0	3.0	1.0
O677-P628	2021-08-06	Cleaning	1.0	1.0	1.0
O677-P628	2021-11-01	Cleaning	1.0	4.0	1.0
O677-P628	2021-12-30	Cleaning	1.0	3.0	1.0
O677-P628	2022-01-19	Cleaning	1.0	4.0	1.0
O677-P628	2022-07-28	Cleaning	1.0	4.0	1.0
O677-P628	2022-09-13	Cleaning	1.0	2.0	1.0
O677-P628	2022-11-15	Cleaning	4.0	2.0	1.0
O677-P628	2023-01-31	Cleaning	1.0	4.0	1.0
O677-P628	2023-04-24	Cleaning	1.0	3.0	1.0
O677-P628	2023-06-08	Cleaning	1.0	3.0	1.0
O677-P628	2023-08-01	Cleaning	1.0	4.0	1.0
O677-P628	2023-12-11	Cleaning	1.0	1.0	1.0
O677-P628	2023-12-19	Cleaning	1.0	1.0	1.0

O681-O677

LOF Predictions - 2024-10-01

Max Prediction: 3.03 (Upper Outlier)

Debris Prediction: 1.04 (Lowest)
Grease Prediction: 3.03 (Upper Outlier)
Roots Prediction: 1.17 (Medium)

Key Features

| Length: 250ft | Diameter: 8in | Material: PVC | Install Year: 1991 |
| Slope: 0.08 | Hotspot: N/A | Basin: Q649 | Flow Basin: Downtown Basin |

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
O681-O677	2014-02-04	Cleaning	1.0	4.0	1.0
O681-O677	2014-04-22	Cleaning	1.0	3.0	1.0
O681-O677	2014-06-16	Cleaning	1.0	2.0	1.0
O681-O677	2014-07-31	Cleaning	1.0	1.0	1.0
O681-O677	2014-11-24	Cleaning	1.0	1.0	1.0
O681-O677	2015-02-03	Cleaning	1.0	3.0	1.0
O681-O677	2015-04-06	Cleaning	1.0	3.0	1.0
O681-O677	2015-07-27	Cleaning	1.0	4.0	1.0
O681-O677	2015-09-02	Cleaning	1.0	1.0	1.0
O681-O677	2015-11-17	Cleaning	1.0	3.0	1.0
O681-O677	2016-02-08	Cleaning	1.0	4.0	1.0
O681-O677	2016-03-15	Cleaning	1.0	2.0	1.0
O681-O677	2016-05-31	Cleaning	1.0	3.0	1.0
O681-O677	2016-07-21	Cleaning	1.0	4.0	1.0
O681-O677	2016-10-12	Cleaning	1.0	3.0	1.0
O681-O677	2016-12-06	Cleaning	1.0	4.0	1.0
O681-O677	2017-04-03	Cleaning	1.0	3.0	1.0
O681-O677	2017-06-08	Cleaning	1.0	3.0	1.0
O681-O677	2017-07-03	Cleaning	1.0	3.0	1.0
O681-O677	2017-08-09	Cleaning	1.0	4.0	1.0
O681-O677	2017-11-21	Cleaning	1.0	4.0	1.0
O681-O677	2017-11-28	Cleaning	1.0	3.0	1.0
O681-O677	2018-01-31	Cleaning	1.0	4.0	1.0
O681-O677	2018-05-15	Cleaning	1.0	4.0	1.0
O681-O677	2018-08-13	Cleaning	1.0	4.0	1.0
O681-O677	2018-09-06	Cleaning	1.0	3.0	1.0
O681-O677	2018-11-14	Cleaning	1.0	3.0	1.0
O681-O677	2019-05-02	Cleaning	1.0	1.0	1.0
O681-O677	2019-08-01	Cleaning	1.0	3.0	1.0
O681-O677	2019-11-26	Cleaning	1.0	3.0	1.0
O681-O677	2020-02-03	Cleaning	1.0	1.0	1.0
O681-O677	2020-07-23	CCTV	1.0	3.0	1.0
O681-O677	2020-07-30	Cleaning	1.0	1.0	1.0
O681-O677	2020-10-06	Cleaning	1.0	3.0	1.0
O681-O677	2021-01-26	Cleaning	1.0	3.0	1.0
O681-O677	2021-03-29	Cleaning	1.0	3.0	1.0
O681-O677	2021-05-06	Cleaning	1.0	4.0	1.0
O681-O677	2021-08-04	Cleaning	1.0	3.0	1.0
O681-O677	2021-11-01	Cleaning	1.0	4.0	1.0
O681-O677	2022-01-20	Cleaning	1.0	4.0	1.0
O681-O677	2022-05-25	Cleaning	1.0	4.0	1.0
O681-O677	2022-07-28	Cleaning	1.0	3.0	1.0
O681-O677	2022-11-15	Cleaning	1.0	4.0	1.0
O681-O677	2023-01-31	Cleaning	1.0	4.0	1.0
O681-O677	2023-06-08	Cleaning	1.0	4.0	1.0
O681-O677	2023-08-01	Cleaning	1.0	4.0	1.0
O681-O677	2023-10-25	Cleaning	1.0	4.0	1.0
O681-O677	2023-12-11	Cleaning	1.0	4.0	1.0

O688-O6141

LOF Predictions - 2024-10-01

Max Prediction: 2.76 (Upper Outlier)

Debris Prediction: 1.05 (Lowest)
Grease Prediction: 2.76 (Upper Outlier)
Roots Prediction: 1.28 (Highest)

Key Features

| Length: 65ft | Diameter: 8in | Material: PVC | Install Year: 1985 |
| Slope: nan | Hotspot: N/A | Basin: R663 | Flow Basin: Walker Basin |

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
O688-O6141	2014-02-04	Cleaning	1.0	4.0	1.0
O688-O6141	2014-04-23	Cleaning	1.0	1.0	1.0
O688-O6141	2014-06-17	Cleaning	1.0	2.0	1.0
O688-O6141	2014-07-31	Cleaning	1.0	1.0	1.0
O688-O6141	2014-11-24	Cleaning	1.0	1.0	1.0
O688-O6141	2015-02-04	Cleaning	1.0	1.0	1.0
O688-O6141	2015-04-06	Cleaning	1.0	2.0	1.0
O688-O6141	2015-07-28	Cleaning	1.0	2.0	1.0
O688-O6141	2015-09-02	Cleaning	1.0	1.0	1.0
O688-O6141	2015-11-17	Cleaning	1.0	2.0	1.0
O688-O6141	2016-02-08	Cleaning	1.0	4.0	1.0
O688-O6141	2016-03-15	Cleaning	1.0	2.0	1.0
O688-O6141	2016-05-31	Cleaning	1.0	1.0	1.0
O688-O6141	2016-07-22	Cleaning	1.0	3.0	1.0
O688-O6141	2016-10-13	Cleaning	1.0	3.0	1.0
O688-O6141	2016-12-19	Cleaning	1.0	3.0	1.0
O688-O6141	2017-04-03	Cleaning	1.0	3.0	1.0
O688-O6141	2017-06-08	Cleaning	1.0	2.0	1.0
O688-O6141	2017-07-03	Cleaning	1.0	1.0	1.0
O688-O6141	2017-08-09	Cleaning	1.0	4.0	1.0
O688-O6141	2017-11-21	Cleaning	1.0	4.0	1.0
O688-O6141	2017-11-28	Cleaning	1.0	3.0	1.0
O688-O6141	2018-01-31	Cleaning	1.0	3.0	1.0
O688-O6141	2018-05-16	Cleaning	1.0	4.0	1.0
O688-O6141	2018-08-14	Cleaning	1.0	4.0	1.0
O688-O6141	2018-09-06	Cleaning	1.0	2.0	1.0
O688-O6141	2018-11-14	Cleaning	1.0	3.0	1.0
O688-O6141	2019-05-06	Cleaning	1.0	3.0	1.0
O688-O6141	2019-08-05	Cleaning	1.0	3.0	1.0
O688-O6141	2019-11-25	Cleaning	1.0	3.0	1.0
O688-O6141	2020-02-03	Cleaning	1.0	1.0	1.0
O688-O6141	2020-07-23	CCTV	1.0	3.0	1.0
O688-O6141	2020-08-11	Cleaning	1.0	1.0	1.0
O688-O6141	2020-10-19	Cleaning	1.0	1.0	1.0
O688-O6141	2021-01-26	Cleaning	1.0	2.0	1.0
O688-O6141	2021-03-30	Cleaning	1.0	3.0	1.0
O688-O6141	2021-05-06	Cleaning	1.0	3.0	1.0
O688-O6141	2021-08-04	Cleaning	1.0	3.0	1.0
O688-O6141	2021-11-01	Cleaning	1.0	4.0	1.0
O688-O6141	2022-01-20	Cleaning	1.0	4.0	1.0
O688-O6141	2022-05-25	Cleaning	1.0	4.0	1.0
O688-O6141	2022-08-02	Cleaning	1.0	4.0	1.0
O688-O6141	2022-11-17	Cleaning	3.0	3.0	2.0
O688-O6141	2023-01-30	Cleaning	1.0	2.0	1.0
O688-O6141	2023-06-08	Cleaning	1.0	4.0	1.0
O688-O6141	2023-08-02	Cleaning	1.0	3.0	1.0
O688-O6141	2023-10-25	Cleaning	1.0	4.0	1.0
O688-O6141	2023-12-12	Cleaning	1.0	3.0	1.0

O6103-O6104

LOF Predictions - 2024-10-01

Max Prediction: 3.26 (Upper Outlier)

Debris Prediction: 1.10 (Medium)
Grease Prediction: 3.26 (Upper Outlier)
Roots Prediction: 1.04 (Lowest)

Key Features

Length: 133ft	Diameter: 6in	Material: VCP	Install Year: 1908
Slope: nan	Hotspot: N/A	Basin: Q672	Flow Basin: Midtown Basin

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
O6103-O6104	2014-02-10	Cleaning	2.0	4.0	1.0
O6103-O6104	2014-04-23	Cleaning	1.0	2.0	1.0
O6103-O6104	2014-06-18	Cleaning	1.0	2.0	1.0
O6103-O6104	2014-07-31	Cleaning	1.0	1.0	1.0
O6103-O6104	2014-12-08	Cleaning	1.0	2.0	1.0
O6103-O6104	2015-02-05	Cleaning	1.0	2.0	1.0
O6103-O6104	2015-04-08	Cleaning	1.0	1.0	1.0
O6103-O6104	2015-07-31	Cleaning	1.0	1.0	1.0
O6103-O6104	2015-09-09	Cleaning	1.0	1.0	1.0
O6103-O6104	2015-11-18	Cleaning	1.0	3.0	1.0
O6103-O6104	2016-03-17	Cleaning	1.0	2.0	1.0
O6103-O6104	2016-06-01	Cleaning	1.0	4.0	1.0
O6103-O6104	2016-07-28	Cleaning	1.0	3.0	1.0
O6103-O6104	2016-11-28	Cleaning	1.0	3.0	1.0
O6103-O6104	2016-12-21	Cleaning	1.0	4.0	1.0
O6103-O6104	2017-04-04	Cleaning	1.0	4.0	1.0
O6103-O6104	2017-06-13	Cleaning	1.0	1.0	1.0
O6103-O6104	2017-07-07	Cleaning	1.0	1.0	1.0
O6103-O6104	2017-08-10	Cleaning	1.0	3.0	2.0
O6103-O6104	2017-11-30	Cleaning	1.0	4.0	1.0
O6103-O6104	2018-01-31	Cleaning	1.0	3.0	1.0
O6103-O6104	2018-05-21	Cleaning	1.0	3.0	1.0
O6103-O6104	2018-08-14	Cleaning	1.0	4.0	1.0
O6103-O6104	2018-09-12	Cleaning	1.0	3.0	1.0
O6103-O6104	2018-11-20	Cleaning	1.0	3.0	1.0
O6103-O6104	2019-05-07	Cleaning	1.0	3.0	1.0
O6103-O6104	2019-08-06	Cleaning	1.0	4.0	2.0
O6103-O6104	2019-11-26	Cleaning	3.0	3.0	1.0
O6103-O6104	2020-02-04	Cleaning	1.0	3.0	1.0
O6103-O6104	2020-07-15	Cleaning	1.0	4.0	1.0
O6103-O6104	2020-07-15	CCTV	1.0	3.0	2.0
O6103-O6104	2020-07-22	Cleaning	2.0	3.0	1.0
O6103-O6104	2020-08-11	Cleaning	1.0	3.0	1.0
O6103-O6104	2020-10-19	Cleaning	1.0	3.0	1.0
O6103-O6104	2021-04-05	Cleaning	3.0	3.0	1.0
O6103-O6104	2021-05-06	Cleaning	1.0	4.0	1.0
O6103-O6104	2021-08-06	Cleaning	1.0	1.0	1.0
O6103-O6104	2021-11-03	Cleaning	1.0	4.0	1.0
O6103-O6104	2022-01-24	Cleaning	1.0	4.0	1.0
O6103-O6104	2022-05-31	Cleaning	1.0	4.0	1.0
O6103-O6104	2022-08-03	Cleaning	1.0	4.0	1.0
O6103-O6104	2022-11-22	Cleaning	3.0	4.0	1.0
O6103-O6104	2023-02-07	Cleaning	1.0	4.0	1.0
O6103-O6104	2023-06-12	Cleaning	1.0	4.0	1.0
O6103-O6104	2023-08-08	Cleaning	1.0	3.0	1.0
O6103-O6104	2023-10-30	Cleaning	1.0	1.0	1.0
O6103-O6104	2023-12-14	Cleaning	1.0	4.0	1.0

O6141-O681

LOF Predictions - 2024-10-01

Max Prediction: 2.47 (Upper Outlier)

Debris Prediction: 1.08 (Medium)
Grease Prediction: 2.47 (Upper Outlier)
Roots Prediction: 1.22 (Medium)

Key Features

Length: 191ft	Diameter: 8in	Material: PVC	Install Year: 1991
Slope: 0.04	Hotspot: N/A	Basin: Q649	Flow Basin: Downtown Basin

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
O6141-O681	2014-02-04	Cleaning	1.0	4.0	1.0
O6141-O681	2014-04-22	Cleaning	1.0	2.0	1.0
O6141-O681	2014-06-17	Cleaning	1.0	2.0	1.0
O6141-O681	2014-07-31	Cleaning	1.0	1.0	1.0
O6141-O681	2014-11-24	Cleaning	1.0	1.0	1.0
O6141-O681	2015-02-03	Cleaning	1.0	1.0	1.0
O6141-O681	2015-04-06	Cleaning	1.0	2.0	1.0
O6141-O681	2015-07-28	Cleaning	1.0	2.0	1.0
O6141-O681	2015-09-02	Cleaning	1.0	1.0	1.0
O6141-O681	2015-11-17	Cleaning	1.0	2.0	1.0
O6141-O681	2016-02-08	Cleaning	1.0	4.0	1.0
O6141-O681	2016-03-15	Cleaning	1.0	2.0	1.0
O6141-O681	2016-05-31	Cleaning	1.0	1.0	1.0
O6141-O681	2016-07-22	Cleaning	1.0	3.0	1.0
O6141-O681	2016-10-17	Cleaning	1.0	1.0	1.0
O6141-O681	2016-12-06	Cleaning	1.0	4.0	1.0
O6141-O681	2017-04-03	Cleaning	1.0	3.0	1.0
O6141-O681	2017-06-08	Cleaning	1.0	3.0	1.0
O6141-O681	2017-07-03	Cleaning	1.0	1.0	1.0
O6141-O681	2017-08-09	Cleaning	1.0	4.0	1.0
O6141-O681	2017-11-21	Cleaning	1.0	4.0	1.0
O6141-O681	2017-11-28	Cleaning	1.0	3.0	1.0
O6141-O681	2018-01-31	Cleaning	1.0	3.0	1.0
O6141-O681	2018-05-16	Cleaning	1.0	4.0	1.0
O6141-O681	2018-08-13	Cleaning	1.0	4.0	1.0
O6141-O681	2018-09-06	Cleaning	1.0	2.0	1.0
O6141-O681	2018-11-14	Cleaning	1.0	3.0	1.0
O6141-O681	2019-05-06	Cleaning	1.0	1.0	1.0
O6141-O681	2019-08-05	Cleaning	1.0	2.0	1.0
O6141-O681	2019-11-25	Cleaning	1.0	3.0	1.0
O6141-O681	2020-02-03	Cleaning	1.0	3.0	1.0
O6141-O681	2020-07-23	CCTV	1.0	3.0	1.0
O6141-O681	2020-08-11	Cleaning	1.0	1.0	1.0
O6141-O681	2020-10-06	Cleaning	1.0	2.0	1.0
O6141-O681	2021-01-26	Cleaning	1.0	3.0	1.0
O6141-O681	2021-03-30	Cleaning	1.0	3.0	1.0
O6141-O681	2021-05-06	Cleaning	1.0	3.0	1.0
O6141-O681	2021-08-04	Cleaning	1.0	3.0	1.0
O6141-O681	2021-11-01	Cleaning	1.0	4.0	1.0
O6141-O681	2022-01-20	Cleaning	1.0	4.0	1.0
O6141-O681	2022-05-25	Cleaning	1.0	1.0	1.0
O6141-O681	2022-08-02	Cleaning	2.0	4.0	1.0
O6141-O681	2022-11-17	Cleaning	3.0	3.0	2.0
O6141-O681	2023-01-30	Cleaning	1.0	3.0	1.0
O6141-O681	2023-06-08	Cleaning	1.0	4.0	1.0
O6141-O681	2023-08-02	Cleaning	1.0	3.0	1.0
O6141-O681	2023-10-25	Cleaning	1.0	4.0	1.0
O6141-O681	2023-12-12	Cleaning	1.0	3.0	1.0

P667-P659

LOF Predictions - 2024-10-01

Max Prediction: 2.48 (Upper Outlier)

Debris Prediction: 2.48 (Upper Outlier)
Grease Prediction: 1.42 (Upper Outlier)
Roots Prediction: 1.14 (Medium)

Key Features

Length: 273ft	Diameter: 8in	Material: CIPP	Install Year: 1985
Slope: nan	Hotspot: N/A	Basin: Q679	Flow Basin: Paradise Park Basin

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
P667-P659	2014-01-27	Cleaning	3.0	1.0	1.0
P667-P659	2014-08-15	Cleaning	3.0	1.0	1.0
P667-P659	2015-03-30	Cleaning	3.0	1.0	1.0
P667-P659	2015-11-10	Cleaning	1.0	1.0	1.0
P667-P659	2016-05-04	Cleaning	1.0	1.0	1.0
P667-P659	2017-01-17	Cleaning	3.0	1.0	1.0
P667-P659	2017-01-18	Cleaning	4.0	1.0	1.0
P667-P659	2017-06-08	Cleaning	3.0	1.0	1.0
P667-P659	2017-08-23	Cleaning	4.0	1.0	1.0
P667-P659	2017-12-12	Cleaning	3.0	1.0	1.0
P667-P659	2018-02-01	Cleaning	4.0	1.0	1.0
P667-P659	2018-03-28	Cleaning	1.0	1.0	1.0
P667-P659	2018-09-05	Cleaning	4.0	1.0	1.0
P667-P659	2018-11-19	Cleaning	4.0	1.0	1.0
P667-P659	2019-07-01	Cleaning	4.0	1.0	1.0
P667-P659	2020-04-07	Cleaning	1.0	1.0	1.0
P667-P659	2020-09-15	CCTV	3.0	1.0	1.0
P667-P659	2020-10-07	Cleaning	3.0	1.0	1.0
P667-P659	2020-11-24	Cleaning	1.0	1.0	1.0
P667-P659	2021-07-13	Cleaning	1.0	1.0	1.0
P667-P659	2022-03-14	Cleaning	4.0	1.0	1.0
P667-P659	2022-12-02	Cleaning	1.0	1.0	1.0
P667-P659	2023-01-31	Cleaning	4.0	1.0	1.0
P667-P659	2023-07-27	Cleaning	4.0	1.0	1.0
P667-P659	2023-10-30	Cleaning	4.0	1.0	1.0
P667-P659	2024-04-25	Cleaning	1.0	1.0	1.0

3.4 Root foaming analysis and recommendations

Cleaning of gravity main segments generally is assumed to take care of roots, grease and debris. If roots are the only or main reason that segments need cleaning, then these segments are good candidates for root foaming.

V&A breaks these criteria down as follows:

- Roots specific LOF prediction: Upper Outlier

- Debris and Grease LOF predictions: <1.5 (round down to "clear")

- Last five Debris/Grease conditions either from cleaning or CCTV: clear (1)

There are 33 segments (1.78% of segments) that match these filters.

Segment candidates for root foaming base

Embedded Spreadsheet 17: Proposed segments as root foaming candidates.

The cleaning and condition histories for these 33 segments is in Appendix A.

3.5 Total cleaning resource needed

This is a table showing CAWD's actual number of segment cleanings and cleaning miles per calendar year:

Calendar Year	Total Cleanings	Total Miles
2007	1,661	77.37
2008	2,576	120.27
2009	2,451	111.45
2010	3,854	172.87
2011	3,516	160.07
2012	2,788	122.06
2013	2,740	115.61
2014	2,991	127.97
2015	2,697	119.31
2016	3,286	138.34
2017	2,956	123.39
2018	3,111	136.65
2019	2,464	108.23
2020	2,798	122.22
2021	2,642	114.85
2022	2,600	112.01
2023	2,661	119.36
2024	471	22.23

Figure 3-1: CAWD actual number of segments cleaned, and cleaning miles, by calendar year.

Generally, CAWD has been cleaning a total of 110-120 miles of gravity main pipe per year.

From the most recent cleaning data file received in August 2024, using the cleaning frequency in column O gives the following breakdown for CAWD's per-segment cleaning frequencies:

Table 3-2: Number of segments by cleaning frequency.

Cleaning Frequencies (Months)

	Count	Percentage
1	6	0.32%
3	60	3.25%
4	23	1.24%
5	24	1.30%
6	4	0.22%
7	11	0.60%
8	1107	59.90%
9	54	2.92%
10	18	0.97%
12	202	10.93%
14	9	0.49%
18	30	1.62%
24	202	10.93%
30	20	1.08%
36	28	1.52%
	50	2.71%

If the 50 segments without a designated cleaning frequency are assumed to be on the most common frequency, eight months, then the annual cleaning frequency is about 110 miles (very close to recent year actuals).

Table 3-3: CAWD cleaning miles based on cleaning frequency of record.

Carmel - Cleaning Frequencies					
Cleaning File 2					
Total GMs Miles	77.57				
Total GMs Segments	1848				
Frequency (Months)	Category	Percentage of the System	Total Miles	Total Segments	Miles Cleaned by Year
1	Hotspot	0.32%	0.25	6	2.98
2	Hotspot	0.00%	0.00	0	0.00
3	Hotspot	3.25%	2.52	60	10.08
4	Hotspot	1.24%	0.96	23	2.89
6	System Wide	2.12%	1.64	39	3.29
8	System Wide	62.61%	48.57	1157	72.85
10	System Wide	3.89%	3.02	72	3.62
12	System Wide	10.93%	8.48	202	8.48
14	System Wide	0.49%	0.38	9	0.33
18	System Wide	1.62%	1.25	30	0.84
24	System Wide	10.93%	8.48	202	4.24
30	System Wide	1.08%	0.84	20	0.34
36	System Wide	1.52%	1.18	28	0.39
Total		100.00%	77.57	1848	110.32

As adjustments are made to cleaning frequencies based on recommendations made in this report, the following spreadsheet can be used to plan total annual gravity main segment cleaning resources needed.

Carmel Cleaning
Frequency Resource P

Embedded Spreadsheet 18: Gravity main cleaning frequency vs resource requirements planning spreadsheet.

3.6 Task 11, best practice recommendations and roadmap

CAWD's current CMMS implementation gathers observed condition data for: odor, roots, grease, sand, gravel and grit. Six categories of observations are too many and V&A recommends that sand, grit and gravel be consolidated into one category as debris.

Another observation is that the cleaning frequency number found in column O does not seem to be consistently applied. Further there are 14 possible frequencies, which is far too many for a system the size of CAWD: 1, 3, 4, 5, 6, 7, 8, 9, 10, 12, 14, 18, or 24 months. Also, some gravity main segments don't have an assigned frequency. V&A's recommendations for cleaning frequencies are as follows:

- Reduce the number of cleaning frequency options from 14 down to five or six

- Six possible frequencies for consideration: 1, 3, 8, 12, 24 and either 30 or 36 months

- In CAWD's CMMS, cleaning frequency should be a pull-down menu and "none" should not be an option

V&A's proposes incremental adoption of the findings and recommendations in this report. This process starts by identifying and acting on gravity main segments that should be either higher or lower priority than they currently are.

Additional recommendations will come from discussions about the findings in this report and implementation plans and details.

3.7 Future data science opportunities

3.7.1 Consequence consideration for gravity main cleaning prioritization

Once the details of this report have been discussed and an adoption path agreed upon with CAWD, it will be straightforward to add CAWD's judgment of segment consequence as an additional criteria to the segment cleaning spreadsheet detailed in this report.

3.7.2 Risk-based gravity main cleaning and maintenance

V&A's proposed path in this report is for incremental adoption of recommendations to make some gravity main segments higher or lower priorities than they currently are. For this approach V&A's LOF predictions are based on an effective date of 10/1/2014.

A future approach would be to move to risk-based gravity main cleaning and maintenance. For a risk-based approach V&A and CAWD would discuss and agree on a tolerable level of risk and clean or maintain gravity main segments before that level of risk is reached or exceeded. For example, a goal might be to clean or maintain all gravity main segments before a level of medium/moderate (a predicted LOF of 3.0) was reached or exceeded for grease, roots or debris (grit, sand, gravel). This approach would require frequent monitoring and adjustment.

Appendix A— recommended segments for high frequency cleaning

Q783-Q711

LOF Predictions - 2024-10-01

Max Prediction: 2.49 (Upper Outlier)

Debris Prediction: 1.17 (Medium)

Grease Prediction: 1.01 (Medium)

Roots Prediction: 2.49 (Upper Outlier)

Key Features

| Length: 328ft | Diameter: 6in | Material: VCP | Install Year: 1953 |
| Slope: 0.07 | Hotspot: N/A | Basin: R709 | Flow Basin: Mission Basin |

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
Q783-Q711	2014-03-28	Cleaning	1.0	1.0	3.0
Q783-Q711	2014-09-17	Cleaning	1.0	1.0	2.0
Q783-Q711	2015-05-11	Cleaning	1.0	1.0	2.0
Q783-Q711	2015-12-28	Cleaning	1.0	1.0	1.0
Q783-Q711	2016-07-05	Cleaning	1.0	1.0	1.0
Q783-Q711	2017-02-28	Cleaning	1.0	1.0	3.0
Q783-Q711	2017-09-29	Cleaning	2.0	1.0	3.0
Q783-Q711	2018-05-02	Cleaning	1.0	1.0	1.0
Q783-Q711	2019-01-09	Cleaning	1.0	1.0	1.0
Q783-Q711	2019-09-05	Cleaning	1.0	1.0	3.0
Q783-Q711	2020-06-30	Cleaning	1.0	1.0	4.0
Q783-Q711	2020-12-29	Cleaning	1.0	1.0	3.0
Q783-Q711	2021-08-18	Cleaning	1.0	1.0	4.0
Q783-Q711	2021-08-18	CCTV	1.0	1.0	3.0
Q783-Q711	2021-09-29	Cleaning	1.0	1.0	2.0
Q783-Q711	2022-05-04	Cleaning	1.0	1.0	4.0
Q783-Q711	2023-02-07	Cleaning	1.0	1.0	1.0
Q783-Q711	2023-08-02	CCTV	1.0	1.0	2.0
Q783-Q711	2023-09-26	Cleaning	3.0	1.0	3.0

O677-P628

LOF Predictions - 2024-10-01

Max Prediction: 2.49 (Upper Outlier)

Debris Prediction: 1.04 (Lowest)

Grease Prediction: 2.49 (Upper Outlier)

Roots Prediction: 1.19 (Medium)

Key Features

| Length: 460ft | Diameter: 8in | Material: PVC | Install Year: 1985 |
| Slope: 0.03 | Hotspot: N/A | Basin: Q649 | Flow Basin: Downtown Basin |

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
O677-P628	2014-02-10	Cleaning	1.0	1.0	3.0
O677-P628	2014-04-22	Cleaning	1.0	2.0	1.0
O677-P628	2014-06-10	Cleaning	1.0	2.0	1.0
O677-P628	2014-07-31	Cleaning	1.0	1.0	1.0
O677-P628	2014-11-24	Cleaning	1.0	1.0	1.0
O677-P628	2015-01-27	Cleaning	1.0	4.0	1.0
O677-P628	2015-04-06	Cleaning	1.0	2.0	1.0
O677-P628	2015-07-27	Cleaning	1.0	4.0	1.0
O677-P628	2015-09-01	Cleaning	1.0	2.0	1.0
O677-P628	2015-11-17	Cleaning	1.0	3.0	1.0
O677-P628	2016-03-08	Cleaning	1.0	4.0	1.0
O677-P628	2016-05-16	Cleaning	1.0	1.0	3.0
O677-P628	2016-07-25	Cleaning	1.0	3.0	1.0
O677-P628	2016-10-12	Cleaning	1.0	4.0	1.0
O677-P628	2016-12-05	Cleaning	1.0	2.0	1.0
O677-P628	2016-12-06	Cleaning	1.0	4.0	1.0
O677-P628	2017-03-29	Cleaning	1.0	3.0	1.0
O677-P628	2017-04-03	Cleaning	1.0	3.0	1.0
O677-P628	2017-05-18	Cleaning	1.0	2.0	1.0
O677-P628	2017-07-06	Cleaning	1.0	1.0	1.0
O677-P628	2017-08-09	Cleaning	1.0	3.0	1.0
O677-P628	2017-11-21	Cleaning	1.0	4.0	1.0
O677-P628	2017-11-28	Cleaning	1.0	3.0	1.0
O677-P628	2018-01-31	Cleaning	1.0	1.0	1.0
O677-P628	2018-05-15	Cleaning	1.0	4.0	1.0
O677-P628	2018-08-13	Cleaning	1.0	4.0	1.0
O677-P628	2018-08-28	Cleaning	1.0	2.0	1.0
O677-P628	2018-11-19	Cleaning	1.0	3.0	1.0
O677-P628	2019-04-30	Cleaning	1.0	3.0	1.0
O677-P628	2019-08-01	Cleaning	1.0	3.0	1.0
O677-P628	2019-10-01	CCTV	1.0	3.0	1.0
O677-P628	2019-11-25	Cleaning	1.0	2.0	1.0
O677-P628	2020-02-03	Cleaning	1.0	1.0	1.0
O677-P628	2020-07-30	Cleaning	1.0	1.0	1.0
O677-P628	2020-09-29	Cleaning	1.0	3.0	1.0
O677-P628	2021-03-29	Cleaning	1.0	1.0	1.0
O677-P628	2021-04-23	Cleaning	1.0	3.0	1.0
O677-P628	2021-08-06	Cleaning	1.0	1.0	1.0
O677-P628	2021-11-01	Cleaning	1.0	4.0	1.0
O677-P628	2021-12-30	Cleaning	1.0	3.0	1.0
O677-P628	2022-01-19	Cleaning	1.0	4.0	1.0
O677-P628	2022-07-28	Cleaning	1.0	4.0	1.0
O677-P628	2022-09-13	Cleaning	1.0	2.0	1.0
O677-P628	2022-11-15	Cleaning	4.0	2.0	1.0
O677-P628	2023-01-31	Cleaning	1.0	4.0	1.0
O677-P628	2023-04-24	Cleaning	1.0	3.0	1.0
O677-P628	2023-06-08	Cleaning	1.0	3.0	1.0
O677-P628	2023-08-01	Cleaning	1.0	4.0	1.0
O677-P628	2023-12-11	Cleaning	1.0	1.0	1.0
O677-P628	2023-12-19	Cleaning	1.0	1.0	1.0

T608-T604

LOF Predictions - 2024-10-01

Max Prediction: 2.53 (Upper Outlier)

Debris Prediction: 2.53 (Upper Outlier)

Grease Prediction: 1.01 (Medium)

Roots Prediction: 1.10 (Medium)

Key Features

Length: 159ft	Diameter: 6in	Material: VCP	Install Year: 1962
Slope: 0.02	Hotspot: N/A	Basin: R709	Flow Basin: Mission Basin

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
T608-T604	2014-01-06	Cleaning	1.0	1.0	1.0
T608-T604	2014-04-30	Cleaning	1.0	1.0	1.0
T608-T604	2014-11-19	Cleaning	1.0	1.0	1.0
T608-T604	2015-07-14	Cleaning	1.0	1.0	1.0
T608-T604	2016-02-01	Cleaning	1.0	1.0	1.0
T608-T604	2016-04-12	CCTV	1.0	1.0	2.0
T608-T604	2016-08-24	Cleaning	2.0	1.0	1.0
T608-T604	2017-01-11	Cleaning	2.0	1.0	1.0
T608-T604	2017-04-11	Cleaning	1.0	1.0	1.0
T608-T604	2017-12-18	Cleaning	1.0	1.0	1.0
T608-T604	2018-06-28	Cleaning	1.0	1.0	1.0
T608-T604	2019-02-20	Cleaning	1.0	1.0	1.0
T608-T604	2019-10-17	Cleaning	1.0	1.0	1.0
T608-T604	2020-08-11	Cleaning	1.0	1.0	1.0
T608-T604	2021-02-19	Cleaning	1.0	1.0	1.0
T608-T604	2021-08-11	Cleaning	1.0	1.0	4.0
T608-T604	2021-10-26	Cleaning	1.0	1.0	1.0
T608-T604	2022-01-10	CCTV	3.0	3.0	2.0
T608-T604	2022-06-08	Cleaning	3.0	1.0	1.0
T608-T604	2023-02-16	Spill	5.0	2.0	2.0
T608-T604	2023-03-22	Cleaning	1.0	1.0	1.0
T608-T604	2023-06-14	Cleaning	4.0	1.0	1.0
T608-T604	2023-08-25	Cleaning	1.0	1.0	1.0
T608-T604	2023-11-16	Cleaning	1.0	1.0	1.0
T608-T604	2024-01-04	Cleaning	3.0	1.0	1.0

R823-R824

LOF Predictions - 2024-10-01

Max Prediction: 2.53 (Upper Outlier)

Debris Prediction: 2.53 (Upper Outlier)

Grease Prediction: 1.01 (Medium)

Roots Prediction: 2.22 (Upper Outlier)

Key Features

Length: 304ft	Diameter: 15in	Material: VCP	Install Year: 1959
Slope: nan	Hotspot: N/A	Basin: R709	Flow Basin: Mission Basin

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
R823-R824	2015-11-05	Cleaning	1.0	1.0	1.0
R823-R824	2017-05-24	Cleaning	1.0	1.0	3.0
R823-R824	2017-05-24	CCTV	3.0	1.0	3.0
R823-R824	2017-08-15	Cleaning	1.0	1.0	1.0
R823-R824	2018-10-22	Cleaning	3.0	1.0	1.0
R823-R824	2019-10-10	Cleaning	4.0	1.0	1.0
R823-R824	2019-10-11	Cleaning	1.0	1.0	1.0
R823-R824	2020-11-17	Cleaning	1.0	1.0	1.0
R823-R824	2021-11-15	Cleaning	4.0	1.0	2.0
R823-R824	2022-04-26	CCTV	3.0	1.0	3.0
R823-R824	2022-04-28	Cleaning	4.0	1.0	4.0
R823-R824	2022-11-29	Cleaning	4.0	1.0	3.0
R823-R824	2023-07-25	Cleaning	4.0	1.0	3.0

R750-R754

LOF Predictions - 2024-10-01

Max Prediction: 2.53 (Upper Outlier)

Debris Prediction: 2.53 (Upper Outlier)

Grease Prediction: 1.28 (Upper Outlier)

Roots Prediction: 1.06 (Lowest)

Key Features

Length: 132ft	Diameter: 10in	Material: VCP	Install Year: 1953
Slope: 0.02	Hotspot: N/A	Basin: R709	Flow Basin: Mission Basin

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
R750-R754	2015-11-04	Cleaning	3.0	1.0	1.0
R750-R754	2016-08-24	Cleaning	4.0	2.0	1.0
R750-R754	2018-10-30	Cleaning	3.0	1.0	1.0
R750-R754	2022-09-14	Cleaning	4.0	1.0	1.0

R526-R525

LOF Predictions - 2024-10-01

Max Prediction: 2.53 (Upper Outlier)

Debris Prediction: 1.24 (Medium)

Grease Prediction: 1.01 (Medium)

Roots Prediction: 2.53 (Upper Outlier)

Key Features

Length: 316ft	Diameter: 12in	Material: VCP	Install Year: 1924
Slope: nan	Hotspot: N/A	Basin: R709	Flow Basin: Mission Basin

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
R526-R525	2014-05-12	Cleaning	2.0	1.0	3.0
R526-R525	2014-12-09	Cleaning	1.0	1.0	1.0
R526-R525	2015-08-10	Cleaning	1.0	1.0	3.0
R526-R525	2016-02-10	Cleaning	2.0	1.0	2.0
R526-R525	2016-09-19	Cleaning	2.0	1.0	3.0
R526-R525	2017-05-02	Cleaning	1.0	1.0	1.0
R526-R525	2017-05-04	Cleaning	1.0	1.0	4.0
R526-R525	2017-05-04	CCTV	1.0	1.0	3.0
R526-R525	2017-12-28	Cleaning	1.0	1.0	2.0
R526-R525	2018-07-30	Cleaning	3.0	1.0	4.0
R526-R525	2019-03-14	Cleaning	1.0	1.0	1.0
R526-R525	2019-12-16	Cleaning	1.0	1.0	1.0
R526-R525	2020-08-25	Cleaning	1.0	1.0	2.0
R526-R525	2021-03-15	Cleaning	1.0	1.0	2.0
R526-R525	2021-11-10	Cleaning	2.0	1.0	3.0
R526-R525	2021-12-14	CCTV	1.0	1.0	3.0
R526-R525	2022-07-25	Cleaning	1.0	1.0	3.0
R526-R525	2023-03-03	Cleaning	1.0	1.0	1.0
R526-R525	2023-11-06	Cleaning	1.0	1.0	3.0

P604-Q601

LOF Predictions - 2024-10-01

Max Prediction: 2.53 (Upper Outlier)

Debris Prediction: 2.53 (Upper Outlier)

Grease Prediction: 1.18 (Highest)

Roots Prediction: 1.10 (Medium)

Key Features

Length: 460ft	Diameter: 6in	Material: VCP	Install Year: 1908
Slope: nan	Hotspot: N/A	Basin: Q631	Flow Basin: Beach Basin

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
P604-Q601	2014-01-16	Cleaning	3.0	1.0	1.0
P604-Q601	2014-01-17	CCTV	1.0	1.0	1.0
P604-Q601	2014-05-14	Cleaning	2.0	1.0	1.0
P604-Q601	2014-12-17	Cleaning	3.0	1.0	1.0
P604-Q601	2015-08-10	Cleaning	2.0	1.0	1.0
P604-Q601	2016-02-16	Cleaning	3.0	1.0	1.0
P604-Q601	2016-10-18	Cleaning	4.0	1.0	3.0
P604-Q601	2017-05-17	Cleaning	2.0	1.0	1.0
P604-Q601	2018-01-04	Cleaning	4.0	1.0	1.0
P604-Q601	2018-08-07	CCTV	3.0	3.0	3.0
P604-Q601	2018-08-08	Cleaning	4.0	1.0	1.0
P604-Q601	2019-04-02	Cleaning	2.0	1.0	1.0
P604-Q601	2019-12-31	Cleaning	1.0	1.0	1.0
P604-Q601	2020-08-25	Cleaning	1.0	1.0	1.0
P604-Q601	2021-03-22	Cleaning	4.0	1.0	1.0
P604-Q601	2021-12-14	Cleaning	4.0	1.0	1.0
P604-Q601	2022-07-27	Cleaning	4.0	1.0	1.0
P604-Q601	2023-03-20	Cleaning	4.0	1.0	1.0
P604-Q601	2023-11-21	Cleaning	4.0	1.0	1.0

Q502-Q503

LOF Predictions - 2024-10-01

Max Prediction: 2.55 (Upper Outlier)

Debris Prediction: 2.55 (Upper Outlier)

Grease Prediction: 1.01 (Medium)

Roots Prediction: 1.09 (Medium)

Key Features

Length: 346ft	Diameter: 6in	Material: VCP	Install Year: 1908
Slope: nan	Hotspot: N/A	Basin: Q631	Flow Basin: Beach Basin

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
Q502-Q503	2014-05-14	Cleaning	1.0	1.0	1.0
Q502-Q503	2014-12-18	Cleaning	3.0	1.0	1.0
Q502-Q503	2015-08-10	Cleaning	2.0	1.0	1.0
Q502-Q503	2016-02-17	Cleaning	2.0	1.0	1.0
Q502-Q503	2016-10-19	Cleaning	2.0	1.0	1.0
Q502-Q503	2017-05-17	Cleaning	2.0	1.0	1.0
Q502-Q503	2018-01-04	Cleaning	1.0	1.0	1.0
Q502-Q503	2018-08-22	Cleaning	4.0	1.0	1.0
Q502-Q503	2018-08-22	CCTV	3.0	1.0	2.0
Q502-Q503	2019-04-02	Cleaning	3.0	1.0	1.0
Q502-Q503	2019-12-30	Cleaning	4.0	1.0	1.0
Q502-Q503	2020-08-31	Cleaning	1.0	1.0	1.0
Q502-Q503	2021-03-23	Cleaning	4.0	1.0	1.0
Q502-Q503	2021-11-16	Cleaning	4.0	1.0	1.0
Q502-Q503	2022-07-27	Cleaning	4.0	1.0	1.0
Q502-Q503	2023-11-27	Cleaning	1.0	1.0	1.0

Q633-Q635

LOF Predictions - 2024-10-01

Max Prediction: 2.57 (Upper Outlier)

Debris Prediction: 1.32 (Medium)

Grease Prediction: 2.57 (Upper Outlier)

Roots Prediction: 1.18 (Medium)

Key Features

Length: 451ft	Diameter: 6in	Material: CIPP	Install Year: 1985
Slope: 0.01	Hotspot: N/A	Basin: R621	Flow Basin: Santa Lucia Basin

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
Q633-Q635	2014-06-03	Cleaning	3.0	3.0	1.0
Q633-Q635	2015-01-15	Cleaning	1.0	1.0	1.0
Q633-Q635	2015-01-20	CCTV	1.0	1.0	3.0
Q633-Q635	2015-08-24	Cleaning	2.0	1.0	1.0
Q633-Q635	2016-03-01	Cleaning	2.0	2.0	1.0
Q633-Q635	2016-10-03	Cleaning	1.0	1.0	1.0
Q633-Q635	2017-05-11	Cleaning	1.0	1.0	1.0
Q633-Q635	2018-01-25	Cleaning	1.0	1.0	1.0
Q633-Q635	2018-08-21	Cleaning	4.0	4.0	1.0
Q633-Q635	2019-01-23	Cleaning	4.0	4.0	1.0
Q633-Q635	2019-03-21	CCTV	3.0	3.0	1.0
Q633-Q635	2019-04-22	Cleaning	2.0	2.0	1.0
Q633-Q635	2020-01-08	Cleaning	3.0	3.0	1.0
Q633-Q635	2020-09-24	Cleaning	1.0	1.0	1.0
Q633-Q635	2020-12-30	Cleaning	1.0	1.0	1.0
Q633-Q635	2021-04-19	Cleaning	3.0	1.0	1.0
Q633-Q635	2021-10-27	Cleaning	1.0	4.0	1.0
Q633-Q635	2021-11-17	Cleaning	1.0	3.0	1.0
Q633-Q635	2022-09-01	Cleaning	3.0	1.0	1.0
Q633-Q635	2023-01-31	Cleaning	1.0	4.0	1.0
Q633-Q635	2023-04-04	Cleaning	1.0	3.0	1.0
Q633-Q635	2023-12-11	Cleaning	1.0	3.0	1.0

S615-S609

LOF Predictions - 2024-10-01

Max Prediction: 2.58 (Upper Outlier)

Debris Prediction: 2.58 (Upper Outlier)

Grease Prediction: 1.33 (Upper Outlier)

Roots Prediction: 1.07 (Lowest)

Key Features

Length: 301ft	Diameter: 6in	Material: VCP	Install Year: 1962
Slope: nan	Hotspot: N/A	Basin: R709	Flow Basin: Mission Basin

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
S615-S609	2014-01-15	Cleaning	3.0	1.0	1.0
S615-S609	2014-05-01	Cleaning	4.0	3.0	1.0
S615-S609	2014-11-13	Cleaning	3.0	1.0	1.0
S615-S609	2015-07-08	Cleaning	3.0	1.0	1.0
S615-S609	2016-02-03	Cleaning	4.0	1.0	1.0
S615-S609	2016-08-09	Cleaning	3.0	1.0	1.0
S615-S609	2017-03-15	Cleaning	3.0	1.0	1.0
S615-S609	2017-07-10	Cleaning	2.0	1.0	1.0
S615-S609	2017-12-07	Cleaning	2.0	1.0	1.0
S615-S609	2017-12-20	Cleaning	3.0	1.0	1.0
S615-S609	2018-07-03	Cleaning	4.0	1.0	1.0
S615-S609	2018-12-05	Cleaning	4.0	1.0	1.0
S615-S609	2019-02-25	Cleaning	3.0	1.0	1.0
S615-S609	2019-06-26	Cleaning	3.0	1.0	1.0
S615-S609	2019-11-19	Cleaning	4.0	1.0	1.0
S615-S609	2020-05-27	Cleaning	3.0	1.0	1.0
S615-S609	2020-11-17	Cleaning	4.0	1.0	1.0
S615-S609	2021-05-12	Cleaning	1.0	1.0	1.0
S615-S609	2021-10-27	Cleaning	4.0	1.0	1.0
S615-S609	2022-06-14	Cleaning	4.0	3.0	1.0
S615-S609	2022-12-24	Cleaning	3.0	1.0	1.0
S615-S609	2023-11-02	Cleaning	4.0	1.0	1.0

Q603-Q502

LOF Predictions - 2024-10-01

Max Prediction: 2.59 (Upper Outlier)

Debris Prediction: 2.59 (Upper Outlier)

Grease Prediction: 1.07 (Medium)

Roots Prediction: 1.04 (Lowest)

Key Features

Length: 106ft	Diameter: 6in	Material: VCP	Install Year: 1908
Slope: nan	Hotspot: N/A	Basin: Q631	Flow Basin: Beach Basin

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
Q603-Q502	2014-05-15	Cleaning	2.0	1.0	1.0
Q603-Q502	2014-12-18	Cleaning	3.0	1.0	1.0
Q603-Q502	2015-08-10	Cleaning	2.0	1.0	1.0
Q603-Q502	2016-02-16	Cleaning	4.0	1.0	1.0
Q603-Q502	2016-10-18	Cleaning	4.0	1.0	1.0
Q603-Q502	2017-05-17	Cleaning	2.0	1.0	1.0
Q603-Q502	2018-01-04	Cleaning	4.0	1.0	1.0
Q603-Q502	2018-08-22	Cleaning	4.0	1.0	1.0
Q603-Q502	2018-08-22	CCTV	3.0	1.0	2.0
Q603-Q502	2019-04-02	Cleaning	2.0	1.0	1.0
Q603-Q502	2019-12-26	Cleaning	4.0	1.0	1.0
Q603-Q502	2020-08-31	Cleaning	1.0	1.0	1.0
Q603-Q502	2021-03-23	Cleaning	4.0	1.0	1.0
Q603-Q502	2021-11-16	Cleaning	4.0	1.0	1.0
Q603-Q502	2022-07-28	Cleaning	4.0	1.0	1.0
Q603-Q502	2023-11-27	Cleaning	1.0	1.0	1.0

O6128-O668

LOF Predictions - 2024-10-01

Max Prediction: 2.59 (Upper Outlier)

Debris Prediction: 2.59 (Upper Outlier)

Grease Prediction: 1.06 (Medium)

Roots Prediction: 1.09 (Medium)

Key Features

Length: 53ft	Diameter: 10in	Material: VCP	Install Year: 1908
Slope: nan	Hotspot: N/A	Basin: Q631	Flow Basin: Beach Basin

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
O6128-O668	2014-05-27	Cleaning	1.0	1.0	1.0
O6128-O668	2015-01-12	Cleaning	1.0	1.0	1.0
O6128-O668	2015-08-19	Cleaning	1.0	1.0	1.0
O6128-O668	2016-02-23	Cleaning	1.0	1.0	1.0
O6128-O668	2016-09-27	Cleaning	1.0	1.0	1.0
O6128-O668	2017-05-08	Cleaning	3.0	1.0	1.0
O6128-O668	2018-01-17	Cleaning	1.0	1.0	1.0
O6128-O668	2018-02-12	Cleaning	4.0	1.0	1.0
O6128-O668	2018-08-20	Cleaning	3.0	1.0	3.0
O6128-O668	2018-10-23	Cleaning	4.0	1.0	1.0
O6128-O668	2018-10-25	Cleaning	4.0	1.0	1.0
O6128-O668	2018-10-25	CCTV	3.0	1.0	2.0
O6128-O668	2019-04-16	Cleaning	1.0	1.0	1.0
O6128-O668	2019-12-20	Cleaning	3.0	1.0	1.0
O6128-O668	2020-09-16	Cleaning	3.0	1.0	1.0
O6128-O668	2021-04-07	Cleaning	3.0	1.0	1.0
O6128-O668	2021-12-08	Cleaning	4.0	1.0	1.0
O6128-O668	2022-08-22	Cleaning	4.0	1.0	1.0
O6128-O668	2023-04-17	Cleaning	1.0	1.0	1.0
O6128-O668	2023-12-11	Cleaning	3.0	1.0	1.0

R746-R747

LOF Predictions - 2024-10-01

Max Prediction: 2.60 (Upper Outlier)

Debris Prediction: 2.60 (Upper Outlier)

Grease Prediction: 1.32 (Upper Outlier)

Roots Prediction: 1.13 (Medium)

Key Features

Length: 315ft	Diameter: 15in	Material: VCP	Install Year: 1953
Slope: 0.0	Hotspot: N/A	Basin: R709	Flow Basin: Mission Basin

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
R746-R747	2015-11-04	Cleaning	3.0	1.0	1.0
R746-R747	2016-08-15	Cleaning	4.0	1.0	1.0
R746-R747	2017-05-25	CCTV	3.0	1.0	3.0
R746-R747	2017-08-14	Cleaning	3.0	1.0	1.0
R746-R747	2017-08-15	Cleaning	4.0	1.0	1.0
R746-R747	2018-10-22	Cleaning	3.0	1.0	1.0
R746-R747	2019-10-10	Cleaning	4.0	1.0	1.0
R746-R747	2020-11-17	Cleaning	1.0	1.0	1.0
R746-R747	2021-11-15	Cleaning	4.0	1.0	1.0
R746-R747	2022-04-26	Cleaning	4.0	1.0	1.0
R746-R747	2022-04-26	CCTV	1.0	3.0	2.0
R746-R747	2022-11-29	Cleaning	4.0	1.0	1.0

O668-P606

LOF Predictions - 2024-10-01

Max Prediction: 2.60 (Upper Outlier)

Debris Prediction: 2.60 (Upper Outlier)

Grease Prediction: 1.01 (Medium)

Roots Prediction: 1.23 (Medium)

Key Features

Length: 475ft	Diameter: 10in	Material: PVC	Install Year: 1985
Slope: 0.01	Hotspot: N/A	Basin: Q631	Flow Basin: Beach Basin

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
O668-P606	2014-05-28	Cleaning	1.0	1.0	3.0
O668-P606	2015-01-12	Cleaning	1.0	1.0	1.0
O668-P606	2015-08-19	Cleaning	1.0	1.0	1.0
O668-P606	2016-02-23	Cleaning	1.0	1.0	1.0
O668-P606	2016-09-27	Cleaning	2.0	1.0	1.0
O668-P606	2017-05-08	Cleaning	3.0	1.0	1.0
O668-P606	2018-01-17	Cleaning	1.0	1.0	2.0
O668-P606	2018-08-20	Cleaning	3.0	1.0	3.0
O668-P606	2018-10-23	Cleaning	4.0	1.0	1.0
O668-P606	2018-10-25	Cleaning	4.0	1.0	1.0
O668-P606	2018-10-25	CCTV	3.0	1.0	2.0
O668-P606	2019-04-16	Cleaning	1.0	1.0	1.0
O668-P606	2019-12-20	Cleaning	3.0	1.0	1.0
O668-P606	2020-09-16	Cleaning	3.0	1.0	1.0
O668-P606	2021-04-07	Cleaning	3.0	1.0	1.0
O668-P606	2021-12-08	Cleaning	4.0	1.0	1.0
O668-P606	2022-08-22	Cleaning	4.0	1.0	1.0
O668-P606	2023-04-17	Cleaning	4.0	1.0	3.0
O668-P606	2023-12-07	Cleaning	2.0	1.0	1.0

Q631-Q640

LOF Predictions - 2024-10-01

Max Prediction: 2.61 (Upper Outlier)

Debris Prediction: 2.13 (Upper Outlier)

Grease Prediction: 2.61 (Upper Outlier)

Roots Prediction: 1.06 (Lowest)

Key Features

Length: 234ft	Diameter: 12in	Material: VCP	Install Year: 1924
Slope: nan	Hotspot: N/A	Basin: R621	Flow Basin: Santa Lucia Basin

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
Q631-Q640	2014-06-04	Cleaning	2.0	1.0	1.0
Q631-Q640	2014-11-24	Cleaning	1.0	1.0	1.0
Q631-Q640	2015-07-23	Cleaning	1.0	1.0	1.0
Q631-Q640	2016-02-04	Cleaning	1.0	3.0	1.0
Q631-Q640	2016-09-08	Cleaning	1.0	1.0	1.0
Q631-Q640	2017-05-03	CCTV	1.0	3.0	1.0
Q631-Q640	2018-01-02	Cleaning	1.0	2.0	1.0
Q631-Q640	2018-05-30	Cleaning	3.0	3.0	1.0
Q631-Q640	2018-07-25	Cleaning	1.0	1.0	1.0
Q631-Q640	2019-03-11	Cleaning	3.0	3.0	1.0
Q631-Q640	2019-11-13	Cleaning	1.0	1.0	1.0
Q631-Q640	2020-08-17	Cleaning	4.0	4.0	1.0
Q631-Q640	2021-03-30	Cleaning	1.0	1.0	1.0
Q631-Q640	2022-09-09	Cleaning	3.0	1.0	1.0
Q631-Q640	2022-10-03	Cleaning	4.0	1.0	1.0
Q631-Q640	2022-10-03	CCTV	1.0	3.0	1.0
Q631-Q640	2023-03-16	Cleaning	4.0	4.0	1.0
Q631-Q640	2023-11-08	Cleaning	4.0	4.0	1.0

P602-P603

LOF Predictions - 2024-10-01

Max Prediction: 2.61 (Upper Outlier)

Debris Prediction: 2.61 (Upper Outlier)

Grease Prediction: 1.15 (Highest)

Roots Prediction: 1.13 (Medium)

Key Features

Length: 491ft	Diameter: 6in	Material: VCP	Install Year: 1908
Slope: nan	Hotspot: N/A	Basin: Q631	Flow Basin: Beach Basin

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
P602-P603	2014-05-13	Cleaning	2.0	1.0	1.0
P602-P603	2014-12-17	Cleaning	4.0	1.0	1.0
P602-P603	2015-08-10	Cleaning	2.0	1.0	1.0
P602-P603	2016-02-16	Cleaning	4.0	1.0	2.0
P602-P603	2016-10-17	Cleaning	2.0	1.0	1.0
P602-P603	2017-05-17	Cleaning	2.0	1.0	1.0
P602-P603	2018-01-03	Cleaning	4.0	1.0	1.0
P602-P603	2018-08-07	Cleaning	4.0	1.0	2.0
P602-P603	2018-08-07	CCTV	1.0	1.0	3.0
P602-P603	2019-03-19	Cleaning	4.0	1.0	1.0
P602-P603	2019-12-18	Cleaning	4.0	1.0	1.0
P602-P603	2020-08-28	Cleaning	1.0	1.0	1.0
P602-P603	2021-03-22	Cleaning	4.0	1.0	1.0
P602-P603	2021-12-14	Cleaning	4.0	1.0	1.0
P602-P603	2022-07-26	Cleaning	4.0	1.0	1.0
P602-P603	2023-03-20	Cleaning	1.0	1.0	1.0
P602-P603	2023-11-21	Cleaning	4.0	1.0	1.0

Q601-Q602

LOF Predictions - 2024-10-01

Max Prediction: 2.62 (Upper Outlier)

Debris Prediction: 2.62 (Upper Outlier)

Grease Prediction: 1.14 (Highest)

Roots Prediction: 1.14 (Medium)

Key Features

Length: 445ft	Diameter: 6in	Material: VCP	Install Year: 1908
Slope: nan	Hotspot: N/A	Basin: Q631	Flow Basin: Beach Basin

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
Q601-Q602	2014-01-16	Cleaning	3.0	1.0	1.0
Q601-Q602	2014-01-17	CCTV	1.0	1.0	2.0
Q601-Q602	2014-05-14	Cleaning	2.0	1.0	1.0
Q601-Q602	2014-12-18	Cleaning	3.0	1.0	1.0
Q601-Q602	2015-08-10	Cleaning	2.0	1.0	1.0
Q601-Q602	2016-02-16	Cleaning	4.0	1.0	1.0
Q601-Q602	2016-10-18	Cleaning	4.0	1.0	1.0
Q601-Q602	2017-05-17	Cleaning	3.0	1.0	3.0
Q601-Q602	2018-01-04	Cleaning	4.0	1.0	1.0
Q601-Q602	2018-08-08	Cleaning	4.0	1.0	1.0
Q601-Q602	2018-08-08	CCTV	3.0	1.0	3.0
Q601-Q602	2019-04-02	Cleaning	3.0	1.0	4.0
Q601-Q602	2019-12-31	Cleaning	1.0	1.0	1.0
Q601-Q602	2020-08-25	Cleaning	1.0	1.0	1.0
Q601-Q602	2021-03-22	Cleaning	4.0	1.0	1.0
Q601-Q602	2021-12-14	Cleaning	4.0	1.0	1.0
Q601-Q602	2022-07-27	Cleaning	4.0	1.0	1.0
Q601-Q602	2023-03-20	Cleaning	4.0	1.0	1.0
Q601-Q602	2023-11-21	Cleaning	4.0	1.0	1.0

R708-R709

LOF Predictions - 2024-10-01

Max Prediction: 2.45 (Upper Outlier)

Debris Prediction: 2.45 (Upper Outlier)

Grease Prediction: 1.11 (Highest)

Roots Prediction: 1.27 (Highest)

Key Features

Length: 21ft	Diameter: 27in	Material: CIPP	Install Year: 1985
Slope: nan	Hotspot: N/A	Basin: R709	Flow Basin: Mission Basin

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Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
R708-R709	2016-09-14	Cleaning	1.0	1.0	1.0
R708-R709	2018-10-25	Cleaning	3.0	1.0	1.0
R708-R709	2022-03-03	CCTV	1.0	1.0	1.0
R708-R709	2022-09-12	Cleaning	4.0	1.0	1.0

Q803-Q804

LOF Predictions - 2024-10-01

Max Prediction: 2.45 (Upper Outlier)

Debris Prediction: 1.04 (Lowest)

Grease Prediction: 1.01 (Medium)

Roots Prediction: 2.45 (Upper Outlier)

Key Features

Length: 84ft	Diameter: 6in	Material: VCP	Install Year: 1972
Slope: nan	Hotspot: N/A	Basin: R822	Flow Basin: Hatton Basin

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
Q803-Q804	2014-03-13	Cleaning	1.0	1.0	1.0
Q803-Q804	2014-09-29	Cleaning	1.0	1.0	1.0
Q803-Q804	2015-05-13	Cleaning	1.0	1.0	1.0
Q803-Q804	2016-10-26	Cleaning	1.0	1.0	1.0
Q803-Q804	2017-09-26	Cleaning	1.0	1.0	1.0
Q803-Q804	2018-05-21	Cleaning	1.0	1.0	1.0
Q803-Q804	2019-07-15	Cleaning	1.0	1.0	2.0
Q803-Q804	2020-12-02	Cleaning	1.0	1.0	1.0
Q803-Q804	2021-05-11	CCTV	1.0	1.0	3.0
Q803-Q804	2022-09-06	Cleaning	1.0	1.0	1.0
Q803-Q804	2023-10-18	Cleaning	1.0	1.0	4.0

Q732-R701

LOF Predictions - 2024-10-01

Max Prediction: 2.46 (Upper Outlier)

Debris Prediction: 2.46 (Upper Outlier)

Grease Prediction: 1.01 (Medium)

Roots Prediction: 1.06 (Lowest)

Key Features

Length: 281ft	Diameter: 6in	Material: VCP	Install Year: 1953
Slope: 0.0	Hotspot: N/A	Basin: R709	Flow Basin: Mission Basin

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Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
Q732-R701	2014-03-05	Cleaning	1.0	1.0	1.0
Q732-R701	2014-09-17	Cleaning	2.0	1.0	2.0
Q732-R701	2015-06-04	Cleaning	1.0	1.0	1.0
Q732-R701	2016-08-11	Cleaning	3.0	1.0	1.0
Q732-R701	2017-07-13	Cleaning	4.0	1.0	1.0
Q732-R701	2017-08-22	Cleaning	2.0	1.0	1.0
Q732-R701	2018-09-25	Cleaning	4.0	1.0	1.0
Q732-R701	2019-11-06	Cleaning	1.0	1.0	1.0
Q732-R701	2020-11-30	Cleaning	3.0	1.0	1.0
Q732-R701	2022-08-31	Cleaning	4.0	1.0	1.0
Q732-R701	2022-08-31	CCTV	3.0	1.0	2.0
Q732-R701	2023-11-30	Cleaning	4.0	1.0	1.0

N757-N759

LOF Predictions - 2024-10-01

Max Prediction: 2.46 (Upper Outlier)

Debris Prediction: 2.46 (Upper Outlier)

Grease Prediction: 1.01 (Medium)

Roots Prediction: 1.04 (Lowest)

Key Features

Length: 151ft	Diameter: 6in	Material: VCP	Install Year: 1924
Slope: nan	Hotspot: N/A	Basin: Q679	Flow Basin: Paradise Park Basin

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
N757-N759	2014-02-03	Cleaning	3.0	1.0	2.0
N757-N759	2014-08-07	Cleaning	3.0	1.0	1.0
N757-N759	2015-03-24	Cleaning	1.0	1.0	1.0
N757-N759	2015-11-05	Cleaning	4.0	1.0	1.0
N757-N759	2016-04-21	Cleaning	1.0	1.0	1.0
N757-N759	2017-01-12	Cleaning	4.0	2.0	1.0
N757-N759	2017-08-02	Cleaning	3.0	1.0	1.0
N757-N759	2018-04-09	Cleaning	3.0	1.0	1.0
N757-N759	2018-11-26	Cleaning	3.0	1.0	1.0
N757-N759	2019-07-22	Cleaning	3.0	1.0	1.0
N757-N759	2020-04-02	Cleaning	2.0	1.0	1.0
N757-N759	2020-09-02	CCTV	3.0	1.0	1.0
N757-N759	2020-11-18	Cleaning	3.0	1.0	1.0
N757-N759	2021-06-25	Cleaning	3.0	1.0	1.0
N757-N759	2022-03-21	Cleaning	4.0	1.0	1.0
N757-N759	2022-11-30	Cleaning	4.0	1.0	1.0
N757-N759	2023-07-26	Cleaning	3.0	1.0	1.0

Q602-Q6115

LOF Predictions - 2024-10-01

Max Prediction: 2.47 (Upper Outlier)

Debris Prediction: 2.47 (Upper Outlier)

Grease Prediction: 1.14 (Highest)

Roots Prediction: 1.12 (Medium)

Key Features

| Length: 219ft | Diameter: 6in | Material: VCP | Install Year: 1908 |
| Slope: nan | Hotspot: N/A | Basin: Q631 | Flow Basin: Beach Basin |

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
Q602-Q6115	2014-01-16	Cleaning	3.0	1.0	1.0
Q602-Q6115	2014-01-17	CCTV	1.0	1.0	1.0
Q602-Q6115	2014-05-14	Cleaning	2.0	1.0	2.0
Q602-Q6115	2014-12-18	Cleaning	3.0	1.0	1.0
Q602-Q6115	2015-08-10	Cleaning	2.0	1.0	1.0
Q602-Q6115	2016-02-16	Cleaning	1.0	1.0	1.0
Q602-Q6115	2016-10-19	Cleaning	3.0	1.0	1.0
Q602-Q6115	2016-12-28	Cleaning	3.0	1.0	1.0
Q602-Q6115	2017-05-17	Cleaning	2.0	1.0	1.0
Q602-Q6115	2018-01-04	Cleaning	4.0	1.0	1.0
Q602-Q6115	2018-07-16	Cleaning	1.0	1.0	4.0
Q602-Q6115	2018-08-08	CCTV	3.0	3.0	2.0
Q602-Q6115	2018-08-09	Cleaning	1.0	1.0	1.0
Q602-Q6115	2019-04-02	Cleaning	2.0	1.0	1.0
Q602-Q6115	2019-12-31	Cleaning	1.0	1.0	1.0
Q602-Q6115	2020-08-25	Cleaning	1.0	1.0	1.0
Q602-Q6115	2021-03-29	Cleaning	4.0	1.0	1.0
Q602-Q6115	2021-12-14	Cleaning	4.0	1.0	1.0
Q602-Q6115	2022-07-27	Cleaning	4.0	1.0	1.0
Q602-Q6115	2023-03-20	Cleaning	4.0	1.0	1.0
Q602-Q6115	2023-11-21	Cleaning	4.0	1.0	1.0

O6141-O681

LOF Predictions - 2024-10-01

Max Prediction: 2.47 (Upper Outlier)

Debris Prediction: 1.08 (Medium)

Grease Prediction: 2.47 (Upper Outlier)

Roots Prediction: 1.22 (Medium)

Key Features

| Length: 191ft | Diameter: 8in | Material: PVC | Install Year: 1991 |
| Slope: 0.04 | Hotspot: N/A | Basin: Q649 | Flow Basin: Downtown Basin |

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
O6141-O681	2014-02-04	Cleaning	1.0	4.0	1.0
O6141-O681	2014-04-22	Cleaning	1.0	2.0	1.0
O6141-O681	2014-06-17	Cleaning	1.0	2.0	1.0
O6141-O681	2014-07-31	Cleaning	1.0	1.0	1.0
O6141-O681	2014-11-24	Cleaning	1.0	1.0	1.0
O6141-O681	2015-02-03	Cleaning	1.0	1.0	1.0
O6141-O681	2015-04-06	Cleaning	1.0	2.0	1.0
O6141-O681	2015-07-28	Cleaning	1.0	2.0	1.0
O6141-O681	2015-09-02	Cleaning	1.0	1.0	1.0
O6141-O681	2015-11-17	Cleaning	1.0	2.0	1.0
O6141-O681	2016-02-08	Cleaning	1.0	4.0	1.0
O6141-O681	2016-03-15	Cleaning	1.0	2.0	1.0
O6141-O681	2016-05-31	Cleaning	1.0	1.0	1.0
O6141-O681	2016-07-22	Cleaning	1.0	3.0	1.0
O6141-O681	2016-10-17	Cleaning	1.0	1.0	1.0
O6141-O681	2016-12-06	Cleaning	1.0	4.0	1.0
O6141-O681	2017-04-03	Cleaning	1.0	3.0	1.0
O6141-O681	2017-06-08	Cleaning	1.0	3.0	1.0
O6141-O681	2017-07-03	Cleaning	1.0	1.0	1.0
O6141-O681	2017-08-09	Cleaning	1.0	4.0	1.0
O6141-O681	2017-11-21	Cleaning	1.0	4.0	1.0
O6141-O681	2017-11-28	Cleaning	1.0	3.0	1.0
O6141-O681	2018-01-31	Cleaning	1.0	3.0	1.0
O6141-O681	2018-05-16	Cleaning	1.0	4.0	1.0
O6141-O681	2018-08-13	Cleaning	1.0	4.0	1.0
O6141-O681	2018-09-06	Cleaning	1.0	2.0	1.0
O6141-O681	2018-11-14	Cleaning	1.0	3.0	1.0
O6141-O681	2019-05-06	Cleaning	1.0	1.0	1.0
O6141-O681	2019-08-05	Cleaning	1.0	2.0	1.0
O6141-O681	2019-11-25	Cleaning	1.0	3.0	1.0
O6141-O681	2020-02-03	Cleaning	1.0	3.0	1.0
O6141-O681	2020-07-23	CCTV	1.0	3.0	1.0
O6141-O681	2020-08-11	Cleaning	1.0	1.0	1.0
O6141-O681	2020-10-06	Cleaning	1.0	2.0	1.0
O6141-O681	2021-01-26	Cleaning	1.0	3.0	1.0
O6141-O681	2021-03-30	Cleaning	1.0	3.0	1.0
O6141-O681	2021-05-06	Cleaning	1.0	3.0	1.0
O6141-O681	2021-08-04	Cleaning	1.0	3.0	1.0
O6141-O681	2021-11-01	Cleaning	1.0	4.0	1.0
O6141-O681	2022-01-20	Cleaning	1.0	4.0	1.0
O6141-O681	2022-05-25	Cleaning	1.0	1.0	1.0
O6141-O681	2022-08-02	Cleaning	2.0	4.0	1.0
O6141-O681	2022-11-17	Cleaning	3.0	3.0	2.0
O6141-O681	2023-01-30	Cleaning	1.0	3.0	1.0
O6141-O681	2023-06-08	Cleaning	1.0	4.0	1.0
O6141-O681	2023-08-02	Cleaning	1.0	3.0	1.0
O6141-O681	2023-10-25	Cleaning	1.0	4.0	1.0
O6141-O681	2023-12-12	Cleaning	1.0	3.0	1.0

O708-O702

LOF Predictions - 2024-10-01

Max Prediction: 2.63 (Upper Outlier)

Debris Prediction: 2.63 (Upper Outlier)

Grease Prediction: 1.03 (Medium)

Roots Prediction: 1.08 (Medium)

Key Features

Length: 258ft	Diameter: 8in	Material: CIPP	Install Year: 1985
Slope: 0.02	Hotspot: N/A	Basin: Q679	Flow Basin: Paradise Park Basin

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
O708-O702	2014-01-02	Cleaning	1.0	1.0	1.0
O708-O702	2014-08-04	Cleaning	2.0	1.0	1.0
O708-O702	2015-03-20	Cleaning	1.0	1.0	1.0
O708-O702	2015-10-28	Cleaning	4.0	1.0	1.0
O708-O702	2016-04-20	Cleaning	3.0	1.0	1.0
O708-O702	2016-12-30	Cleaning	4.0	1.0	1.0
O708-O702	2017-07-24	Cleaning	1.0	1.0	1.0
O708-O702	2018-03-07	Cleaning	4.0	1.0	1.0
O708-O702	2018-10-31	Cleaning	3.0	1.0	1.0
O708-O702	2019-06-21	Cleaning	4.0	1.0	1.0
O708-O702	2020-03-10	Cleaning	1.0	1.0	1.0
O708-O702	2020-03-12	Cleaning	1.0	1.0	1.0
O708-O702	2020-08-03	CCTV	3.0	1.0	1.0
O708-O702	2020-08-16	CCTV	3.0	1.0	1.0
O708-O702	2020-11-17	Cleaning	4.0	1.0	1.0
O708-O702	2021-06-22	Cleaning	1.0	1.0	1.0
O708-O702	2022-02-14	Cleaning	4.0	1.0	1.0
O708-O702	2022-11-16	Cleaning	4.0	1.0	1.0
O708-O702	2023-07-12	Cleaning	4.0	1.0	1.0
O708-O702	2024-04-02	Cleaning	1.0	1.0	1.0

S618-S615

LOF Predictions - 2024-10-01

Max Prediction: 2.64 (Upper Outlier)

Debris Prediction: 2.64 (Upper Outlier)

Grease Prediction: 1.41 (Upper Outlier)

Roots Prediction: 1.17 (Medium)

Key Features

Length: 182ft	Diameter: 6in	Material: STEEL	Install Year: 1962
Slope: nan	Hotspot: N/A	Basin: R709	Flow Basin: Mission Basin

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
S618-S615	2014-05-01	Cleaning	4.0	3.0	1.0
S618-S615	2014-11-13	Cleaning	3.0	1.0	1.0
S618-S615	2015-07-08	Cleaning	3.0	1.0	1.0
S618-S615	2016-02-03	Cleaning	4.0	1.0	1.0
S618-S615	2016-08-09	Cleaning	3.0	1.0	1.0
S618-S615	2017-03-15	Cleaning	3.0	1.0	1.0
S618-S615	2017-07-10	Cleaning	2.0	1.0	1.0
S618-S615	2017-12-07	Cleaning	2.0	1.0	1.0
S618-S615	2017-12-20	Cleaning	3.0	1.0	1.0
S618-S615	2018-07-03	Cleaning	4.0	1.0	1.0
S618-S615	2018-12-05	Cleaning	4.0	1.0	1.0
S618-S615	2019-02-25	Cleaning	3.0	1.0	1.0
S618-S615	2019-06-26	Cleaning	3.0	1.0	1.0
S618-S615	2019-11-19	Cleaning	4.0	1.0	1.0
S618-S615	2020-05-27	Cleaning	3.0	1.0	1.0
S618-S615	2020-11-17	Cleaning	4.0	1.0	1.0
S618-S615	2021-05-12	Cleaning	1.0	1.0	1.0
S618-S615	2022-06-14	Cleaning	4.0	3.0	1.0
S618-S615	2022-12-24	Cleaning	3.0	1.0	1.0
S618-S615	2023-11-02	Cleaning	4.0	1.0	1.0

R706-R707

LOF Predictions - 2024-10-01

Max Prediction: 2.65 (Upper Outlier)

Debris Prediction: 2.65 (Upper Outlier)

Grease Prediction: 1.16 (Highest)

Roots Prediction: 1.08 (Medium)

Key Features

| Length: 168ft | Diameter: 12in | Material: VCP | Install Year: 1953 |
| Slope: 0.0 | Hotspot: N/A | Basin: R709 | Flow Basin: Mission Basin |

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
R706-R707	2014-02-13	Cleaning	4.0	1.0	3.0
R706-R707	2014-08-27	Cleaning	4.0	1.0	1.0
R706-R707	2015-04-06	Cleaning	3.0	1.0	1.0
R706-R707	2015-12-02	Cleaning	3.0	1.0	1.0
R706-R707	2017-01-30	Cleaning	3.0	1.0	1.0
R706-R707	2017-09-06	Cleaning	4.0	1.0	1.0
R706-R707	2017-10-11	Cleaning	3.0	1.0	1.0
R706-R707	2018-04-13	Cleaning	3.0	1.0	1.0
R706-R707	2018-12-11	Cleaning	4.0	1.0	1.0
R706-R707	2018-12-12	Cleaning	4.0	1.0	1.0
R706-R707	2019-08-19	Cleaning	3.0	1.0	1.0
R706-R707	2020-04-22	Cleaning	4.0	1.0	1.0
R706-R707	2020-12-03	Cleaning	4.0	1.0	1.0
R706-R707	2021-03-15	CCTV	3.0	1.0	1.0
R706-R707	2022-06-28	Cleaning	3.0	1.0	1.0
R706-R707	2023-03-17	Cleaning	4.0	1.0	1.0
R706-R707	2023-09-18	Cleaning	3.0	1.0	1.0
R706-R707	2023-10-04	Cleaning	1.0	1.0	1.0

Q504-Q518

LOF Predictions - 2024-10-01

Max Prediction: 2.65 (Upper Outlier)

Debris Prediction: 2.65 (Upper Outlier)

Grease Prediction: 1.01 (Medium)

Roots Prediction: 1.07 (Lowest)

Key Features

Length: 383ft	Diameter: 6in	Material: VCP	Install Year: 1924
Slope: nan	Hotspot: N/A	Basin: Q631	Flow Basin: Beach Basin

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
Q504-Q518	2014-05-15	Cleaning	2.0	1.0	2.0
Q504-Q518	2015-01-12	Cleaning	1.0	1.0	1.0
Q504-Q518	2015-08-10	Cleaning	1.0	1.0	1.0
Q504-Q518	2016-02-17	Cleaning	4.0	1.0	1.0
Q504-Q518	2016-10-19	Cleaning	3.0	1.0	1.0
Q504-Q518	2017-05-18	Cleaning	1.0	1.0	1.0
Q504-Q518	2018-01-04	Cleaning	4.0	1.0	1.0
Q504-Q518	2018-08-23	CCTV	3.0	1.0	3.0
Q504-Q518	2018-09-11	Cleaning	1.0	1.0	1.0
Q504-Q518	2019-03-21	Cleaning	3.0	1.0	1.0
Q504-Q518	2019-12-30	Cleaning	3.0	1.0	1.0
Q504-Q518	2020-08-31	Cleaning	3.0	1.0	1.0
Q504-Q518	2021-03-23	Cleaning	4.0	1.0	1.0
Q504-Q518	2021-12-15	Cleaning	3.0	1.0	1.0
Q504-Q518	2022-07-28	Cleaning	4.0	1.0	1.0
Q504-Q518	2023-04-06	Cleaning	4.0	1.0	1.0
Q504-Q518	2023-12-04	Cleaning	4.0	1.0	1.0

O6143-O6128

LOF Predictions - 2024-10-01

Max Prediction: 2.65 (Upper Outlier)

Debris Prediction: 2.65 (Upper Outlier)

Grease Prediction: 1.13 (Highest)

Roots Prediction: 1.22 (Medium)

Key Features

Length: 238ft	Diameter: 10in	Material: VCP/ PVC?	Install Year: 1908
Slope: nan	Hotspot: N/A	Basin: Q631	Flow Basin: Beach Basin

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
O6143-O6128	2014-05-27	Cleaning	1.0	1.0	1.0
O6143-O6128	2015-01-14	Cleaning	1.0	1.0	1.0
O6143-O6128	2015-08-19	Cleaning	3.0	1.0	1.0
O6143-O6128	2016-02-24	Cleaning	1.0	1.0	1.0
O6143-O6128	2016-09-27	Cleaning	3.0	1.0	1.0
O6143-O6128	2017-05-08	Cleaning	4.0	1.0	1.0
O6143-O6128	2018-01-17	Cleaning	3.0	1.0	1.0
O6143-O6128	2018-08-20	Cleaning	3.0	1.0	2.0
O6143-O6128	2018-10-23	CCTV	3.0	1.0	3.0
O6143-O6128	2018-10-25	Cleaning	4.0	1.0	1.0
O6143-O6128	2019-04-16	Cleaning	4.0	1.0	1.0
O6143-O6128	2019-12-20	Cleaning	4.0	1.0	1.0
O6143-O6128	2020-09-16	Cleaning	3.0	1.0	1.0
O6143-O6128	2021-04-07	Cleaning	3.0	1.0	1.0
O6143-O6128	2021-12-08	Cleaning	4.0	1.0	1.0
O6143-O6128	2022-08-22	Cleaning	4.0	1.0	1.0
O6143-O6128	2023-04-17	Cleaning	4.0	1.0	1.0
O6143-O6128	2023-12-11	Cleaning	4.0	1.0	1.0

Q518-Q519

LOF Predictions - 2024-10-01

Max Prediction: 2.66 (Upper Outlier)

Debris Prediction: 2.66 (Upper Outlier)

Grease Prediction: 1.01 (Medium)

Roots Prediction: 1.05 (Lowest)

Key Features

Length: 388ft	Diameter: 6in	Material: VCP	Install Year: 1924
Slope: nan	Hotspot: N/A	Basin: Q631	Flow Basin: Beach Basin

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
Q518-Q519	2017-01-19	Cleaning	1.0	1.0	1.0
Q518-Q519	2018-01-10	Cleaning	1.0	1.0	1.0
Q518-Q519	2018-08-28	CCTV	3.0	1.0	2.0
Q518-Q519	2019-04-02	Cleaning	1.0	1.0	1.0
Q518-Q519	2019-12-30	Cleaning	4.0	1.0	1.0
Q518-Q519	2020-08-31	Cleaning	4.0	1.0	1.0
Q518-Q519	2021-03-23	Cleaning	1.0	1.0	1.0
Q518-Q519	2021-12-16	Cleaning	3.0	1.0	1.0
Q518-Q519	2022-07-27	Cleaning	3.0	1.0	1.0
Q518-Q519	2023-04-06	Cleaning	4.0	1.0	1.0
Q518-Q519	2023-12-04	Cleaning	4.0	1.0	1.0

T601-S622

LOF Predictions - 2024-10-01

Max Prediction: 2.67 (Upper Outlier)

Debris Prediction: 2.67 (Upper Outlier)

Grease Prediction: 2.14 (Upper Outlier)

Roots Prediction: 1.26 (Highest)

Key Features

Length: 116ft	Diameter: 6in	Material: STEEL	Install Year: 1962
Slope: nan	Hotspot: N/A	Basin: R709	Flow Basin: Mission Basin

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
T601-S622	2014-05-01	Cleaning	4.0	3.0	1.0
T601-S622	2014-11-13	Cleaning	1.0	1.0	1.0
T601-S622	2015-07-08	Cleaning	3.0	1.0	1.0
T601-S622	2016-02-03	Cleaning	4.0	1.0	1.0
T601-S622	2016-08-09	Cleaning	3.0	1.0	1.0
T601-S622	2017-03-15	Cleaning	3.0	1.0	1.0
T601-S622	2017-07-10	Cleaning	2.0	1.0	1.0
T601-S622	2017-12-20	Cleaning	3.0	1.0	1.0
T601-S622	2018-07-03	Cleaning	4.0	4.0	1.0
T601-S622	2018-12-05	Cleaning	4.0	3.0	1.0
T601-S622	2019-06-26	Cleaning	3.0	1.0	1.0
T601-S622	2019-11-19	Cleaning	4.0	1.0	1.0
T601-S622	2020-05-27	Cleaning	3.0	1.0	1.0
T601-S622	2020-11-17	Cleaning	4.0	1.0	1.0
T601-S622	2021-05-12	Cleaning	1.0	1.0	1.0
T601-S622	2022-06-14	Cleaning	4.0	3.0	1.0
T601-S622	2022-12-24	Cleaning	3.0	1.0	1.0
T601-S622	2023-11-02	Cleaning	4.0	4.0	1.0

R747-R748

LOF Predictions - 2024-10-01

Max Prediction: 2.67 (Upper Outlier)

Debris Prediction: 2.67 (Upper Outlier)

Grease Prediction: 1.15 (Highest)

Roots Prediction: 1.13 (Medium)

Key Features

Length: 349ft	Diameter: 15in	Material: VCP	Install Year: 1953
Slope: 0.0	Hotspot: N/A	Basin: R709	Flow Basin: Mission Basin

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Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
R747-R748	2015-11-05	Cleaning	1.0	1.0	1.0
R747-R748	2016-08-15	Cleaning	4.0	1.0	1.0
R747-R748	2017-05-25	CCTV	1.0	1.0	2.0
R747-R748	2017-08-14	Cleaning	4.0	1.0	1.0
R747-R748	2017-08-15	Cleaning	1.0	1.0	1.0
R747-R748	2018-10-22	Cleaning	4.0	1.0	1.0
R747-R748	2019-10-10	Cleaning	1.0	1.0	1.0
R747-R748	2020-11-17	Cleaning	3.0	1.0	1.0
R747-R748	2021-11-15	Cleaning	4.0	1.0	1.0
R747-R748	2022-04-26	Cleaning	4.0	1.0	1.0
R747-R748	2022-04-26	CCTV	1.0	1.0	2.0
R747-R748	2022-11-29	Cleaning	4.0	1.0	1.0

T602-T601

LOF Predictions - 2024-10-01

Max Prediction: 2.68 (Upper Outlier)

Debris Prediction: 2.68 (Upper Outlier)

Grease Prediction: 2.05 (Upper Outlier)

Roots Prediction: 1.26 (Highest)

Key Features

Length: 184ft	Diameter: 6in	Material: STEEL	Install Year: 1962
Slope: nan	Hotspot: N/A	Basin: R709	Flow Basin: Mission Basin

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
T602-T601	2014-05-01	Cleaning	4.0	3.0	1.0
T602-T601	2014-11-13	Cleaning	3.0	1.0	1.0
T602-T601	2015-07-14	Cleaning	3.0	1.0	1.0
T602-T601	2016-02-03	Cleaning	4.0	1.0	1.0
T602-T601	2016-08-09	Cleaning	3.0	1.0	1.0
T602-T601	2017-03-15	Cleaning	1.0	1.0	1.0
T602-T601	2017-07-10	Cleaning	2.0	1.0	1.0
T602-T601	2017-12-20	Cleaning	3.0	1.0	1.0
T602-T601	2018-07-03	Cleaning	4.0	3.0	1.0
T602-T601	2018-12-05	Cleaning	4.0	3.0	1.0
T602-T601	2019-06-26	Cleaning	3.0	1.0	1.0
T602-T601	2019-11-19	Cleaning	4.0	1.0	1.0
T602-T601	2020-05-27	Cleaning	3.0	1.0	1.0
T602-T601	2020-11-17	Cleaning	4.0	1.0	1.0
T602-T601	2021-05-12	Cleaning	1.0	1.0	1.0
T602-T601	2022-06-14	Cleaning	4.0	3.0	1.0
T602-T601	2022-12-24	Cleaning	3.0	1.0	1.0
T602-T601	2023-11-02	Cleaning	4.0	4.0	1.0

T648-T602

LOF Predictions - 2024-10-01

Max Prediction: 2.70 (Upper Outlier)

Debris Prediction: 2.70 (Upper Outlier)

Grease Prediction: 2.35 (Upper Outlier)

Roots Prediction: 1.28 (Highest)

Key Features

Length: 47ft	Diameter: 6in	Material: STEEL	Install Year: 1962
Slope: nan	Hotspot: N/A	Basin: R709	Flow Basin: Mission Basin

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
T648-T602	2014-05-01	Cleaning	4.0	3.0	1.0
T648-T602	2014-11-13	Cleaning	3.0	1.0	1.0
T648-T602	2015-07-14	Cleaning	3.0	1.0	1.0
T648-T602	2016-02-03	Cleaning	4.0	1.0	1.0
T648-T602	2016-08-09	Cleaning	3.0	1.0	1.0
T648-T602	2017-03-16	Cleaning	1.0	1.0	1.0
T648-T602	2017-07-10	Cleaning	2.0	1.0	1.0
T648-T602	2017-12-20	Cleaning	3.0	1.0	1.0
T648-T602	2018-07-03	Cleaning	4.0	1.0	1.0
T648-T602	2018-12-05	Cleaning	4.0	3.0	1.0
T648-T602	2019-06-26	Cleaning	3.0	1.0	1.0
T648-T602	2019-11-19	Cleaning	4.0	1.0	1.0
T648-T602	2020-05-27	Cleaning	3.0	1.0	1.0
T648-T602	2020-11-17	Cleaning	4.0	1.0	1.0
T648-T602	2021-05-12	Cleaning	1.0	1.0	1.0
T648-T602	2022-06-14	Cleaning	4.0	3.0	1.0
T648-T602	2022-12-24	Cleaning	3.0	1.0	1.0
T648-T602	2023-11-02	Cleaning	4.0	4.0	1.0

S622-S616

LOF Predictions - 2024-10-01

Max Prediction: 2.70 (Upper Outlier)

Debris Prediction: 2.70 (Upper Outlier)

Grease Prediction: 1.95 (Upper Outlier)

Roots Prediction: 1.25 (Highest)

Key Features

Length: 115ft	Diameter: 6in	Material: STEEL	Install Year: 1962
Slope: nan	Hotspot: N/A	Basin: R709	Flow Basin: Mission Basin

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
S622-S616	2014-05-01	Cleaning	4.0	3.0	1.0
S622-S616	2014-11-13	Cleaning	3.0	1.0	1.0
S622-S616	2015-07-08	Cleaning	3.0	1.0	1.0
S622-S616	2016-02-03	Cleaning	4.0	1.0	1.0
S622-S616	2016-08-09	Cleaning	3.0	1.0	1.0
S622-S616	2017-03-15	Cleaning	3.0	1.0	1.0
S622-S616	2017-07-10	Cleaning	2.0	1.0	1.0
S622-S616	2017-12-20	Cleaning	3.0	1.0	1.0
S622-S616	2018-07-03	Cleaning	4.0	4.0	1.0
S622-S616	2018-12-05	Cleaning	4.0	3.0	1.0
S622-S616	2019-02-25	Cleaning	3.0	1.0	1.0
S622-S616	2019-06-26	Cleaning	3.0	3.0	1.0
S622-S616	2019-11-19	Cleaning	4.0	1.0	1.0
S622-S616	2020-05-27	Cleaning	3.0	1.0	1.0
S622-S616	2020-11-17	Cleaning	4.0	1.0	1.0
S622-S616	2021-05-12	Cleaning	1.0	1.0	1.0
S622-S616	2022-06-14	Cleaning	4.0	3.0	1.0
S622-S616	2022-12-24	Cleaning	3.0	1.0	1.0
S622-S616	2023-11-02	Cleaning	4.0	1.0	1.0

O629-O630

LOF Predictions - 2024-10-01

Max Prediction: 2.71 (Upper Outlier)

Debris Prediction: 1.04 (Lowest)

Grease Prediction: 1.01 (Medium)

Roots Prediction: 2.71 (Upper Outlier)

Key Features

Length: 240ft	Diameter: 6in	Material: VCP	Install Year: 1908
Slope: 0.05	Hotspot: N/A	Basin: Q631	Flow Basin: Beach Basin

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
O629-O630	2014-06-19	Cleaning	1.0	1.0	1.0
O629-O630	2015-02-09	Cleaning	1.0	1.0	1.0
O629-O630	2015-09-15	Cleaning	1.0	1.0	3.0
O629-O630	2016-03-16	Cleaning	1.0	1.0	1.0
O629-O630	2017-06-14	Cleaning	1.0	1.0	1.0
O629-O630	2018-02-13	Cleaning	1.0	1.0	3.0
O629-O630	2018-09-06	Cleaning	1.0	1.0	1.0
O629-O630	2019-05-08	Cleaning	1.0	1.0	4.0
O629-O630	2019-12-02	CCTV	1.0	1.0	3.0
O629-O630	2019-12-03	Cleaning	1.0	1.0	2.0
O629-O630	2020-02-13	Cleaning	1.0	1.0	1.0
O629-O630	2020-10-07	Cleaning	1.0	1.0	3.0
O629-O630	2021-05-07	Cleaning	1.0	1.0	3.0
O629-O630	2022-01-10	Cleaning	1.0	1.0	3.0
O629-O630	2022-09-26	Cleaning	1.0	1.0	4.0
O629-O630	2023-05-09	Cleaning	1.0	1.0	2.0
O629-O630	2024-02-15	Cleaning	1.0	1.0	3.0

R715-Q738

LOF Predictions - 2024-10-01

Max Prediction: 2.73 (Upper Outlier)

Debris Prediction: 2.73 (Upper Outlier)

Grease Prediction: 1.01 (Medium)

Roots Prediction: 1.07 (Lowest)

Key Features

Length: 330ft	Diameter: 6in	Material: VCP	Install Year: 1953
Slope: 0.0	Hotspot: N/A	Basin: R709	Flow Basin: Mission Basin

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
R715-Q738	2014-02-27	Cleaning	3.0	1.0	1.0
R715-Q738	2014-09-10	Cleaning	3.0	1.0	1.0
R715-Q738	2015-04-21	Cleaning	3.0	1.0	1.0
R715-Q738	2015-12-16	Cleaning	1.0	1.0	1.0
R715-Q738	2016-06-27	Cleaning	2.0	1.0	1.0
R715-Q738	2017-02-13	Cleaning	3.0	1.0	1.0
R715-Q738	2017-10-06	Cleaning	3.0	1.0	1.0
R715-Q738	2018-04-26	Cleaning	3.0	1.0	2.0
R715-Q738	2019-01-29	Cleaning	3.0	1.0	1.0
R715-Q738	2019-09-03	Cleaning	4.0	1.0	1.0
R715-Q738	2020-05-04	Cleaning	1.0	1.0	1.0
R715-Q738	2020-12-14	Cleaning	4.0	1.0	1.0
R715-Q738	2021-01-08	CCTV	3.0	3.0	3.0
R715-Q738	2021-08-10	Cleaning	4.0	1.0	1.0
R715-Q738	2022-03-31	Cleaning	3.0	1.0	1.0
R715-Q738	2023-01-12	Cleaning	2.0	1.0	1.0
R715-Q738	2023-05-01	Cleaning	3.0	1.0	1.0
R715-Q738	2024-02-08	Cleaning	3.0	1.0	1.0

R608-R614

LOF Predictions - 2024-10-01

Max Prediction: 2.73 (Upper Outlier)

Debris Prediction: 1.72 (Highest)

Grease Prediction: 2.73 (Upper Outlier)

Roots Prediction: 1.10 (Medium)

Key Features

Length: 425ft	Diameter: 6in	Material: VCP	Install Year: 1948
Slope: 0.0	Hotspot: N/A	Basin: R709	Flow Basin: Mission Basin

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
R608-R614	2014-01-23	CCTV	1.0	1.0	1.0
R608-R614	2014-01-24	Cleaning	3.0	1.0	1.0
R608-R614	2014-05-07	Cleaning	2.0	1.0	1.0
R608-R614	2014-12-08	Cleaning	1.0	1.0	1.0
R608-R614	2015-08-03	Cleaning	1.0	1.0	1.0
R608-R614	2016-02-08	Cleaning	3.0	2.0	1.0
R608-R614	2016-09-08	Cleaning	1.0	1.0	1.0
R608-R614	2017-04-11	CCTV	1.0	1.0	3.0
R608-R614	2017-04-12	CCTV	3.0	1.0	3.0
R608-R614	2017-05-01	Cleaning	1.0	1.0	1.0
R608-R614	2017-12-27	Cleaning	3.0	1.0	1.0
R608-R614	2018-07-23	Cleaning	3.0	3.0	1.0
R608-R614	2019-03-13	Cleaning	1.0	1.0	1.0
R608-R614	2019-11-12	Cleaning	1.0	1.0	2.0
R608-R614	2020-08-24	Cleaning	1.0	1.0	1.0
R608-R614	2021-03-08	Cleaning	1.0	4.0	1.0
R608-R614	2021-11-02	Cleaning	4.0	4.0	1.0
R608-R614	2021-12-06	CCTV	3.0	3.0	3.0
R608-R614	2022-07-20	Cleaning	2.0	1.0	2.0
R608-R614	2023-02-27	Cleaning	3.0	3.0	1.0
R608-R614	2023-10-27	Cleaning	1.0	4.0	1.0

S608-S618

LOF Predictions - 2024-10-01

Max Prediction: 2.75 (Upper Outlier)

Debris Prediction: 2.75 (Upper Outlier)

Grease Prediction: 1.88 (Upper Outlier)

Roots Prediction: 1.18 (Medium)

Key Features

Length: 95ft	Diameter: 6in	Material: STEEL	Install Year: 1962
Slope: nan	Hotspot: N/A	Basin: R709	Flow Basin: Mission Basin

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
S608-S618	2014-05-01	Cleaning	4.0	3.0	1.0
S608-S618	2014-11-13	Cleaning	3.0	1.0	1.0
S608-S618	2015-07-08	Cleaning	3.0	1.0	1.0
S608-S618	2016-02-03	Cleaning	4.0	1.0	1.0
S608-S618	2016-08-09	Cleaning	3.0	1.0	1.0
S608-S618	2017-03-15	Cleaning	3.0	1.0	1.0
S608-S618	2017-07-10	Cleaning	2.0	1.0	1.0
S608-S618	2017-12-07	Cleaning	2.0	1.0	1.0
S608-S618	2017-12-20	Cleaning	3.0	1.0	1.0
S608-S618	2018-07-03	Cleaning	4.0	1.0	1.0
S608-S618	2018-12-05	Cleaning	4.0	1.0	1.0
S608-S618	2019-02-25	Cleaning	3.0	1.0	1.0
S608-S618	2019-06-26	Cleaning	3.0	3.0	1.0
S608-S618	2019-11-19	Cleaning	4.0	1.0	1.0
S608-S618	2020-05-27	Cleaning	3.0	1.0	1.0
S608-S618	2020-11-17	Cleaning	4.0	1.0	1.0
S608-S618	2021-05-12	Cleaning	1.0	1.0	1.0
S608-S618	2022-06-14	Cleaning	4.0	3.0	1.0
S608-S618	2022-12-24	Cleaning	3.0	1.0	1.0
S608-S618	2023-11-02	Cleaning	4.0	1.0	1.0

R841-R853

LOF Predictions - 2024-10-01

Max Prediction: 2.75 (Upper Outlier)

Debris Prediction: 1.75 (Highest)

Grease Prediction: 2.75 (Upper Outlier)

Roots Prediction: 1.07 (Lowest)

Key Features

| Length: 244ft | Diameter: 8in | Material: VCP | Install Year: 1969 |
| Slope: nan | Hotspot: N/A | Basin: R709 | Flow Basin: Mission Basin |

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
R841-R853	2014-02-11	Cleaning	2.0	2.0	1.0
R841-R853	2014-08-04	Cleaning	1.0	1.0	1.0
R841-R853	2015-04-15	Cleaning	1.0	1.0	1.0
R841-R853	2015-07-28	Cleaning	1.0	1.0	1.0
R841-R853	2015-11-19	Cleaning	3.0	3.0	1.0
R841-R853	2016-05-18	Cleaning	1.0	1.0	1.0
R841-R853	2016-07-27	Cleaning	1.0	1.0	1.0
R841-R853	2016-12-12	Cleaning	1.0	3.0	1.0
R841-R853	2017-04-05	Cleaning	1.0	1.0	1.0
R841-R853	2017-07-13	Cleaning	1.0	1.0	1.0
R841-R853	2017-11-22	Cleaning	1.0	4.0	1.0
R841-R853	2017-12-04	Cleaning	1.0	4.0	1.0
R841-R853	2018-05-23	Cleaning	2.0	3.0	1.0
R841-R853	2018-08-16	Cleaning	4.0	4.0	1.0
R841-R853	2018-11-26	Cleaning	1.0	4.0	1.0
R841-R853	2019-08-07	Cleaning	1.0	4.0	1.0
R841-R853	2019-12-12	Cleaning	1.0	4.0	1.0
R841-R853	2020-03-23	Cleaning	1.0	4.0	1.0
R841-R853	2021-02-01	Cleaning	1.0	1.0	1.0
R841-R853	2021-04-14	Cleaning	1.0	1.0	1.0
R841-R853	2021-08-09	Cleaning	1.0	1.0	1.0
R841-R853	2021-08-19	Cleaning	3.0	1.0	1.0
R841-R853	2021-11-04	Cleaning	3.0	4.0	1.0
R841-R853	2022-01-25	Cleaning	1.0	4.0	1.0
R841-R853	2022-03-02	CCTV	1.0	3.0	2.0
R841-R853	2022-06-07	Cleaning	3.0	4.0	1.0
R841-R853	2022-08-10	Cleaning	2.0	2.0	1.0
R841-R853	2022-11-16	Cleaning	1.0	4.0	1.0
R841-R853	2023-05-30	Cleaning	2.0	4.0	1.0
R841-R853	2023-08-11	Cleaning	4.0	1.0	1.0
R841-R853	2023-12-27	Cleaning	2.0	4.0	1.0

T603-T648

LOF Predictions - 2024-10-01

Max Prediction: 2.76 (Upper Outlier)

Debris Prediction: 2.76 (Upper Outlier)

Grease Prediction: 1.52 (Upper Outlier)

Roots Prediction: 1.06 (Lowest)

Key Features

| Length: 183ft | Diameter: 6in | Material: STEEL | Install Year: 1962 |
| Slope: nan | Hotspot: N/A | Basin: R709 | Flow Basin: Mission Basin |

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
T603-T648	2014-05-01	Cleaning	4.0	3.0	1.0
T603-T648	2014-11-13	Cleaning	2.0	1.0	1.0
T603-T648	2015-07-14	Cleaning	3.0	1.0	1.0
T603-T648	2016-02-03	Cleaning	4.0	1.0	1.0
T603-T648	2016-08-09	Cleaning	3.0	1.0	1.0
T603-T648	2017-03-16	Cleaning	1.0	1.0	1.0
T603-T648	2017-07-10	Cleaning	2.0	1.0	1.0
T603-T648	2017-12-20	Cleaning	3.0	1.0	1.0
T603-T648	2018-07-03	Cleaning	4.0	1.0	1.0
T603-T648	2018-12-05	Cleaning	4.0	3.0	1.0
T603-T648	2019-06-26	Cleaning	1.0	1.0	1.0
T603-T648	2019-11-19	Cleaning	4.0	1.0	1.0
T603-T648	2020-05-27	Cleaning	3.0	1.0	1.0
T603-T648	2020-11-17	Cleaning	4.0	1.0	1.0
T603-T648	2021-05-12	Cleaning	1.0	1.0	1.0
T603-T648	2022-06-10	Spill	5.0	2.0	2.0
T603-T648	2022-06-14	Cleaning	4.0	3.0	1.0
T603-T648	2022-12-24	Cleaning	3.0	1.0	1.0
T603-T648	2023-06-14	Cleaning	4.0	1.0	1.0
T603-T648	2023-08-25	Cleaning	4.0	1.0	1.0
T603-T648	2023-11-02	Cleaning	4.0	2.0	1.0
T603-T648	2024-01-04	Cleaning	1.0	1.0	1.0

O688-O6141

LOF Predictions - 2024-10-01

Max Prediction: 2.76 (Upper Outlier)

Debris Prediction: 1.05 (Lowest)

Grease Prediction: 2.76 (Upper Outlier)

Roots Prediction: 1.28 (Highest)

Key Features

| Length: 65ft | Diameter: 8in | Material: PVC | Install Year: 1985 |
| Slope: nan | Hotspot: N/A | Basin: R663 | Flow Basin: Walker Basin |

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
O688-O6141	2014-02-04	Cleaning	1.0	4.0	1.0
O688-O6141	2014-04-23	Cleaning	1.0	1.0	1.0
O688-O6141	2014-06-17	Cleaning	1.0	2.0	1.0
O688-O6141	2014-07-31	Cleaning	1.0	1.0	1.0
O688-O6141	2014-11-24	Cleaning	1.0	1.0	1.0
O688-O6141	2015-02-04	Cleaning	1.0	1.0	1.0
O688-O6141	2015-04-06	Cleaning	1.0	2.0	1.0
O688-O6141	2015-07-28	Cleaning	1.0	2.0	1.0
O688-O6141	2015-09-02	Cleaning	1.0	1.0	1.0
O688-O6141	2015-11-17	Cleaning	1.0	2.0	1.0
O688-O6141	2016-02-08	Cleaning	1.0	4.0	1.0
O688-O6141	2016-03-15	Cleaning	1.0	2.0	1.0
O688-O6141	2016-05-31	Cleaning	1.0	1.0	1.0
O688-O6141	2016-07-22	Cleaning	1.0	3.0	1.0
O688-O6141	2016-10-13	Cleaning	1.0	3.0	1.0
O688-O6141	2016-12-19	Cleaning	1.0	3.0	1.0
O688-O6141	2017-04-03	Cleaning	1.0	3.0	1.0
O688-O6141	2017-06-08	Cleaning	1.0	2.0	1.0
O688-O6141	2017-07-03	Cleaning	1.0	1.0	1.0
O688-O6141	2017-08-09	Cleaning	1.0	4.0	1.0
O688-O6141	2017-11-21	Cleaning	1.0	4.0	1.0
O688-O6141	2017-11-28	Cleaning	1.0	3.0	1.0
O688-O6141	2018-01-31	Cleaning	1.0	3.0	1.0
O688-O6141	2018-05-16	Cleaning	1.0	4.0	1.0
O688-O6141	2018-08-14	Cleaning	1.0	4.0	1.0
O688-O6141	2018-09-06	Cleaning	1.0	2.0	1.0
O688-O6141	2018-11-14	Cleaning	1.0	3.0	1.0
O688-O6141	2019-05-06	Cleaning	1.0	3.0	1.0
O688-O6141	2019-08-05	Cleaning	1.0	3.0	1.0
O688-O6141	2019-11-25	Cleaning	1.0	3.0	1.0
O688-O6141	2020-02-03	Cleaning	1.0	1.0	1.0
O688-O6141	2020-07-23	CCTV	1.0	3.0	1.0
O688-O6141	2020-08-11	Cleaning	1.0	1.0	1.0
O688-O6141	2020-10-19	Cleaning	1.0	1.0	1.0
O688-O6141	2021-01-26	Cleaning	1.0	2.0	1.0
O688-O6141	2021-03-30	Cleaning	1.0	3.0	1.0
O688-O6141	2021-05-06	Cleaning	1.0	3.0	1.0
O688-O6141	2021-08-04	Cleaning	1.0	3.0	1.0
O688-O6141	2021-11-01	Cleaning	1.0	4.0	1.0
O688-O6141	2022-01-20	Cleaning	1.0	4.0	1.0
O688-O6141	2022-05-25	Cleaning	1.0	4.0	1.0
O688-O6141	2022-08-02	Cleaning	1.0	4.0	1.0
O688-O6141	2022-11-17	Cleaning	3.0	3.0	2.0
O688-O6141	2023-01-30	Cleaning	1.0	2.0	1.0
O688-O6141	2023-06-08	Cleaning	1.0	4.0	1.0
O688-O6141	2023-08-02	Cleaning	1.0	3.0	1.0
O688-O6141	2023-10-25	Cleaning	1.0	4.0	1.0
O688-O6141	2023-12-12	Cleaning	1.0	3.0	1.0

O608-O6143

LOF Predictions - 2024-10-01

Max Prediction: 2.77 (Upper Outlier)

Debris Prediction: 2.77 (Upper Outlier)

Grease Prediction: 1.13 (Highest)

Roots Prediction: 1.20 (Medium)

Key Features

Length: 300ft	Diameter: 10in	Material: VCP/PVC?	Install Year: 1908
Slope: nan	Hotspot: N/A	Basin: Q631	Flow Basin: Beach Basin

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
O608-O6143	2014-05-27	Cleaning	1.0	1.0	1.0
O608-O6143	2015-01-14	Cleaning	1.0	1.0	1.0
O608-O6143	2015-08-20	Cleaning	1.0	1.0	1.0
O608-O6143	2016-02-24	Cleaning	1.0	1.0	1.0
O608-O6143	2016-09-27	Cleaning	3.0	1.0	1.0
O608-O6143	2017-05-08	Cleaning	4.0	1.0	1.0
O608-O6143	2018-01-17	Cleaning	3.0	1.0	1.0
O608-O6143	2018-08-20	Cleaning	4.0	1.0	1.0
O608-O6143	2018-10-19	Cleaning	4.0	1.0	1.0
O608-O6143	2018-10-19	CCTV	3.0	1.0	3.0
O608-O6143	2019-04-16	Cleaning	4.0	1.0	1.0
O608-O6143	2019-12-23	Cleaning	3.0	1.0	1.0
O608-O6143	2020-09-16	Cleaning	3.0	1.0	1.0
O608-O6143	2021-04-07	Cleaning	3.0	1.0	1.0
O608-O6143	2021-12-08	Cleaning	4.0	1.0	1.0
O608-O6143	2022-08-22	Cleaning	4.0	1.0	1.0
O608-O6143	2023-04-17	Cleaning	4.0	1.0	1.0
O608-O6143	2023-12-11	Cleaning	4.0	1.0	1.0

Q6115-Q603

LOF Predictions - 2024-10-01

Max Prediction: 2.84 (Upper Outlier)

Debris Prediction: 2.84 (Upper Outlier)

Grease Prediction: 1.14 (Highest)

Roots Prediction: 1.14 (Medium)

Key Features

Length: 384ft	Diameter: 6in	Material: VCP	Install Year: 1908
Slope: nan	Hotspot: N/A	Basin: Q631	Flow Basin: Beach Basin

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
Q6115-Q603	2014-05-14	Cleaning	1.0	1.0	1.0
Q6115-Q603	2014-12-18	Cleaning	3.0	1.0	1.0
Q6115-Q603	2015-08-10	Cleaning	2.0	1.0	1.0
Q6115-Q603	2016-02-16	Cleaning	4.0	1.0	1.0
Q6115-Q603	2016-10-18	Cleaning	4.0	1.0	3.0
Q6115-Q603	2017-05-17	Cleaning	2.0	1.0	1.0
Q6115-Q603	2018-01-04	Cleaning	4.0	1.0	1.0
Q6115-Q603	2018-08-20	CCTV	3.0	3.0	3.0
Q6115-Q603	2018-08-22	Cleaning	4.0	1.0	1.0
Q6115-Q603	2019-04-02	Cleaning	3.0	1.0	1.0
Q6115-Q603	2019-12-26	Cleaning	4.0	1.0	1.0
Q6115-Q603	2020-08-31	Cleaning	4.0	1.0	1.0
Q6115-Q603	2021-03-23	Cleaning	4.0	1.0	1.0
Q6115-Q603	2021-11-16	Cleaning	4.0	1.0	1.0
Q6115-Q603	2022-07-27	Cleaning	4.0	1.0	1.0
Q6115-Q603	2023-11-21	Cleaning	4.0	1.0	1.0

R847-R854

LOF Predictions - 2024-10-01

Max Prediction: 2.85 (Upper Outlier)

Debris Prediction: 1.41 (Medium)

Grease Prediction: 2.85 (Upper Outlier)

Roots Prediction: 1.04 (Lowest)

Key Features

Length: 37ft	Diameter: 8in	Material: VCP	Install Year: 1969
Slope: nan	Hotspot: N/A	Basin: R709	Flow Basin: Mission Basin

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
R847-R854	2014-02-11	Cleaning	1.0	1.0	1.0
R847-R854	2014-08-01	Cleaning	1.0	1.0	1.0
R847-R854	2015-04-14	Cleaning	1.0	1.0	1.0
R847-R854	2015-07-28	Cleaning	2.0	2.0	1.0
R847-R854	2015-11-19	Cleaning	3.0	4.0	1.0
R847-R854	2016-05-18	Cleaning	1.0	1.0	1.0
R847-R854	2016-07-26	Cleaning	3.0	1.0	1.0
R847-R854	2016-12-12	Cleaning	1.0	1.0	1.0
R847-R854	2017-04-05	Cleaning	1.0	1.0	1.0
R847-R854	2017-07-12	Cleaning	2.0	3.0	1.0
R847-R854	2017-11-22	Cleaning	1.0	4.0	1.0
R847-R854	2017-12-04	Cleaning	1.0	4.0	1.0
R847-R854	2018-05-23	Cleaning	2.0	3.0	1.0
R847-R854	2018-08-16	Cleaning	4.0	4.0	1.0
R847-R854	2018-11-26	Cleaning	1.0	4.0	1.0
R847-R854	2019-08-07	Cleaning	1.0	4.0	1.0
R847-R854	2019-12-12	Cleaning	1.0	4.0	1.0
R847-R854	2020-03-23	Cleaning	1.0	4.0	1.0
R847-R854	2021-02-01	Cleaning	1.0	1.0	1.0
R847-R854	2021-04-14	Cleaning	3.0	3.0	1.0
R847-R854	2021-08-09	Cleaning	1.0	1.0	1.0
R847-R854	2021-08-19	Cleaning	3.0	1.0	1.0
R847-R854	2021-11-04	Cleaning	3.0	4.0	1.0
R847-R854	2022-01-25	Cleaning	1.0	4.0	1.0
R847-R854	2022-03-02	CCTV	1.0	3.0	2.0
R847-R854	2022-06-07	Cleaning	3.0	4.0	1.0
R847-R854	2022-08-10	Cleaning	2.0	2.0	1.0
R847-R854	2022-11-15	Cleaning	1.0	3.0	1.0
R847-R854	2023-05-30	Cleaning	2.0	4.0	1.0
R847-R854	2023-08-09	Cleaning	1.0	1.0	1.0
R847-R854	2023-12-27	Cleaning	2.0	4.0	1.0

Q729-Q730

LOF Predictions - 2024-10-01

Max Prediction: 2.85 (Upper Outlier)

Debris Prediction: 2.85 (Upper Outlier)

Grease Prediction: 1.01 (Medium)

Roots Prediction: 1.08 (Medium)

Key Features

Length: 337ft	Diameter: 6in	Material: VCP	Install Year: 1953
Slope: 0.0	Hotspot: N/A	Basin: R709	Flow Basin: Mission Basin

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
Q729-Q730	2014-03-05	Cleaning	1.0	1.0	1.0
Q729-Q730	2014-09-19	Cleaning	4.0	1.0	2.0
Q729-Q730	2015-07-31	Cleaning	1.0	1.0	1.0
Q729-Q730	2016-08-17	Cleaning	3.0	1.0	1.0
Q729-Q730	2017-08-22	Cleaning	4.0	1.0	1.0
Q729-Q730	2018-05-07	Cleaning	4.0	1.0	1.0
Q729-Q730	2019-11-04	Cleaning	4.0	1.0	1.0
Q729-Q730	2020-12-01	Cleaning	3.0	1.0	1.0
Q729-Q730	2022-08-04	Cleaning	4.0	1.0	1.0
Q729-Q730	2022-08-04	CCTV	3.0	1.0	3.0
Q729-Q730	2022-08-31	Cleaning	4.0	1.0	1.0
Q729-Q730	2023-11-09	Cleaning	4.0	1.0	1.0

Q716-Q715

LOF Predictions - 2024-10-01

Max Prediction: 2.92 (Upper Outlier)

Debris Prediction: 1.83 (Highest)

Grease Prediction: 2.92 (Upper Outlier)

Roots Prediction: 1.06 (Lowest)

Key Features

Length: 295ft	Diameter: 6in	Material: VCP	Install Year: 1953
Slope: 0.08	Hotspot: N/A	Basin: R709	Flow Basin: Mission Basin

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
Q716-Q715	2014-03-25	Cleaning	1.0	1.0	1.0
Q716-Q715	2014-03-28	Cleaning	2.0	2.0	1.0
Q716-Q715	2014-09-17	Cleaning	3.0	3.0	2.0
Q716-Q715	2015-05-07	Cleaning	1.0	1.0	1.0
Q716-Q715	2015-12-28	Cleaning	3.0	3.0	2.0
Q716-Q715	2016-07-01	Cleaning	1.0	3.0	1.0
Q716-Q715	2017-02-27	Cleaning	2.0	2.0	1.0
Q716-Q715	2017-09-29	Cleaning	3.0	3.0	1.0
Q716-Q715	2018-05-01	Cleaning	3.0	4.0	2.0
Q716-Q715	2019-01-09	Cleaning	1.0	1.0	1.0
Q716-Q715	2019-04-15	Cleaning	1.0	1.0	2.0
Q716-Q715	2019-09-05	Cleaning	3.0	2.0	1.0
Q716-Q715	2020-06-29	Cleaning	1.0	3.0	1.0
Q716-Q715	2020-12-28	Cleaning	1.0	3.0	1.0
Q716-Q715	2021-08-17	Cleaning	1.0	4.0	1.0
Q716-Q715	2021-08-17	CCTV	3.0	3.0	1.0
Q716-Q715	2021-09-28	Cleaning	4.0	3.0	1.0
Q716-Q715	2022-05-03	Cleaning	1.0	4.0	1.0
Q716-Q715	2023-02-06	Cleaning	4.0	3.0	1.0
Q716-Q715	2023-09-26	Cleaning	3.0	4.0	1.0

R748-R793

LOF Predictions - 2024-10-01

Max Prediction: 2.93 (Upper Outlier)

Debris Prediction: 2.93 (Upper Outlier)

Grease Prediction: 1.17 (Highest)

Roots Prediction: 1.16 (Medium)

Key Features

Length: 171ft	Diameter: 10in	Material: VCP	Install Year: 1953
Slope: nan	Hotspot: N/A	Basin: R709	Flow Basin: Mission Basin

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
R748-R793	2015-11-04	Cleaning	3.0	1.0	1.0
R748-R793	2016-08-15	Cleaning	4.0	1.0	1.0
R748-R793	2017-08-14	Cleaning	3.0	1.0	1.0
R748-R793	2017-08-15	Cleaning	4.0	1.0	1.0
R748-R793	2018-10-16	Cleaning	3.0	1.0	1.0
R748-R793	2018-10-22	Cleaning	1.0	1.0	1.0
R748-R793	2019-10-10	Cleaning	1.0	1.0	1.0
R748-R793	2020-11-17	Cleaning	1.0	1.0	1.0
R748-R793	2021-11-15	Cleaning	4.0	1.0	4.0
R748-R793	2022-04-26	Cleaning	4.0	1.0	1.0
R748-R793	2022-04-26	CCTV	1.0	1.0	1.0
R748-R793	2022-04-28	Cleaning	4.0	1.0	1.0
R748-R793	2022-11-29	Cleaning	4.0	1.0	1.0

P603-P604

LOF Predictions - 2024-10-01

Max Prediction: 3.03 (Upper Outlier)

Debris Prediction: 3.03 (Upper Outlier)

Grease Prediction: 1.14 (Highest)

Roots Prediction: 1.10 (Medium)

Key Features

Length: 418ft	Diameter: 6in	Material: VCP	Install Year: 1908
Slope: nan	Hotspot: N/A	Basin: Q631	Flow Basin: Beach Basin

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
P603-P604	2014-01-16	Cleaning	3.0	1.0	1.0
P603-P604	2014-01-17	CCTV	1.0	1.0	2.0
P603-P604	2014-05-14	Cleaning	2.0	1.0	1.0
P603-P604	2014-12-17	Cleaning	3.0	1.0	1.0
P603-P604	2015-08-10	Cleaning	2.0	1.0	1.0
P603-P604	2016-02-16	Cleaning	4.0	1.0	1.0
P603-P604	2016-10-17	Cleaning	3.0	1.0	1.0
P603-P604	2017-05-17	Cleaning	2.0	1.0	1.0
P603-P604	2018-01-04	Cleaning	4.0	1.0	1.0
P603-P604	2018-01-29	Cleaning	4.0	1.0	4.0
P603-P604	2018-08-07	CCTV	1.0	1.0	2.0
P603-P604	2018-08-08	Cleaning	4.0	1.0	1.0
P603-P604	2019-04-01	Cleaning	4.0	1.0	1.0
P603-P604	2019-12-23	Cleaning	3.0	1.0	1.0
P603-P604	2020-08-25	Cleaning	4.0	1.0	1.0
P603-P604	2021-03-22	Cleaning	4.0	1.0	1.0
P603-P604	2021-12-14	Cleaning	4.0	1.0	1.0
P603-P604	2022-07-26	Cleaning	4.0	1.0	1.0
P603-P604	2023-03-20	Cleaning	4.0	1.0	1.0
P603-P604	2023-11-21	Cleaning	4.0	1.0	1.0

O681-O677

LOF Predictions - 2024-10-01

Max Prediction: 3.03 (Upper Outlier)

Debris Prediction: 1.04 (Lowest)

Grease Prediction: 3.03 (Upper Outlier)

Roots Prediction: 1.17 (Medium)

Key Features

Length: 250ft	Diameter: 8in	Material: PVC	Install Year: 1991
Slope: 0.08	Hotspot: N/A	Basin: Q649	Flow Basin: Downtown Basin

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
O681-O677	2014-02-04	Cleaning	1.0	4.0	1.0
O681-O677	2014-04-22	Cleaning	1.0	3.0	1.0
O681-O677	2014-06-16	Cleaning	1.0	2.0	1.0
O681-O677	2014-07-31	Cleaning	1.0	1.0	1.0
O681-O677	2014-11-24	Cleaning	1.0	1.0	1.0
O681-O677	2015-02-03	Cleaning	1.0	3.0	1.0
O681-O677	2015-04-06	Cleaning	1.0	3.0	1.0
O681-O677	2015-07-27	Cleaning	1.0	4.0	1.0
O681-O677	2015-09-02	Cleaning	1.0	1.0	1.0
O681-O677	2015-11-17	Cleaning	1.0	3.0	1.0
O681-O677	2016-02-08	Cleaning	1.0	4.0	1.0
O681-O677	2016-03-15	Cleaning	1.0	2.0	1.0
O681-O677	2016-05-31	Cleaning	1.0	3.0	1.0
O681-O677	2016-07-21	Cleaning	1.0	4.0	1.0
O681-O677	2016-10-12	Cleaning	1.0	3.0	1.0
O681-O677	2016-12-06	Cleaning	1.0	4.0	1.0
O681-O677	2017-04-03	Cleaning	1.0	3.0	1.0
O681-O677	2017-06-08	Cleaning	1.0	3.0	1.0
O681-O677	2017-07-03	Cleaning	1.0	3.0	1.0
O681-O677	2017-08-09	Cleaning	1.0	4.0	1.0
O681-O677	2017-11-21	Cleaning	1.0	4.0	1.0
O681-O677	2017-11-28	Cleaning	1.0	3.0	1.0
O681-O677	2018-01-31	Cleaning	1.0	4.0	1.0
O681-O677	2018-05-15	Cleaning	1.0	4.0	1.0
O681-O677	2018-08-13	Cleaning	1.0	4.0	1.0
O681-O677	2018-09-06	Cleaning	1.0	3.0	1.0
O681-O677	2018-11-14	Cleaning	1.0	3.0	1.0
O681-O677	2019-05-02	Cleaning	1.0	1.0	1.0
O681-O677	2019-08-01	Cleaning	1.0	3.0	1.0
O681-O677	2019-11-26	Cleaning	1.0	3.0	1.0
O681-O677	2020-02-03	Cleaning	1.0	1.0	1.0
O681-O677	2020-07-23	CCTV	1.0	3.0	1.0
O681-O677	2020-07-30	Cleaning	1.0	1.0	1.0
O681-O677	2020-10-06	Cleaning	1.0	3.0	1.0
O681-O677	2021-01-26	Cleaning	1.0	3.0	1.0
O681-O677	2021-03-29	Cleaning	1.0	3.0	1.0
O681-O677	2021-05-06	Cleaning	1.0	4.0	1.0
O681-O677	2021-08-04	Cleaning	1.0	3.0	1.0
O681-O677	2021-11-01	Cleaning	1.0	4.0	1.0
O681-O677	2022-01-20	Cleaning	1.0	4.0	1.0
O681-O677	2022-05-25	Cleaning	1.0	4.0	1.0
O681-O677	2022-07-28	Cleaning	1.0	3.0	1.0
O681-O677	2022-11-15	Cleaning	1.0	4.0	1.0
O681-O677	2023-01-31	Cleaning	1.0	4.0	1.0
O681-O677	2023-06-08	Cleaning	1.0	4.0	1.0
O681-O677	2023-08-01	Cleaning	1.0	4.0	1.0
O681-O677	2023-10-25	Cleaning	1.0	4.0	1.0
O681-O677	2023-12-11	Cleaning	1.0	4.0	1.0

O604-O608

LOF Predictions - 2024-10-01

Max Prediction: 3.04 (Upper Outlier)

Debris Prediction: 3.04 (Upper Outlier)

Grease Prediction: 1.01 (Medium)

Roots Prediction: 1.06 (Lowest)

Key Features

Length: 43ft	Diameter: 10in	Material: VCP	Install Year: 1908
Slope: nan	Hotspot: N/A	Basin: Q631	Flow Basin: Beach Basin

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
O604-O608	2014-05-27	Cleaning	1.0	1.0	1.0
O604-O608	2015-01-14	Cleaning	1.0	1.0	1.0
O604-O608	2015-08-20	Cleaning	1.0	1.0	1.0
O604-O608	2016-02-24	Cleaning	1.0	1.0	1.0
O604-O608	2016-09-27	Cleaning	3.0	1.0	1.0
O604-O608	2017-05-08	Cleaning	4.0	1.0	1.0
O604-O608	2018-01-17	Cleaning	1.0	1.0	1.0
O604-O608	2018-08-20	Cleaning	1.0	1.0	1.0
O604-O608	2018-10-19	Cleaning	4.0	1.0	1.0
O604-O608	2018-10-19	CCTV	3.0	1.0	1.0
O604-O608	2019-04-16	Cleaning	4.0	1.0	1.0
O604-O608	2019-12-23	Cleaning	3.0	1.0	1.0
O604-O608	2020-09-16	Cleaning	3.0	1.0	1.0
O604-O608	2021-04-07	Cleaning	3.0	1.0	1.0
O604-O608	2021-12-08	Cleaning	4.0	1.0	1.0
O604-O608	2022-08-22	Cleaning	4.0	1.0	1.0
O604-O608	2023-04-17	Cleaning	4.0	1.0	1.0
O604-O608	2023-12-11	Cleaning	4.0	1.0	1.0

S616-S608

LOF Predictions - 2024-10-01

Max Prediction: 3.25 (Upper Outlier)

Debris Prediction: 3.25 (Upper Outlier)

Grease Prediction: 1.59 (Upper Outlier)

Roots Prediction: 1.40 (Highest)

Key Features

Length: 121ft	Diameter: 6in	Material: STEEL	Install Year: 1962
Slope: nan	Hotspot: N/A	Basin: R709	Flow Basin: Mission Basin

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
S616-S608	2014-05-01	Cleaning	4.0	3.0	1.0
S616-S608	2014-11-13	Cleaning	3.0	1.0	1.0
S616-S608	2015-07-08	Cleaning	3.0	1.0	1.0
S616-S608	2016-02-03	Cleaning	4.0	1.0	1.0
S616-S608	2016-08-09	Cleaning	3.0	1.0	1.0
S616-S608	2017-03-15	Cleaning	3.0	1.0	1.0
S616-S608	2017-07-10	Cleaning	2.0	1.0	1.0
S616-S608	2017-12-20	Cleaning	3.0	1.0	1.0
S616-S608	2018-07-03	Cleaning	4.0	4.0	1.0
S616-S608	2018-12-05	Cleaning	4.0	1.0	1.0
S616-S608	2019-02-25	Cleaning	3.0	1.0	1.0
S616-S608	2019-06-26	Cleaning	3.0	3.0	1.0
S616-S608	2019-11-19	Cleaning	4.0	1.0	1.0
S616-S608	2020-05-27	Cleaning	3.0	1.0	1.0
S616-S608	2020-11-17	Cleaning	4.0	1.0	1.0
S616-S608	2021-05-12	Cleaning	1.0	1.0	1.0
S616-S608	2022-06-14	Cleaning	4.0	3.0	1.0
S616-S608	2022-12-24	Cleaning	3.0	1.0	1.0
S616-S608	2023-11-02	Cleaning	4.0	1.0	1.0
S616-S608	2024-08-05	Spill	3.0	3.0	3.0

O6103-O6104

LOF Predictions - 2024-10-01

Max Prediction: 3.26 (Upper Outlier)

Debris Prediction: 1.10 (Medium)

Grease Prediction: 3.26 (Upper Outlier)

Roots Prediction: 1.04 (Lowest)

Key Features

Length: 133ft	Diameter: 6in	Material: VCP	Install Year: 1908
Slope: nan	Hotspot: N/A	Basin: Q672	Flow Basin: Midtown Basin

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
O6103-O6104	2014-02-10	Cleaning	2.0	4.0	1.0
O6103-O6104	2014-04-23	Cleaning	1.0	2.0	1.0
O6103-O6104	2014-06-18	Cleaning	1.0	2.0	1.0
O6103-O6104	2014-07-31	Cleaning	1.0	1.0	1.0
O6103-O6104	2014-12-08	Cleaning	1.0	2.0	1.0
O6103-O6104	2015-02-05	Cleaning	1.0	2.0	1.0
O6103-O6104	2015-04-08	Cleaning	1.0	1.0	1.0
O6103-O6104	2015-07-31	Cleaning	1.0	1.0	1.0
O6103-O6104	2015-09-09	Cleaning	1.0	1.0	1.0
O6103-O6104	2015-11-18	Cleaning	1.0	3.0	1.0
O6103-O6104	2016-03-17	Cleaning	1.0	2.0	1.0
O6103-O6104	2016-06-01	Cleaning	1.0	4.0	1.0
O6103-O6104	2016-07-28	Cleaning	1.0	3.0	1.0
O6103-O6104	2016-11-28	Cleaning	1.0	3.0	1.0
O6103-O6104	2016-12-21	Cleaning	1.0	4.0	1.0
O6103-O6104	2017-04-04	Cleaning	1.0	4.0	1.0
O6103-O6104	2017-06-13	Cleaning	1.0	1.0	1.0
O6103-O6104	2017-07-07	Cleaning	1.0	1.0	1.0
O6103-O6104	2017-08-10	Cleaning	1.0	3.0	2.0
O6103-O6104	2017-11-30	Cleaning	1.0	4.0	1.0
O6103-O6104	2018-01-31	Cleaning	1.0	3.0	1.0
O6103-O6104	2018-05-21	Cleaning	1.0	3.0	1.0
O6103-O6104	2018-08-14	Cleaning	1.0	4.0	1.0
O6103-O6104	2018-09-12	Cleaning	1.0	3.0	1.0
O6103-O6104	2018-11-20	Cleaning	1.0	3.0	1.0
O6103-O6104	2019-05-07	Cleaning	1.0	3.0	1.0
O6103-O6104	2019-08-06	Cleaning	1.0	4.0	2.0
O6103-O6104	2019-11-26	Cleaning	3.0	3.0	1.0
O6103-O6104	2020-02-04	Cleaning	1.0	3.0	1.0
O6103-O6104	2020-07-15	Cleaning	1.0	4.0	1.0
O6103-O6104	2020-07-15	CCTV	1.0	3.0	2.0
O6103-O6104	2020-07-22	Cleaning	2.0	3.0	1.0
O6103-O6104	2020-08-11	Cleaning	1.0	3.0	1.0
O6103-O6104	2020-10-19	Cleaning	1.0	3.0	1.0
O6103-O6104	2021-04-05	Cleaning	3.0	3.0	1.0
O6103-O6104	2021-05-06	Cleaning	1.0	4.0	1.0
O6103-O6104	2021-08-06	Cleaning	1.0	1.0	1.0
O6103-O6104	2021-11-03	Cleaning	1.0	4.0	1.0
O6103-O6104	2022-01-24	Cleaning	1.0	4.0	1.0
O6103-O6104	2022-05-31	Cleaning	1.0	4.0	1.0
O6103-O6104	2022-08-03	Cleaning	1.0	4.0	1.0
O6103-O6104	2022-11-22	Cleaning	3.0	4.0	1.0
O6103-O6104	2023-02-07	Cleaning	1.0	4.0	1.0
O6103-O6104	2023-06-12	Cleaning	1.0	4.0	1.0
O6103-O6104	2023-08-08	Cleaning	1.0	3.0	1.0
O6103-O6104	2023-10-30	Cleaning	1.0	1.0	1.0
O6103-O6104	2023-12-14	Cleaning	1.0	4.0	1.0

R854-S802

LOF Predictions - 2024-10-01

Max Prediction: 3.33 (Upper Outlier)

Debris Prediction: 1.70 (Highest)

Grease Prediction: 3.33 (Upper Outlier)

Roots Prediction: 1.04 (Lowest)

Key Features

Length: 370ft	Diameter: 8in	Material: VCP	Install Year: 1969
Slope: nan	Hotspot: N/A	Basin: R709	Flow Basin: Mission Basin

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
R854-S802	2014-02-11	Cleaning	3.0	3.0	1.0
R854-S802	2014-07-02	Cleaning	3.0	1.0	1.0
R854-S802	2014-08-01	Cleaning	1.0	1.0	1.0
R854-S802	2015-04-14	Cleaning	1.0	1.0	1.0
R854-S802	2015-07-28	Cleaning	2.0	2.0	1.0
R854-S802	2015-11-19	Cleaning	1.0	4.0	1.0
R854-S802	2016-05-18	Cleaning	1.0	1.0	1.0
R854-S802	2016-07-26	Cleaning	3.0	1.0	1.0
R854-S802	2016-08-22	Cleaning	3.0	3.0	1.0
R854-S802	2016-08-23	Cleaning	3.0	3.0	1.0
R854-S802	2016-12-12	Cleaning	1.0	1.0	1.0
R854-S802	2017-04-05	Cleaning	1.0	1.0	1.0
R854-S802	2017-07-12	Cleaning	2.0	3.0	1.0
R854-S802	2017-11-22	Cleaning	1.0	4.0	1.0
R854-S802	2017-12-04	Cleaning	1.0	4.0	1.0
R854-S802	2018-05-23	Cleaning	2.0	3.0	1.0
R854-S802	2018-08-16	Cleaning	4.0	4.0	1.0
R854-S802	2018-10-30	Cleaning	1.0	3.0	1.0
R854-S802	2018-11-26	Cleaning	1.0	4.0	1.0
R854-S802	2019-08-07	Cleaning	1.0	4.0	1.0
R854-S802	2019-12-12	Cleaning	1.0	4.0	1.0
R854-S802	2020-03-23	Cleaning	1.0	4.0	1.0
R854-S802	2021-02-01	Cleaning	1.0	1.0	1.0
R854-S802	2021-04-22	Cleaning	1.0	1.0	1.0
R854-S802	2021-08-09	Cleaning	1.0	1.0	1.0
R854-S802	2021-08-19	Cleaning	3.0	1.0	1.0
R854-S802	2021-11-04	Cleaning	3.0	4.0	1.0
R854-S802	2022-01-28	Cleaning	1.0	1.0	1.0
R854-S802	2022-03-02	CCTV	1.0	3.0	2.0
R854-S802	2022-06-07	Cleaning	3.0	4.0	1.0
R854-S802	2022-08-10	Cleaning	3.0	3.0	1.0
R854-S802	2022-09-08	Cleaning	3.0	3.0	1.0
R854-S802	2022-11-15	Cleaning	1.0	3.0	1.0
R854-S802	2023-01-31	Cleaning	1.0	4.0	1.0
R854-S802	2023-05-30	Cleaning	2.0	4.0	1.0
R854-S802	2023-08-09	Cleaning	4.0	4.0	1.0
R854-S802	2023-12-27	Cleaning	2.0	4.0	1.0

R824-R831

LOF Predictions - 2024-10-01

Max Prediction: 2.48 (Upper Outlier)

Debris Prediction: 2.48 (Upper Outlier)

Grease Prediction: 1.03 (Medium)

Roots Prediction: 1.10 (Medium)

Key Features

Length: 407ft	Diameter: 15in	Material: VCP	Install Year: 1953
Slope: nan	Hotspot: N/A	Basin: R709	Flow Basin: Mission Basin

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
R824-R831	2015-11-04	Cleaning	3.0	1.0	1.0
R824-R831	2016-08-15	Cleaning	3.0	1.0	1.0
R824-R831	2017-05-24	CCTV	1.0	1.0	3.0
R824-R831	2017-08-14	Cleaning	1.0	1.0	1.0
R824-R831	2017-08-15	Cleaning	1.0	1.0	1.0
R824-R831	2018-10-22	Cleaning	1.0	1.0	1.0
R824-R831	2019-10-10	Cleaning	4.0	1.0	1.0
R824-R831	2020-11-17	Cleaning	1.0	1.0	1.0
R824-R831	2021-11-15	Cleaning	4.0	1.0	2.0
R824-R831	2022-04-19	CCTV	1.0	1.0	3.0
R824-R831	2022-04-28	Cleaning	4.0	1.0	4.0
R824-R831	2022-11-29	Cleaning	4.0	3.0	1.0
R824-R831	2023-07-25	Cleaning	4.0	1.0	1.0

P667-P659

LOF Predictions - 2024-10-01

Max Prediction: 2.48 (Upper Outlier)

Debris Prediction: 2.48 (Upper Outlier)

Grease Prediction: 1.42 (Upper Outlier)

Roots Prediction: 1.14 (Medium)

Key Features

| Length: 273ft | Diameter: 8in | Material: CIPP | Install Year: 1985 |
| Slope: nan | Hotspot: N/A | Basin: Q679 | Flow Basin: Paradise Park Basin |

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
P667-P659	2014-01-27	Cleaning	3.0	1.0	1.0
P667-P659	2014-08-15	Cleaning	3.0	1.0	1.0
P667-P659	2015-03-30	Cleaning	3.0	1.0	1.0
P667-P659	2015-11-10	Cleaning	1.0	1.0	1.0
P667-P659	2016-05-04	Cleaning	1.0	1.0	1.0
P667-P659	2017-01-17	Cleaning	3.0	1.0	1.0
P667-P659	2017-01-18	Cleaning	4.0	1.0	1.0
P667-P659	2017-06-08	Cleaning	3.0	1.0	1.0
P667-P659	2017-08-23	Cleaning	4.0	1.0	1.0
P667-P659	2017-12-12	Cleaning	3.0	1.0	1.0
P667-P659	2018-02-01	Cleaning	4.0	1.0	1.0
P667-P659	2018-03-28	Cleaning	1.0	1.0	1.0
P667-P659	2018-09-05	Cleaning	4.0	1.0	1.0
P667-P659	2018-11-19	Cleaning	4.0	1.0	1.0
P667-P659	2019-07-01	Cleaning	4.0	1.0	1.0
P667-P659	2020-04-07	Cleaning	1.0	1.0	1.0
P667-P659	2020-09-15	CCTV	3.0	1.0	1.0
P667-P659	2020-10-07	Cleaning	3.0	1.0	1.0
P667-P659	2020-11-24	Cleaning	1.0	1.0	1.0
P667-P659	2021-07-13	Cleaning	1.0	1.0	1.0
P667-P659	2022-03-14	Cleaning	4.0	1.0	1.0
P667-P659	2022-12-02	Cleaning	1.0	1.0	1.0
P667-P659	2023-01-31	Cleaning	4.0	1.0	1.0
P667-P659	2023-07-27	Cleaning	4.0	1.0	1.0
P667-P659	2023-10-30	Cleaning	4.0	1.0	1.0
P667-P659	2024-04-25	Cleaning	1.0	1.0	1.0

S712-S711

LOF Predictions - 2024-10-01

Max Prediction: 2.49 (Upper Outlier)

Debris Prediction: 2.10 (Upper Outlier)

Grease Prediction: 2.49 (Upper Outlier)

Roots Prediction: 1.06 (Lowest)

Key Features

| Length: 159ft | Diameter: 8in | Material: CIPP | Install Year: 1985 |
| Slope: 0.05 | Hotspot: N/A | Basin: R709 | Flow Basin: Mission Basin |

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
S712-S711	2014-02-11	Cleaning	2.0	2.0	1.0
S712-S711	2014-08-01	Cleaning	3.0	3.0	1.0
S712-S711	2015-04-14	Cleaning	1.0	1.0	1.0
S712-S711	2015-07-27	Cleaning	3.0	3.0	1.0
S712-S711	2015-11-19	Cleaning	2.0	2.0	1.0
S712-S711	2016-02-09	Cleaning	2.0	2.0	1.0
S712-S711	2016-03-30	Cleaning	1.0	1.0	1.0
S712-S711	2016-05-16	Cleaning	3.0	3.0	1.0
S712-S711	2016-07-26	Cleaning	3.0	3.0	1.0
S712-S711	2016-12-06	Cleaning	2.0	2.0	1.0
S712-S711	2017-04-05	Cleaning	1.0	1.0	1.0
S712-S711	2017-07-12	Cleaning	1.0	3.0	1.0
S712-S711	2017-11-22	Cleaning	1.0	4.0	1.0
S712-S711	2017-12-04	Cleaning	1.0	1.0	1.0
S712-S711	2018-05-22	Cleaning	3.0	3.0	1.0
S712-S711	2018-08-16	Cleaning	3.0	4.0	1.0
S712-S711	2018-11-20	Cleaning	4.0	4.0	1.0
S712-S711	2019-08-06	Cleaning	3.0	4.0	1.0
S712-S711	2019-12-12	Cleaning	3.0	4.0	1.0
S712-S711	2020-03-23	Cleaning	1.0	3.0	1.0
S712-S711	2021-01-25	Cleaning	2.0	2.0	1.0
S712-S711	2021-02-01	Cleaning	3.0	3.0	1.0
S712-S711	2021-04-22	Cleaning	1.0	1.0	1.0
S712-S711	2021-08-03	Cleaning	1.0	4.0	1.0
S712-S711	2021-11-04	Cleaning	4.0	4.0	1.0
S712-S711	2022-01-25	Cleaning	3.0	3.0	1.0
S712-S711	2022-03-09	CCTV	1.0	3.0	1.0
S712-S711	2022-03-10	CCTV	1.0	1.0	1.0
S712-S711	2022-06-06	Cleaning	4.0	4.0	1.0
S712-S711	2022-08-10	Cleaning	4.0	4.0	1.0
S712-S711	2022-11-17	Cleaning	4.0	3.0	1.0
S712-S711	2023-05-30	Cleaning	4.0	3.0	1.0
S712-S711	2023-08-25	Cleaning	1.0	1.0	1.0
S712-S711	2023-12-27	Cleaning	3.0	3.0	1.0

Appendix B-Root Foaming Candidates

N643-N644

LOF Predictions - 2024-10-01

Max Prediction: 2.12 (Highest)

Debris Prediction: 1.08 (Medium)

Grease Prediction: 1.01 (Medium)

Roots Prediction: 2.12 (Upper Outlier)

Key Features

Length: 245ft	Diameter: 6in	Material: VCP	Install Year: 1908
Slope: 0.14	Hotspot: N/A	Basin: Q672	Flow Basin: Midtown Basin

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
N643-N644	2014-07-02	Cleaning	1.0	1.0	1.0
N643-N644	2015-02-17	Cleaning	1.0	1.0	3.0
N643-N644	2015-09-28	Cleaning	1.0	1.0	1.0
N643-N644	2016-03-30	Cleaning	1.0	1.0	1.0
N643-N644	2016-11-21	Cleaning	1.0	1.0	1.0
N643-N644	2017-06-21	Cleaning	3.0	1.0	1.0
N643-N644	2018-02-27	Cleaning	1.0	1.0	2.0
N643-N644	2018-09-25	Cleaning	1.0	1.0	2.0
N643-N644	2019-05-28	Cleaning	1.0	1.0	1.0
N643-N644	2019-12-19	Cleaning	1.0	1.0	4.0
N643-N644	2019-12-19	CCTV	1.0	1.0	3.0
N643-N644	2020-02-20	Cleaning	1.0	1.0	4.0
N643-N644	2020-10-28	Cleaning	1.0	1.0	1.0
N643-N644	2021-05-26	Cleaning	1.0	1.0	1.0
N643-N644	2022-01-13	Cleaning	1.0	1.0	1.0
N643-N644	2022-10-14	Cleaning	1.0	1.0	4.0
N643-N644	2023-06-06	Cleaning	1.0	1.0	3.0
N643-N644	2024-02-22	Cleaning	1.0	1.0	3.0

N753-N756

LOF Predictions - 2024-10-01

Max Prediction: 2.26 (Highest)

Debris Prediction: 1.14 (Medium)

Grease Prediction: 1.02 (Medium)

Roots Prediction: 2.26 (Upper Outlier)

Key Features

Length: 307ft	Diameter: 6in	Material: VCP	Install Year: 1924
Slope: nan	Hotspot: N/A	Basin: Q679	Flow Basin: Paradise Park Basin

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
N753-N756	2014-02-10	Cleaning	1.0	1.0	1.0
N753-N756	2014-08-11	Cleaning	1.0	1.0	2.0
N753-N756	2015-03-26	Cleaning	1.0	1.0	1.0
N753-N756	2015-11-06	Cleaning	3.0	1.0	2.0
N753-N756	2016-05-03	Cleaning	1.0	1.0	1.0
N753-N756	2017-01-18	Cleaning	1.0	1.0	3.0
N753-N756	2017-08-23	Cleaning	1.0	1.0	1.0
N753-N756	2018-04-10	Cleaning	1.0	1.0	4.0
N753-N756	2018-11-27	Cleaning	1.0	1.0	2.0
N753-N756	2019-07-24	Cleaning	1.0	1.0	1.0
N753-N756	2020-04-15	Cleaning	1.0	1.0	1.0
N753-N756	2020-09-02	CCTV	3.0	1.0	2.0
N753-N756	2020-11-23	Cleaning	1.0	1.0	1.0
N753-N756	2021-06-29	Cleaning	1.0	1.0	3.0
N753-N756	2022-03-21	Cleaning	1.0	1.0	1.0
N753-N756	2022-12-29	Cleaning	1.0	1.0	3.0
N753-N756	2023-10-02	Cleaning	1.0	1.0	1.0

Q803-Q804

LOF Predictions - 2024-10-01

Max Prediction: 2.45 (Upper Outlier)

Debris Prediction: 1.04 (Lowest)

Grease Prediction: 1.01 (Medium)

Roots Prediction: 2.45 (Upper Outlier)

Key Features

Length: 84ft	Diameter: 6in	Material: VCP	Install Year: 1972
Slope: nan	Hotspot: N/A	Basin: R822	Flow Basin: Hatton Basin

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
Q803-Q804	2014-03-13	Cleaning	1.0	1.0	1.0
Q803-Q804	2014-09-29	Cleaning	1.0	1.0	1.0
Q803-Q804	2015-05-13	Cleaning	1.0	1.0	1.0
Q803-Q804	2016-10-26	Cleaning	1.0	1.0	1.0
Q803-Q804	2017-09-26	Cleaning	1.0	1.0	1.0
Q803-Q804	2018-05-21	Cleaning	1.0	1.0	1.0
Q803-Q804	2019-07-15	Cleaning	1.0	1.0	2.0
Q803-Q804	2020-12-02	Cleaning	1.0	1.0	1.0
Q803-Q804	2021-05-11	CCTV	1.0	1.0	3.0
Q803-Q804	2022-09-06	Cleaning	1.0	1.0	1.0
Q803-Q804	2023-10-18	Cleaning	1.0	1.0	4.0

O629-O630

LOF Predictions - 2024-10-01

Max Prediction: 2.71 (Upper Outlier)

Debris Prediction: 1.04 (Lowest)

Grease Prediction: 1.01 (Medium)

Roots Prediction: 2.71 (Upper Outlier)

Key Features

Length: 240ft	Diameter: 6in	Material: VCP	Install Year: 1908
Slope: 0.05	Hotspot: N/A	Basin: Q631	Flow Basin: Beach Basin

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
O629-O630	2014-06-19	Cleaning	1.0	1.0	1.0
O629-O630	2015-02-09	Cleaning	1.0	1.0	1.0
O629-O630	2015-09-15	Cleaning	1.0	1.0	3.0
O629-O630	2016-03-16	Cleaning	1.0	1.0	1.0
O629-O630	2017-06-14	Cleaning	1.0	1.0	1.0
O629-O630	2018-02-13	Cleaning	1.0	1.0	3.0
O629-O630	2018-09-06	Cleaning	1.0	1.0	1.0
O629-O630	2019-05-08	Cleaning	1.0	1.0	4.0
O629-O630	2019-12-02	CCTV	1.0	1.0	3.0
O629-O630	2019-12-03	Cleaning	1.0	1.0	2.0
O629-O630	2020-02-13	Cleaning	1.0	1.0	1.0
O629-O630	2020-10-07	Cleaning	1.0	1.0	3.0
O629-O630	2021-05-07	Cleaning	1.0	1.0	3.0
O629-O630	2022-01-10	Cleaning	1.0	1.0	3.0
O629-O630	2022-09-26	Cleaning	1.0	1.0	4.0
O629-O630	2023-05-09	Cleaning	1.0	1.0	2.0
O629-O630	2024-02-15	Cleaning	1.0	1.0	3.0

Q820-Q821

LOF Predictions - 2024-10-01

Max Prediction: 1.51 (Medium)

Debris Prediction: 1.04 (Lowest)

Grease Prediction: 1.01 (Medium)

Roots Prediction: 1.51 (Upper Outlier)

Key Features

Length: 294ft	Diameter: 6in	Material: VCP	Install Year: 1959
Slope: 0.1	Hotspot: N/A	Basin: R822	Flow Basin: Hatton Basin

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
Q820-Q821	2014-04-08	Cleaning	1.0	1.0	3.0
Q820-Q821	2014-10-14	Cleaning	1.0	1.0	1.0
Q820-Q821	2015-05-21	Cleaning	1.0	1.0	1.0
Q820-Q821	2015-12-30	Cleaning	1.0	1.0	1.0
Q820-Q821	2016-07-08	Cleaning	1.0	1.0	3.0
Q820-Q821	2017-03-06	Cleaning	1.0	1.0	2.0
Q820-Q821	2017-10-24	Cleaning	1.0	1.0	1.0
Q820-Q821	2018-05-24	Cleaning	1.0	1.0	1.0
Q820-Q821	2019-01-11	Cleaning	1.0	1.0	3.0
Q820-Q821	2019-09-24	Cleaning	1.0	1.0	2.0
Q820-Q821	2020-06-11	Cleaning	1.0	1.0	1.0
Q820-Q821	2021-01-05	Cleaning	1.0	1.0	1.0
Q820-Q821	2021-07-13	CCTV	1.0	1.0	3.0
Q820-Q821	2021-10-12	Cleaning	1.0	1.0	2.0
Q820-Q821	2022-05-18	Cleaning	1.0	1.0	4.0
Q820-Q821	2023-01-19	Cleaning	1.0	1.0	1.0
Q820-Q821	2023-10-24	Cleaning	1.0	1.0	1.0

N742-N744

LOF Predictions - 2024-10-01

Max Prediction: 1.51 (Medium)

Debris Prediction: 1.09 (Medium)

Grease Prediction: 1.02 (Medium)

Roots Prediction: 1.51 (Upper Outlier)

Key Features

Length: 388ft	Diameter: 6in	Material: VCP	Install Year: 1924
Slope: nan	Hotspot: N/A	Basin: Q679	Flow Basin: Paradise Park Basin

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
N742-N744	2014-02-10	Cleaning	1.0	1.0	2.0
N742-N744	2014-08-11	Cleaning	2.0	1.0	4.0
N742-N744	2015-03-25	Cleaning	1.0	1.0	1.0
N742-N744	2015-11-06	Cleaning	1.0	1.0	1.0
N742-N744	2016-05-03	Cleaning	1.0	1.0	1.0
N742-N744	2017-01-18	Cleaning	1.0	1.0	4.0
N742-N744	2017-08-21	Cleaning	1.0	1.0	2.0
N742-N744	2018-04-10	Cleaning	1.0	1.0	1.0
N742-N744	2018-11-27	Cleaning	1.0	1.0	1.0
N742-N744	2019-07-23	Cleaning	1.0	1.0	2.0
N742-N744	2020-04-15	Cleaning	1.0	1.0	3.0
N742-N744	2020-09-01	Cleaning	1.0	1.0	1.0
N742-N744	2020-09-01	CCTV	1.0	1.0	3.0
N742-N744	2020-11-23	Cleaning	1.0	1.0	2.0
N742-N744	2021-06-25	Cleaning	1.0	1.0	2.0
N742-N744	2022-03-23	Cleaning	1.0	1.0	1.0
N742-N744	2023-07-27	Cleaning	1.0	1.0	1.0

O646-O647

LOF Predictions - 2024-10-01

Max Prediction: 1.52 (Medium)

Debris Prediction: 1.06 (Lowest)

Grease Prediction: 1.01 (Medium)

Roots Prediction: 1.52 (Upper Outlier)

Key Features

Length: 211ft	Diameter: 6in	Material: PVC	Install Year: 1985
Slope: 0.08	Hotspot: N/A	Basin: Q631	Flow Basin: Beach Basin

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
O646-O647	2014-06-17	Cleaning	1.0	1.0	1.0
O646-O647	2015-02-09	Cleaning	1.0	1.0	1.0
O646-O647	2015-09-14	Cleaning	1.0	1.0	1.0
O646-O647	2016-03-14	Cleaning	2.0	1.0	1.0
O646-O647	2016-11-01	Cleaning	1.0	1.0	1.0
O646-O647	2017-06-12	Cleaning	1.0	1.0	1.0
O646-O647	2018-02-12	Cleaning	1.0	1.0	1.0
O646-O647	2018-09-05	Cleaning	2.0	1.0	2.0
O646-O647	2019-05-09	Cleaning	1.0	1.0	1.0
O646-O647	2019-12-02	CCTV	1.0	1.0	1.0
O646-O647	2020-02-13	Cleaning	1.0	1.0	1.0
O646-O647	2020-10-06	Cleaning	1.0	1.0	1.0
O646-O647	2021-04-29	Cleaning	1.0	1.0	1.0
O646-O647	2022-01-10	Cleaning	1.0	1.0	1.0
O646-O647	2022-09-26	Cleaning	1.0	1.0	1.0
O646-O647	2023-05-09	Cleaning	1.0	1.0	1.0
O646-O647	2024-02-14	Cleaning	1.0	1.0	4.0

P905-P907

LOF Predictions - 2024-10-01

Max Prediction: 1.54 (Medium)

Debris Prediction: 1.05 (Lowest)

Grease Prediction: 1.01 (Medium)

Roots Prediction: 1.54 (Upper Outlier)

Key Features

Length: 254ft	Diameter: 8in	Material: VCP	Install Year: 1973
Slope: 0.08	Hotspot: N/A	Basin: R809	Flow Basin: Valley Basin

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
P905-P907	2014-04-03	Cleaning	1.0	1.0	1.0
P905-P907	2014-10-17	Cleaning	1.0	1.0	1.0
P905-P907	2015-06-04	Cleaning	1.0	1.0	1.0
P905-P907	2016-01-14	Cleaning	1.0	1.0	1.0
P905-P907	2016-07-21	Cleaning	1.0	1.0	1.0
P905-P907	2017-03-21	Cleaning	1.0	1.0	1.0
P905-P907	2017-11-08	Cleaning	1.0	1.0	1.0
P905-P907	2018-12-17	Cleaning	1.0	1.0	1.0
P905-P907	2020-01-09	Cleaning	1.0	1.0	1.0
P905-P907	2020-06-22	Cleaning	1.0	1.0	1.0
P905-P907	2021-02-04	Cleaning	1.0	1.0	2.0
P905-P907	2021-04-20	CCTV	1.0	1.0	1.0
P905-P907	2021-10-21	Cleaning	1.0	1.0	1.0
P905-P907	2023-08-16	Cleaning	1.0	1.0	1.0

Q733-R705

LOF Predictions - 2024-10-01

Max Prediction: 1.55 (Medium)

Debris Prediction: 1.04 (Lowest)

Grease Prediction: 1.02 (Medium)

Roots Prediction: 1.55 (Upper Outlier)

Key Features

Length: 465ft	Diameter: 6in	Material: VCP	Install Year: 1953
Slope: 0.6	Hotspot: N/A	Basin: R709	Flow Basin: Mission Basin

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
Q733-R705	2014-02-27	Cleaning	1.0	1.0	2.0
Q733-R705	2014-09-09	Cleaning	1.0	1.0	2.0
Q733-R705	2015-04-21	Cleaning	1.0	1.0	1.0
Q733-R705	2015-12-16	Cleaning	1.0	1.0	1.0
Q733-R705	2016-06-22	Cleaning	2.0	1.0	3.0
Q733-R705	2017-02-10	Cleaning	1.0	1.0	3.0
Q733-R705	2017-10-04	Cleaning	1.0	1.0	4.0
Q733-R705	2018-04-25	Cleaning	1.0	1.0	4.0
Q733-R705	2018-12-12	Cleaning	1.0	1.0	4.0
Q733-R705	2019-01-29	Cleaning	1.0	1.0	1.0
Q733-R705	2019-09-03	Cleaning	1.0	1.0	2.0
Q733-R705	2020-04-22	Cleaning	1.0	1.0	3.0
Q733-R705	2020-12-15	Cleaning	1.0	1.0	1.0
Q733-R705	2021-01-13	CCTV	1.0	1.0	3.0
Q733-R705	2021-08-10	Cleaning	1.0	1.0	1.0
Q733-R705	2022-04-01	Cleaning	1.0	1.0	1.0
Q733-R705	2023-01-12	Cleaning	1.0	1.0	3.0
Q733-R705	2023-05-01	Cleaning	1.0	1.0	1.0
Q733-R705	2024-02-08	Cleaning	1.0	1.0	1.0

P907-P908

LOF Predictions - 2024-10-01

Max Prediction: 1.55 (Medium)

Debris Prediction: 1.05 (Lowest)

Grease Prediction: 1.01 (Medium)

Roots Prediction: 1.55 (Upper Outlier)

Key Features

Length: 252ft	Diameter: 8in	Material: VCP	Install Year: 1973
Slope: 0.13	Hotspot: N/A	Basin: R809	Flow Basin: Valley Basin

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
P907-P908	2014-04-03	Cleaning	1.0	1.0	1.0
P907-P908	2014-10-16	Cleaning	1.0	1.0	1.0
P907-P908	2015-06-04	Cleaning	1.0	1.0	1.0
P907-P908	2016-01-13	Cleaning	1.0	1.0	1.0
P907-P908	2016-07-21	Cleaning	1.0	1.0	1.0
P907-P908	2017-03-21	Cleaning	1.0	1.0	1.0
P907-P908	2017-11-08	Cleaning	1.0	1.0	1.0
P907-P908	2018-12-17	Cleaning	1.0	1.0	1.0
P907-P908	2020-01-09	Cleaning	1.0	1.0	1.0
P907-P908	2020-06-22	Cleaning	1.0	1.0	1.0
P907-P908	2021-02-04	Cleaning	1.0	1.0	2.0
P907-P908	2021-04-20	CCTV	1.0	1.0	1.0
P907-P908	2021-10-21	Cleaning	1.0	1.0	1.0
P907-P908	2023-08-16	Cleaning	1.0	1.0	1.0

P739-P789

LOF Predictions - 2024-10-01

Max Prediction: 1.56 (Medium)

Debris Prediction: 1.30 (Medium)

Grease Prediction: 1.10 (Highest)

Roots Prediction: 1.56 (Upper Outlier)

Key Features

Length: 83ft	Diameter: 6in	Material: STEEL	Install Year: 1908
Slope: 0.01	Hotspot: N/A	Basin: R709	Flow Basin: Mission Basin

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
P739-P789	2014-01-07	Cleaning	1.0	1.0	1.0
P739-P789	2014-01-08	CCTV	1.0	1.0	1.0
P739-P789	2014-02-25	Cleaning	1.0	1.0	1.0
P739-P789	2014-09-04	Cleaning	1.0	1.0	1.0
P739-P789	2015-05-04	Cleaning	1.0	1.0	1.0
P739-P789	2015-12-08	Cleaning	1.0	1.0	1.0
P739-P789	2016-08-03	Cleaning	1.0	1.0	1.0
P739-P789	2017-02-08	Cleaning	1.0	1.0	1.0
P739-P789	2017-10-04	Cleaning	1.0	1.0	1.0
P739-P789	2018-04-23	Cleaning	1.0	1.0	1.0
P739-P789	2019-02-21	Cleaning	1.0	1.0	1.0
P739-P789	2019-10-23	Cleaning	1.0	1.0	3.0
P739-P789	2020-05-15	Cleaning	3.0	1.0	1.0
P739-P789	2021-01-12	Cleaning	1.0	1.0	1.0
P739-P789	2021-05-06	CCTV	1.0	1.0	2.0
P739-P789	2022-06-21	Cleaning	1.0	1.0	1.0
P739-P789	2023-05-30	Cleaning	1.0	1.0	3.0
P739-P789	2023-10-23	Cleaning	1.0	1.0	1.0

Q780-Q722

LOF Predictions - 2024-10-01

Max Prediction: 1.57 (Medium)

Debris Prediction: 1.34 (Medium)

Grease Prediction: 1.14 (Highest)

Roots Prediction: 1.57 (Upper Outlier)

Key Features

Length: 293ft	Diameter: 6in	Material: VCP	Install Year: 1953
Slope: 0.09	Hotspot: N/A	Basin: R709	Flow Basin: Mission Basin

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
Q780-Q722	2014-03-27	Cleaning	1.0	1.0	1.0
Q780-Q722	2014-09-17	Cleaning	1.0	1.0	1.0
Q780-Q722	2015-05-07	Cleaning	1.0	1.0	1.0
Q780-Q722	2015-12-28	Cleaning	1.0	1.0	1.0
Q780-Q722	2016-07-01	Cleaning	1.0	1.0	1.0
Q780-Q722	2017-02-27	Cleaning	1.0	1.0	1.0
Q780-Q722	2017-09-29	Cleaning	1.0	1.0	1.0
Q780-Q722	2018-05-01	Cleaning	1.0	1.0	1.0
Q780-Q722	2019-01-09	Cleaning	1.0	1.0	1.0
Q780-Q722	2019-09-05	Cleaning	1.0	1.0	1.0
Q780-Q722	2020-12-28	Cleaning	1.0	1.0	1.0

Q6104-Q6105

LOF Predictions - 2024-10-01

Max Prediction: 1.59 (Medium)

Debris Prediction: 1.09 (Medium)

Grease Prediction: 1.01 (Medium)

Roots Prediction: 1.59 (Upper Outlier)

Key Features

Length: 422ft	Diameter: 6in	Material: VCP	Install Year: 1953
Slope: nan	Hotspot: N/A	Basin: R709	Flow Basin: Mission Basin

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
Q6104-Q6105	2014-02-12	Cleaning	1.0	1.0	2.0
Q6104-Q6105	2014-08-28	Cleaning	1.0	1.0	2.0
Q6104-Q6105	2015-04-03	Cleaning	1.0	1.0	1.0
Q6104-Q6105	2015-11-30	Cleaning	1.0	1.0	1.0
Q6104-Q6105	2016-05-12	Cleaning	1.0	1.0	1.0
Q6104-Q6105	2017-01-27	Cleaning	1.0	1.0	1.0
Q6104-Q6105	2017-10-03	Cleaning	1.0	1.0	2.0
Q6104-Q6105	2018-04-18	Cleaning	1.0	1.0	1.0
Q6104-Q6105	2018-12-11	Cleaning	1.0	1.0	2.0
Q6104-Q6105	2019-08-23	Cleaning	1.0	1.0	2.0
Q6104-Q6105	2020-04-21	Cleaning	1.0	1.0	2.0
Q6104-Q6105	2020-10-21	CCTV	1.0	3.0	3.0
Q6104-Q6105	2020-12-15	Cleaning	1.0	1.0	1.0
Q6104-Q6105	2021-08-03	Cleaning	1.0	1.0	1.0
Q6104-Q6105	2022-04-04	Cleaning	1.0	1.0	3.0
Q6104-Q6105	2022-12-09	Cleaning	1.0	1.0	1.0
Q6104-Q6105	2023-09-11	Cleaning	1.0	1.0	2.0

O642-O644

LOF Predictions - 2024-10-01

Max Prediction: 1.59 (Medium)

Debris Prediction: 1.04 (Lowest)

Grease Prediction: 1.01 (Medium)

Roots Prediction: 1.59 (Upper Outlier)

Key Features

Length: 203ft	Diameter: 8in	Material: PVC	Install Year: 1985
Slope: 0.07	Hotspot: N/A	Basin: Q631	Flow Basin: Beach Basin

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
O642-O644	2014-06-18	Cleaning	1.0	1.0	1.0
O642-O644	2015-02-09	Cleaning	1.0	1.0	1.0
O642-O644	2015-09-14	Cleaning	1.0	1.0	1.0
O642-O644	2016-03-15	Cleaning	1.0	1.0	1.0
O642-O644	2016-11-01	Cleaning	1.0	1.0	1.0
O642-O644	2017-06-12	Cleaning	1.0	1.0	1.0
O642-O644	2018-02-12	Cleaning	1.0	1.0	1.0
O642-O644	2018-09-05	Cleaning	1.0	1.0	1.0
O642-O644	2019-05-08	Cleaning	1.0	1.0	1.0
O642-O644	2019-12-05	CCTV	1.0	1.0	3.0
O642-O644	2020-02-13	Cleaning	1.0	1.0	1.0
O642-O644	2020-10-06	Cleaning	1.0	1.0	1.0
O642-O644	2021-04-29	Cleaning	1.0	1.0	1.0
O642-O644	2022-01-05	Cleaning	1.0	1.0	1.0
O642-O644	2022-09-23	Cleaning	1.0	1.0	1.0
O642-O644	2023-05-09	Cleaning	1.0	1.0	1.0
O642-O644	2024-02-14	Cleaning	1.0	1.0	4.0

O771-O772

LOF Predictions - 2024-10-01

Max Prediction: 1.60 (Medium)

Debris Prediction: 1.06 (Lowest)

Grease Prediction: 1.04 (Medium)

Roots Prediction: 1.60 (Upper Outlier)

Key Features

Length: 153ft	Diameter: 6in	Material: VCP	Install Year: 1908
Slope: 0.01	Hotspot: N/A	Basin: Q679	Flow Basin: Paradise Park Basin

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
O771-O772	2014-01-23	Cleaning	1.0	1.0	1.0
O771-O772	2014-07-29	Cleaning	1.0	1.0	1.0
O771-O772	2015-03-09	Cleaning	1.0	1.0	1.0
O771-O772	2015-10-27	Cleaning	1.0	1.0	3.0
O771-O772	2016-04-18	Cleaning	1.0	1.0	2.0
O771-O772	2016-12-27	Cleaning	1.0	3.0	3.0
O771-O772	2017-07-17	Cleaning	1.0	1.0	1.0
O771-O772	2018-03-06	Cleaning	1.0	1.0	1.0
O771-O772	2018-10-25	Cleaning	1.0	1.0	1.0
O771-O772	2019-06-20	Cleaning	1.0	1.0	1.0
O771-O772	2020-03-12	Cleaning	1.0	1.0	2.0
O771-O772	2020-07-22	CCTV	1.0	1.0	3.0
O771-O772	2020-11-17	Cleaning	1.0	1.0	1.0
O771-O772	2021-06-21	Cleaning	1.0	1.0	1.0
O771-O772	2022-02-22	Cleaning	1.0	1.0	3.0
O771-O772	2022-11-09	Cleaning	1.0	1.0	1.0
O771-O772	2023-07-06	Cleaning	1.0	1.0	1.0
O771-O772	2024-04-10	Cleaning	1.0	1.0	1.0

O6129-O6144

LOF Predictions - 2024-10-01

Max Prediction: 1.60 (Medium)

Debris Prediction: 1.07 (Medium)

Grease Prediction: 1.01 (Medium)

Roots Prediction: 1.60 (Upper Outlier)

Key Features

Length: 137ft	Diameter: 6in	Material: PVC	Install Year: 1985
Slope: nan	Hotspot: N/A	Basin: Q631	Flow Basin: Beach Basin

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
O6129-O6144	2014-06-23	Cleaning	1.0	1.0	1.0
O6129-O6144	2015-02-09	Cleaning	1.0	1.0	1.0
O6129-O6144	2015-09-17	Cleaning	1.0	1.0	1.0
O6129-O6144	2016-03-21	Cleaning	1.0	1.0	1.0
O6129-O6144	2016-09-27	CCTV	1.0	1.0	3.0
O6129-O6144	2016-11-08	Cleaning	1.0	1.0	2.0
O6129-O6144	2017-06-15	Cleaning	1.0	1.0	1.0
O6129-O6144	2018-02-14	Cleaning	1.0	1.0	2.0
O6129-O6144	2018-09-07	Cleaning	1.0	1.0	2.0
O6129-O6144	2019-05-21	Cleaning	4.0	1.0	3.0
O6129-O6144	2020-02-18	Cleaning	1.0	1.0	1.0
O6129-O6144	2020-10-14	Cleaning	1.0	1.0	1.0
O6129-O6144	2021-05-13	Cleaning	1.0	1.0	1.0
O6129-O6144	2022-01-05	Cleaning	1.0	1.0	1.0
O6129-O6144	2022-03-15	CCTV	1.0	1.0	3.0
O6129-O6144	2022-09-27	Cleaning	1.0	1.0	1.0
O6129-O6144	2023-05-16	Cleaning	1.0	1.0	1.0

Q826-R818

LOF Predictions - 2024-10-01

Max Prediction: 1.62 (Medium)

Debris Prediction: 1.07 (Medium)

Grease Prediction: 1.02 (Medium)

Roots Prediction: 1.62 (Upper Outlier)

Key Features

Length: 216ft	Diameter: 8in	Material: HDPE	Install Year: 1959
Slope: 0.2	Hotspot: N/A	Basin: R822	Flow Basin: Hatton Basin

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
Q826-R818	2014-04-08	Cleaning	1.0	1.0	1.0
Q826-R818	2014-10-15	Cleaning	1.0	1.0	1.0
Q826-R818	2015-05-27	Cleaning	1.0	1.0	1.0
Q826-R818	2015-12-30	Cleaning	1.0	1.0	1.0
Q826-R818	2016-07-08	Cleaning	1.0	1.0	1.0
Q826-R818	2017-03-07	Cleaning	1.0	1.0	1.0
Q826-R818	2017-10-24	Cleaning	1.0	1.0	1.0
Q826-R818	2018-05-24	Cleaning	1.0	1.0	1.0
Q826-R818	2019-01-16	Cleaning	1.0	1.0	1.0
Q826-R818	2019-09-24	Cleaning	1.0	1.0	1.0
Q826-R818	2020-06-11	Cleaning	1.0	1.0	1.0
Q826-R818	2021-01-05	Cleaning	1.0	1.0	1.0
Q826-R818	2021-07-14	CCTV	1.0	1.0	1.0
Q826-R818	2021-10-12	Cleaning	1.0	1.0	1.0
Q826-R818	2022-01-20	CCTV	3.0	1.0	1.0
Q826-R818	2022-01-24	CCTV	1.0	1.0	2.0
Q826-R818	2022-02-03	CCTV	1.0	1.0	1.0
Q826-R818	2022-05-23	Cleaning	1.0	1.0	1.0
Q826-R818	2023-01-19	Cleaning	1.0	1.0	1.0
Q826-R818	2023-10-31	Cleaning	1.0	1.0	1.0

N744-N7121

LOF Predictions - 2024-10-01

Max Prediction: 1.63 (Medium)

Debris Prediction: 1.08 (Medium)

Grease Prediction: 1.01 (Medium)

Roots Prediction: 1.63 (Upper Outlier)

Key Features

Length: 128ft	Diameter: 6in	Material: CIPP	Install Year: 1985
Slope: nan	Hotspot: N/A	Basin: Q679	Flow Basin: Paradise Park Basin

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
N744-N7121	2014-02-04	Cleaning	1.0	1.0	1.0
N744-N7121	2014-08-11	Cleaning	1.0	1.0	1.0
N744-N7121	2015-03-25	Cleaning	1.0	1.0	1.0
N744-N7121	2015-11-06	Cleaning	1.0	1.0	1.0
N744-N7121	2016-05-03	Cleaning	1.0	1.0	3.0
N744-N7121	2017-01-18	Cleaning	1.0	1.0	3.0
N744-N7121	2017-08-21	Cleaning	1.0	1.0	1.0
N744-N7121	2018-04-10	Cleaning	1.0	1.0	1.0
N744-N7121	2018-11-27	Cleaning	1.0	1.0	1.0
N744-N7121	2019-07-23	Cleaning	1.0	1.0	1.0
N744-N7121	2020-04-15	Cleaning	1.0	1.0	1.0
N744-N7121	2020-09-01	CCTV	1.0	1.0	2.0
N744-N7121	2020-11-23	Cleaning	1.0	1.0	1.0
N744-N7121	2021-06-25	Cleaning	1.0	1.0	1.0
N744-N7121	2022-03-23	Cleaning	1.0	1.0	1.0
N744-N7121	2022-12-29	Cleaning	1.0	1.0	1.0
N744-N7121	2023-07-27	Cleaning	1.0	1.0	1.0

N601-N602

LOF Predictions - 2024-10-01

Max Prediction: 1.64 (Medium)

Debris Prediction: 1.09 (Medium)

Grease Prediction: 1.11 (Highest)

Roots Prediction: 1.64 (Upper Outlier)

Key Features

Length: 165ft	Diameter: 6in	Material: VCP	Install Year: 1924
Slope: 0.14	Hotspot: N/A	Basin: N609	Flow Basin: Carmel Wood Basin

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
N601-N602	2014-07-09	Cleaning	1.0	1.0	1.0
N601-N602	2015-03-12	Cleaning	1.0	1.0	1.0
N601-N602	2015-10-02	Cleaning	1.0	1.0	1.0
N601-N602	2016-04-05	Cleaning	1.0	1.0	1.0
N601-N602	2016-12-15	Cleaning	1.0	1.0	1.0
N601-N602	2017-07-03	Cleaning	1.0	1.0	1.0
N601-N602	2018-04-02	Cleaning	1.0	1.0	1.0
N601-N602	2018-10-12	Cleaning	1.0	1.0	1.0
N601-N602	2019-07-22	Cleaning	1.0	1.0	1.0
N601-N602	2020-02-21	CCTV	1.0	1.0	2.0
N601-N602	2020-02-27	Cleaning	1.0	1.0	1.0
N601-N602	2020-10-23	Cleaning	1.0	1.0	1.0
N601-N602	2021-06-01	Cleaning	1.0	1.0	1.0
N601-N602	2021-07-30	Cleaning	1.0	1.0	3.0
N601-N602	2021-07-30	Spill	3.0	3.0	3.0
N601-N602	2021-08-05	Cleaning	1.0	1.0	3.0
N601-N602	2022-03-03	Cleaning	1.0	1.0	1.0
N601-N602	2022-10-06	Spill	2.0	2.0	5.0
N601-N602	2022-12-24	Cleaning	1.0	1.0	1.0
N601-N602	2023-06-14	Cleaning	1.0	1.0	1.0
N601-N602	2023-08-25	Cleaning	1.0	1.0	1.0
N601-N602	2023-10-31	Cleaning	1.0	1.0	1.0
N601-N602	2024-01-02	Cleaning	1.0	1.0	1.0
N601-N602	2024-01-04	Cleaning	1.0	1.0	1.0

Q688-Q694

LOF Predictions - 2024-10-01

Max Prediction: 1.66 (Highest)

Debris Prediction: 1.10 (Medium)

Grease Prediction: 1.01 (Medium)

Roots Prediction: 1.66 (Upper Outlier)

Key Features

Length: 220ft	Diameter: 6in	Material: VCP	Install Year: 1908
Slope: nan	Hotspot: N/A	Basin: R709	Flow Basin: Mission Basin

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
Q688-Q694	2014-02-14	Cleaning	1.0	1.0	2.0
Q688-Q694	2014-08-28	Cleaning	1.0	1.0	2.0
Q688-Q694	2015-04-03	Cleaning	1.0	1.0	2.0
Q688-Q694	2015-12-01	Cleaning	2.0	1.0	2.0
Q688-Q694	2016-05-12	Cleaning	1.0	1.0	1.0
Q688-Q694	2017-01-27	Cleaning	1.0	1.0	3.0
Q688-Q694	2017-10-03	Cleaning	1.0	1.0	1.0
Q688-Q694	2018-04-18	Cleaning	1.0	1.0	1.0
Q688-Q694	2018-12-11	Cleaning	1.0	1.0	1.0
Q688-Q694	2019-08-26	Cleaning	1.0	1.0	1.0
Q688-Q694	2020-04-21	Cleaning	1.0	1.0	2.0
Q688-Q694	2020-10-19	CCTV	3.0	1.0	3.0
Q688-Q694	2020-12-15	Cleaning	1.0	1.0	2.0
Q688-Q694	2021-08-03	Cleaning	1.0	1.0	3.0
Q688-Q694	2022-04-04	Cleaning	1.0	1.0	3.0
Q688-Q694	2022-12-28	Cleaning	1.0	1.0	1.0
Q688-Q694	2023-09-11	Cleaning	1.0	1.0	2.0

O804-O805

LOF Predictions - 2024-10-01

Max Prediction: 1.67 (Highest)

Debris Prediction: 1.07 (Medium)

Grease Prediction: 1.01 (Medium)

Roots Prediction: 1.67 (Upper Outlier)

Key Features

Length: 232ft	Diameter: 10in	Material: HDPE	Install Year: 1966
Slope: nan	Hotspot: N/A	Basin: 1972	Flow Basin: Hatton Basin

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
O804-O805	2014-03-18	Cleaning	1.0	1.0	1.0
O804-O805	2014-09-30	Cleaning	1.0	1.0	1.0
O804-O805	2015-06-08	Cleaning	1.0	1.0	1.0
O804-O805	2016-10-24	Cleaning	4.0	1.0	1.0
O804-O805	2017-09-07	Cleaning	1.0	1.0	1.0
O804-O805	2018-05-23	Cleaning	1.0	1.0	1.0
O804-O805	2019-07-17	Cleaning	1.0	1.0	1.0
O804-O805	2020-12-01	CCTV	1.0	1.0	1.0
O804-O805	2020-12-02	Cleaning	1.0	1.0	1.0
O804-O805	2022-09-07	Cleaning	1.0	1.0	1.0
O804-O805	2023-10-20	Cleaning	1.0	1.0	2.0

O652-O653

LOF Predictions - 2024-10-01

Max Prediction: 1.71 (Highest)

Debris Prediction: 1.05 (Lowest)

Grease Prediction: 1.01 (Medium)

Roots Prediction: 1.71 (Upper Outlier)

Key Features

Length: 190ft	Diameter: 6in	Material: VCP	Install Year: 1908
Slope: nan	Hotspot: N/A	Basin: Q631	Flow Basin: Beach Basin

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
O652-O653	2014-06-25	Cleaning	1.0	1.0	1.0
O652-O653	2015-02-12	Cleaning	1.0	1.0	1.0
O652-O653	2015-09-23	Cleaning	1.0	1.0	1.0
O652-O653	2016-03-23	Cleaning	1.0	1.0	1.0
O652-O653	2016-03-29	Cleaning	1.0	1.0	1.0
O652-O653	2016-11-15	Cleaning	1.0	1.0	1.0
O652-O653	2017-06-20	Cleaning	1.0	2.0	1.0
O652-O653	2018-02-21	Cleaning	1.0	1.0	1.0
O652-O653	2018-09-17	Cleaning	1.0	1.0	2.0
O652-O653	2019-05-14	Cleaning	1.0	1.0	3.0
O652-O653	2019-12-18	CCTV	1.0	1.0	2.0
O652-O653	2020-04-01	Cleaning	1.0	1.0	1.0
O652-O653	2021-01-14	Cleaning	1.0	1.0	4.0
O652-O653	2021-10-15	Cleaning	1.0	1.0	4.0
O652-O653	2022-07-05	Cleaning	1.0	1.0	3.0
O652-O653	2022-09-28	Cleaning	1.0	1.0	1.0
O652-O653	2023-05-23	Cleaning	1.0	1.0	1.0
O652-O653	2024-02-22	Cleaning	1.0	1.0	1.0

O6135-O6106

LOF Predictions - 2024-10-01

Max Prediction: 1.75 (Highest)

Debris Prediction: 1.19 (Medium)

Grease Prediction: 1.47 (Upper Outlier)

Roots Prediction: 1.75 (Upper Outlier)

Key Features

Length: 61ft	Diameter: 6in	Material: VCP	Install Year: 1908
Slope: nan	Hotspot: N/A	Basin: Q679	Flow Basin: Paradise Park Basin

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
O6135-O6106	2020-07-16	CCTV	1.0	1.0	1.0
O6135-O6106	2020-07-28	CCTV	1.0	1.0	2.0

S1044-S1045

LOF Predictions - 2024-10-01

Max Prediction: 1.80 (Highest)

Debris Prediction: 1.07 (Medium)

Grease Prediction: 1.01 (Medium)

Roots Prediction: 1.80 (Upper Outlier)

Key Features

Length: 106ft	Diameter: 6in	Material: VCP	Install Year: 1969
Slope: nan	Hotspot: N/A	Basin: R809	Flow Basin: Valley Basin

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
S1044-S1045	2014-04-15	Cleaning	1.0	1.0	2.0
S1044-S1045	2014-10-29	Cleaning	1.0	1.0	1.0
S1044-S1045	2015-06-22	Cleaning	1.0	1.0	1.0
S1044-S1045	2016-01-20	Cleaning	1.0	1.0	3.0
S1044-S1045	2016-07-29	Cleaning	1.0	1.0	1.0
S1044-S1045	2017-03-20	Cleaning	1.0	1.0	3.0
S1044-S1045	2017-08-15	Cleaning	1.0	1.0	1.0
S1044-S1045	2018-06-19	Cleaning	1.0	1.0	2.0
S1044-S1045	2019-01-23	Cleaning	1.0	1.0	1.0
S1044-S1045	2019-09-30	Cleaning	1.0	1.0	4.0
S1044-S1045	2020-07-21	Cleaning	1.0	1.0	1.0
S1044-S1045	2021-02-10	Cleaning	1.0	1.0	1.0
S1044-S1045	2021-09-09	CCTV	1.0	1.0	1.0
S1044-S1045	2021-09-13	Cleaning	1.0	1.0	1.0
S1044-S1045	2021-09-13	CCTV	1.0	1.0	3.0
S1044-S1045	2022-04-15	Cleaning	1.0	1.0	2.0
S1044-S1045	2023-02-07	Cleaning	1.0	1.0	1.0
S1044-S1045	2023-08-25	Cleaning	1.0	1.0	1.0

P904-P903

LOF Predictions - 2024-10-01

Max Prediction: 1.81 (Highest)

Debris Prediction: 1.04 (Lowest)

Grease Prediction: 1.01 (Medium)

Roots Prediction: 1.81 (Upper Outlier)

Key Features

Length: 76ft	Diameter: 6in	Material: VCP	Install Year: 1973
Slope: 0.12	Hotspot: N/A	Basin: R809	Flow Basin: Valley Basin

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
P904-P903	2014-04-03	Cleaning	1.0	1.0	1.0
P904-P903	2014-10-20	Cleaning	1.0	1.0	1.0
P904-P903	2015-06-04	Cleaning	1.0	1.0	1.0
P904-P903	2016-01-15	Cleaning	1.0	1.0	1.0
P904-P903	2016-07-25	Cleaning	1.0	1.0	1.0
P904-P903	2017-03-21	Cleaning	1.0	1.0	3.0
P904-P903	2017-11-13	Cleaning	1.0	1.0	3.0
P904-P903	2018-12-17	Cleaning	1.0	1.0	2.0
P904-P903	2020-01-15	Cleaning	1.0	1.0	3.0
P904-P903	2020-06-30	Cleaning	1.0	1.0	2.0
P904-P903	2021-02-08	Cleaning	1.0	1.0	1.0
P904-P903	2021-04-20	CCTV	1.0	1.0	1.0
P904-P903	2021-10-25	Cleaning	1.0	1.0	1.0
P904-P903	2023-08-17	Cleaning	1.0	1.0	3.0

O926-P904

LOF Predictions - 2024-10-01

Max Prediction: 1.84 (Highest)

Debris Prediction: 1.04 (Lowest)

Grease Prediction: 1.01 (Medium)

Roots Prediction: 1.84 (Upper Outlier)

Key Features

Length: 182ft	Diameter: 6in	Material: VCP	Install Year: 1973
Slope: 0.14	Hotspot: N/A	Basin: R809	Flow Basin: Valley Basin

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
O926-P904	2014-04-03	Cleaning	1.0	1.0	1.0
O926-P904	2014-10-20	Cleaning	1.0	1.0	1.0
O926-P904	2015-06-15	Cleaning	1.0	1.0	1.0
O926-P904	2016-01-15	Cleaning	1.0	1.0	2.0
O926-P904	2016-07-25	Cleaning	1.0	1.0	1.0
O926-P904	2017-03-21	Cleaning	1.0	1.0	3.0
O926-P904	2017-11-13	Cleaning	1.0	1.0	3.0
O926-P904	2018-12-17	Cleaning	1.0	1.0	2.0
O926-P904	2020-01-15	Cleaning	1.0	1.0	3.0
O926-P904	2020-06-30	Cleaning	1.0	1.0	2.0
O926-P904	2021-02-08	Cleaning	1.0	1.0	1.0
O926-P904	2021-04-20	CCTV	1.0	1.0	2.0
O926-P904	2021-10-25	Cleaning	1.0	1.0	1.0
O926-P904	2023-08-17	Cleaning	1.0	1.0	3.0

Q713-Q784

LOF Predictions - 2024-10-01

Max Prediction: 1.86 (Highest)

Debris Prediction: 1.04 (Lowest)

Grease Prediction: 1.01 (Medium)

Roots Prediction: 1.86 (Upper Outlier)

Key Features

Length: 124ft	Diameter: 6in	Material: VCP	Install Year: 1953
Slope: 0.28	Hotspot: N/A	Basin: R709	Flow Basin: Mission Basin

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Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
Q713-Q784	2017-09-29	Cleaning	1.0	1.0	1.0
Q713-Q784	2018-05-01	Cleaning	1.0	1.0	3.0
Q713-Q784	2019-01-02	Cleaning	1.0	1.0	1.0
Q713-Q784	2019-01-09	Cleaning	1.0	1.0	1.0
Q713-Q784	2019-09-05	Cleaning	1.0	1.0	4.0
Q713-Q784	2020-06-30	Cleaning	1.0	1.0	1.0
Q713-Q784	2020-12-29	Cleaning	1.0	1.0	1.0
Q713-Q784	2021-07-28	Cleaning	1.0	1.0	4.0
Q713-Q784	2021-08-24	CCTV	1.0	1.0	3.0
Q713-Q784	2021-09-29	Cleaning	1.0	1.0	1.0
Q713-Q784	2022-05-04	Cleaning	1.0	1.0	1.0
Q713-Q784	2023-02-07	Cleaning	1.0	1.0	1.0
Q713-Q784	2023-09-26	Cleaning	1.0	1.0	1.0

O766-O767

LOF Predictions - 2024-10-01

Max Prediction: 1.88 (Highest)

Debris Prediction: 1.07 (Medium)

Grease Prediction: 1.09 (Highest)

Roots Prediction: 1.88 (Upper Outlier)

Key Features

Length: 223ft	Diameter: 6in	Material: VCP	Install Year: 1908
Slope: nan	Hotspot: N/A	Basin: Q679	Flow Basin: Paradise Park Basin

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
O766-O767	2014-01-23	Cleaning	1.0	1.0	1.0
O766-O767	2014-07-29	Cleaning	1.0	1.0	1.0
O766-O767	2015-03-09	Cleaning	1.0	1.0	1.0
O766-O767	2015-10-27	Cleaning	1.0	1.0	1.0
O766-O767	2016-04-18	Cleaning	1.0	1.0	1.0
O766-O767	2016-12-28	Cleaning	1.0	1.0	1.0
O766-O767	2017-07-19	Cleaning	1.0	1.0	1.0
O766-O767	2018-03-06	Cleaning	1.0	1.0	1.0
O766-O767	2018-10-25	Cleaning	1.0	1.0	1.0
O766-O767	2019-06-20	Cleaning	1.0	1.0	1.0
O766-O767	2020-03-12	Cleaning	1.0	1.0	1.0
O766-O767	2020-07-14	CCTV	1.0	3.0	3.0
O766-O767	2020-11-17	Cleaning	1.0	1.0	1.0
O766-O767	2021-06-17	Cleaning	1.0	1.0	1.0
O766-O767	2022-02-22	Cleaning	1.0	1.0	3.0
O766-O767	2022-11-09	Cleaning	1.0	1.0	4.0
O766-O767	2023-07-10	Cleaning	1.0	1.0	4.0
O766-O767	2024-04-10	Cleaning	1.0	1.0	1.0

M777-M784

LOF Predictions - 2024-10-01

Max Prediction: 1.90 (Highest)

Debris Prediction: 1.04 (Lowest)

Grease Prediction: 1.31 (Upper Outlier)

Roots Prediction: 1.90 (Upper Outlier)

Key Features

Length: 102ft	Diameter: 6in	Material: VCP	Install Year: 1924
Slope: nan	Hotspot: N/A	Basin: N609	Flow Basin: Carmel Wood Basin

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
M777-M784	2014-01-23	CCTV	1.0	1.0	3.0
M777-M784	2014-11-21	Cleaning	1.0	1.0	4.0

P754-P755

LOF Predictions - 2024-10-01

Max Prediction: 1.93 (Highest)

Debris Prediction: 1.09 (Medium)

Grease Prediction: 1.03 (Medium)

Roots Prediction: 1.93 (Upper Outlier)

Key Features

| Length: 503ft | Diameter: 6in | Material: VCP | Install Year: 1953 |
| Slope: 0.05 | Hotspot: N/A | Basin: R709 | Flow Basin: Mission Basin |

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
P754-P755	2014-02-25	Cleaning	1.0	1.0	1.0
P754-P755	2014-09-08	Cleaning	1.0	1.0	3.0
P754-P755	2015-04-20	Cleaning	1.0	1.0	2.0
P754-P755	2015-12-15	Cleaning	1.0	1.0	1.0
P754-P755	2016-06-16	Cleaning	2.0	1.0	3.0
P754-P755	2017-02-06	Cleaning	1.0	1.0	2.0
P754-P755	2017-10-02	Cleaning	2.0	1.0	4.0
P754-P755	2018-04-25	Cleaning	1.0	1.0	2.0
P754-P755	2019-01-14	Cleaning	1.0	1.0	1.0
P754-P755	2019-09-03	Cleaning	1.0	1.0	1.0
P754-P755	2020-05-21	Cleaning	1.0	1.0	4.0
P754-P755	2020-10-26	CCTV	1.0	1.0	3.0
P754-P755	2020-12-28	Cleaning	1.0	1.0	1.0
P754-P755	2021-08-18	Cleaning	1.0	1.0	1.0
P754-P755	2022-04-11	Cleaning	1.0	1.0	3.0
P754-P755	2023-01-06	Cleaning	1.0	1.0	1.0
P754-P755	2023-09-25	Cleaning	1.0	1.0	1.0

O942-O943

LOF Predictions - 2024-10-01

Max Prediction: 1.99 (Highest)

Debris Prediction: 1.37 (Medium)

Grease Prediction: 1.01 (Medium)

Roots Prediction: 1.99 (Upper Outlier)

Key Features

Length: 179ft	Diameter: 6in	Material: VCP	Install Year: 1973
Slope: 0.15	Hotspot: N/A	Basin: R809	Flow Basin: Valley Basin

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
O942-O943	2014-10-22	Cleaning	1.0	1.0	1.0
O942-O943	2015-10-15	Cleaning	1.0	1.0	1.0
O942-O943	2017-03-28	Cleaning	1.0	1.0	1.0
O942-O943	2018-06-07	Cleaning	1.0	1.0	1.0
O942-O943	2019-07-08	Cleaning	1.0	1.0	1.0
O942-O943	2020-07-09	Cleaning	1.0	1.0	1.0
O942-O943	2021-06-30	Cleaning	1.0	1.0	1.0
O942-O943	2021-07-06	Cleaning	1.0	1.0	4.0
O942-O943	2021-07-06	CCTV	1.0	1.0	3.0
O942-O943	2022-07-06	Cleaning	1.0	1.0	3.0

O6120-O6135

LOF Predictions - 2024-10-01

Max Prediction: 2.02 (Highest)

Debris Prediction: 1.32 (Medium)

Grease Prediction: 1.45 (Upper Outlier)

Roots Prediction: 2.02 (Upper Outlier)

Key Features

Length: 248ft	Diameter: 8in	Material: VCP	Install Year: 1908
Slope: nan	Hotspot: N/A	Basin: Q679	Flow Basin: Paradise Park Basin

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
O6120-O6135	2020-07-28	CCTV	1.0	1.0	3.0
O6120-O6135	2020-07-29	CCTV	1.0	1.0	2.0

R724-R788

LOF Predictions - 2024-10-01

Max Prediction: 2.10 (Highest)

Debris Prediction: 1.04 (Lowest)

Grease Prediction: 1.01 (Medium)

Roots Prediction: 2.10 (Upper Outlier)

Key Features

Length: 307ft	Diameter: 6in	Material: VCP	Install Year: 1953
Slope: 0.02	Hotspot: N/A	Basin: R709	Flow Basin: Mission Basin

Conditions

Asset ID	Date	Condition Type	Debris	Grease	Roots
R724-R788	2014-03-04	Cleaning	1.0	1.0	3.0
R724-R788	2014-09-11	Cleaning	1.0	1.0	1.0
R724-R788	2015-04-23	Cleaning	1.0	1.0	1.0
R724-R788	2015-12-16	Cleaning	1.0	1.0	3.0
R724-R788	2016-06-22	Cleaning	1.0	1.0	1.0
R724-R788	2017-02-13	Cleaning	1.0	1.0	1.0
R724-R788	2017-10-10	Cleaning	1.0	1.0	1.0
R724-R788	2018-05-02	Cleaning	1.0	1.0	1.0
R724-R788	2019-01-09	Cleaning	1.0	1.0	2.0
R724-R788	2019-08-27	Cleaning	1.0	1.0	1.0
R724-R788	2020-05-05	Cleaning	1.0	1.0	1.0
R724-R788	2020-12-15	Cleaning	1.0	1.0	1.0
R724-R788	2021-01-12	CCTV	1.0	3.0	3.0
R724-R788	2021-08-11	Cleaning	1.0	1.0	3.0
R724-R788	2022-04-05	Cleaning	1.0	1.0	1.0
R724-R788	2023-01-18	Cleaning	1.0	1.0	2.0
R724-R788	2023-05-04	Cleaning	1.0	1.0	2.0
R724-R788	2024-02-12	Cleaning	1.0	1.0	4.0

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