



**Kevin Laut**

Construction Manager

Capital Planning, Design, and  
Construction

CSU Office of the Chancellor



# SUBSURFACE UTILITY MAPPING MEA

Provide turn-key Subsurface Utility Mapping Services including the following;

- 1) Review of existing documents and surface site features to compile existing utility information without site disturbance
- 2) Use of various technologies to identify the locations of underground utilities
- 3) Excavation and potholing services are required to identify critical utility horizontal and vertical locations
- 4) Full survey and detailing services to create complied or project specific utility drawings
- 5) 3-D modeling of underground utilities as required to support project specific coordination efforts
- 6) Management and coordination of logistics required to complete investigation work

- 1) McCarthy Building Companies, Inc.
- 2) C-Below, Inc.
- 3) PDM GEL Solutions, Inc.

- Contracts will be posted to the [csyou.edu](http://csyou.edu) procurement contract store and a CM Technical Bulletin will be sent out with links and additional info.

<b>CSU</b> The California State University <b>MASTER ENABLING AGREEMENT</b> UNDERGROUND UTILITY MAPPING SERVICES <i>For use on any CSU Campus.</i>										<input type="checkbox"/> SERVICE PROVIDER <input type="checkbox"/> TRUSTEES		
This AGREEMENT is made and entered into this [Day] day of [Month], [Year] pursuant to the Public Contract Code 10700, <i>et seq.</i> , by and between the Trustees of the California State University on behalf of												
<i>Campus, hereafter referred to as Trustees, and</i> <b>California State University</b>				Amendment No.: <b>N/A</b>		Agreement No.: <b>123456</b>		Project No.: <b>123456</b>				
<i>Service Provider, hereafter referred to as Service Provider.</i> <b>Service Provider</b>						CSU Vendor ID No.: <b>123456</b>		License or DIR No.: <b>123456</b>				
WITNESSETH: That the Service Provider in consideration of the statements and conditions herein contained, agrees to furnish labor, materials, and equipment and to perform work necessary to complete, in a skillful manner: Subsurface Utility Mapping Services for multiple projects located at various campuses within the California State University System.												
The Service Provider shall provide such services as more fully described in the following Rider and Exhibits, which by this reference are incorporated herein and made part of this Agreement:												
Rider		A Agreement General Provisions,				consisting of four (4) pages;						
Exhibit		A Scope of Services (RFP),				consisting of (7) pages;						
Exhibit		B Service Order Authorization to Proceed,				consisting of one (1) page;						
Exhibit		C Service Provider Rate Schedule,				consisting of one (1) page;						
The term shall begin upon receipt of an executed Agreement from the Trustees and shall end as of [Date], with the option given by the Trustees of extending the Agreement with the same items and conditions for two (2) additional (1) year periods. Work elements started during the term shall continue to their completion and acceptance by the Trustees.												
The Service Provider shall not perform services in excess of the Agreement without prior written authorization to proceed from the Trustees.												
Service Provider shall report to: California State University, Kevin J. Laut, Construction Manager, Capital Planning, Design and Construction, (562) 951-4994.												
The basic services amount to be expended under this Agreement shall be determined by the overall usage of each participating campus and the administrative office of the California State University. Payment shall be made in accordance with Rider A, Exhibit A, Exhibit B, and Exhibit C.												
<b>Trustees of the California State University</b>						<b>Service Provider</b>						
Campus <b>California State University</b>						Firm Name <b>Service Provider, Inc.</b>						
By (Trustees' Authorized Signature)						By (Authorized Signature)						
Printed Name and Title of Person Signing <b>John Smith, Campus Representative</b>						Printed Name and Title of Person Signing <b>Jack Smith, Service Provider Authorized Signatory</b>						
Address of Campus Project Administrator <b>99999 Lorem Ipsum Drive, Ipsum, CA 99999</b>						Address of Service Provider <b>11111 Ipsum Lorem Drive, Lorem CA 11111</b>						
SCO Acct	Fund	Sub Fund	Agency	Yr.	Ref/Item	Category	Program	Element	Component	Chapter	Fiscal Yr.	Legal Ref.
Data:	123456	123456	123456	123456	123456	123456	123456	123456	123456	123456	123456	123456
Fund Name			PS Account	PS Fund	PS Dept. ID	PS Program	PS Class	PS Project/Grant				
123456			123456	123456	123456	123456	123456	123456		123456		
Amount Encumbered		<i>I hereby certify upon my personal knowledge that budgeted funds are available for the period and purpose of the expenditures stated above.</i>										
\$0.00												
Amount of Increase		<b>Signature of Accounting Officer</b>										
\$0.00		Date										
Amount of Decrease		<i>I hereby certify that I have examined the written Agreement and find the same to be in accordance with the requirements of California State University Contract Law. G. ANDREW JONES, General Counsel</i>										
\$0.00												
Total Amount Encumbered		<b>By Attorney</b>										
\$0.00		Date										
<i>This Agreement may be executed in counterparts all of which taken together shall constitute one and the same Agreement. The exchange of copies of this Agreement by electronic mail in "portable document format" ("PDF") form or by other similar electronic means shall constitute effective execution and delivery of this Agreement and shall have the same effect as copies executed and delivered with original signatures.</i>												

- 1) Identify need for services
- 2) Review the posted proposal and webcast videos to determine which service provider appears to be a best fit for the project
- 3) Contact the preferred service provider to ensure they have availability and coverage for the project
- 4) Coordinate with the service provider to define the following:
  - Project specific scope of services
  - Quality Level required
  - Specific Deliverables
  - Schedule
  - Cost structure
- 5) Campus to execute project specific Service Order within the parameters of the MEA Rider A, General Provisions and Exhibit C, Service Provider Rate Schedule

Make sure not to allow clarifications that contradict or exclude items in Rider A or rates in excess of the rate schedule

Agreement No. 123456  
Service Provider

**THE CALIFORNIA STATE UNIVERSITY**  
**Exhibit B – Service Order and Authorization to Proceed,**  
**Subsurface Utility Mapping Services**

[Date]

Service Provider  
Service Provider, Inc.  
11111 Ipsum Lorem Drive  
Lorem CA, 11111

Dear Service Provider:

[Project Name], [Project Number]  
[Campus]  
Service Order Authorization Number: [insert]

In accordance with the provisions of the Systemwide Master Enabling Agreement Number 1234567, you are hereby authorized to Provide Subsurface Utility Mapping Services for the subject project to the quality levels described in Exhibit A, to the Quality Levels selected below:

[Quality Level D]  
 [Quality Level C & D]  
 [Quality Level B, C, & D]  
 [Quality Level A, B, C, & D]

Per fee schedule,  
 Hourly with a Not to Exceed limit of: \_\_\_\_\_,  
 Fixed fee amount of: \_\_\_\_\_.

Service Provider shall report to:

[CSU Campus Name]  
[Campus Department]  
[Executive Facility Officer or designated campus Project Manager]  
[Campus Address]  
[Campus Project Manager's Phone Number, email]

The total amount to be expended under this Service Order shall not exceed [written and numerical dollar value] inclusive of reimbursables. To invoice, submit a single signed invoice per project. On each invoice identify the MEA Agreement Number and Service Order Authorization Number. Direct invoices to the project manager named above.

Questions regarding this authorization shall be directed to the above named project manager.

Approved: \_\_\_\_\_ Fund: \_\_\_\_\_  
Fund Certified: \_\_\_\_\_

\_\_\_\_\_  
[Name]  
[Campus Project Manager]

\_\_\_\_\_  
[Name]  
[Campus Contracting / Procurement]

c: Campus Executive Facility Officer, Chancellor's Office Planner, File

Rev. 8/11/17

## **CSU Facilities Management Institute Capital Training Program**

### **New & Improved Gordian Program Launch #1**

(Recording is available – live webcast was Tuesday, August 28 – 2:00-3:30PM)

### **APPA Facilities Performance Indicators Update**

Friday, November 9 - 10:00-3:00PM

### **Other Upcoming Training, Time and Date TBD**

New & Improved Gordian Program Launch #2

The Law of Design and Construction (Advanced)

Owner Controlled Insurance Program (OCIP) – Program Updates

CPDC 101

<https://cyou.calstate.edu/Employee-Resources/training/facilities-management-institute/Pages/default.aspx>



## Subsurface Utility Mapping (SUM)

September 10, 2018

Presented To:

Cal State – Via Webcast

Presented By:

Enrico Bertucci, PE

Fermin Glasper, PS

Brianna Lostaglio



## **Enrico Bertucci, PE**

*Director of Operations, National Mapping*

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Enrico Bertucci is the Director of Operations of Subsurface Utility Mapping for McCarthy Building Companies, National Division. He is responsible for the research of technological advancement which influence the geophysical industry. In addition, he is responsible for the staffing and training of all national branch project managers and national field operations project managers.

With more than 11 years of civil engineering, design, construction and management, Enrico has worked on a variety of Mapping projects throughout the state of California such as South Orange County Community College District, Sacramento State University, San Francisco State University and California State University, Los Angeles.

Enrico has a Bachelor of Science degree from Notre Dame University and is a Licensed Professional Engineer.





## **Fermin Glasper, PS**

*Vice President, National Mapping*

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Fermin Glasper is the Vice President of Subsurface Utility Mapping for McCarthy Building Companies, National Division. He is responsible for the overall management and direction of quality control and quality assurance program for the division. This responsibility also includes the oversight of office staff, field crews, research, mapping, utility locating, data collection, surveying, drafting and reviewing all deliverables for completeness and accuracy, in accordance with statutes, standards, and guidelines.

With 20 years of civil engineering, surveying, design, construction management and project management experience, Fermin has worked on numerous universities and high-education projects throughout California such as San Francisco State University, Sacramento State University, California State University, Los Angeles, and South Orange County Community College District.

Fermin is a Geomatics Engineer, from the United States Navy Corps of Engineers, he has Bachelor of Science degree in Management from National Louis University and is a Licensed Professional Surveyor.



## **Brianna Lostaglio**

*Project Manager, Southern California Mapping*

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Brianna Lostaglio is a Project Manager of Subsurface Utility Mapping for McCarthy Building Companies, Southern California Branch Office. She is the owners point of contact and is responsible for the success of the project. In addition, she oversees the global operations and course of the project, directs office and field personnel, all subcontractors, maintains budgets, project safety and total quality management.

With more than seven years of construction and project management experience, Brianna has worked on several universities and higher-education Mapping projects throughout the state of California such as South Orange County Community College District, Sacramento State University, San Francisco State University and California State University, Los Angeles.

Brianna has a Bachelor of Science degree from San Diego State University.



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# Overview

- Subsurface Utility Mapping – The Why and How
- Typical Deliverables
- Procurement Recommendations
- Project Examples



# Technical Definition

**Subsurface Utility Mapping (SUM)** is a branch of engineering practice that involves managing certain risks associated with utility mapping at appropriate quality levels, utility coordination, utility relocation design and coordination, utility condition assessment, communication of utility data to concerned parties, utility relocation cost estimates, implementation of utility accommodation policies, and utility design.



# Does My Campus Need SUM?

## Key Criteria

1. Operational education campus considering new project
2. Aging campus with decades of compounded infrastructure projects
3. Urban complicated site work
4. New projects adjacent to high risk utilities (oxygen, gas, etc.)

LOCAL OCTOBER 28, 2015 6:43 PM

# State fines Fresno County for gas explosion

**HIGHLIGHTS**  
 Cal-OSHA fines county \$101,125 for violating state rules  
 County disagrees, will appeal the discipline  
 The April blast killed one man and injured 12 others



Mail Tribune GET YOUR HEADLINES TO GO. SIGN UP FOR OUR NEWSLETTER TODAY!

## Ruptured gas line closes Phoenix High School

Thursday  
 Posted Jun 5, 2014 at 12:01 AM

Share

A construction crew working in Phoenix hit a gas line Wednesday morning, causing a leak that prompted the lock-down of Phoenix High School and the evacuation of neighboring houses, fire officials said.

A construction crew working in Phoenix hit a gas line Wednesday morning, causing a leak that prompted the lock-down of Phoenix High School and the evacuation of neighboring houses, fire officials said.

Jackson County Fire District No. 5 Capt. Bob Holt said workers struck the roughly 2-inch line while digging at around 10 a.m.

Rose Street was closed between Cheryl Lane and Bolz Road until utility crews could shut down and fix the line. The repairs took about 45 minutes.

## NEWS

Type Size: A A A Print Email Most Popular SHARE

### Crews hit gas line at Estrella

by Jackie Cope - May 21, 2009 11:38 AM  
 The Arizona Republic

The Goodyear Fire Department has reopened two roads in the Estrella community after construction crews hit a natural-gas line Thursday morning, officials said.

Firefighters closed Elliot Road and San Gabriel Drive about 8 a.m. after a backhoe struck the 4-inch gas line as crews worked on the site of a new Bashas' store, fire Battalion Chief Russ Braden said. The roads were reopened around 10:30 a.m.

Southwest Gas, which owns the gas line, was able to patch the leak within about two hours, he said.

## Construction worker injured in large explosion near Glen Carbon, IL

POSTED 2:29 PM, APRIL 6, 2016, BY BETSEY BRUCE, UPDATED AT 07:33PM, APRIL 6, 2016

FACEBOOK SK+ TWITTER REDDIT PINTEREST LINKEDIN EMAIL



MARYVILLE, IL (KTVM) - Route 162 remains closed as first responders continue to deal with the aftermath of this natural gas explosion that occurred before 2pm Wednesday afternoon.

## Gas Leak Closes Route 163, Thousands Evacuated in Mission Valley

POSTED BY DEBBIE L. SKLAR ON MARCH 7, 2018 IN CRIME | 3121 VIEWS | 0 COMMENTS | LEAVE A COMMENT

Share This Article:  
 f t + reddit p in



San Diego Gas & Electric crews at the scene of the gas leak. Courtesy SDG&E

## Portland firm says subcontractor hit gas line in NW Portland gas blast

LOY CLARK PIPELINE COMPANY HIT NW GAS LINE 6:20 6:03 KGW.com

NEIGHBORHOOD PITCHES IN THANKS FIRST RESPONDERS GAS LEAK PROTECTION

Loy Clark pipeline company hit NW gas line

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The inaccurate location of subsurface utilities on design documents places owners, contractors, and campus operations at **RISK.**



# Quantifiable Risks

**1 // Safety**

**2 // Budget**

**3 // Design**

**4 // Schedule**

**5 // Owner Operations**





# When You Map You...



Improve safety.



Ease campus operations pain.



Enhance constructability analysis and certainty for site work while reducing risk.



Enhance schedule and budget accuracy for the project.



Develop logistical tool to streamline future utility additions, shutdowns or switchovers and maintenance.

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18%

Typical  
change  
order rate on  
complex civil  
sites due to  
utility  
unknowns



**SAVE**



**\$4.62**

**FOR  
EVERY**



**\$1.00**

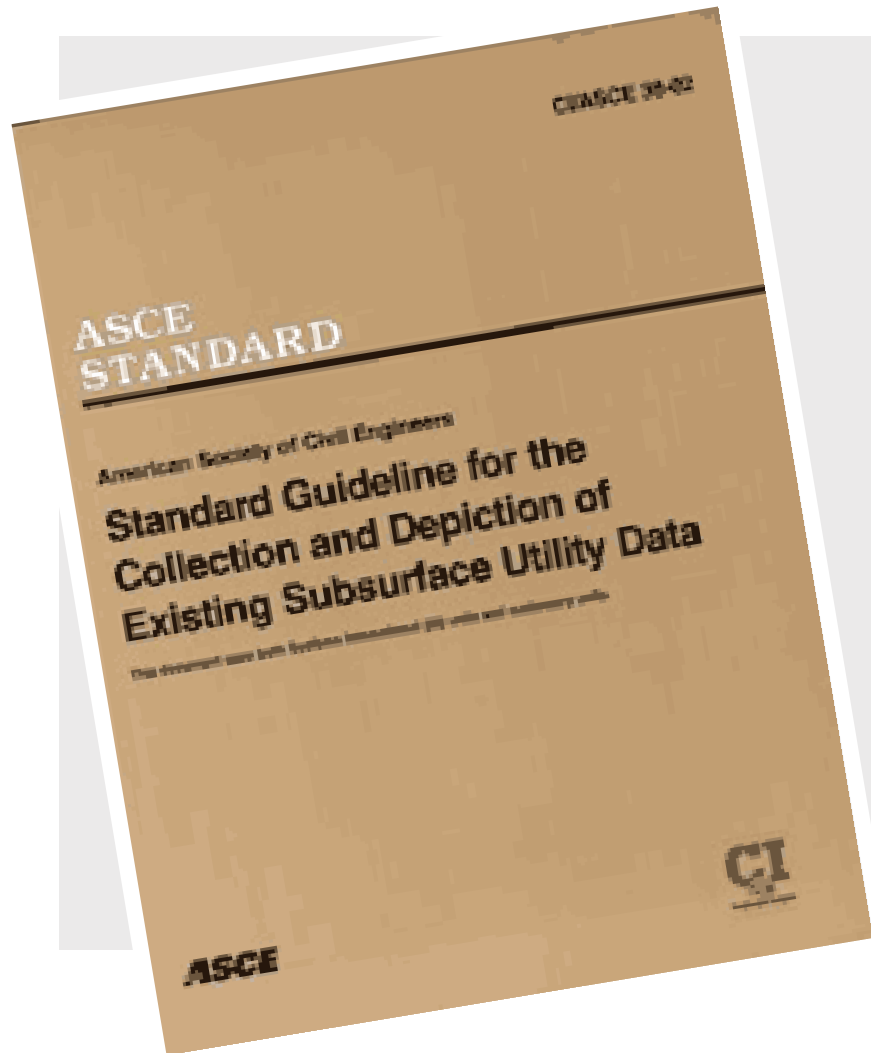
**SPENT ON SUM**



# Written Standards

## Professional ASCE Standard 38-02

Developed in 2002





# SUM Approach

**D //**

- Information derived from existing records or oral recollection
- Presented in AutoCAD Civil 3D or Revit

**C //**

- Coordinate public utility marking
- Global Navigation Satellite System (GNSS) (RTK)
- Robotic Total Station

**B //**

- EM utility locators
- Ground penetrating radar
- LIDAR
- Infrared-energy pattern analysis
- Camera with Sonde
- Computer Assisted Radar Tomography
- Acoustic utility locators
- ESRI GIS software

**A //**

- Hydro-excavation
- 3D Laser Scanning
- Revit
- Point Cloud Modeling
- Navisworks
- BIM / CIM
- GIS Attribute/Database Expansion



## Quality Level

D //

## What We Do

- Review and compile records
- High-level “utility atlas”
- Contact all local utility companies

## What You Get

- 2D utility exhibits (PDF)
- Prepared in AutoCAD Civil 3D



## Quality Level

C //

## What We Do

- At-grade inventory
- Call 811 utility locate
- Collection of visible surface structures
- Survey grade standard of care

## What You Get

- Horizontal and Vertical location of surface structures
- Collection of GIS Attributes
- 2D utility exhibits (PDF)
- Prepared in AutoCAD Civil 3D



## Quality Level

**B** //

## What We Do

- Field investigation
- Facility/basement walk-throughs
- Surface geophysical locating
- Detailed inventory of utility vaults

## What You Get

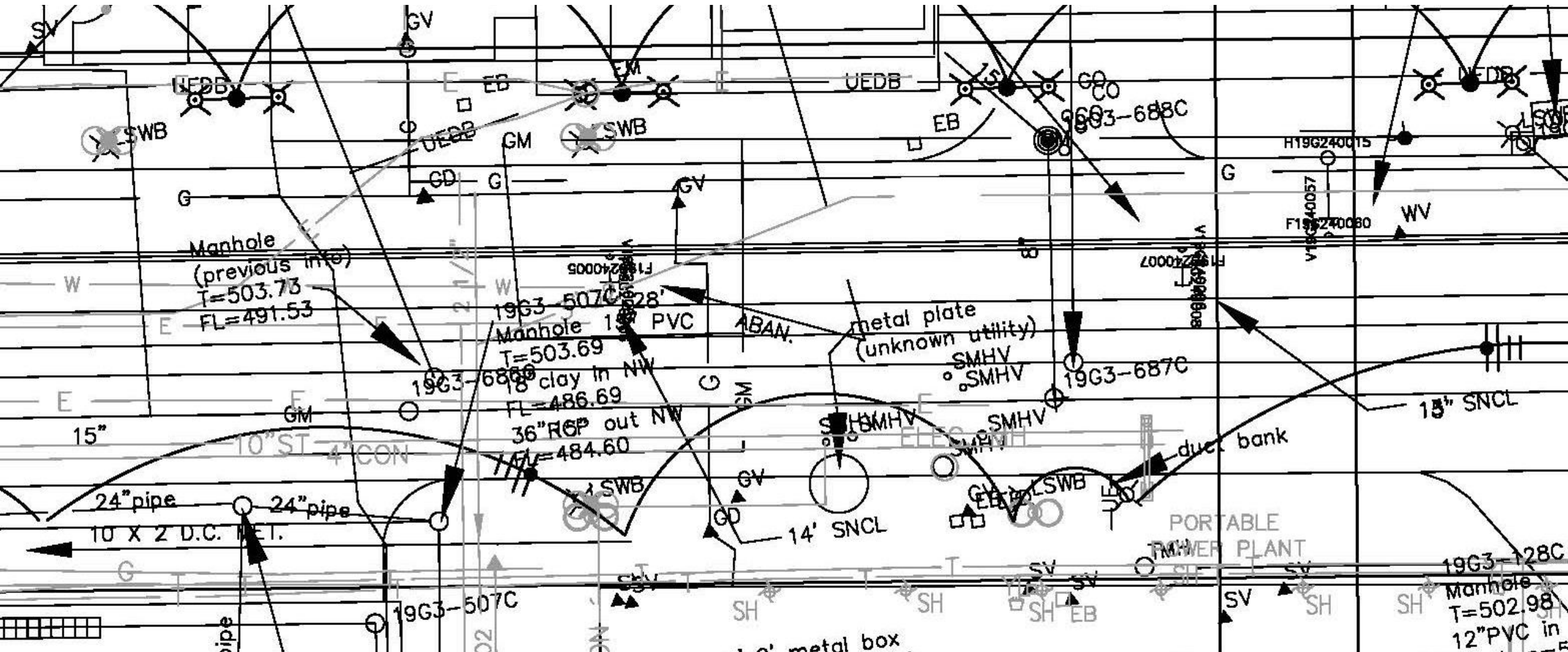
- Refined 2D utility exhibits in CAD or GIS
- Utility vault details & sizes
- Dimensions for subsurface features
- GIS utility database & attributes
- Data helps facility maintenance & lifecycle analysis





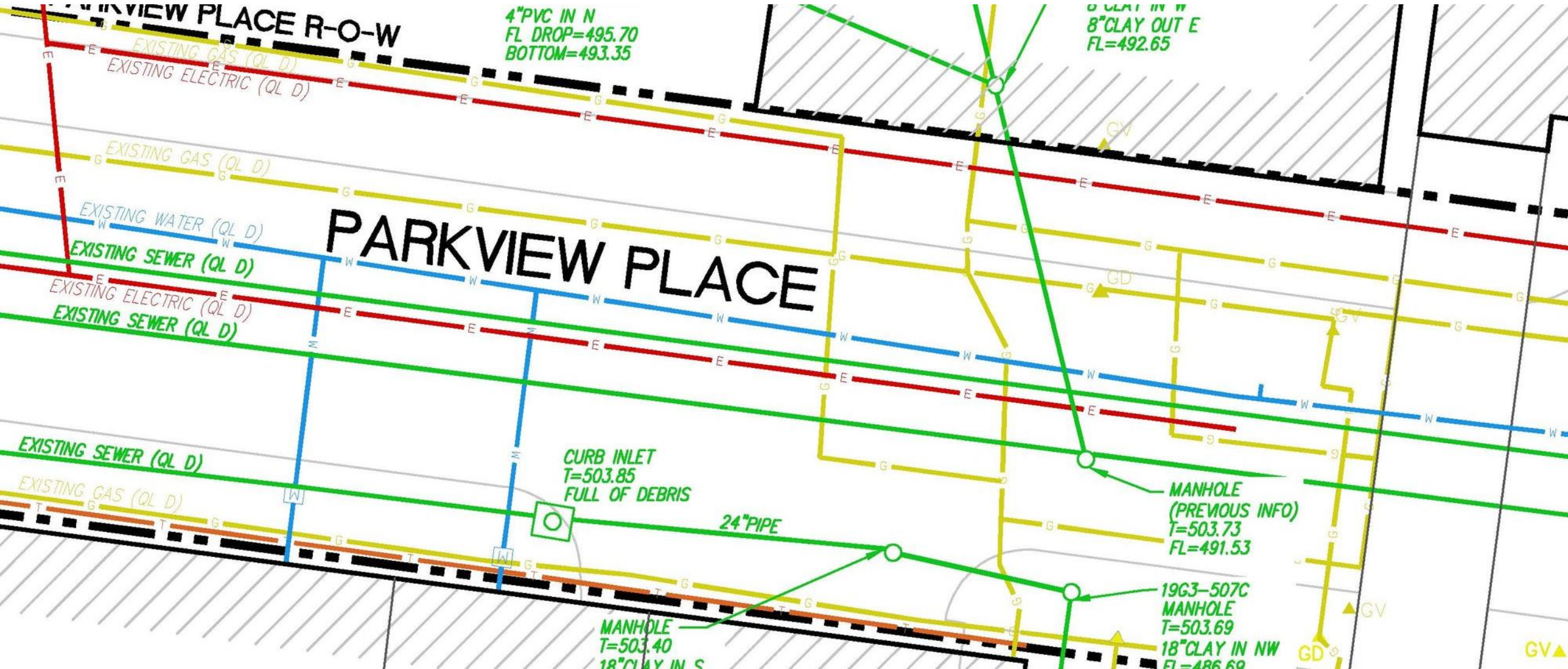


# Typical Civil Drawing





# Quality Level D

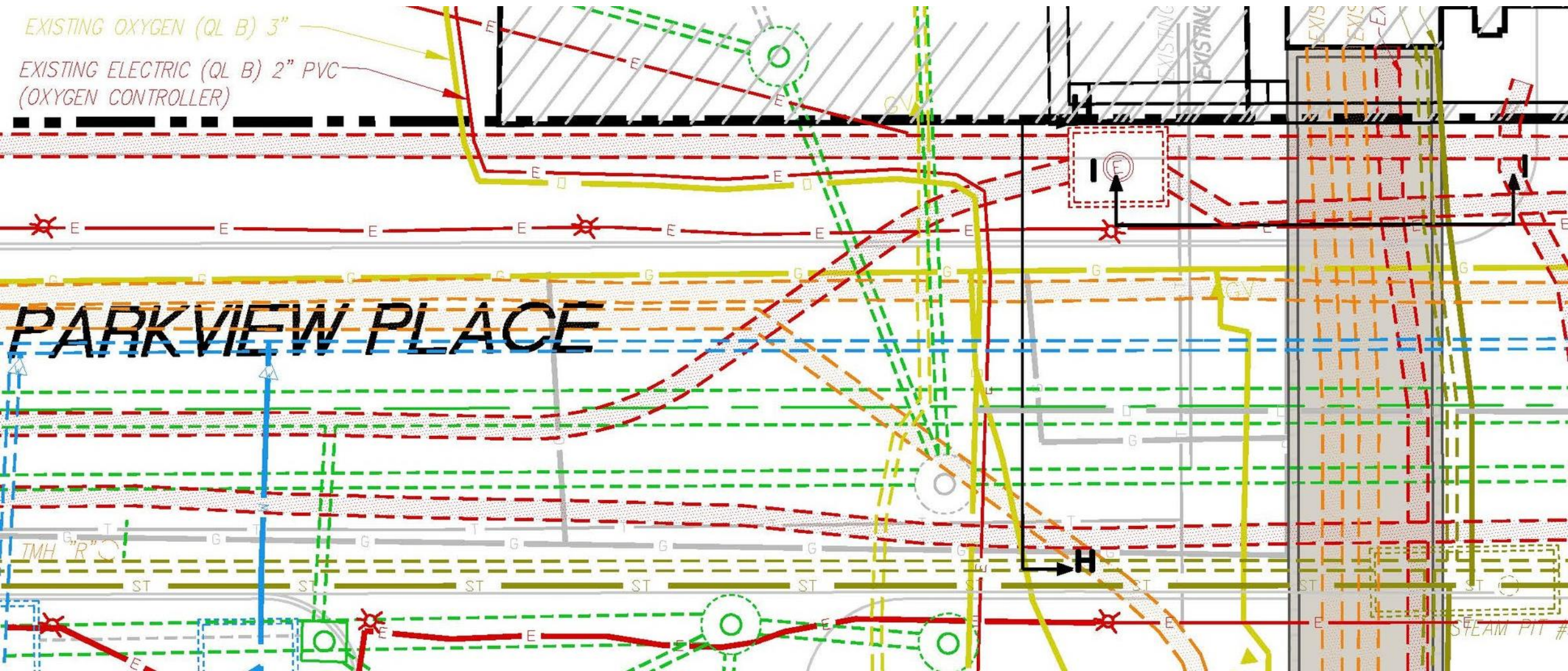




# Quality Level B – Existing Conditions

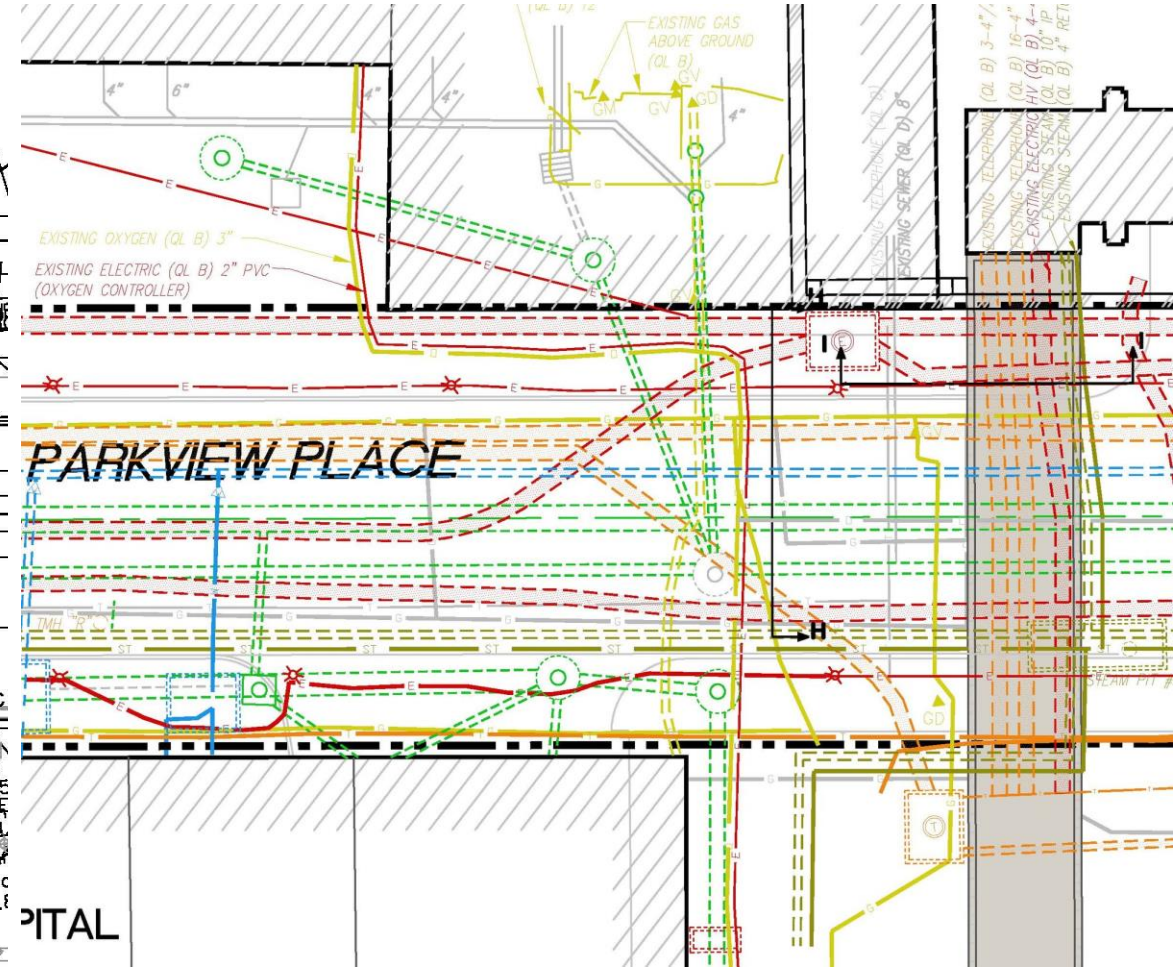
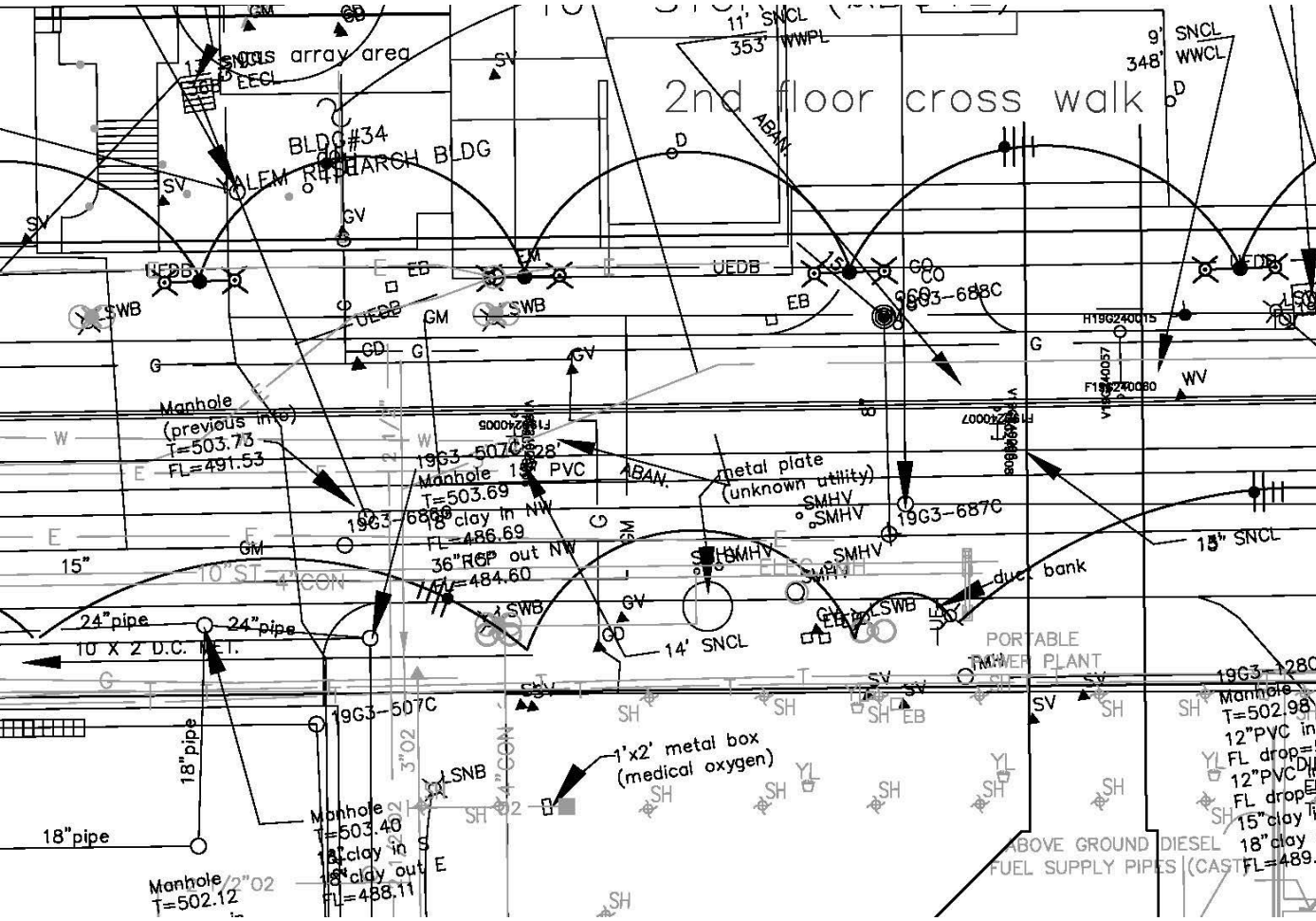
EXISTING OXYGEN (QL B) 3"

EXISTING ELECTRIC (QL B) 2" PVC  
(OXYGEN CONTROLLER)





# Typical vs. Quality Level B



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Upon completion of **Quality Level B**, deeper analysis is required to determine project critical locations where **Quality Level A** utility test holes are required.

## Quality Level

A //

## What We Do

- Hydro-excavation at project critical locations
- Field survey of exposed utilities

## What You Get

- Engineered cross sections
- 3D Civil Information Model (CIM)
- Integrates w/BIM





# Quality Level A

- Video demo



# Typical Deliverables



**Existing Record  
Collection**



**Quality Level B  
Final Deliverable**



**Investigation Field  
Notes**



**Red Flag Report**





# Project Examples - Demo

**GENERAL NOTES:**

**SACRAMENTO STATE**

CALIFORNIA STATE UNIVERSITY - SACRAMENTO  
6000 J STREET, SACRAMENTO, CA 95819  
Existing Subsurface UTILITY EXHIBITS

PROJECT NUMBER:  
19SACR4132

**PROJECT DIRECTORY**

**DRAWING INDEX**

SHEET # SHEET NAME  
UM 1.00 COVER SHEET  
UM 1.01 - 1.04 EXISTING COMPOSITE UTILITY PLAN - QLE-B

**LEGEND:**

**UTILITY COMPANY CONFLICT STATEMENT:**

**811 Know what's below. Call before you dig.**

**GENERAL NOTES:**

**ASU ARIZONA STATE UNIVERSITY**

ASU - ISTB 7  
TEMPE, AZ 85287  
Existing Subsurface UTILITY EXHIBITS

PROJECT NUMBER:  
19AZM12700

**PROJECT DIRECTORY**

**DRAWING INDEX**

SHEET # SHEET NAME  
UM 1.00 COVER SHEET  
UM 1.01 - 1.04 PROPOSED COMPOSITE UTILITY PLAN - QLE-B

**LEGEND:**

**UTILITY COMPANY CONFLICT STATEMENT:**

**811 Know what's below. Call before you dig.**

**GENERAL NOTES:**

**CAL STATE LA**

CALIFORNIA STATE UNIVERSITY - LOS ANGELES  
(PARKING LOT 7)  
5151 STATE UNIVERSITY DR., LOS ANGELES, CA 90032  
Existing Subsurface UTILITY EXHIBITS

PROJECT NUMBER:  
19SACR4132

**PROJECT DIRECTORY**

**DRAWING INDEX**

SHEET # SHEET NAME  
UM 1.00 COVER SHEET  
UM 1.01 - 1.02 EXISTING COMPOSITE UTILITY PLAN - QLE-B

**LEGEND:**

**UTILITY COMPANY CONFLICT STATEMENT:**

**811 Know what's below. Call before you dig.**

**LOCATOR MAP**

**SHEET NUMBER KEY**

UM 1 SHEET OPEN  
UM 1 SHEET TYPE  
UM 1.00 COVER SHEET

**GENERAL NOTES:**

**SAN FRANCISCO STATE UNIVERSITY**

1600 HOLLOWAY AVE.  
SAN FRANCISCO, CA 94132  
Existing Subsurface UTILITY EXHIBITS

PROJECT NUMBER:  
19SANF0071

**PROJECT DIRECTORY**

**DRAWING INDEX**

SHEET # SHEET NAME  
UM 1.00 COVER SHEET  
UM 1.01 - 1.04 EXISTING COMPOSITE UTILITY PLAN - QLE-B

**LEGEND:**

**UTILITY COMPANY CONFLICT STATEMENT:**

**811 Know what's below. Call before you dig.**

**LOCATOR MAP**

**SHEET NUMBER KEY**

UM 1 SHEET OPEN  
UM 1 SHEET TYPE  
UM 1.00 COVER SHEET

**KEY PLAN**



# Procure Quality Level B

**1 //**

Work with a turnkey provider who uses experienced field resources, and utilizes the ASCE 38-02 standards

**2 //**

Prioritize your campus according to upcoming expansion / renovation; high-risk facilities; oldest/jeopardized utilities

**3 //**

Host a meeting with all potential stakeholders, including public utility representatives, to gather information and look ahead at future projects

**4 //**

Gather existing records and walk the campus with our team prior to finalizing scope

**5 //**

Develop a proposal for a small “corner” of the campus

**6 //**

Perform a Quality Level B map

**7 //**

Communicate the SUM information to all designers, especially civil



# Procure Quality Level A

1 //

Host a coordination meeting with stakeholders, designers, and contractors to review the Quality Level B deliverables

2 //

Collaboratively identify project critical locations where additional utility data is required

3 //

Develop a proposal for a Quality Level A map once needs are determined

4 //

Communicate Quality Level A data to all designers



# As-Builts & Utility Atlas Upkeep

1 //

Incorporate As-Built specification into front end documents to be completed throughout your project

2 //

Require timely and accurate As-Built information as a part of review and approval of contractor billing approvals

3 //

Continue to make progress with annual budgeting and mapping until campus-wide existing conditions are known and can provide all operations with certainty

4 //

Gather GIS data for future functionality use



# FAQ

- What makes your service different?
- Why can't you simply "scan" the site in a shorter amount of time?
- What happens when a utility is unlocatable from the surface (QL-B)?
- For 3D Models, do you guarantee elevation data?
- Does this information integrate into GIS?

# QUESTIONS?

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(c) 314.581.0815

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(c) 949.560.7793

Brianna Lostaglio  
Blostaglio@mccarthy.com  
(c) 949.275.3105