



# Utilizing Multi-Channel GPR to Support a Thorough SUE Investigation

*Presented by: Laurie LeBlanc, C. Tech. and Jamie Bradburn*

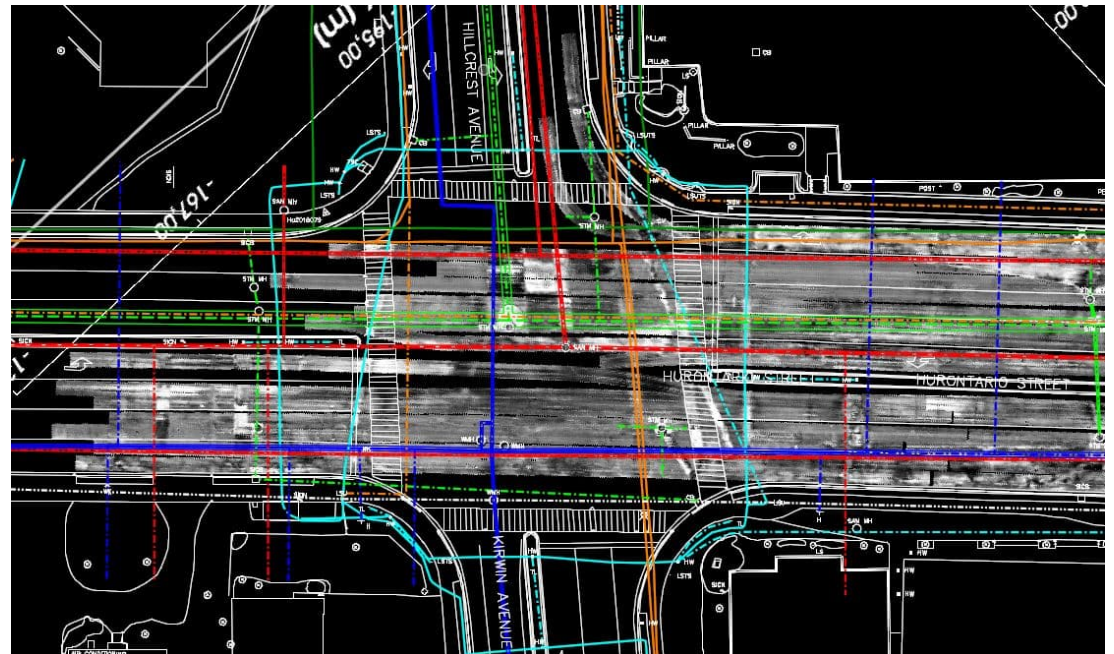
# Introduction

T2 Utility Engineers specializes in professional Utility Engineering services, including Subsurface Utility Engineering (SUE), advanced geophysics, survey, and utility coordination, to support Infrastructure projects from our offices across the United States and Canada.

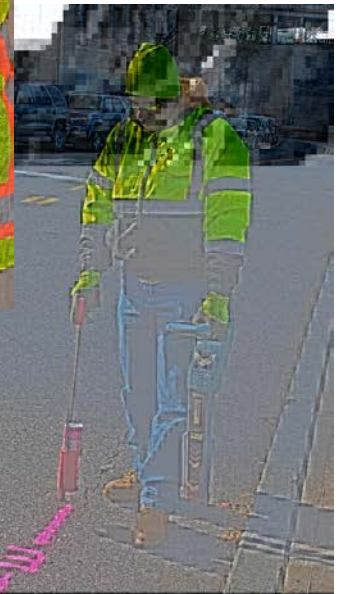
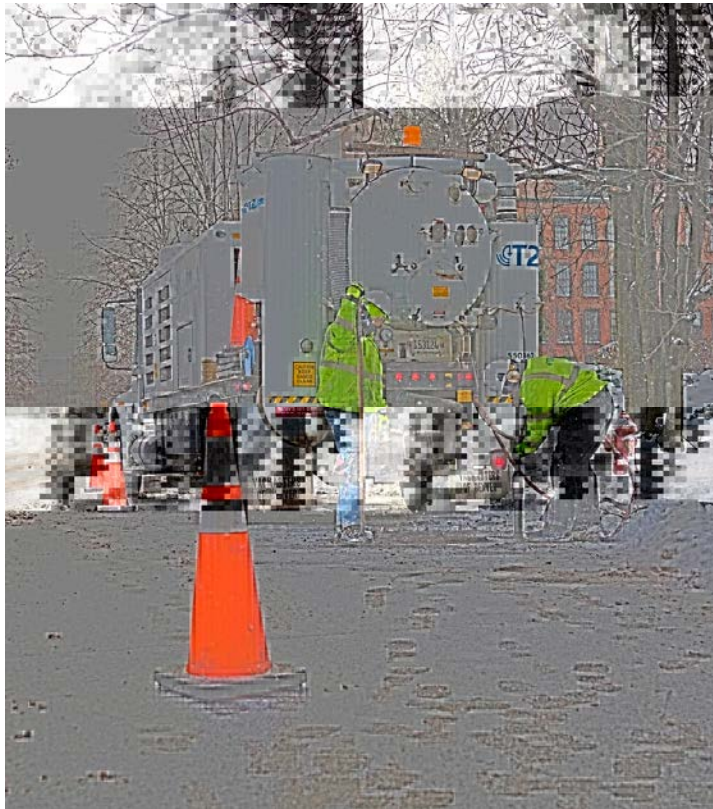


# Utilizing Multi-Channel GPR to Support a Thorough SUE Investigation

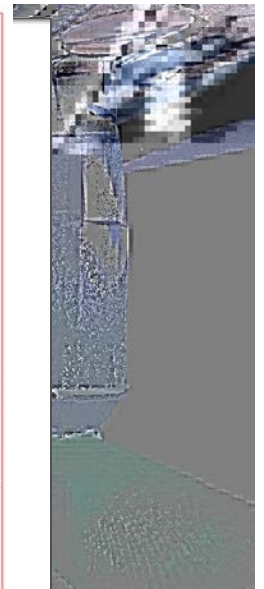
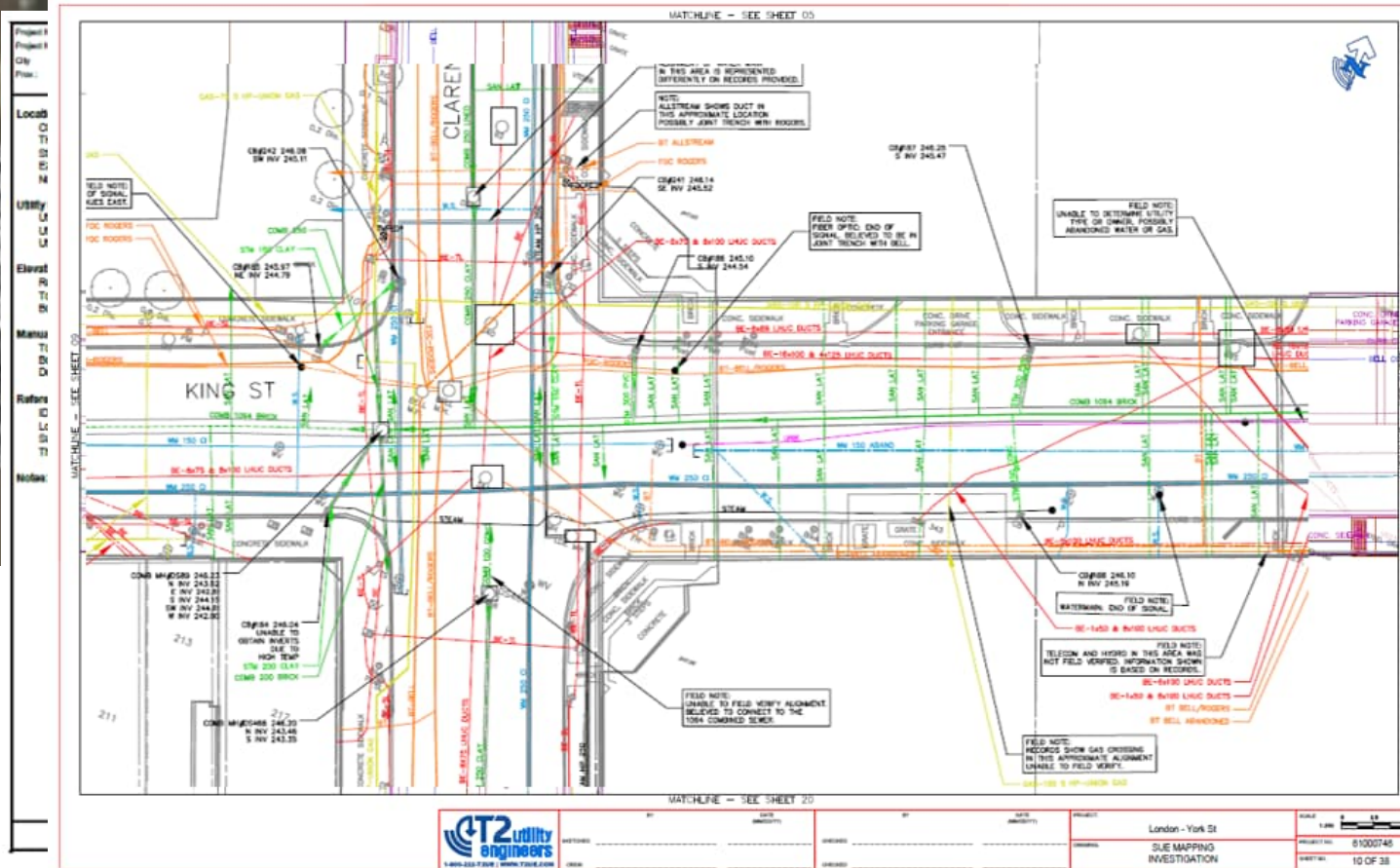
- What is a SUE investigation?
- What is MCGPR?
- The uses of MCGPR
- The use of MCGPR in a SUE investigation



# What is a SUE Investigation?

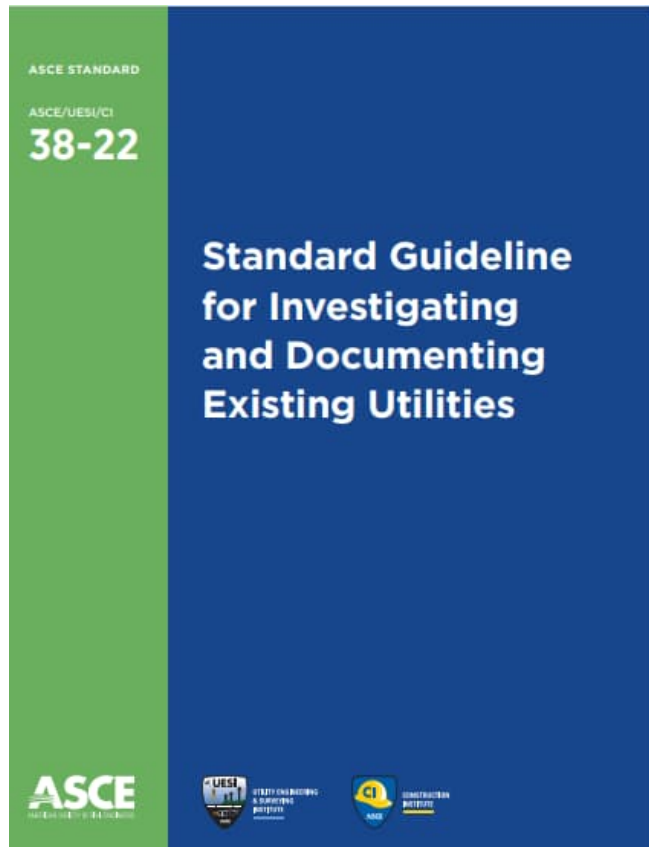


# What is a SUE Investigation?



NO.	DATE	BY	DATE	BY	PROJECT	SCALE
1	10/07/14	...	10/07/14	...	London - York St	1:500
2	10/07/14	...	10/07/14	...	SUE MAPPING	PROJECT NO. 01000746
3	10/07/14	...	10/07/14	...	INVESTIGATION	SHEET NO. 10 OF 38

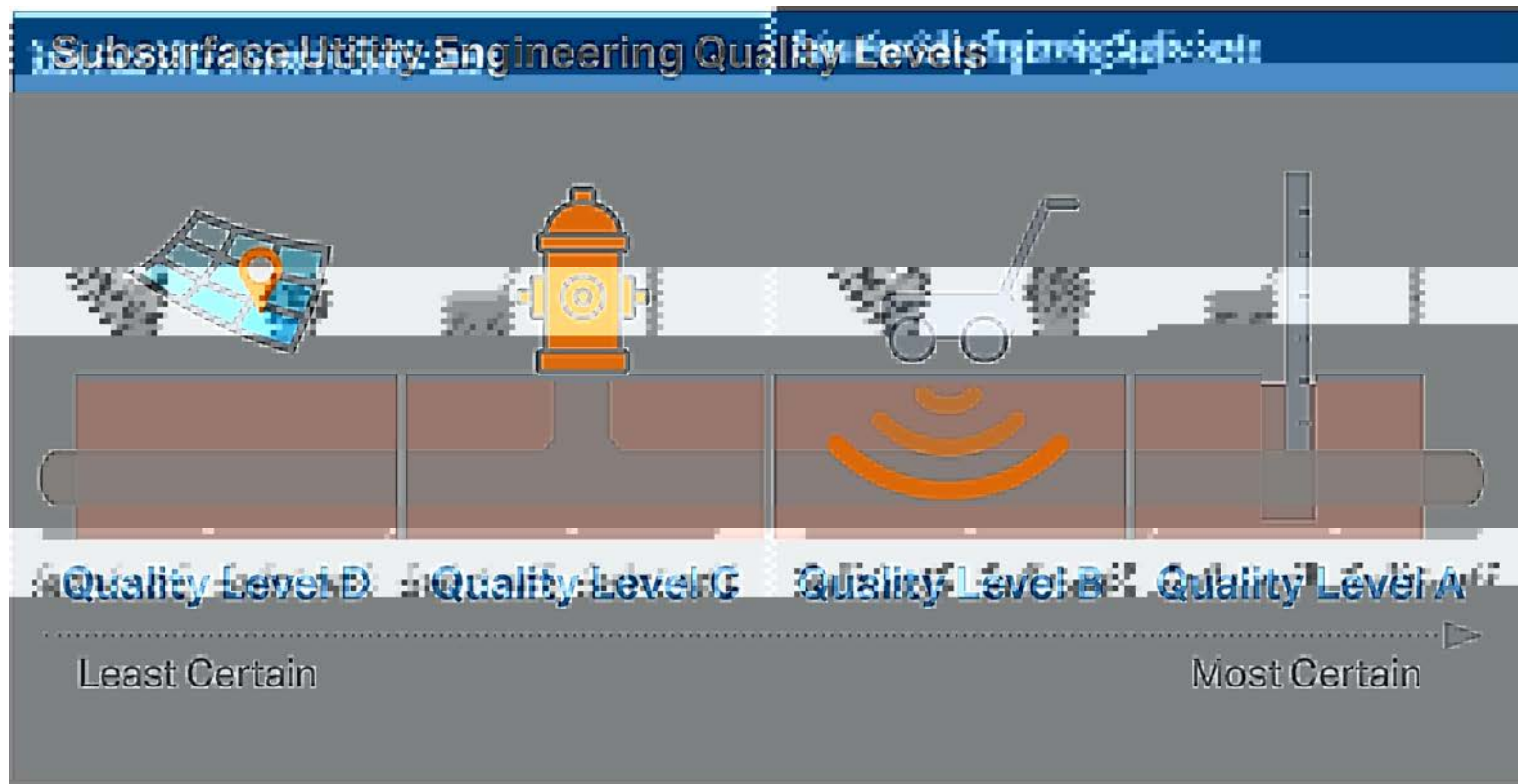
# What is a SUE Investigation?



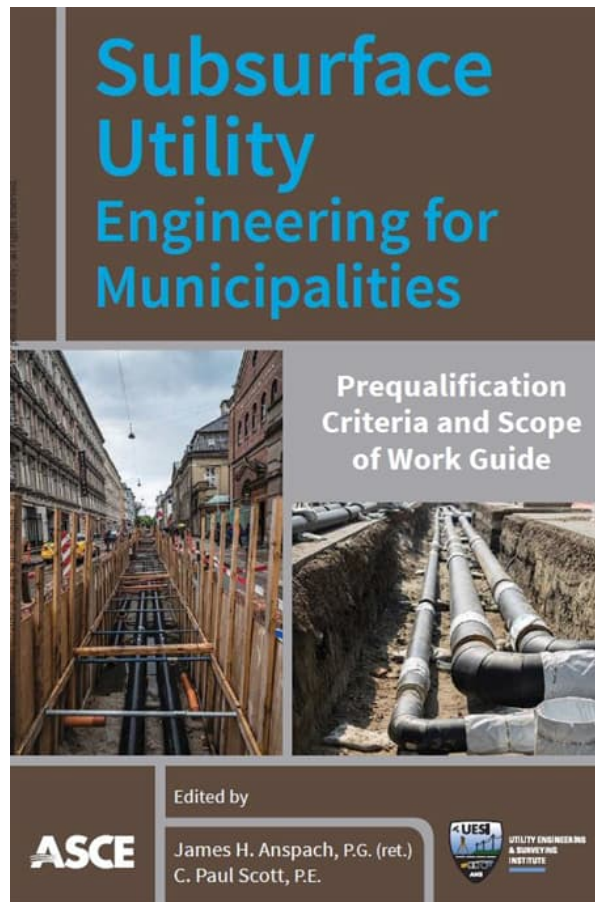
## The Standard:

ASCE 38 presents four utility quality levels that document an engineer's judgment as to the relative unquantifiable uncertainty of the existence and location of existing underground utilities and their structures.

# What is a SUE Investigation?



# What is a SUE Investigation?



## The Necessities for SUE:

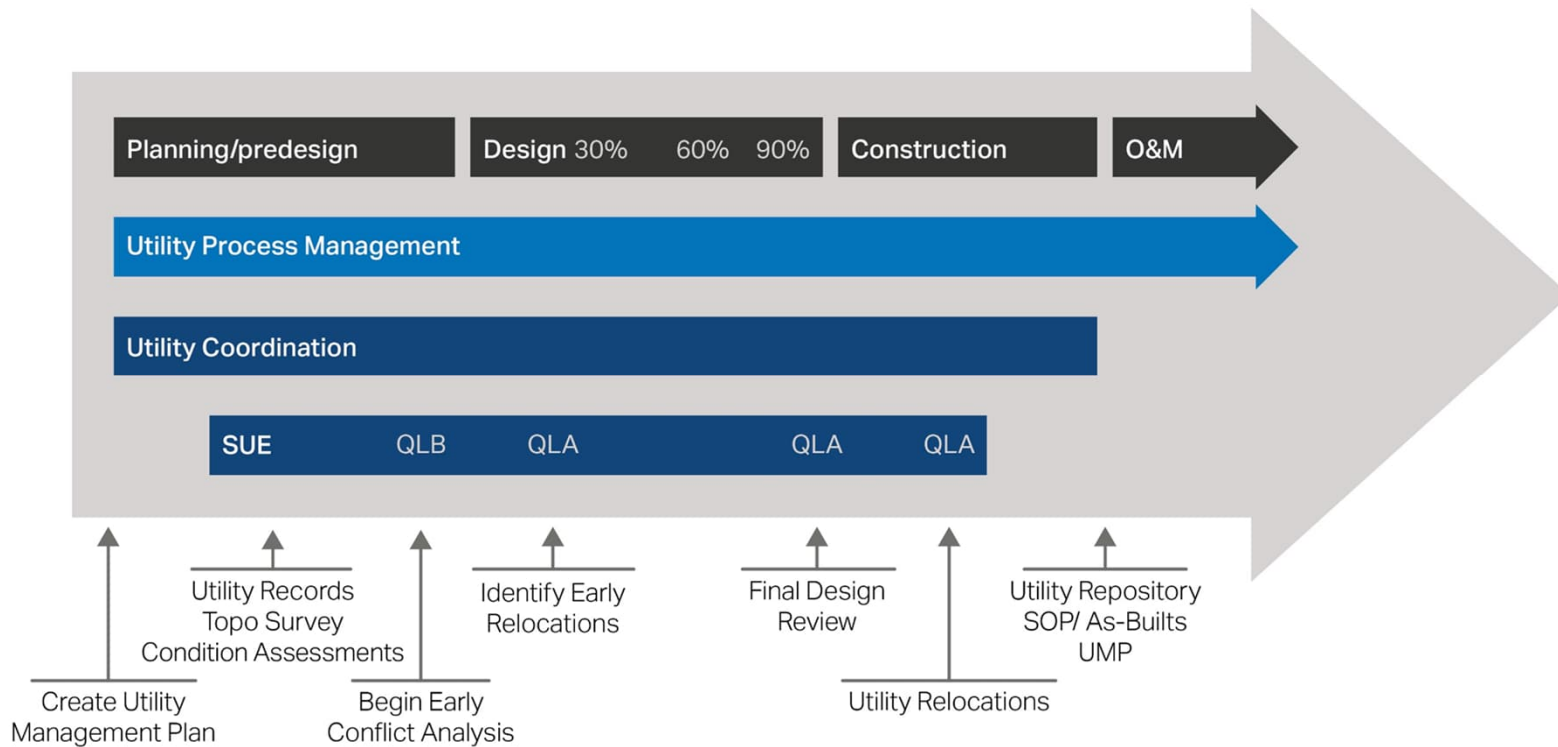
- General Qualifications
- Personnel
- Traditional Equipment

## Advanced Geophysical Methods (MCGPR):

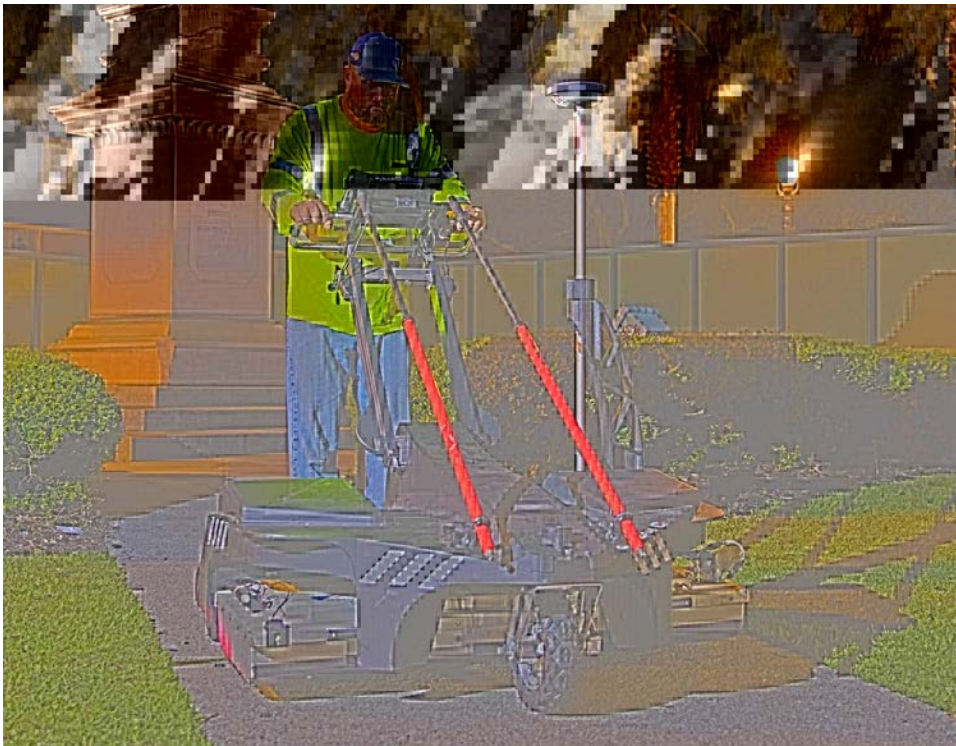
- Professional
- Equipment



# What is a SUE Investigation?



# What is MCGPR?

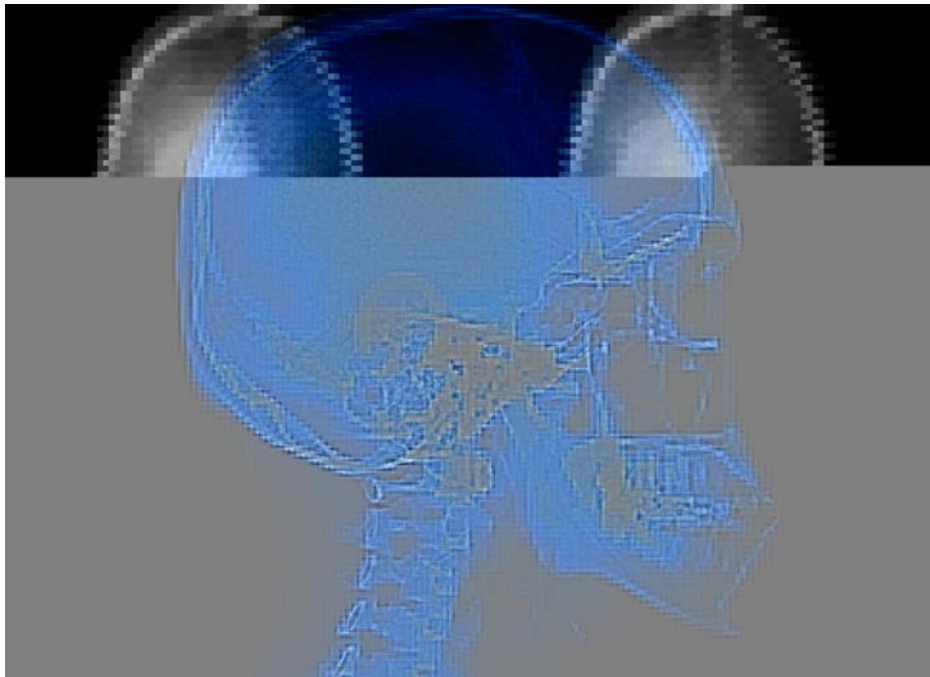


# What is MCGPR?

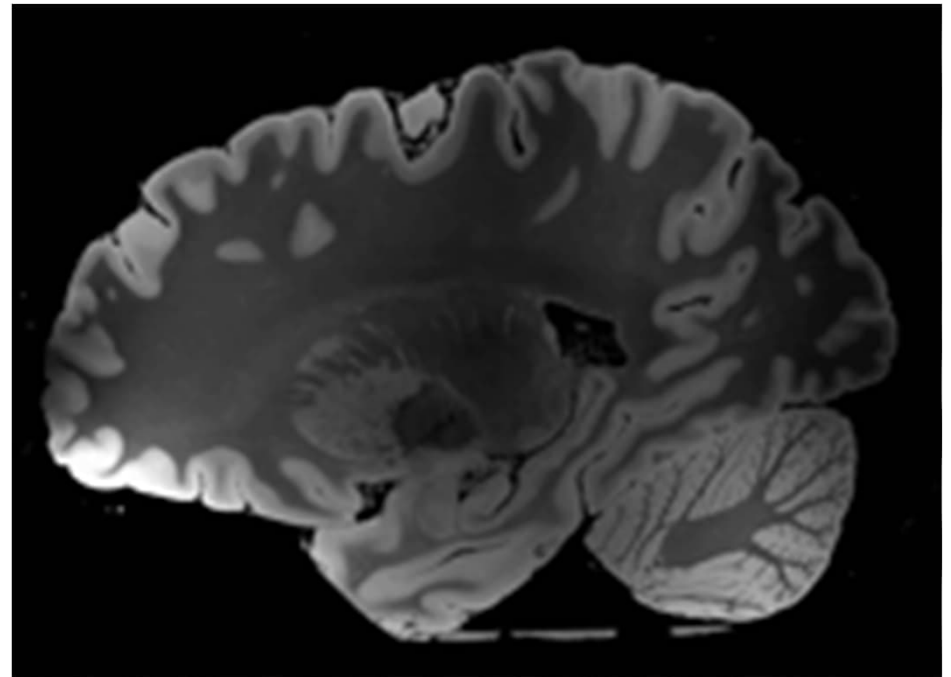
- Arrays of multi-frequency (200MHz and 600 MHz), multi-polarized antennas
- The use of massive arrays allows for fast scans of large areas
- There are multiple types which can be towed or pushed depending on the situation
- Surveys only need to be performed in one direction to gather all the data



# What is MCGPR?

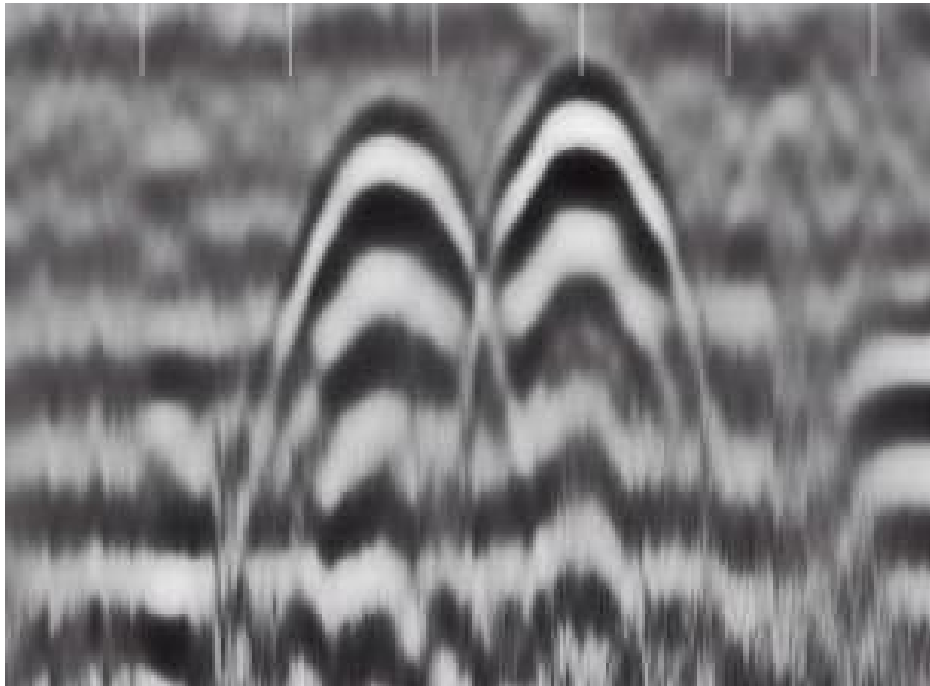


**X-Ray**



**CT Scan**

# What is MCGPR?



**GPR B-Scan**



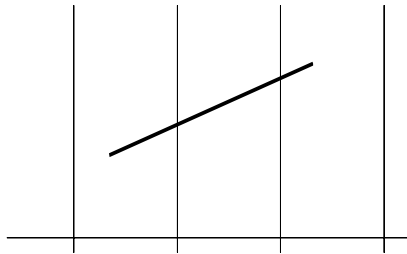
**MCGPR Tomography**

# What is MCGPR?

## How should we survey with GPR?

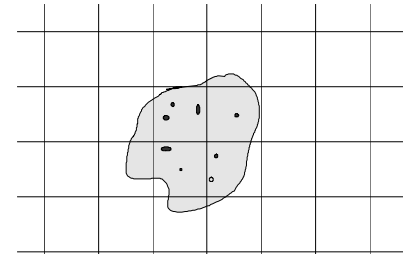
Profile lines according to target layout

**A**



Profile lines for utilities of known orientation.

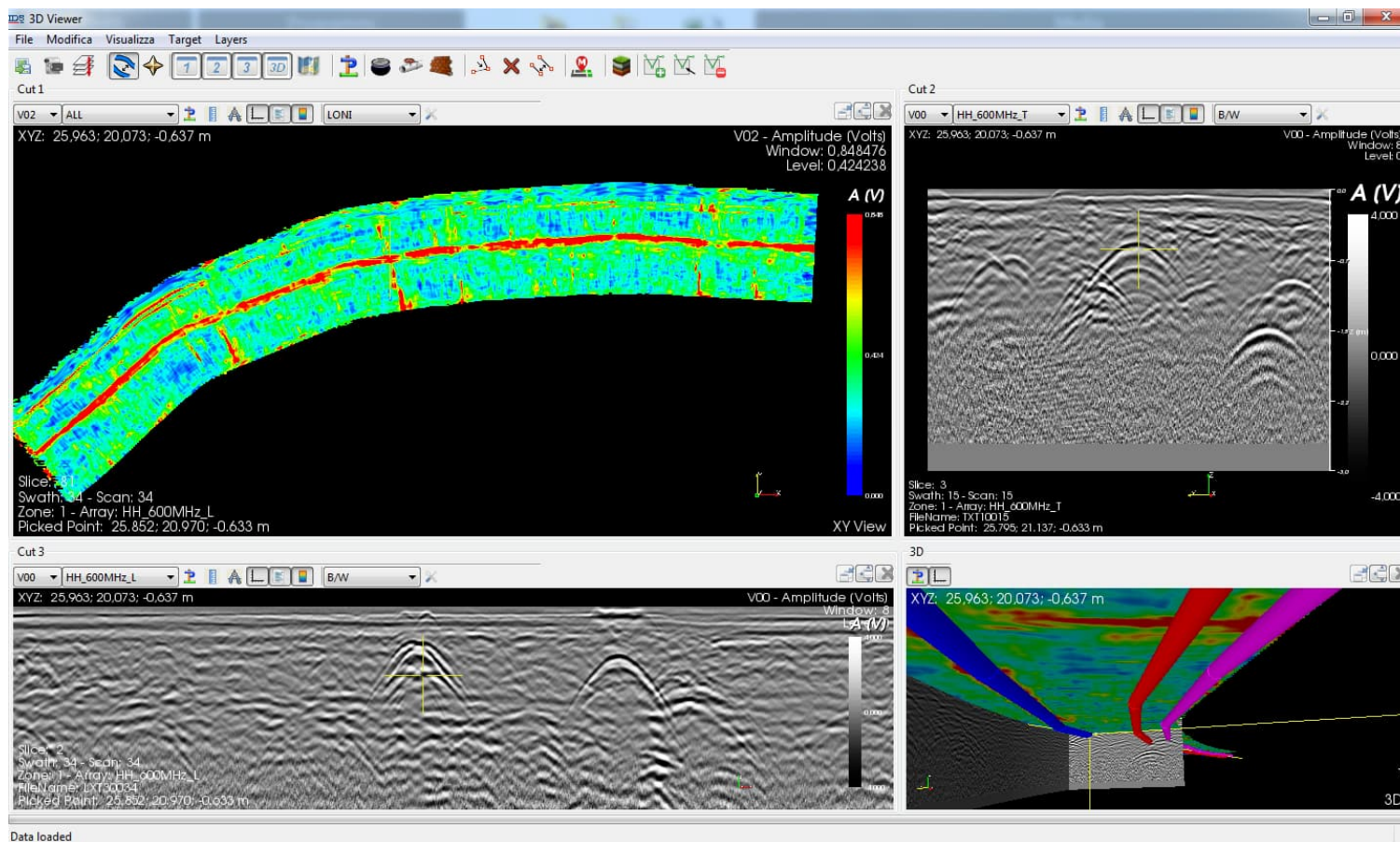
**B**



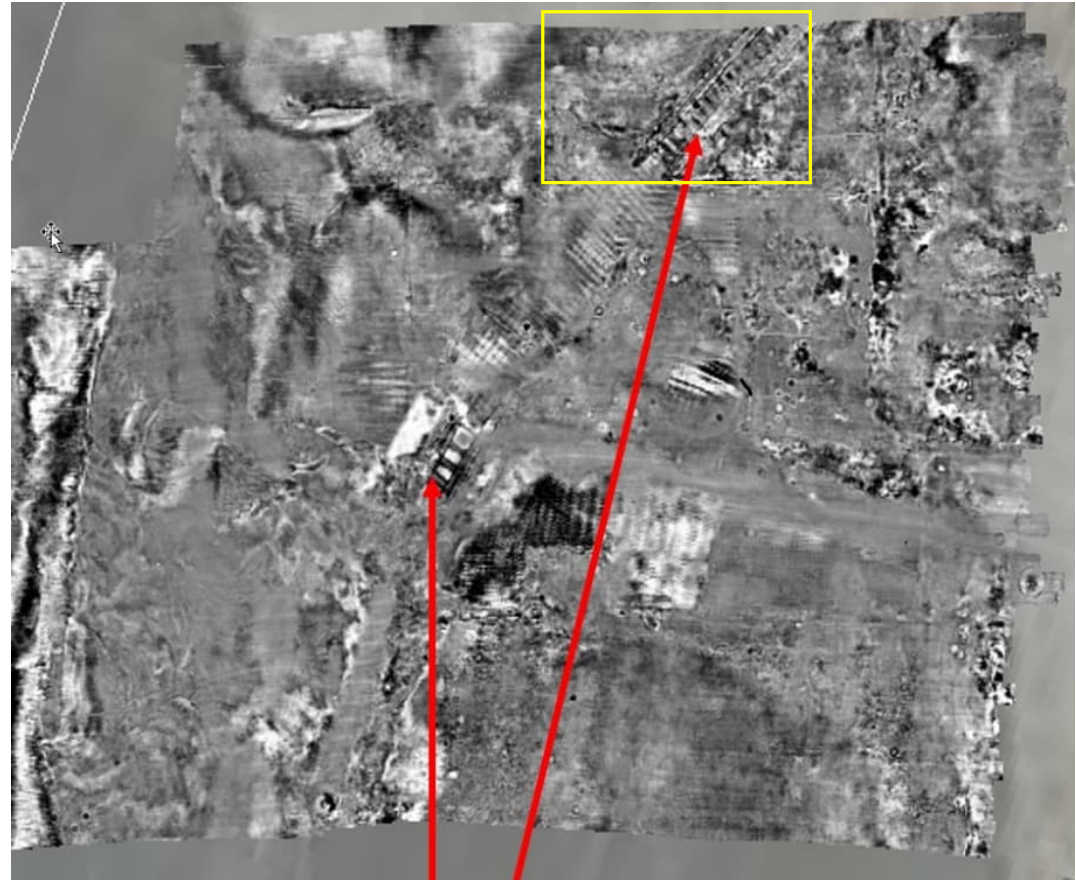
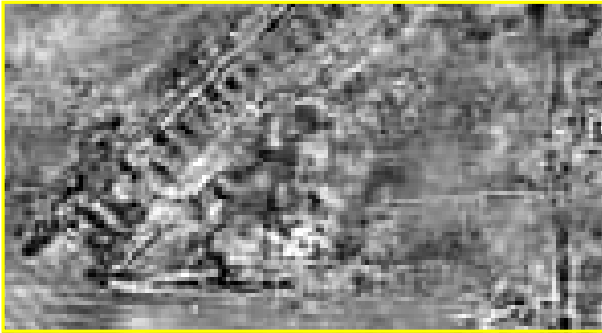
Profile lines following a GRID for targets of unknown orientation.

# What is MCGPR?

## From 2D to 3D

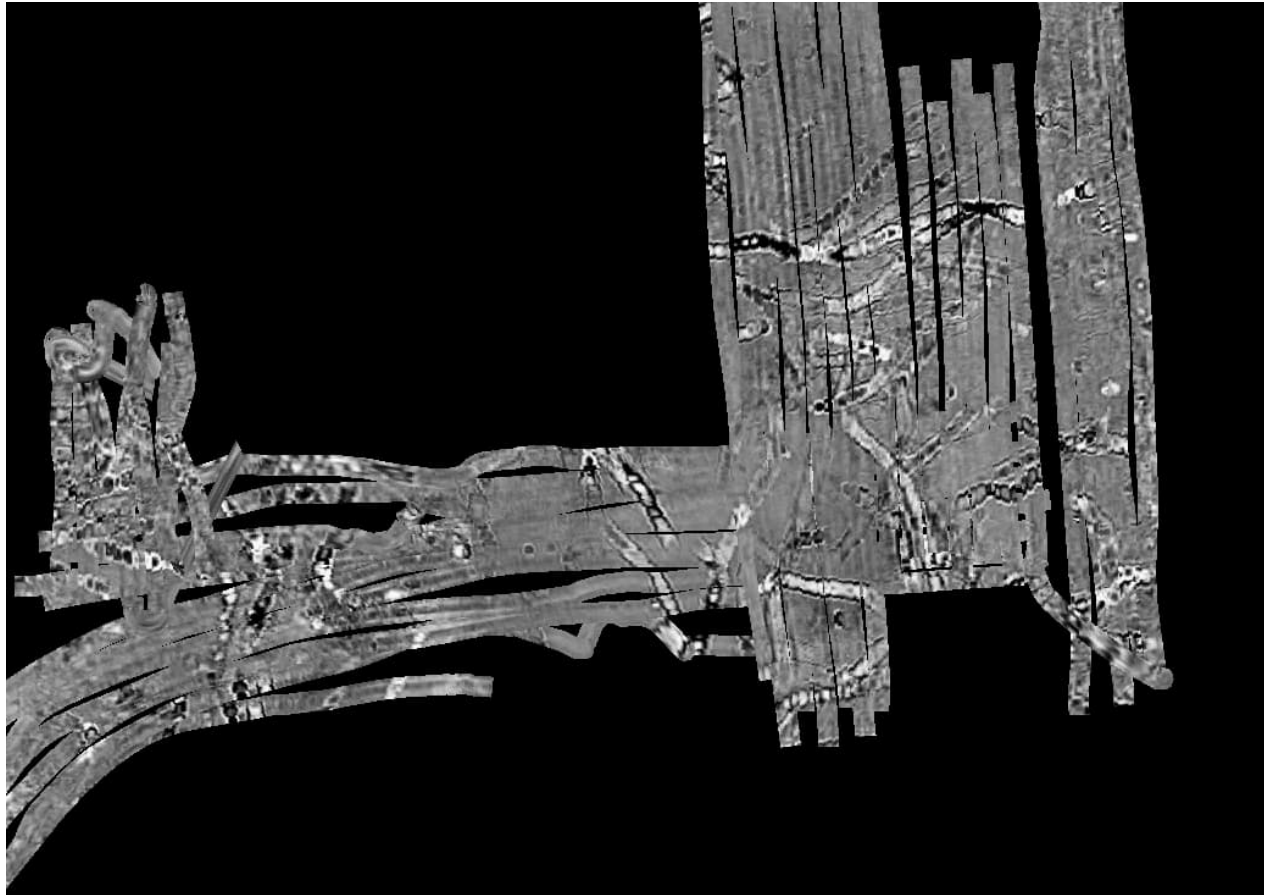


# What is MCGPR?

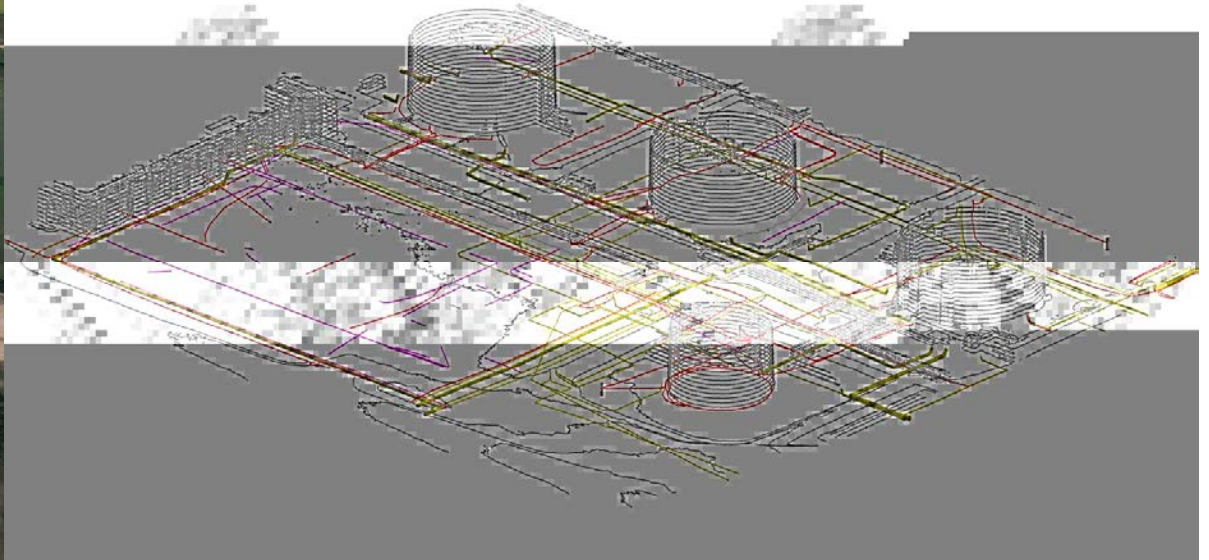




# What is MCGPR?



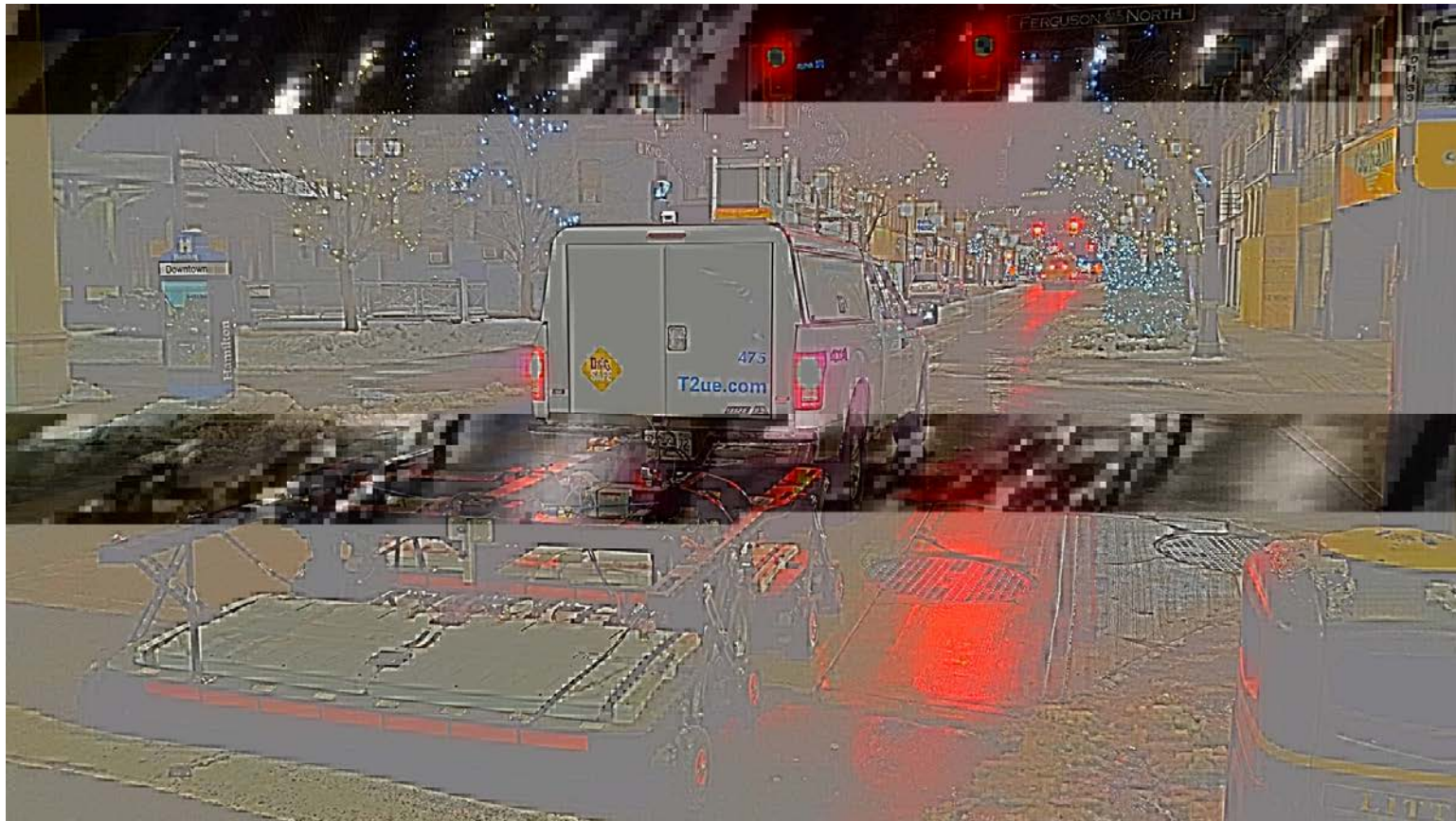
# The Uses of MCGPR – Data Collection



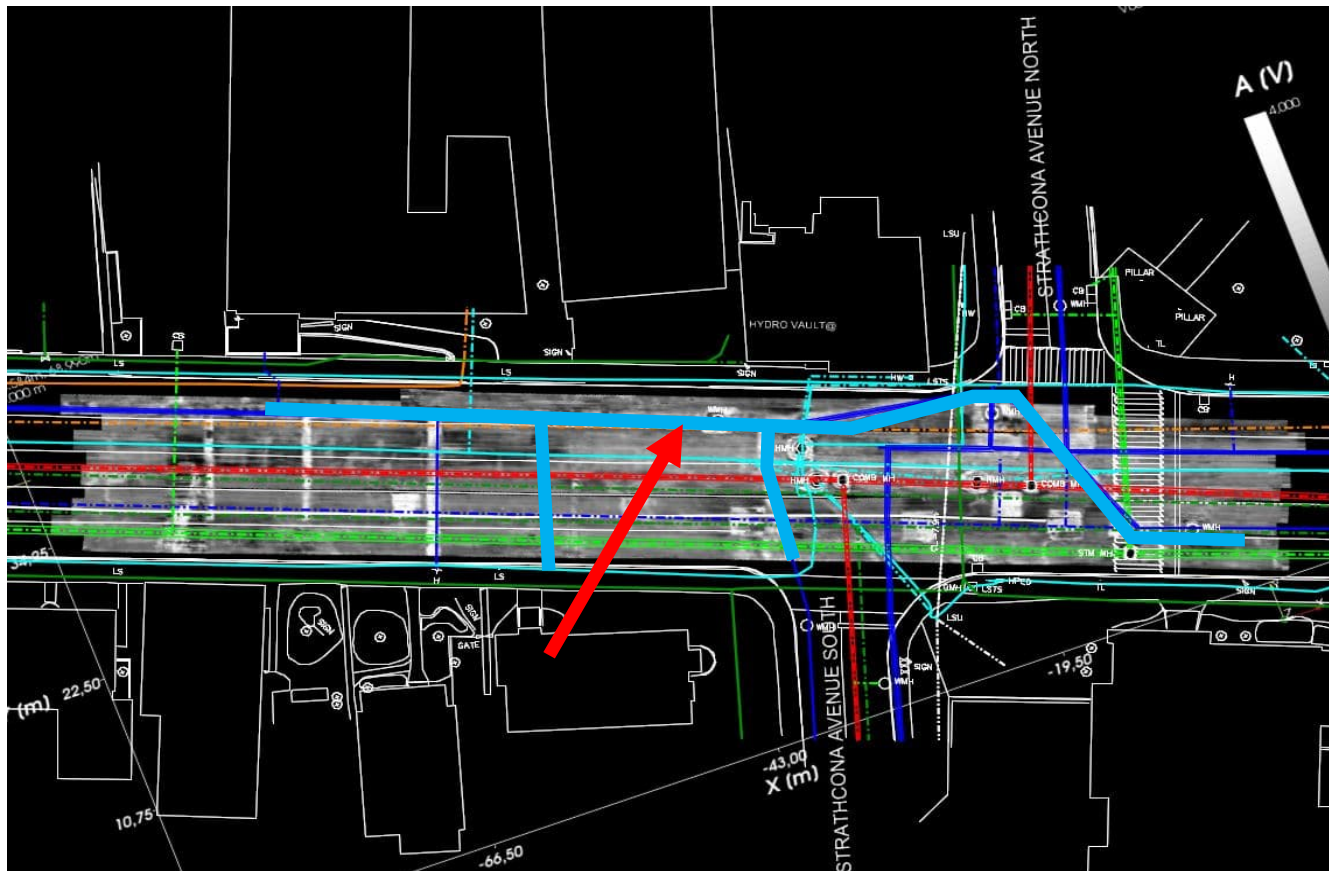
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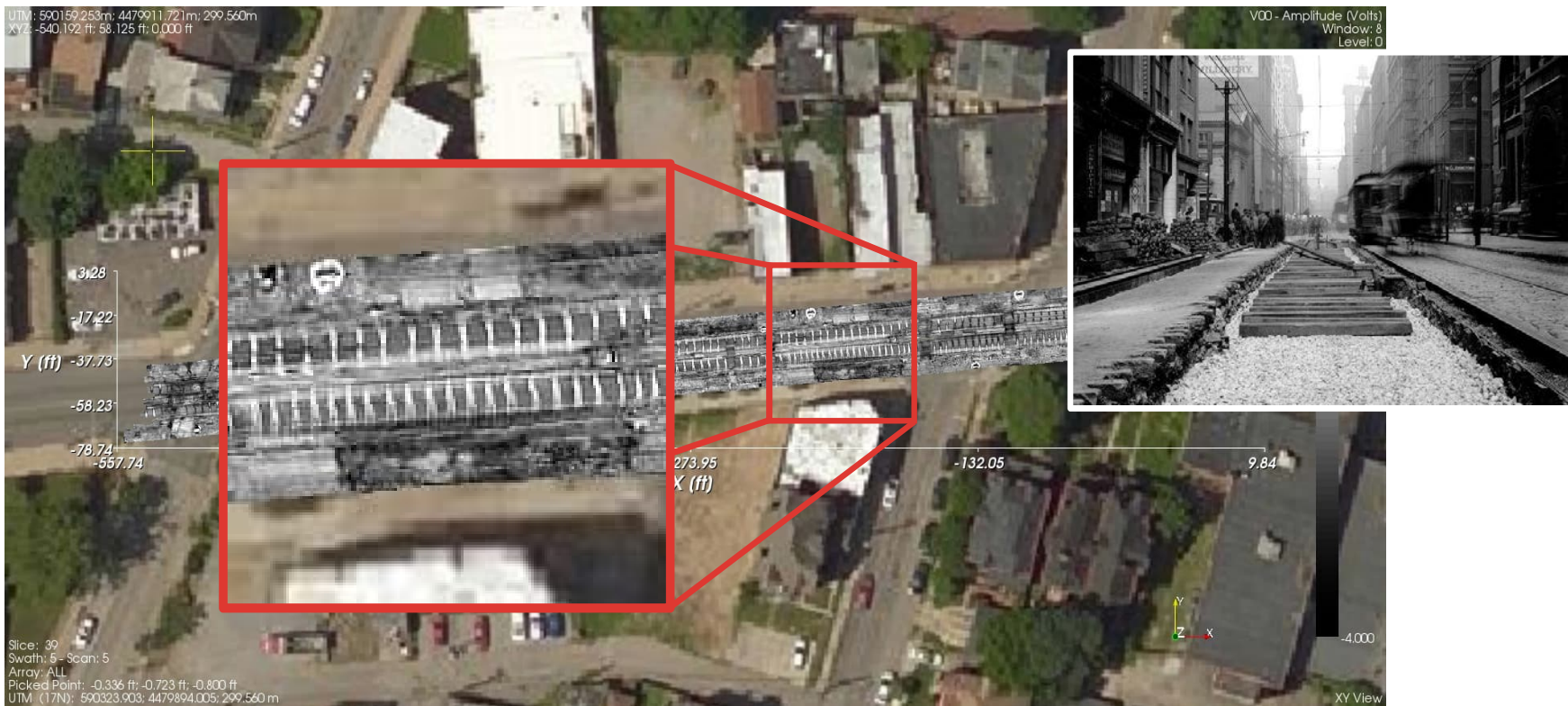
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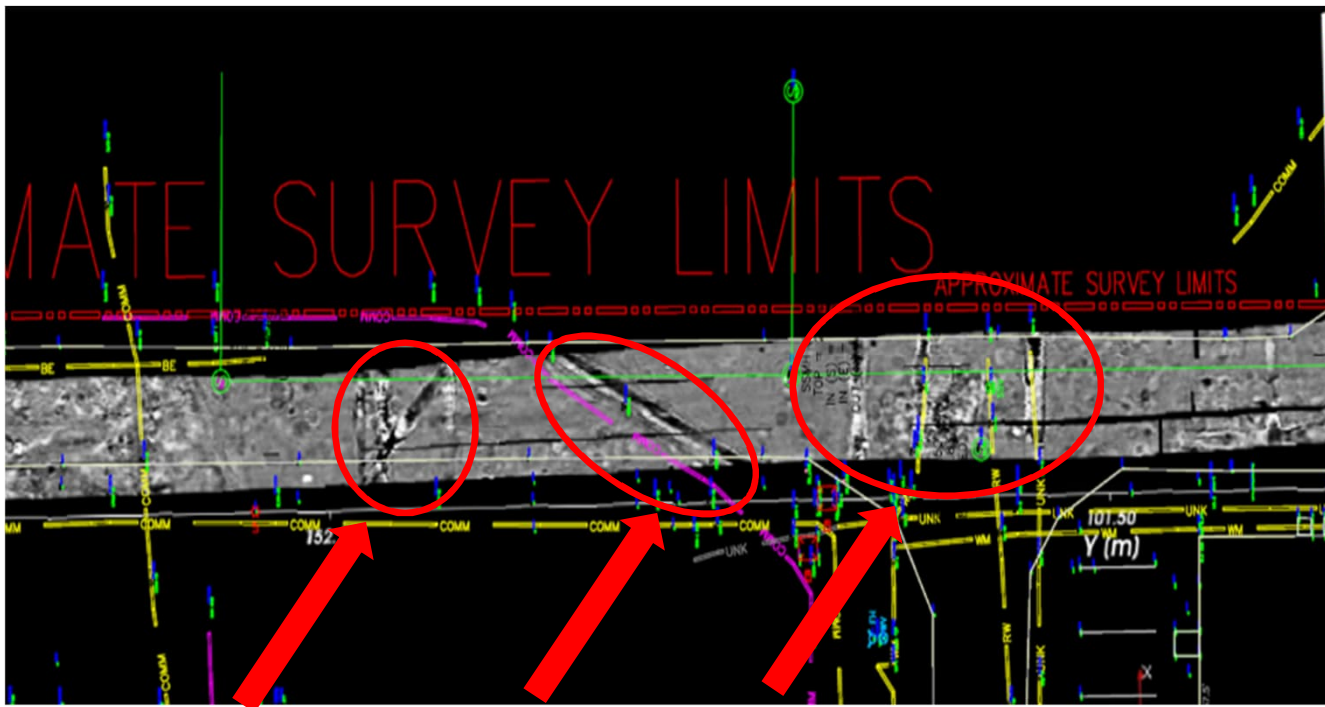
# The Uses of MCGPR – Processing Data



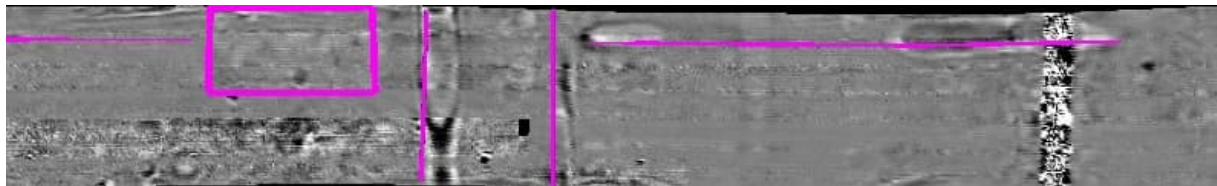
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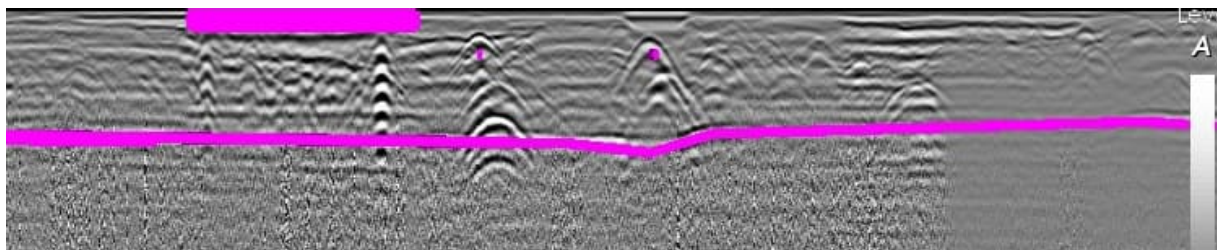
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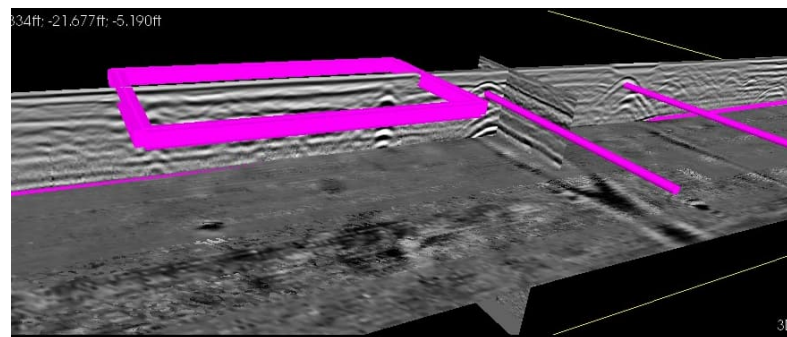
# The Uses of MCGPR – Processing Data



- Plan View



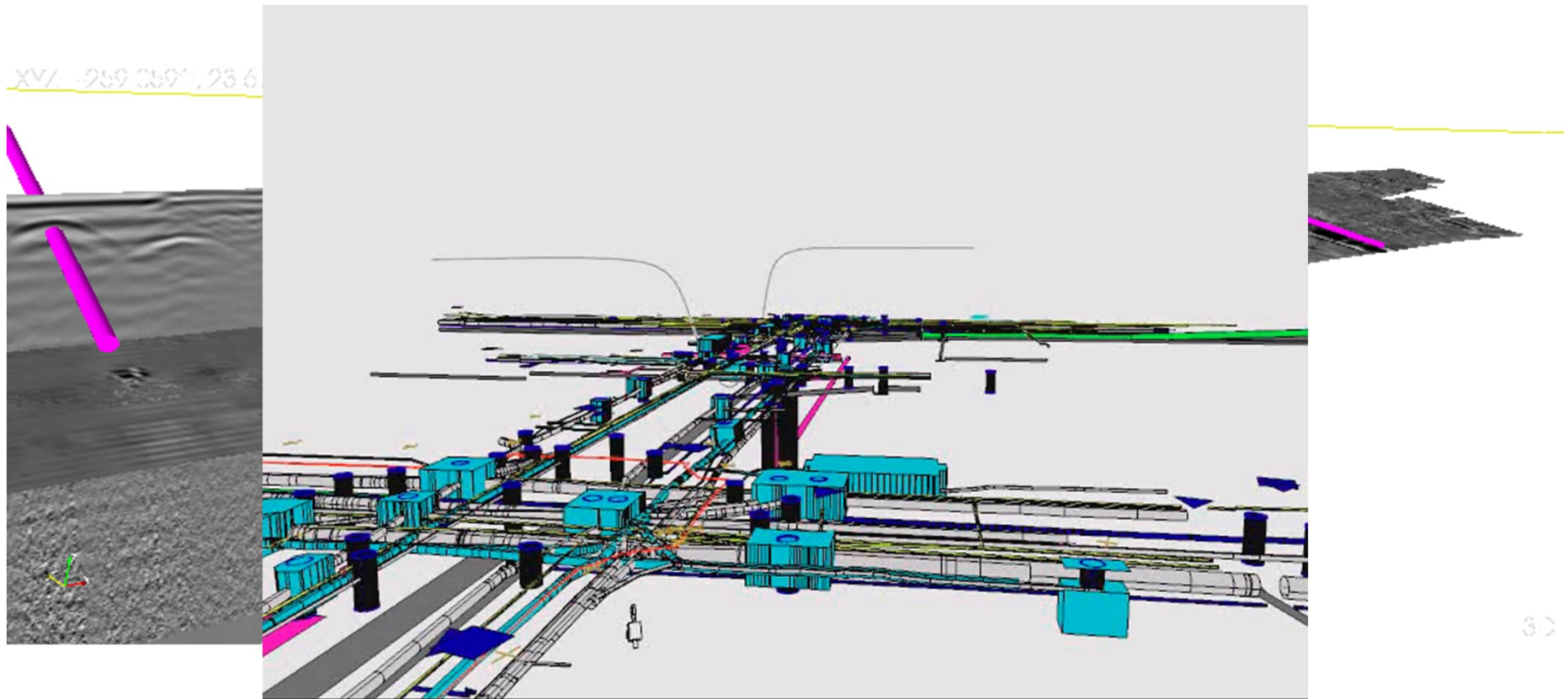
- Profile View



- 3D View



# The Uses of MCGPR – Processing Data



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# Utilizing Multi-Channel GPR to Support a Thorough SUE Investigation

## Vegas Boulevard



**Prior to Development - 1950**

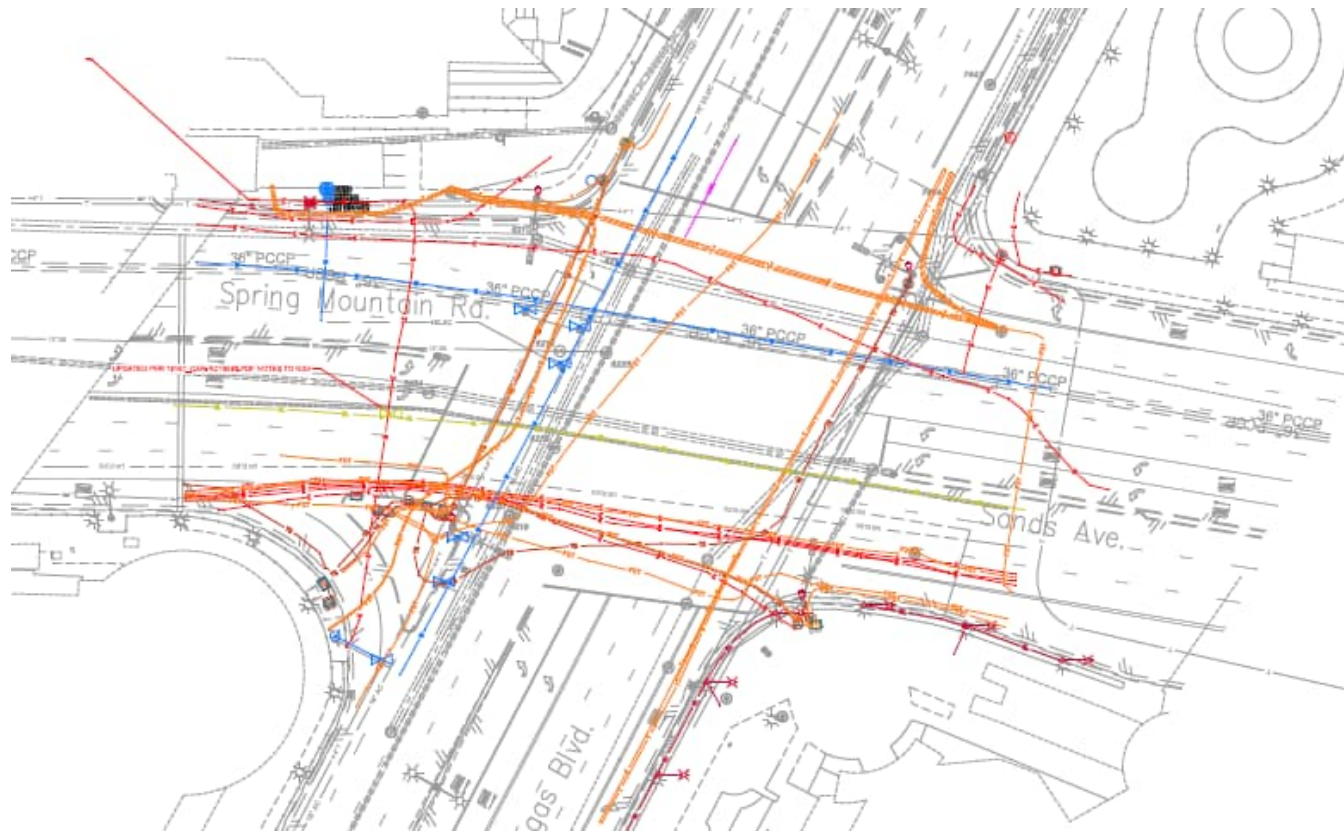


**Present - 2021**

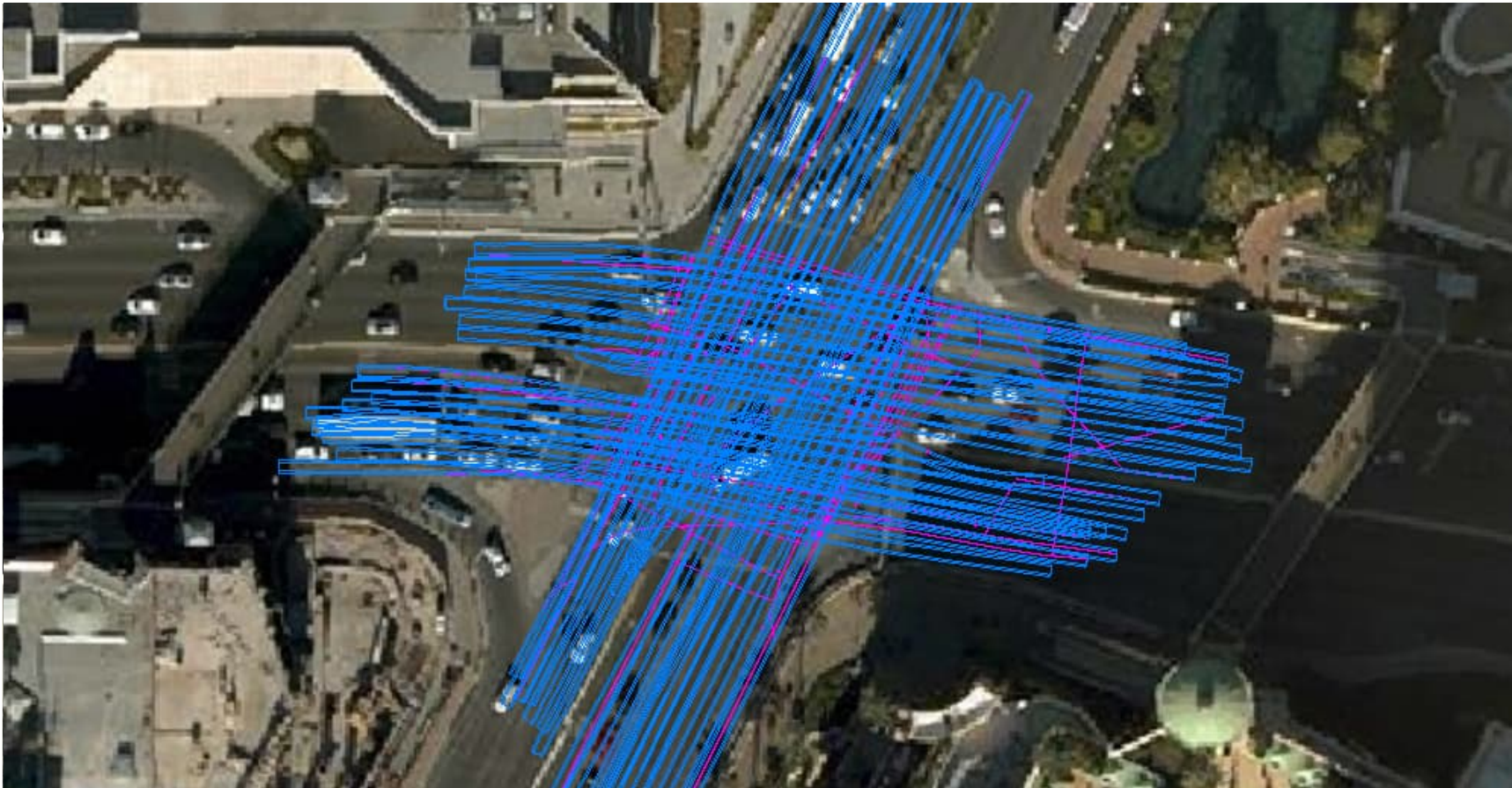
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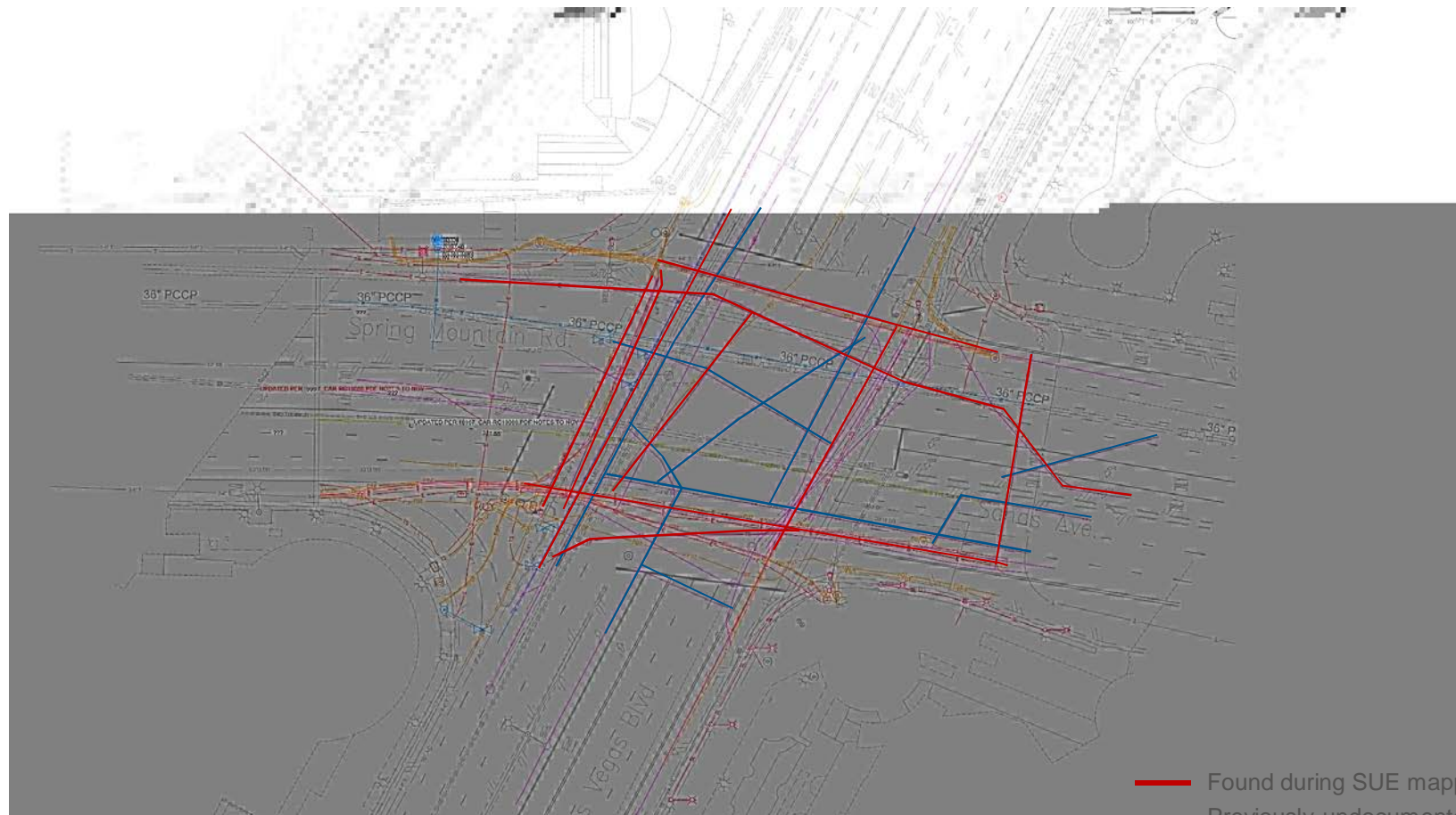
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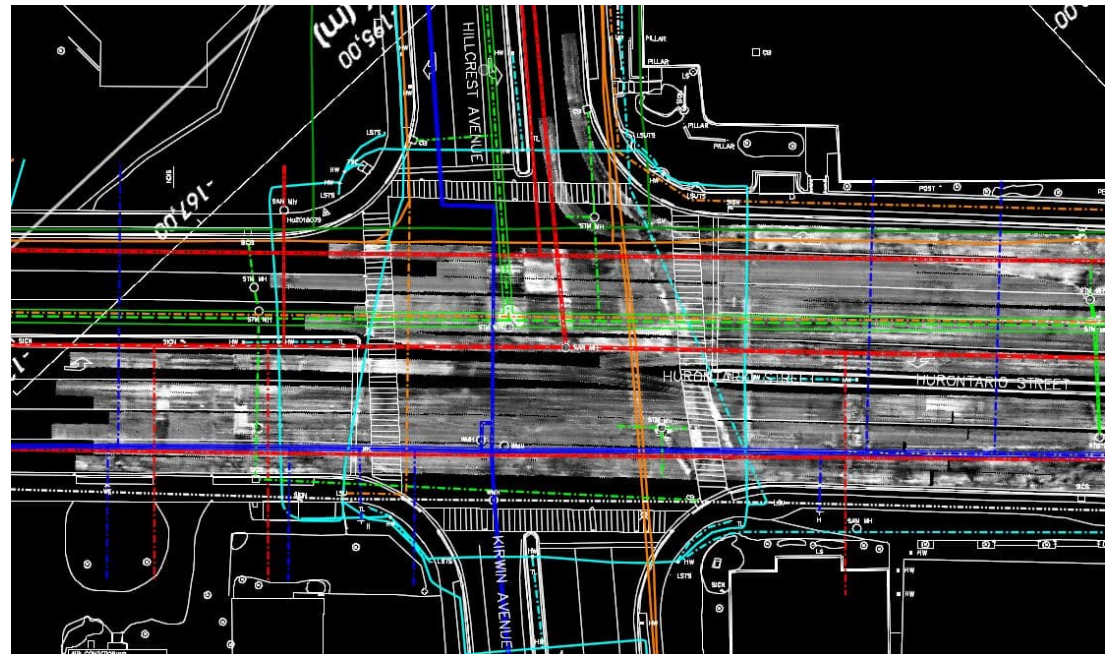


- Found during SUE mapping investigation
- Previously undocumented utilities



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