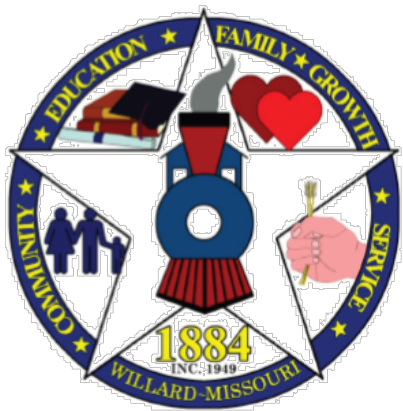


A proposal for City of Willard, MO



Proposal & Scope of Work

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ASTERRA

ASTERRA uses patent-protected technology for infrastructure condition assessment, pipe replacement modeling, and leak detection in urban and rural, water or sewage networks, using L-band synthetic aperture radar (SAR) mounted on a satellite. The technology is based on a proprietary algorithm that detects soil moisture resulting from treated water or wastewater leaks, through the analysis of SAR data. This is of considerable value to industry, governments, and citizens. Because the observation point is orbiting 390 miles above the Earth, this allows for simultaneous monitoring of pipes within a large network.

ASTERRA's Martian Roots

ASTERRA's core technology is based on the search for underground water on Mars and other planets. Lauren Guy, a geophysicist, and entrepreneur who developed the approach, quickly recognized the application could be even more effective here on Earth. The water was closer, the need more immediate, and the technology had the potential to solve a number of critical problems. Mr. Guy founded Utilis (now known as ASTERRA) in 2013 to develop applications for the new technology. In 2016, leak detection in underground water systems became the first commercially used application. This solution is now called Recover.

A Revolutionary Change

From an orbiting satellite, our algorithm which is fine-tuned to detect treated drinking water and wastewater, reveals underground leaks as small as 0.2 gallons per minute. Now, managers of underground water infrastructure can see the water leaking from their systems. Even in the largest cities, it could be seen all at once, with unheard-of speed and efficiency. ASTERRA continues to refine the technology and expand its applications beyond leak detection, adding pipeline monitoring and deficiency analysis to its growing capabilities.

Impact

ASTERRA actively contributes to the United Nations Sustainable Development Goals, particularly focusing on Goal numbers 6 (Clean Water and Sanitation), 9 (Industry, Innovation, and Infrastructure), 11 (Sustainable Cities and Communities), and 13 (Climate Action). By leveraging our expertise in satellite-based infrastructure intelligence, we empower organizations to make data-driven decisions and build a resilient and sustainable future. We are dedicated to creating lasting positive change and supporting the achievement of the SDGs globally.



1. Satellite Radar – Scan Acquisition

Raw scans of the area taken by radar over Areas of Interest (AOI) received from client

2. Radiometric Corrections

ASTERRA takes the raw scan and prepares it for analysis, by filtering interferences from buildings, manmade objects, vegetation, water bodies, and more

3. Algorithmic Analysis

ASTERRA's unique and patented algorithm targets the spectral signature of treated water or wastewater and its interaction with the soil

4. Availability to Client

Newly detected leak locations are delivered via the EO Discover platform to the client on an ongoing basis, with frequency depending on the level of monitoring purchased.

Advantages of Ongoing Monitoring

Today, utilities typically survey their system blindly and reactively. This approach yields minimal results which leads many utilities to deprioritize proactive leak detection. Usually, utilities are forced to use limited resources for work orders to find, dig and repair leaks. In most cases, this results in falling further behind the curve and increased pipe breakages. Rather than leak detectors surveying the entire system blindly, Recover guides leak detectors to likely leak locations which **ASTERRA** has highlighted through their analysis. Now, leak detectors only need to walk 5-10% of the system where water is already leaking. **ASTERRA's** technology can detect active leaks in your system with a single scan, providing a snapshot at that moment in time. However, a single scan may not capture all active leaks. To ensure comprehensive detection, additional scans offer ongoing monitoring, allowing for the identification of more leaks over time. Since leaks can develop and expand, ongoing monitoring ensures that even areas previously inspected will be reassessed and any new or growing leaks will be detected.

Client Benefits & Impact

ASTERRA provides a comprehensive, accurate, and non-invasive remote sensing solution for locating leaks and monitoring any potable water and wastewater system in the world. This works over any type of terrain – flat or hilly; sparsely populated or densely populated high-rises. This is done by extracting information from SAR scans taken high above the ground and converting them into locations of underground potable water or wastewater leaks. Reducing NRW additionally has a positive effect on the environment. By reducing non-revenue water loss, the amount of processing decreases, resulting in a reduction of power use and the associated environmental effects. Locating and fixing wastewater leaks in sewer systems also helps the environment by preventing pollution.

Main benefits of Recover:

- Non-invasive technology: Deployment of sensors or hardware on the ground is not necessary.
- ASTERRA technology is effective irrespective of soil type, pipe material, and pipe diameter.
- Covers large areas at once. Surveys an entire system in urban and rural areas, while also providing location intelligence at a fine resolution. Identifies potential leaks in areas that traditional acoustic leak detection programs may not typically survey.
- Find more leaks in a shorter period: Increases the efficiency of traditional acoustic leak detection programs by prioritizing work locations and offering quicker response times.
- Screening technology that can be used directly or indirectly for condition assessment, asset budget planning and work on structural changes prioritizing network riskier zones.
- Identifies background (i.e., non-surfacing) leaks that might otherwise go undetected for long periods of time.
- Can fit into either CAPEX or OPEX budgets.
- Provides a positive impact on the environment (reduces water loss, electricity used, and CO2 produced).

ASTERRA's Solutions

ASTERRA's solutions include Recover and MasterPlan for potable water and wastewater. All are made available on ASTERRA's EO Discover platform. Recover and MasterPlan are ASTERRA's commercial services offered in this proposal. The output from the proprietary algorithm is provided through the analysis of the SAR data combined with other processing techniques owned by Utilis (dba ASTERRA).

Recover for Leak Detection

Recover is a satellite-based solution for monitoring and detecting leaks in drinking and wastewater systems. It enhances operational efficiency and budget optimization by providing infrastructure intelligence for proactive pipe repair and planning. With Recover, entire city-wide systems can be monitored efficiently.

This advanced technology quickly locates non-surfacing leaks, allowing leak detection crews to focus on targeted repairs instead of unnecessary digging. Compared to traditional methods, Recover identifies more leaks and increases field crew efficiency by up to 400%. It offers the water industry the lowest cost per leak found, averaging 3.5 leaks per crew day compared to 1.3 with traditional acoustic methods. By reducing non-revenue water loss, which amounts to 17 billion gallons annually worldwide, Recover brings significant benefits to companies in the industry.

Furthermore, Recover assists the wastewater sector by mitigating the risks of fines, consent decrees, legal consequences, and reputational damage.

Recover Insights

At the start of the client's subscription period, each client is provided access to the EO Discover platform. EO Discover's interactive workspace enables clients to customize data views for optimal decision-making. The platform also offers flexibility by ensuring compatibility with other asset management system, allowing clients to download and upload files into other platforms. Each client is also provided access to the U-Collect field investigation application. The platform can be accessed 24/7 during the subscription period to view ASTERRA's analysis and results of field investigations and to track success metrics.

Recover includes:

Results through Map Visualization: A GIS layer containing highlighted pipe segments within the network, provided in SHP and KML format for import into any GIS system (client-based, ESRI, or ASTERRA-provided U-Collect) that can be overlaid on a map displaying streets, pipes, hydrants, valves, and potential leak information.

EO Discover: Access to the EO Discover password-protected platform displaying data and field results, along with monitoring the progress of the service progress in real-time.

Enhanced Recover Analysis: Through multiple scans we can identify leak clusters through a temporal and spatial analysis which will aid in maintenance prioritization and asset management plans.

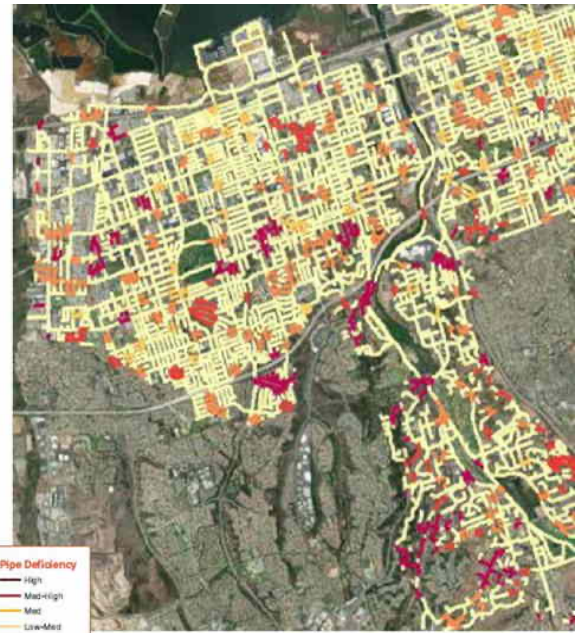
MasterPlan for Pipe Deficiency Assessment

Providing unique insights not available from anyone but ASTERRA, MasterPlan is an actual (not predictive) measurement of non-surfacing pipe leaks. It is pipe agnostic and collected non-invasively by a satellite with wide coverage, often scanning a full system instantaneously. MasterPlan provides actionable insights into your asset management plan in one easy data layer. Trained on five years of leaks discovered using Recover, the algorithm assesses the deficiency of an entire pipe system using multiple SAR scans over time.

ASTERRA MasterPlan provides a GIS dataset containing pipe deficiency levels derived from SAR data. This solution is based on the same proven patented algorithm that is used by Recover to detect leaks in your system but is extended to monitor your system over time using statistical analysis. The general process takes all likely leak locations identified in two consecutive satellite scans (identical coverage and angle) over your area of interest and analyzes the results. It then compares the results from multiple scans and identifies the areas with potential leaky pipes between them.

These results are processed through a learned statistical algorithm and used to assign pipes a score from low to high, signifying the level of deficiency observed.

With ASTERRA Masterplan, we can identify critical areas where the client can focus its future pipeline rehab and replacement efforts. These high deficiency areas can be used for asset management planning purposes, e.g., capital improvement replacement planning.



MasterPlan Insights

MasterPlan provides utilities and engineers with insights into actual pipe conditions. This GIS data layer is compatible and easily integrates into all GIS and GIS-based software. Combine this data with other information, such as pipe age, material, work orders, and consequence of failure to further enhance your replacement planning models or water system master plans.

MasterPlan (Pipe Deficiency Output): A GIS layer containing client pipe segments that are ranked based on condition. Provided in SHP and KML format for import into a GIS or risk modeling system (Client map displaying streets, pipes, hydrants, valves, and potential leak information).

EO Discover: Login credentials to the EO Discover password-protected platform for viewing the pipe data via GIS and for monitoring pipe deficiency levels.

MasterPlan Pipe Deficiency Assessment: A summary assessment detailing the condition of the client's pipes based on the GIS data output of pipe scores from low to high deficiency.

Typical Process and Timeline

- After confirmation of the order through the contract signature or receipt of a purchase order, ASTERRA will acquire the satellite scan(s). ASTERRA must have the order confirmation at least 21 days prior to the first date of satellite coverage to move forward with the satellite data procurement. The date of the acquisition is subject to the technical and operational constraints of the third-party satellite operation company and may change at any time.
- Before the acquisition, the client will provide ASTERRA with an Area of Interest (AOI). Unless agreed otherwise by the parties, the AOI is a designated geographical area to be surveyed using satellite within the client-provided service area.
- During the period prior to the scan acquisition, the client will provide ASTERRA with a GIS layer of all available treated water or sewage lines in the AOI to be analyzed. If available, the client will also provide a hydrant and valve layer within the AOI.
- Unless otherwise agreed upon by both the parties, ASTERRA will provide services only in the AOI overlapping with the client's provided GIS pipe system layer.
- After acquiring the scan and receiving the GIS pipe layers from the client, data will begin to populate on the EO Discover platform. This is approximately 7-14 business days after the first scheduled scan acquisition date. Scan acquisition dates may be changed by a third party (satellite operator) or due to technical constraints. Service start dates may be affected due to poor scan quality according to ASTERRA's quality assurance standards.
- Where applicable, leak field inspection work can begin after the leakage data has populated on EO Discover on an agreeable date between both parties.



EO Discover

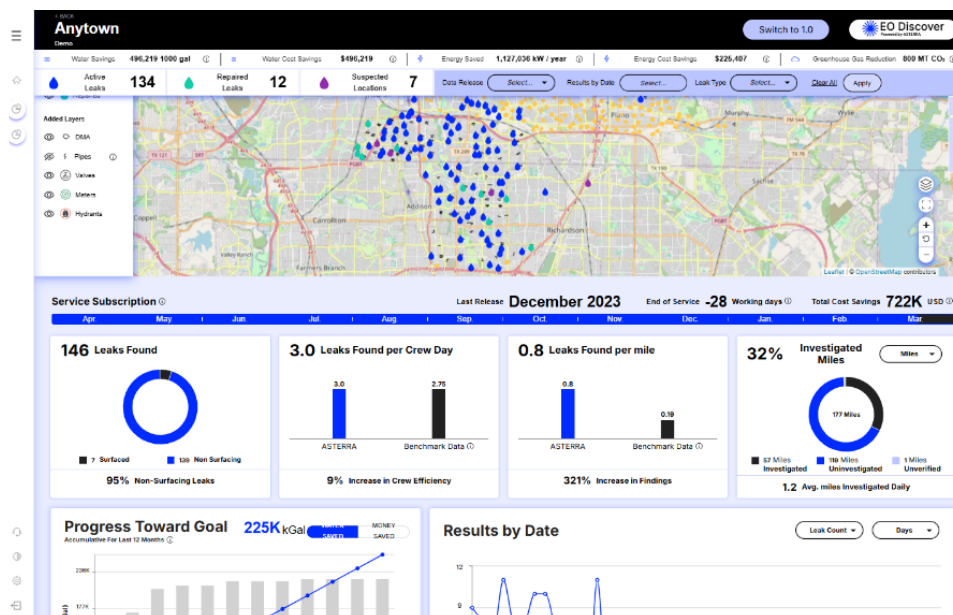
Revolutionizing Water Loss Management

EO Discover is a user-friendly SaaS platform that empowers decision-makers, operators, and field teams with advanced insights to locate underground potable water. Acting as a centralized intelligence hub, EO Discover helps proactively prevent water loss and subterranean infrastructure damage caused by leaks.

By offering real-time visibility and data-driven analysis, the platform supports the achievement of KPIs, ESG goals, and contributions to the UN Sustainable Development Goals (SDGs). EO Discover delivers actionable insights, tracks savings, and helps optimize operations—driving smarter, more sustainable water management across your organization.

Main Benefits of EO Discover

- View all key insights, service data and savings in one intuitive platform
- Access detailed information on potential leaks, including locations, actionable insights and estimated savings once leaks are verified
- Evaluate ongoing services with full performance breakdowns
- Track return on investment, operational performance and environmental impact with precision
- Designed for seamless use across decision-makers, operators and field teams
- Fully compatible with U-Collect mobile application for on-the-go data collection and syncing.





Scope of Work

PROPOSAL

Scope of Work

The scope of work contained herein details the work and services ASTERRA will provide as well as the roles and responsibilities of both ASTERRA and City of Willard, MO (“**Client**”).

Roles, Responsibilities, and Offerings – ASTERRA

ASTERRA will provide Recover data as a service via EO Discover and it will consist of areas identified as potential leaks (i.e., areas containing soil moisture of treated water and/or wastewater underground) using a proprietary satellite imaging algorithm across the **Client’s** water system. ASTERRA will provide a primary contact person for technical and administrative purposes who will interact with the **Client**.

ASTERRA’s Responsibilities (“Services”):

- Acquiring and analyzing the satellite scan(s).
- Providing potential leak location data as a service through our password-protected platform, EO Discover. This data can be exported as GIS data files.
- Providing best practices for field inspection protocols to the Client.

ASTERRA’s Solution for Potable Water:

- **Results through Map Visualization:** A GIS layer containing the likely leak locations, in the form of highlighted pipe segments, provided in GIS data files formatted for import into any GIS system.
- **EO Discover:** Provides access to monitor and track the progress of the service in real time and calculates ROI and impact metrics for ongoing KPI tracking. The license is for the period of service purchased.
- **U-Collect Licenses:** Provided for U-Collect (allows field technician to collect data in the field). The license is active upon delivery for the period of service. Additional licenses may be purchased and/or the initial license extended at the request of the client.

- **Kick-off Meeting:** Prior to fieldwork, an ASTERRA or ASTERRA-certified team (regardless of if it the client's team or a contractor), will call a kick-off meeting to agree on the operational field plan to address the Client's specific needs and the best practices required to get the best results.
- **Initial Field Deployment:** ASTERRA will provide a certified subcontracted acoustic leak detection technician to investigate the points of interest, provide a list of verified leaks, and mark them for repair over a five (5) day/ 40-hour period. The leak detection field verification technician(s) is proficient and experienced in using and operating acoustic equipment. The technician(s) should be provided with all the needed tools to access the listening points. Throughout the five (5) day/40-hour field implementation period, it is estimated that the technician(s) will investigate between 20 and 30 likely leak locations.
- **Optional: Acoustic Leak Detection for Field Investigation (for Potable Water Pipelines Only):** Based upon selecting this option, ASTERRA will provide a certified subcontracted acoustic leak detection team to investigate the points of interest, provide a list of verified leaks, and mark them for repair. The leak detection field verification team(s) is proficient and experienced in using and operating acoustic equipment. The team should be provided with all the needed tools to access the listening points.
- **Optional: ASTERRA MasterPlan Pipe Deficiency Map,** provided as a GIS data set, if purchased within the Recover tier available or as an additional service option.
- **Optional: ESRI Arc GIS Field Maps Integration** – data provided in your ESRI ArcGIS online accounts for easy use in ArcGIS Field Maps. (Additional cost may apply if it is not included in the Recover service tier already).

ASTERRA's Solution for Wastewater

- **Results through Map Visualization:** A GIS layer containing the likely leak locations, in the form of highlighted pipe segments, provided in GIS data files formatted for import into any GIS system.
- **EO Discover:** Provides access to monitor and track the progress of the service in real time and calculates ROI and impact metrics for ongoing KPI tracking. The license is for the period of service purchased.
- **Kick-off Meeting:** ASTERRA or ASTERRA-certified team will call a virtual kick-off meeting to discuss the data delivered and demonstrate the usage of the platform.

Roles, Responsibilities, and Offering – Client

The Client is responsible for providing baseline system data, work order history, and in some cases, an acoustic field verification team to inspect likely leak locations identified by ASTERRA. The client shall identify a primary contact person for technical, administrative, and field inspection coordination. ASTERRA agrees to use the information described below only for the client's specific service and to not share the information with any other third party.

Client Responsibilities

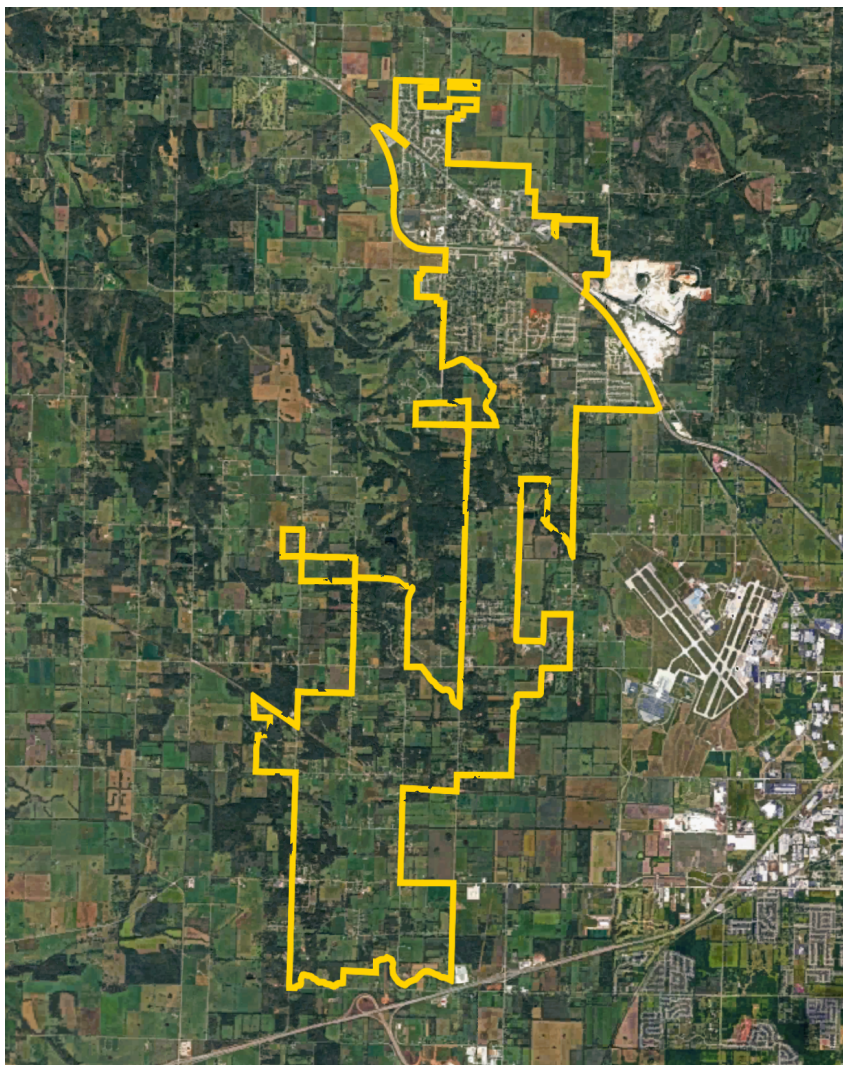
- **Pipe System Information for Potable Water Lines:** Prior to scan acquisition, the **Client** shall provide ASTERRA with a detailed and accurate GIS pipe system layer. If GIS is not available, roads will be used to guide the analysis. ASTERRA will use this layer to identify likely leak locations. The GIS layer should include pipe material and diameter, length of pipeline to be analyzed, hydrants, valves, and any other detailed information available.
- **Pipe System Information for Wastewater Lines:** Prior to scan acquisition, the **Client** shall provide ASTERRA with a detailed and accurate GIS pipe system layer. If GIS is not available, roads will be used to guide the analysis. ASTERRA will use this layer to identify likely leak locations. The GIS layer should include pipe material and diameter, forced and/or gravity lines, length of pipeline to be analyzed, manholes, depth, and any other detailed information available.
- **Leak Detection History (Work Orders):** The **Client** shall provide ASTERRA with a detailed and accurate history of leak findings and repairs beginning one (1) week before the date the first satellite scan is acquired and through the service life cycle.
- **Leak Detection Performance Metrics for Potable Water Lines:** The **Client** shall provide ASTERRA with relevant and available performance metric data related to previous **Client**-utilized leak detection methodologies. This information will be used to calculate value metrics of the service and will be provided to the Client in the final report for their use.

Area of Interest

Client Services for Potable Water

Areas of Interest (AOI)

During this service, ASTERRA will survey the Area of Interest (AOI) to be determined by the client, contained to up to 300 linear miles of mains and service pipes of potable water and wastewater, as outlined in the image below:



Once ASTERRA receives the full GIS pipe system information from the client, the pipe and total miles analyzed per delivery will be identified. Note: both main and service lines will be counted for total pipe length calculation.

Service Package

Subscription-Based Service Package

ASTERRA's Recover solution and features are provided via a subscription to EO Discover through the Prevent package level of service. The Prevent service level contains specific features designed to meet clients' current and future needs, with additional add-on services available.

Prevent 
4 licenses: EO discover / U-collect App
Base line leak analysis
Leak Locations
Enhanced Recover Analysis
Initial Field Deployment

Always Included: Online support, customized success plan, best practices tutorials

Pricing

Area of interest (AOI) for analysis:

Potable Water lines and Wastewater lines: up to 300 linear miles

PREVENT	
Included Annual Services	
2 Satellite Scans and Analyses	
40 hours of Subcontracted Acoustic Leak Detection for Initial Field Deployment *	
4 EO Discover and U-Collect Licenses for 12 Months	
Final Program Report	
Total	\$48,000

- **NOTE:** Acoustic Lead Detection for potable water only.

Proposal is valid until: November 30th, 2026

Note: Once a package is selected, please contact ASTERRA sales team for terms of use and signature processing.