

Appendix J

Subsurface Utility Engineering Investigation Report



SUBSURFACE UTILITY ENGINEERING (SUE) QUALITY LEVEL B INVESTIGATION

Project #46726 (Warden Ave, Markham, ON)

Subsurface Utility Engineering Report for York Region, ON

Prepared For:

The Regional Municipality of York

Rev No.	Date	Description	Prepared By
01	August 16, 2020	Issued for Client Review	Youssef CHOULLI, P.Eng.





The engineering stamp on this document is to confirm that the Subsurface Utility Engineering work was performed according to the scope of work in the contract, the industry best practices and ASCI 38-02 Standard. The QL-B depiction accuracy is governed by the geophysical tool limitations and site conditions, as detailed in multiVIEW's Terms and Conditions in the last sheet of the attached composite drawing.



TABLE OF CONTENTS

1.	Introduction	1
1.1	Background	
1.2	Definitions	
1.3	Abreviations	
1.4	References	
2.	Executive Summary	
3.	Objective, Scope of Work & Project Limits	
4.	Provided Record Data and Validity	
5.	SUE Investigation Methodology	
6.	Equipment for Site Investigation	
7.	Results of the SUE Site Investigation	
8.	SUE Investigation Challenges and Discrepancies	
	endix A: SUE QL-B– Project Area Composite CAD Drawings (46726-SUE-DWG)	
	endix B: Utility Owner Contact List and record validity	
	endix C: Third Party Requirements in the Vicinity of Natural Gas facilities	
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1. INTRODUCTION

BACKGROUND 1.1

The York Region seeks to minimize the overall risk, in preparation for the widening of the Warden Ave, from Elgin Mills Rd to Mackenzie Dr E, Markham, ON and Kennedy Road from Elgin Mills Rd E to Major Mackenzie Dr E. For this reason, The Regional Municipality of York awarded MultiVIEW the contract to perform Subsurface Utility Engineering (SUE) investigation, for the mentioned project area.

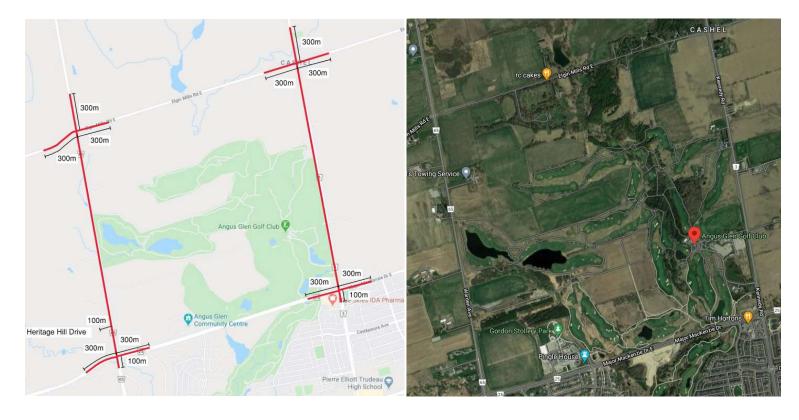


Figure 1-1: Aerial View of the Project Area at Warden Avenue and Kennedy Road, Markham. ON













1.2 **DEFINITIONS**

Ticket	The notification that multiVIEW sends to the utility owner to inform of any conflict and to prompt the utility owner to provide their record data and as built data of their existing utilities in the project limits.
Right-Of-Way (ROW)	Right-Of-Way refers to subsurface land or property acquired for or intended to be occupied by either a street crosswalk, railroad electric transmission line, oil or gas pipeline, water main sanitary, or storm sewer main, shade trees and/or other special private and public utility facilities.
Locate/ Locating	In this scope of work, Locate, refers to leveraging the surface geophysical methods to interpret the presence of a subsurface utility and to mark its approximate horizontal position (designation) on the ground surface. The process of exposing and recording the precise vertical and horizontal location of a utility is not included in this scope of work.
Utility	A privately, publicly, or cooperatively-owned line, facility, or system for producing, transmitting, or distributing communications, cable television, power, electricity, light, heat, gas, oil, crude products, water, steam, waste, or any other similar commodity, including any fire or police signal system or street lighting system.
The Region	The York Region













ABREVIATIONS 1.3

ASCE	American Society of Civil Engineers	QL-A	Quality Level A
Ave	Avenue	QL-B	Quality Level B
ВОС	Bottom of Chamber	QL-C	Quality Level C
СВ	Catch Basin	QL-D	Quality Level D
CAD	Computer Aided Design	ROW	Right-of-Way
CATV	Cable Television	SUE	Subsurface Utility Engineering
CCTV	Closed Circuit Television	SAN	Sanitary
CI	Construction Institute	St	Street
CSE	Confined Space Entry	STM	Storm
EM	Electromagnetic	T/G	Top of Grate Elevation
EOI	End of Surface Geophysical Information		
EORI	End of Record Information		
GPR	Ground Penetrating Radar		
GPS	Global Positioning System		
INV	Invert		
MH	Maintenance Hole (Man Hole)		
Multiview	multiVIEW Locates Inc.		
N/A	Not Applicable		
OBV	Obvert		
		•	•















1.4 REFERENCES

Ref#	Document #	Document Title	Revision date
1	CI/ASCE 38-02	Standard Guideline for the Collection and Depiction of Existing Subsurface Utility Data	2006
2	P-18-69	Subsurface Utility Engineering (SUE) and Utility Coordination Services	March 5, 2018
3	Proposal Project # 46726	Estimate for SUE Consulting Services for The Regional Municipality of York. Warden Ave. & Elgin Mills Rd, Markham, ON	May 19, 2020















2. EXECUTIVE SUMMARY

multiVIEW Locates Inc. has performed the SUE investigation; fieldwork Quality level B (QL-B) and completed the desktop investigation for the project area of the Warden Ave; from Elgin Mills Rd to Mackenzie Drive East, Markham, ON and Kennedy Road; from Elgin Mills Rd to Mackenzie Drive East, Markham, ON . That is defined in the map and scope of work, shown in Figure 1-1 and Figure 2-1.

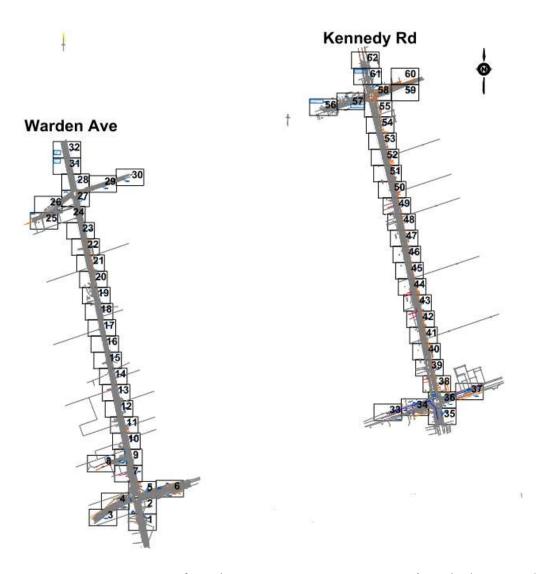


Figure 2-1: Key Map from the Composite SUE QL-B Drawing (Attached in Appendix A)











The present report and attached composite drawing will support the detailed design of the project (e.g. utility relocation plans), allow more accurate cost estimation, minimize risks, and support any prioritization of utility conflicts.

Through a combination of record data analysis, mobilization of personnel and equipment, field verification and professional judgement, this SUE investigation helped to identify and confirm the location of the below ground utilities infrastructure and appurtenances as defined in CI/ASCE 38-02, within the work area and project limits.

The consolidation of the above-mentioned information and investigation results have been integrated into the SUE QL-B Composite CAD Drawing, attached in Appendix -A.

3. OBJECTIVE, SCOPE OF WORK & PROJECT LIMITS

This Subsurface Utility Engineering Investigation has as an objective to identify the location of below ground utilities infrastructure and appurtenances, as defined in CI/ASCE 38-02, Ref [1] and as per Contract, Ref [3].

Project includes the investigation area as per Figure 3-1 and Figure 3-2.

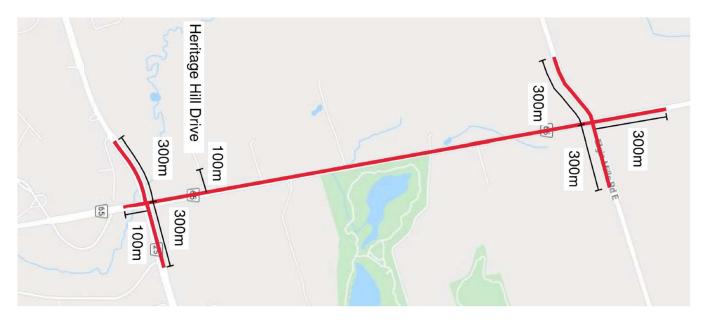


Figure 3-1: Sketch Map of the SUE Investigation & Scope of Work on Warden Avenue











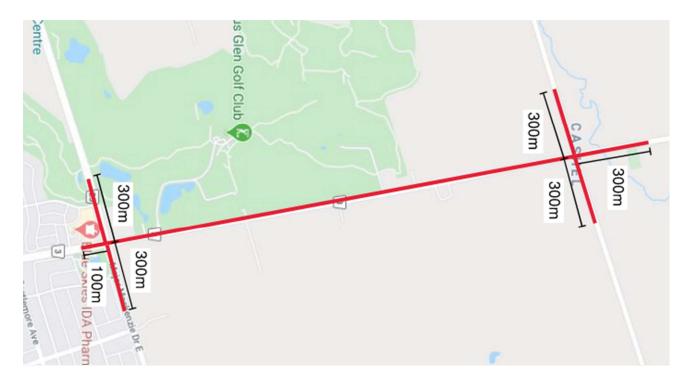


Figure 3-2: Sketch Map of the SUE Investigation & Scope of Work on Kennedy Road

The project limits defined as follows and shown in Figure 3-1 and Figure 3-2.

The work area for this survey is located -

- 1. Approximately 2.5 kilometers on Warden Avenue from 300 meters North of Elgin Mills Road to 100 meters south to Major Mackenzie Road, Markham, ON
- 1a. Approximately 300 meters east on Elgin Mills Road, Markham, ON
- 1b. Approximately 300 meters west on Elgin Mills Road, Markham, ON
- 1c. Approximately 300 meters east on Major Mackenzie Drive, Markham, ON
- 1d. Approximately 300 meters west on Major Mackenzie Drive, Markham, ON
- 1e. Approximately 100 meters on Heritage Drive west, Markham, ON













- 2. Approximately 2.5 kilometers on Kennedy Road from 300 meters North of Elgin Mills Road to 100 meters south to Major Mackenzie Road, Markham, ON
- 2a. Approximately 300 meters east on Elgin Mills Road, Markham, ON
- 2b. Approximately 300 meters west on Elgin Mills Road, Markham, ON
- 2c. Approximately 300 meters east on Major Mackenzie Drive, Markham, ON
- 2d. Approximately 300 meters west on Major Mackenzie Drive, Markham, ON

The scope of work includes the following:

- Complete the desktop investigation (QL-D)
- Complete above ground utility survey (QL-C) of visible above ground utility features
- Using Electromagnetic pipe and cable locating systems and accessories, multiVIEW will locate and mark all toneable underground utility mains: electrical, gas, communications and water within the project area.
- Using differential GPS system, survey the spatial position of field markings where site conditions allow.

The Region provided multiVIEW with a Topo AutoCAD drawing base map and some record data. This AutoCAD drawing was used as a base map.

Details of the investigation are outlined in the subsequent Sections.







8 | Page



4. PROVIDED RECORD DATA AND VALIDITY

multiVIEW, with the help of the Region, identified utility owners with facilities within the project limits. multiVIEW raised tickets for all the possible utility owners, then obtained and reviewed all existing utility information and records. These utility owners include mainly the following:

- The Regional Municipality of York
- Ontario One Call
- Alectra-Powerstream
- Bell, Rogers, Telus, Zayo and other Allstream Telecommunications
- Enbridge Pipelines Gas Inc.

A detailed list of contacted utilities owners and their contact details is provided in Appendix B.

Utility owners typically mention a validity period of six months from issuance of the provided information, which is attached to the record data.

Enbridge Gas Inc. provides typically the following guideline related to their plant for third party:

Third Party Requirements in The Vicinity of Natural Gas Facilities

Copy of this guideline is attached in Appendix C.













5. SUE INVESTIGATION METHODOLOGY

The SUE investigation was performed according to the CI/ASCE 38-02 Standard, Ref [1]. This investigation included data collection, depiction, data analysis, site visits and inspections.

A SUE investigation involves the collection of utility data through four (4) Quality Levels, or activities, as per Figure 6-1 below. Comparing and analyzing data makes it possible to achieve a complete and accurate composite data set for making informed decisions within a project or impact area.

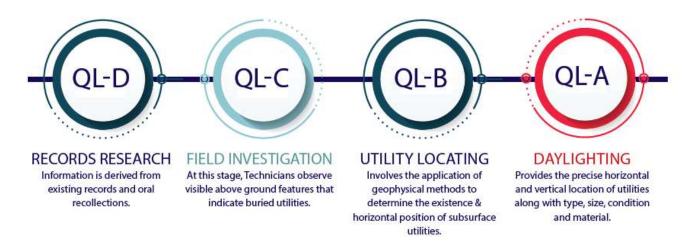


Figure 5-1: Quality Levels for SUE Investigation

In this study, the first three SUE Quality Levels; QL-D, QL-C and QL-B have been requested and performed accordingly.

Quality Level D (QL-D): Information derived from existing records or oral recollections.

Quality Level C (QL-C): Information obtained by surveying and plotting visible above-ground utility features and using professional judgment to correlate this information to Quality Level D information.

Quality Level B (QL-B): Involves the application of surface geophysical methods to determine the existence and horizontal position of subsurface utilities within a project's limits. Non-destructive technologies including Ground Penetrating Radar (GPR) and Electromagnetic (EM) tools are leveraged at this stage to accurately detect conductive and non-conductive underground assets. Quality Level B information is correlated with Quality Levels C & D to provide a comprehensive subsurface utility dataset that includes abandoned lines and other discrepancies, while confirming the accuracy of record data.













Quality Level A (QL-A): Also known as daylighting, provides the precise horizontal and vertical location of utilities along with type, size, condition and material, obtained by the actual exposure (or verification of previously exposed and surveyed utilities) usually through vacuum excavation.

For this project, multiVIEW's QL-B investigation entailed the following activities:

- Mobilize a crew of trained technicians equipped with Electromagnetic (EM) utility locating devices to complete the utility mapping exercise, and determine the existence and approximate horizontal position of toneable buried plant within the project site. The devices can accurately locate the position of steel pipes and cables (conductive), but cannot locate non-metallic utilities such as plastic pipes, drain tiles, concrete sewers or vitreous clay pipe where tracer wires are unavailable (non-conductive).
- The team then marked the inferred utility positions (conductive and non-conductive)
- The team surveyed all subsurface markings and surface features
- Sewer maintenance holes and water chambers were not surveyed and excluded form the SUE scope of work, based on Client request.













6. EQUIPMENT FOR SITE INVESTIGATION

Electromagnetic (EM) Induction tools (RD4000 PL Radio-detection type), otherwise known as pipe and cable locating, were leveraged to carry out the Quality Level B component of the SUE program and accurately locating buried infrastructure utilities.

This technique is extremely effective for locating utilities comprised of electrically conductive material or those that contain an intact tracer wire.



Figure 6-1: Electromagnetic (EM) Induction Process (Pipe and cable Locating)

The following two main detection principles have been applied:

- Passive location Used to locate an electromagnetic field already present on a utility
- Active location Used as a signal transmitter to add a specific signal onto a located utility

Low frequency long wave radio signals transmitted from a radio mast pass into the ground, inducing a signal onto metallic utilities. The utilities re-emit these signals and are located and traced using a cable locator in RADIO mode.













When an alternating current (AC) travels along a cable, an electromagnetic field is generated. The alternating current creates a magnetic field and the oscillation of the current between positive and negative creates a frequency known as Hertz (Hz). The electromagnetic field generated by an AC current can be detected by a cable locator.

7. RESULTS OF THE SUE SITE INVESTIGATION

A number of QL-C and QL-B job site investigations have been performed using equipment outlined in Section 6 to collect and depict data within the project area between May and August 2020.

The site investigation was performed based on the record data and visible features. The updated and detailed position of the utilities was confirmed and the lines were designated in the project area and then represented in the composite CAD Drawing, (46726-SUE-DWG) in Appendix A, in which was displayed with the most accurate possible estimate of its actual location.

These utilities include:

- Enbridge Gas lines Gas main
- Watermain
- Bell
- Bell Fiber
- Hydro cable (H)

- Traffic Light (TL)
- Street Light (SL)













8. SUE INVESTIGATION CHALLENGES AND DISCREPANCIES

A number of challenges were encountered in the project on site, which can explain some of the missing information regarding the lost signals, some missing details. These challenges and some considerations can be summarized as the following:

- Non-toneable sections of Water, electrical and communications lines
- No records for Sewers have been collected and no survey was done on site for STM and SAN lines.
- Street Light (SL) utility lines depiction was based on the site investigation only. No records have been collected, except the data provided by Client in the base Map.
- Identification and depiction of Culverts are not included in this SUE scope of work.
- All the data regarding pipe diameter, material and pressure were taken from the records and have not been verified.
- Overhead utilities are excluded from the scope of this SUE composite drawing.
- A discrepancy about water lines found on site and not in records was highlighted in sheet 3 of the composite Drawing 46726-SUE-DWG-Rev 01.
- No records were available for the utilities in some sections of the project, as mentioned in the composite drawing.













APPENDIX A: SUE QL-B- PROJECT AREA COMPOSITE CAD DRAWINGS (46726-SUE-DWG)



















APPENDIX B: UTILITY OWNER CONTACT LIST AND RECORD **VALIDITY**

Utility	Contact Details Information	Date for Requested Info	Date of Info Received	Type of Data received	Remarks
Bell Canada	Sanzhar Zhorabayev Technicien CAD, Ingénierie - Centre du Canada CAD Technician - MOC, Engineering - Central Canada T : 289.657.8145 7777 Weston Road Vaughan, ON L4L 0G9	2020-06-23	2020-07-09	CAD Drawing	6 months validity from issuance of information
Enbridge Gas	mark-ups <mark- Ups@enbridge.com> Kishore Sagar</mark- 	2020-06-23	2020-06-26	PDF Drawing mark up	
Alectra	Micheline Email- recordseast.info@alectrautilities.com	2020-06-23	2020-06-23		
Beanfield (Formerly Aptum Technologies, Cogeco Peer1)	Dipen Shah Design Technician Direct phone. 416.583.2096 email. dipen@beanfield.com	2020-06-23	2020-06-23		Beanfield (Including Former Aptum) has no















Utility	Contact Details Information	Date for Requested Info	Date of Info Received	Type of Data received	Remarks
					infrastructure in your working area
Telecon (GT)	Mary Tina CAD Technician, Engineering-Central Canada 7777 Weston Road, Woodbridge, ON L4L 0G9 T 289-657-8072	2020-06-23	2020-07-08		GT has no plant within 2m of proposed work- NO CONFLICT
Hydro One	TPUCC Markup - Hydro One. tpumarkup@hydroone.com	2020-06-23	2020-06-25		Hydro One does not owns nor operates underground high voltage transmission facilities in the Project area
Water & Sewer	Arnoor Public Works Permits Infrastructure Planning & Policy Public Works Halton Region 905-825-6000, ext. 6032 1-866- 442-5866	2020-09-29	2020-06-25		There is no water main or sanitary & storm sewer in the area.
OOC Ontario One Call	Solutions@on1call.com	2020-06-23	2020-09-23		
York Region Water & Wastewater		2020-06-23	2020-06-29 2020-06-23		
Rogers	Shoaib Akram CAD Technician, Engineering - Central Canada T 289-657-8020 7777 Weston Rd, Woodbridge (Ontario) L4L 0G9	2020-06-23	2020-07-16		Rogers has no existing plant in the area















Utility	Contact Details Information	Date for Requested Info	Date of Info Received	Type of Data received	Remarks
Zayo	Phil Arbeau Utility Circulations phil.arbeau@zayo.com	2020-06-23	2020-07-15		Zayo has no existing plant in the area
Telus	Indira Sharma (Project Support) Email: telusutilitymarkups@Telecon.ca 289-657-8256 7777 Weston Road Vaughan, ON L4L 0G9	2020-06-23	2020-06-25		TELUS has no infrastructure in the area of your proposed work.













APPENDIX C: THIRD PARTY REQUIREMENTS IN THE VICINITY OF NATURAL GAS FACILITIES



Third_Party_Require ments_in_the_Vicini





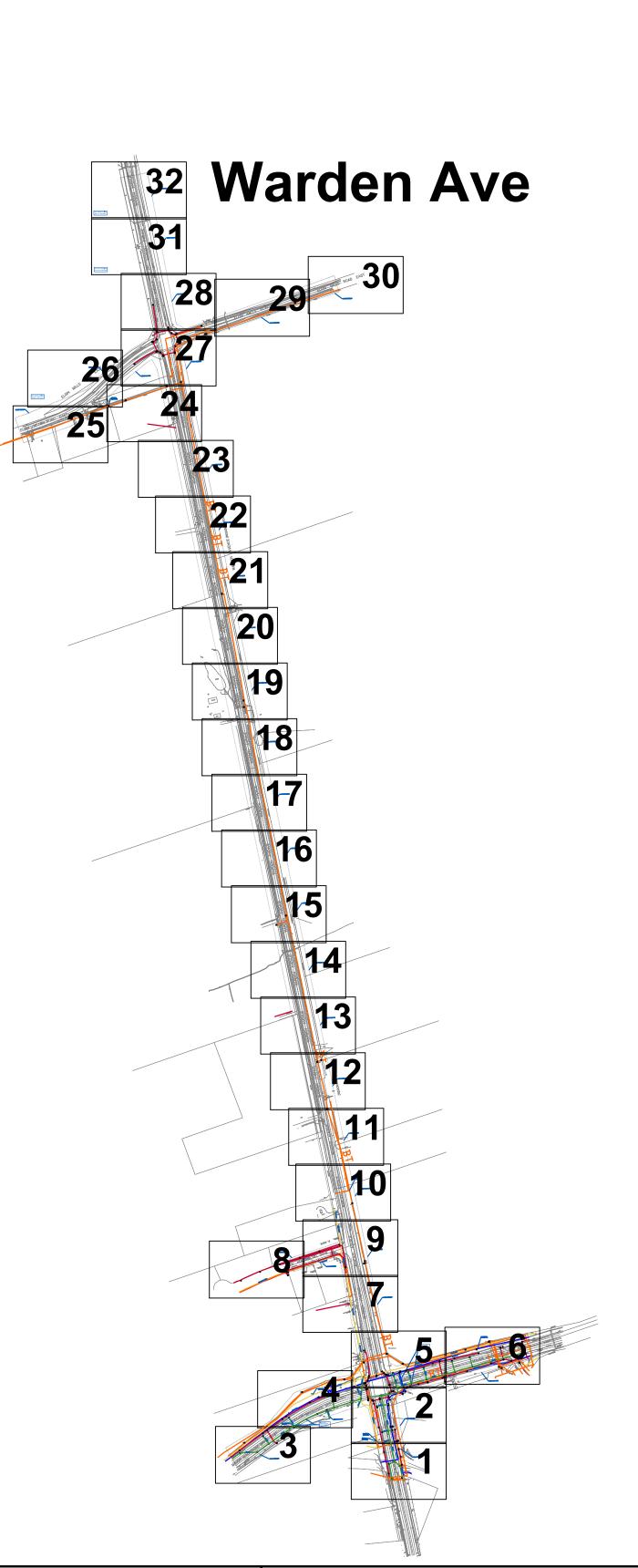


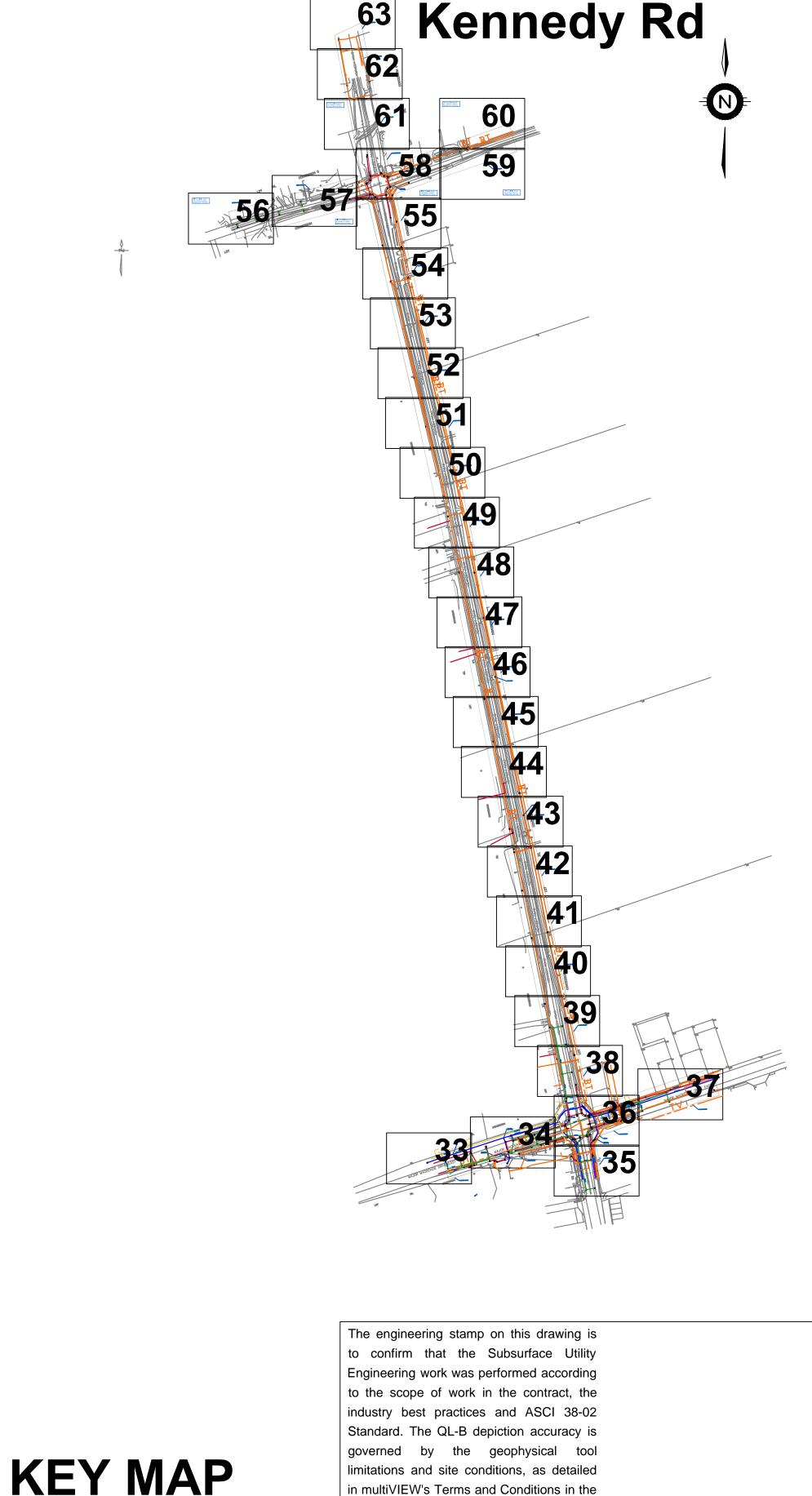




SUE NOTES:

- 1. The SUE Site investigation was performed on June 2020 with a sewers structures (MHs & CBs) survey updated on September 2021.
- 2. Discrepancies between utilities records received from utilities owners are highlighted in this drawing (see sheets).
- 3. This drawing was updated with records from the York Region utilities map website for the missing Sewers records.
- 4. Identification and depiction of Culverts and Ditches are outside of this SUE scope of work.
- 5. Street Light (SL) and Traffic Lights (TL) utility lines depiction was based on the site investigation only. No records have been collected, except Alectra records for Hydro.
- 6. The Sewer records and the connections of STM and SAN are based on the collected data and the QL-C. For this reason, it is highly recommended to perform sonding in order to establish and/or confirm connections.
- 7. Any data regarding pipe diameter, material and pressure were taken from the records and have not been verified. QL-A is recommended to get depth of the utilities, diameter and material composition.
- 8. For more information and details please see the project report: #46726-SUE-Report-Rev01
- 9. No record of service utility lines were available nor collected. All the depicted service lines included in this composite drawing are based on the geophysical survey only.
- 10. Please see some SUE investigation challenges and Technical limitations on sheet #64







GLOSSARY

CONFINED SPACE ENTRY

SAN SANITARY

STORM

- INVERT OBVERT

BOTTOM OF CHAMBER

END OF RECORD INFORMATION UTILITY ABANDONED ACCORDING TO UTILITY RECORDS

END OF SURFACE GEOPHYSICAL INFORMATION TOP OF GRATE ELEVATION

- STREET LIGHT

FOR: THE REGIONAL MUNICIPALITY OF YORK

PROJECT NO: 46726

PROJECT NAME: WARDEN AVE & KENNEDY RD

MARKHAM

DATE: 2021-08-13

Subsurface Utility Engineering CI/ASCE 38-02 Quality Levels

QL'A': Visual verification of utility location and depth using

include oral recollection.

excavation methods. i.e. Hydrovac. QL'B': Utility located using surface geophysical methods i.e. electronically applied or induced magnetic field using specific utility locate equipment or ground penetrating

QL'C': Utility plotted using record information in conjunction with a visual field survey of utility furniture. QL'D': Utility plotted using record information only. This can

GENERAL NOTES

- 1. This information is provided for design purposes only. 2. All inverts shown on this plan by multiVIEW Locates Inc.are in meters and were
- measured from the top of the manhole and/or catch basin lids. 3. Subsurface utility information shown on this drawing was obtained on a best effort, best practices basis, within the technical limitations of the instrumentation. Utilities shown on this map by multiVIEW Locates Inc. were located using ASCE 38-02 Quality Level 'B' methods unless otherwise noted. All other information
- hereon has been supplied by others and is not certified. 5. Third party information provided on these drawings are for the convenience of use but do not constitute information obtained and delivered by multiVIEW Locates Inc.

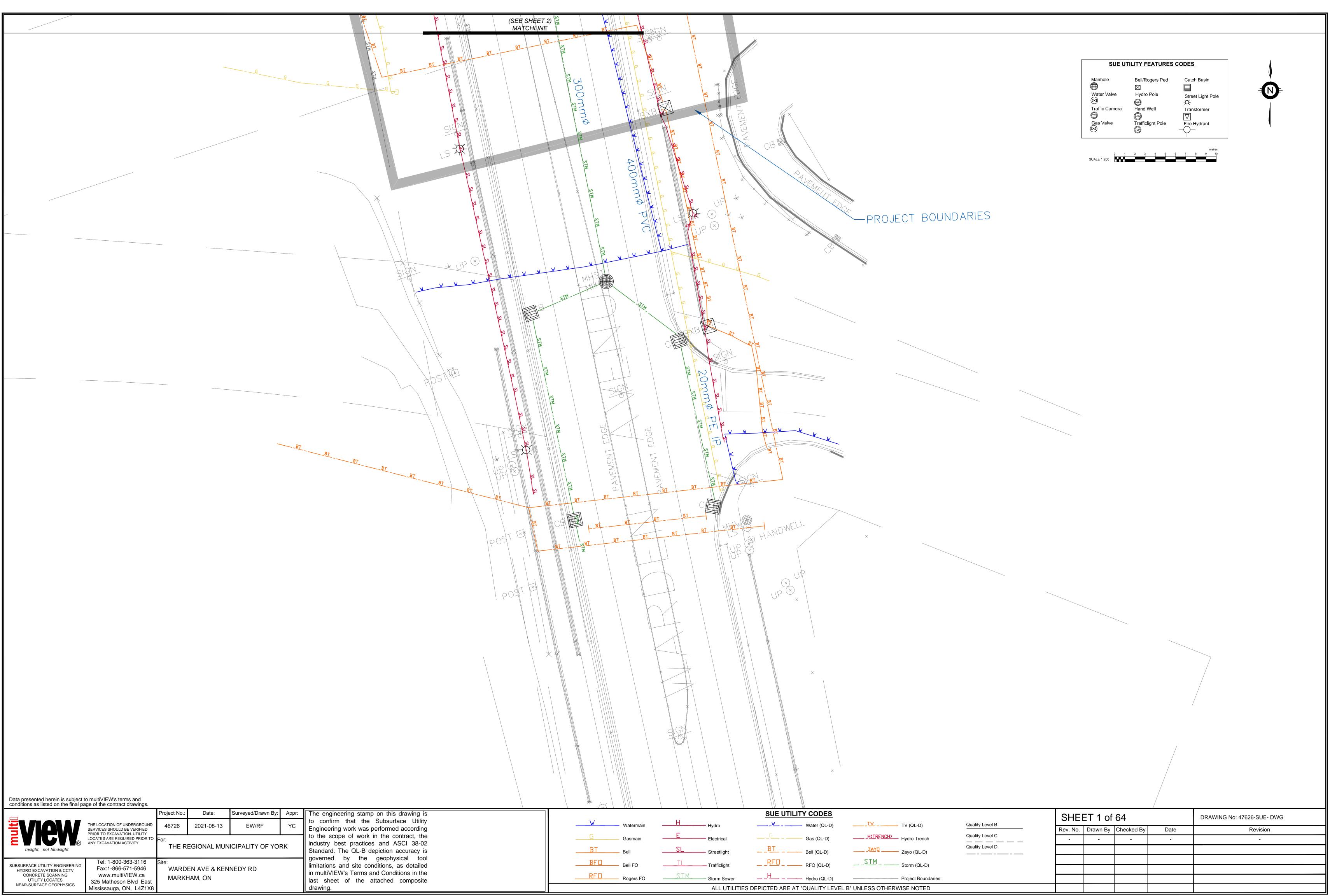
during the course of this project. 6. Elevations represented for this study were obtained by multiVIEW Locates Inc. utilizing datum derived by differential GPS observations and referred to the

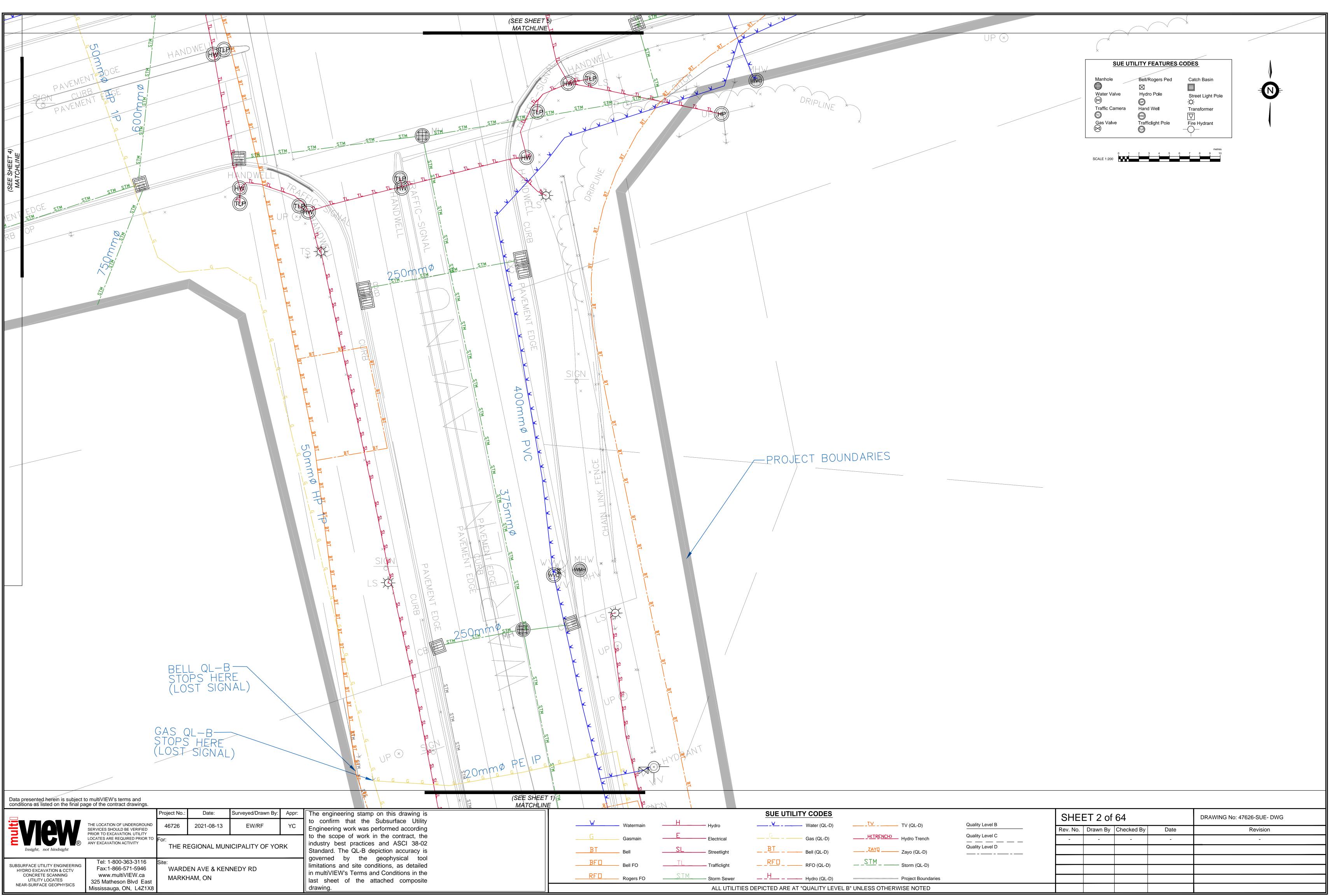


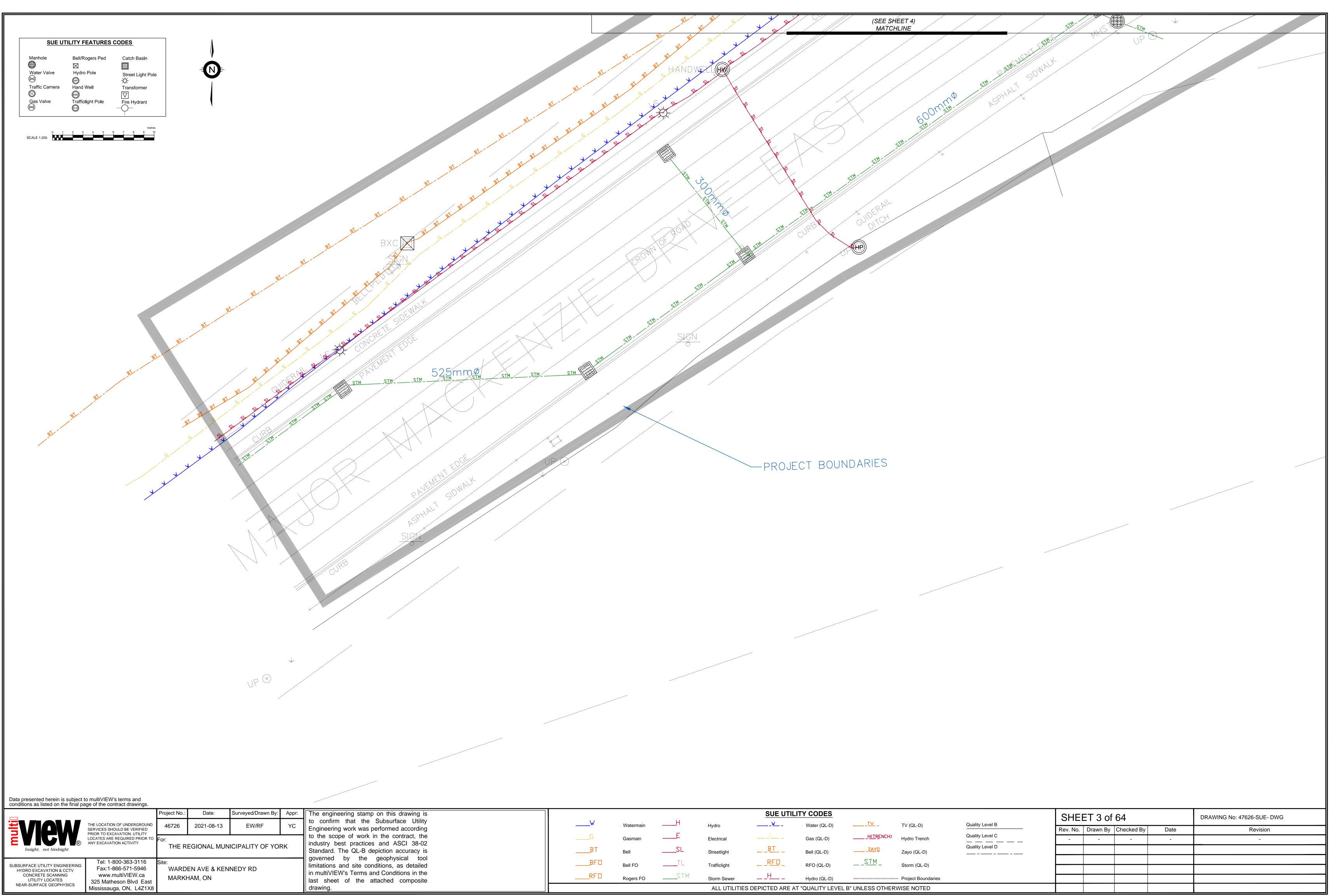
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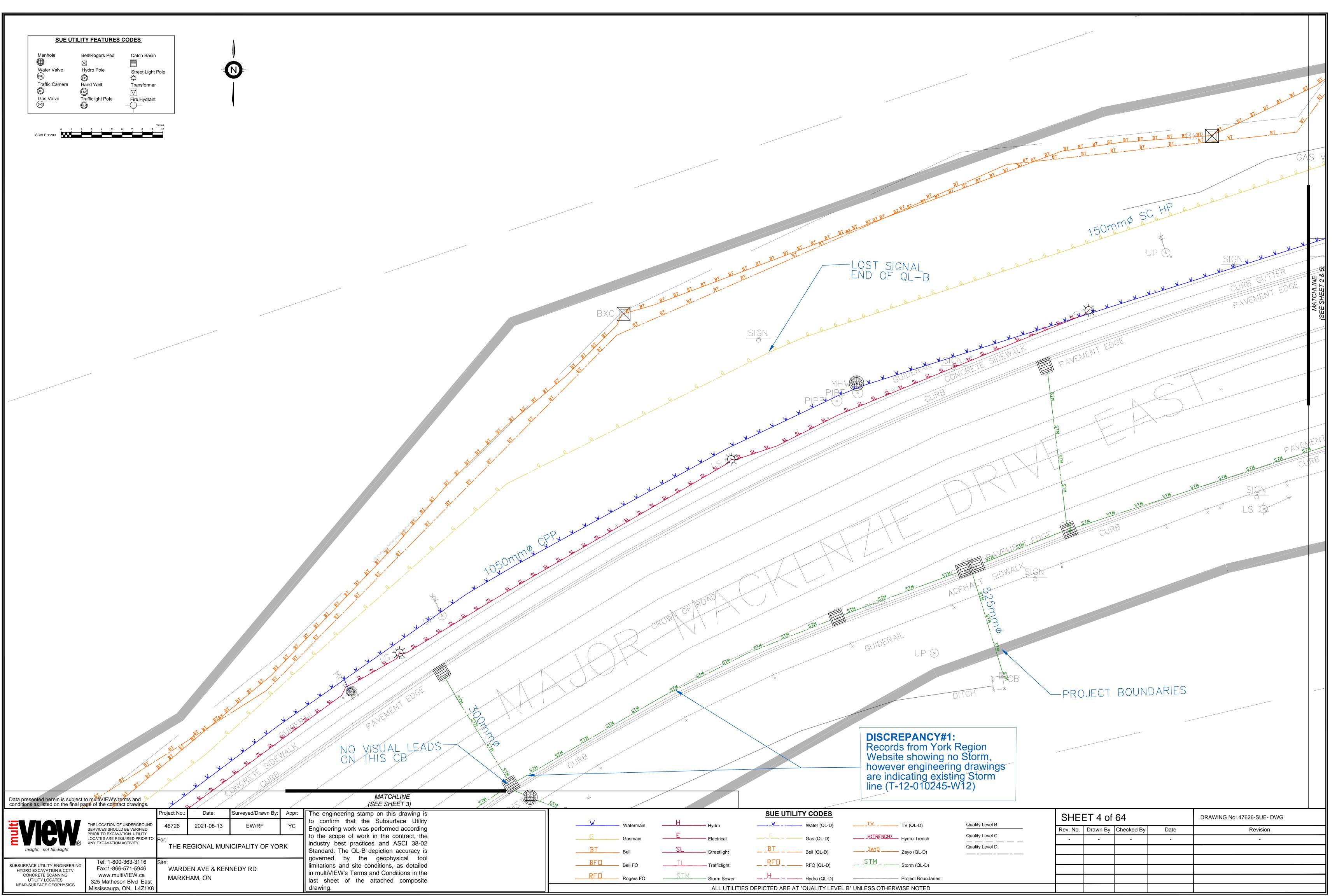
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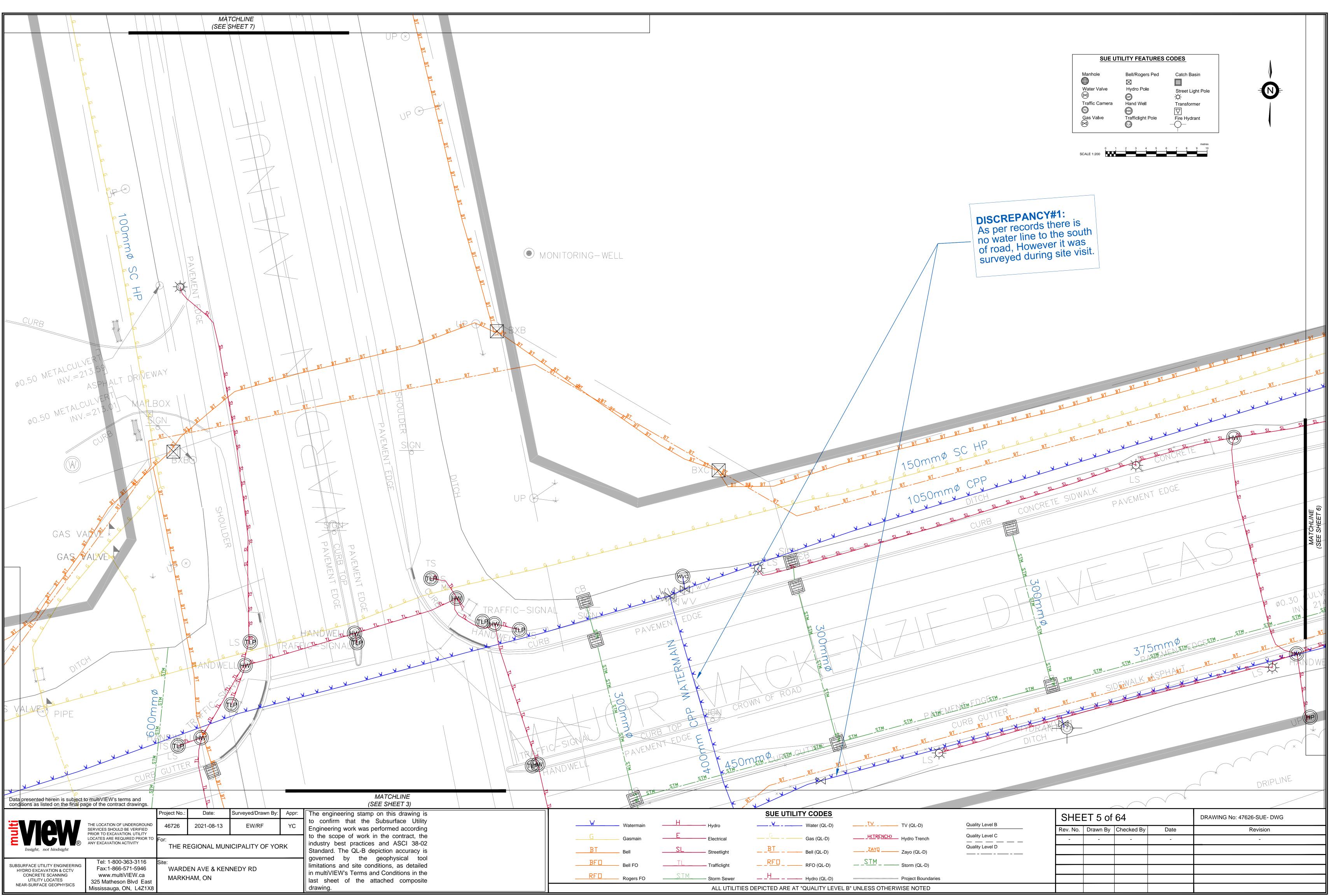
Tel: 1-800-363-3116 Email: sales@multiview.ca www.multiview.ca

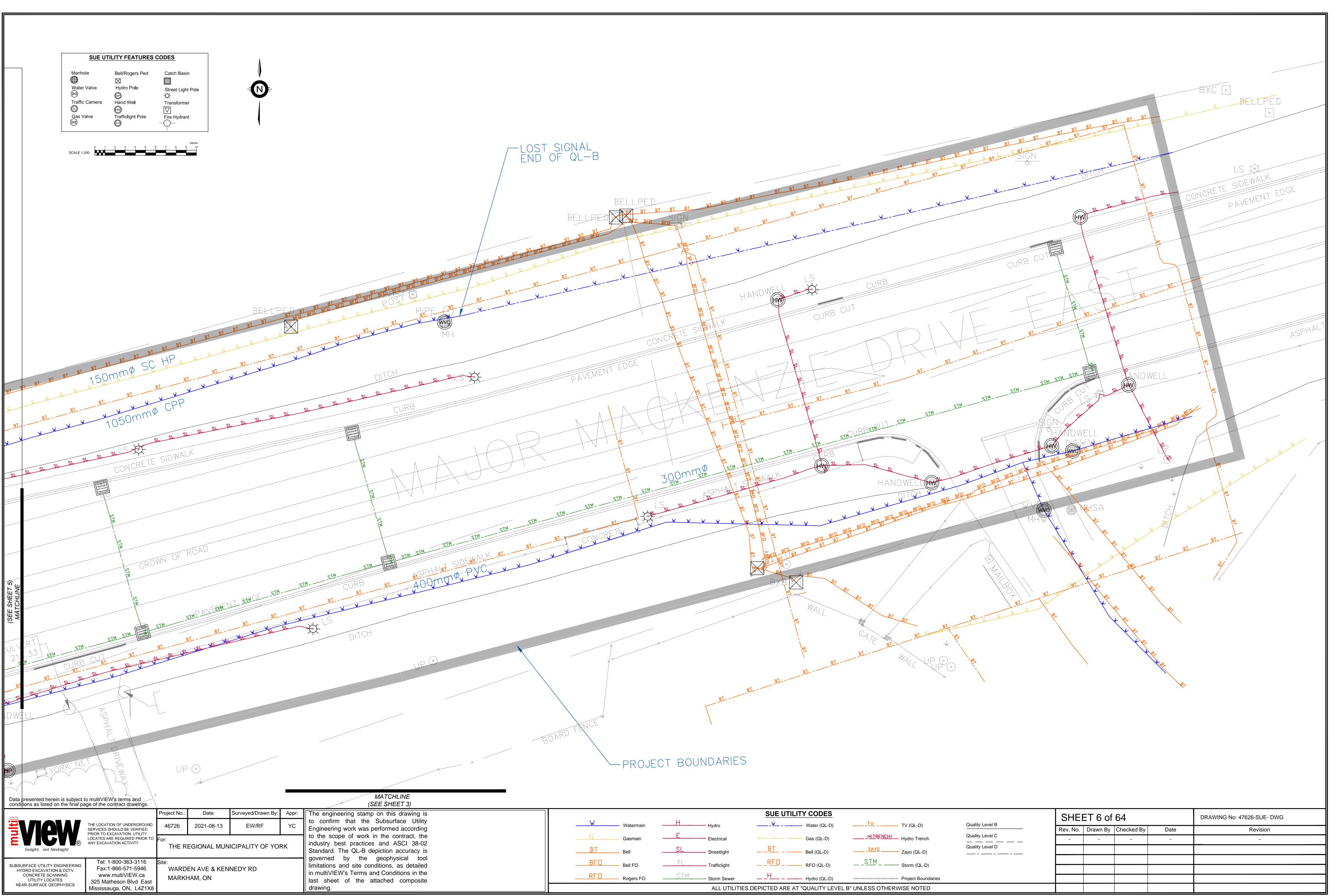


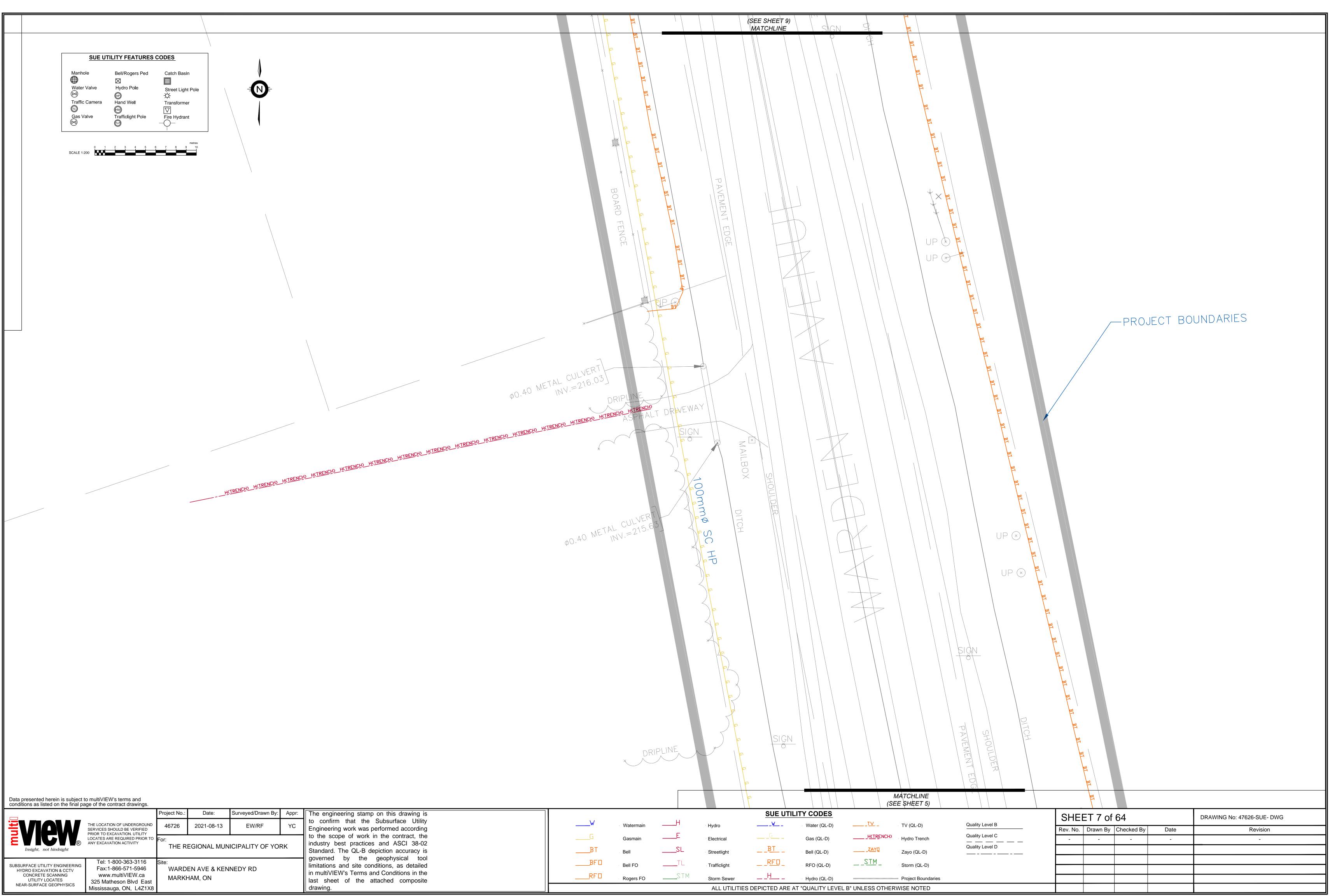


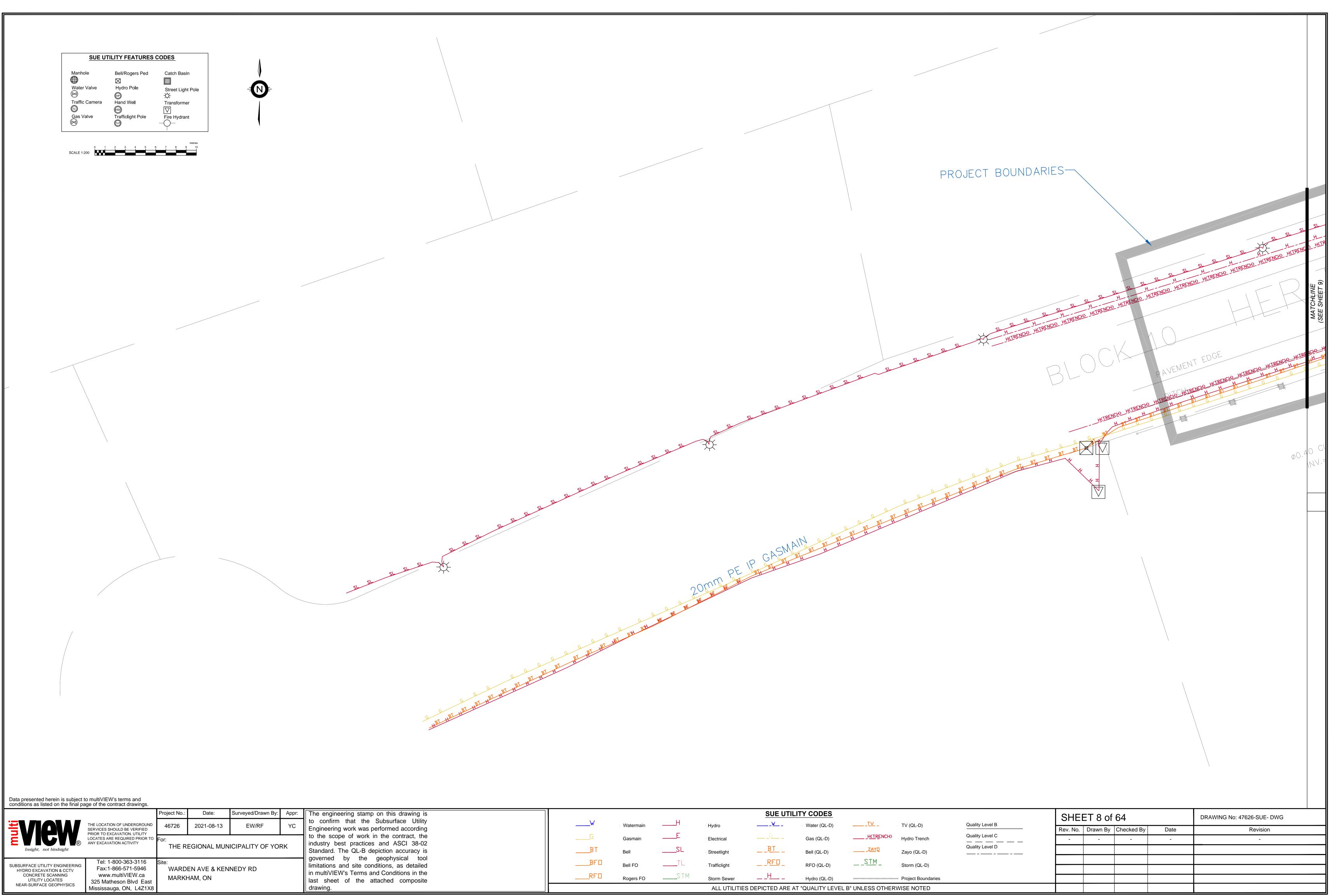


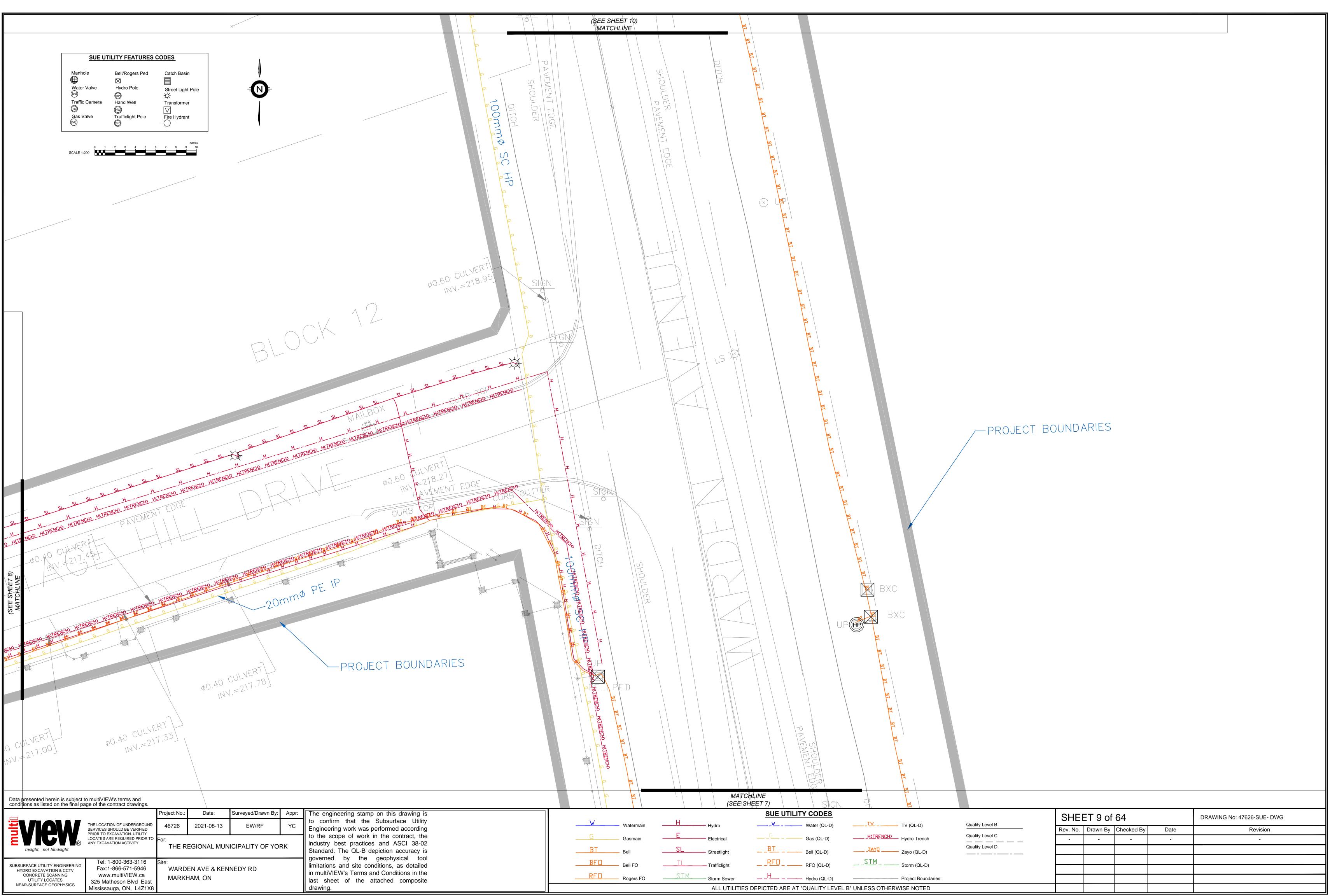


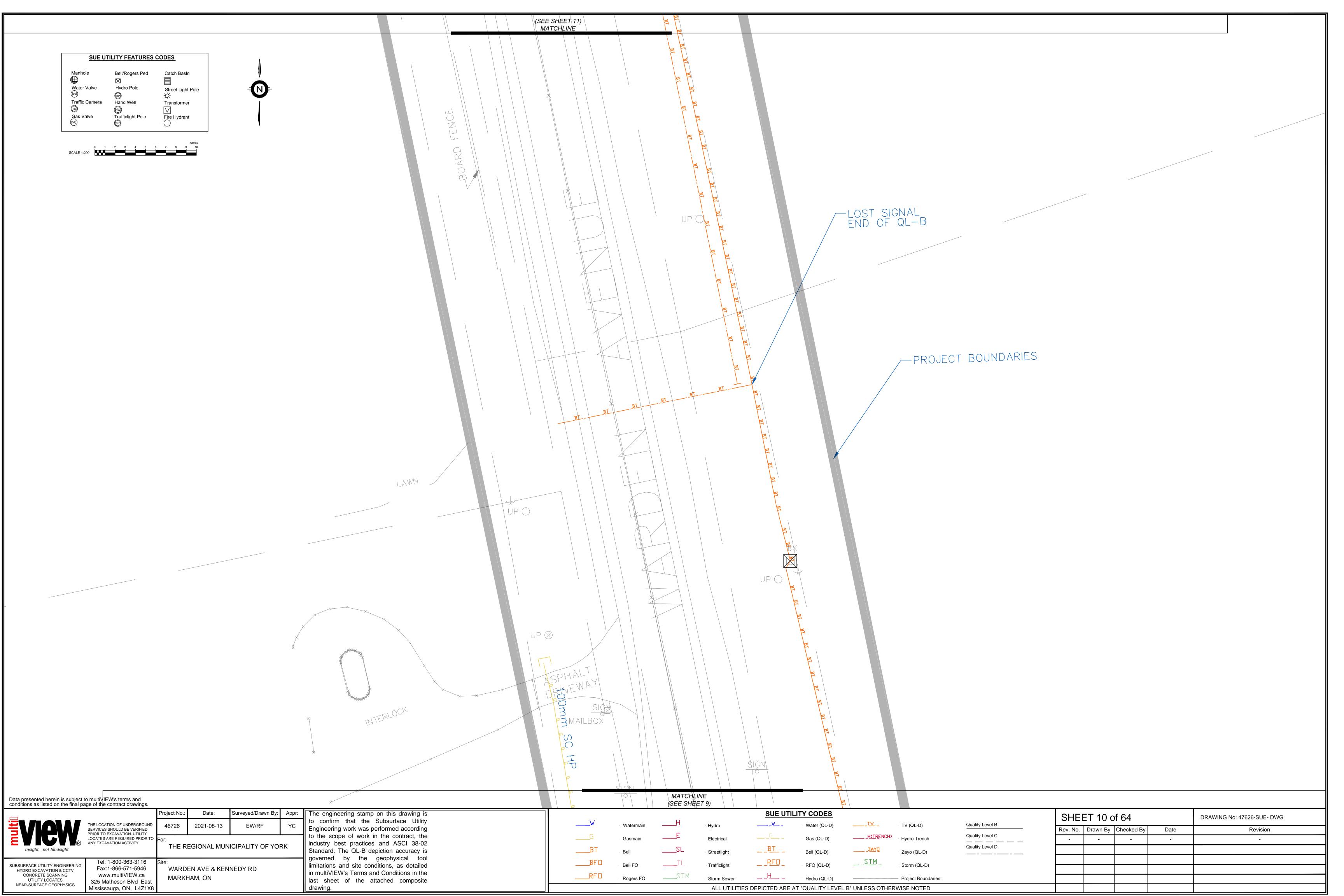


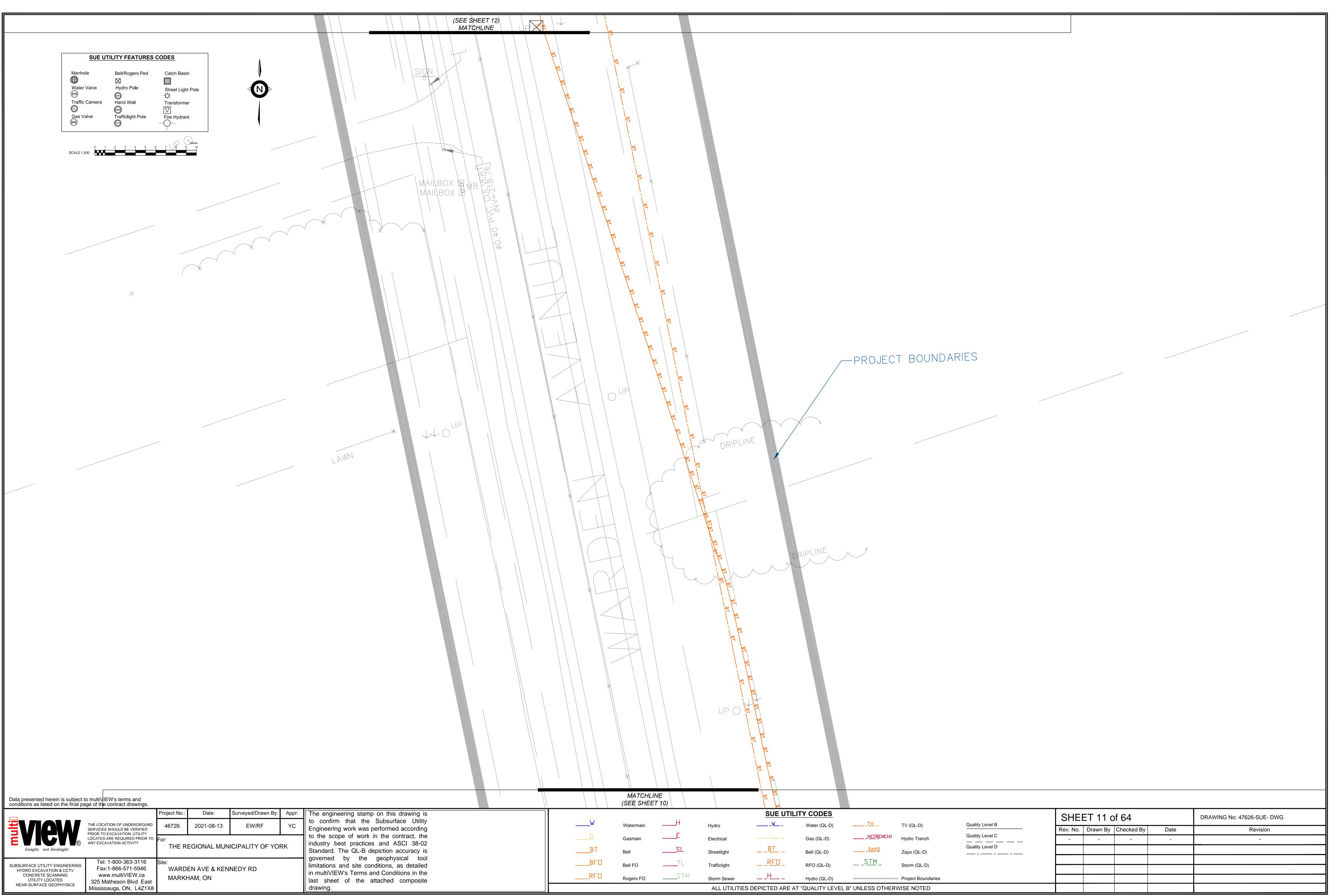


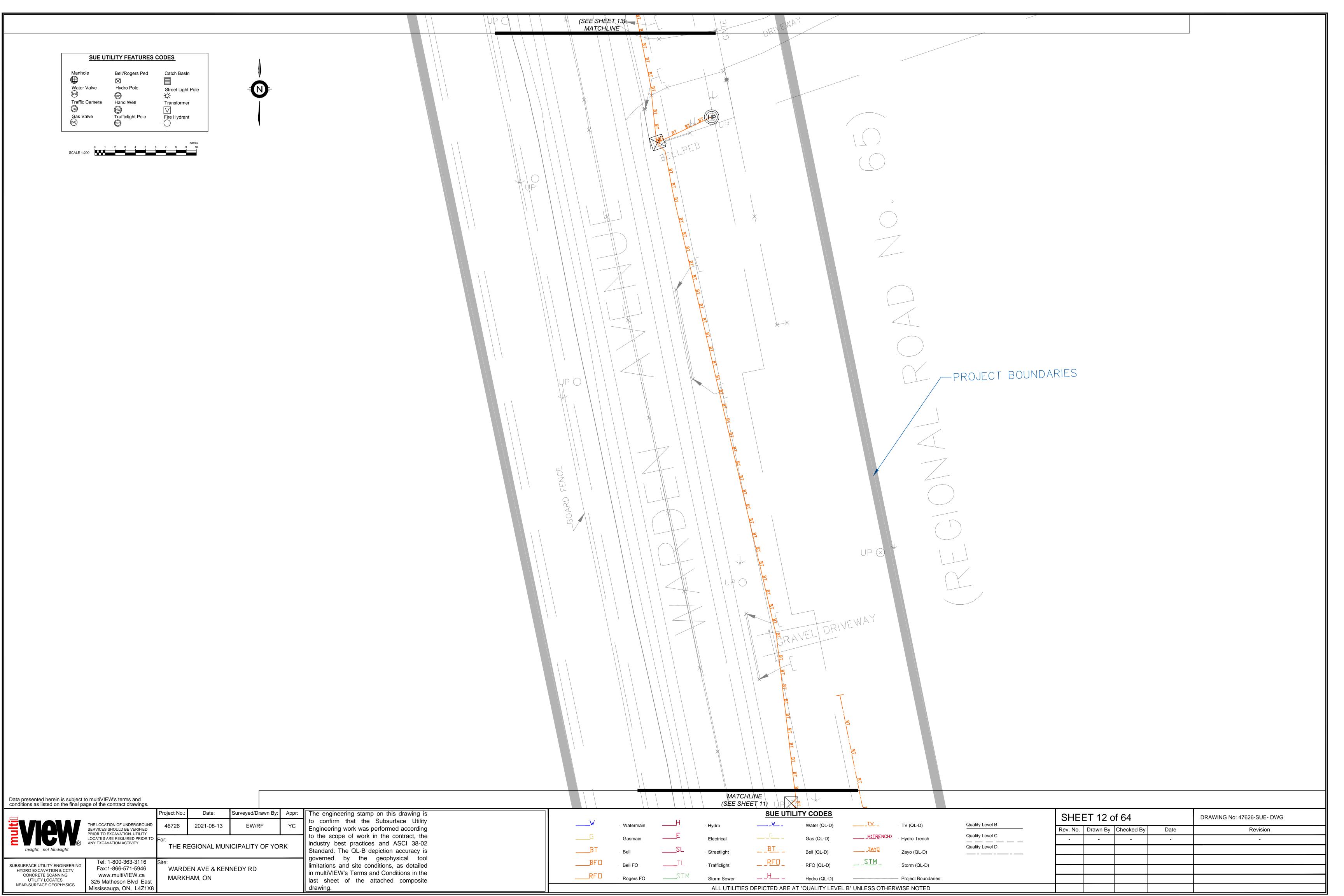


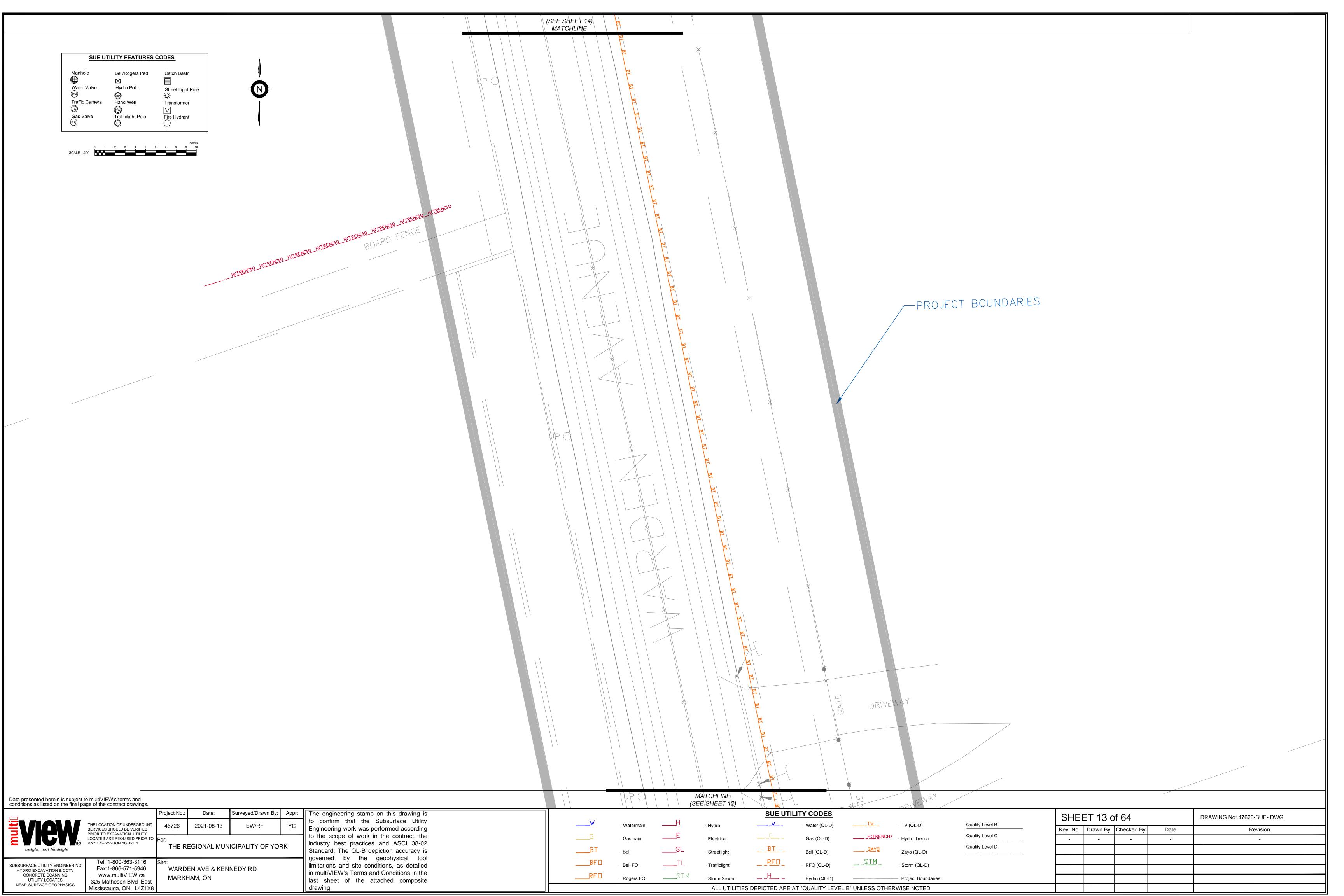


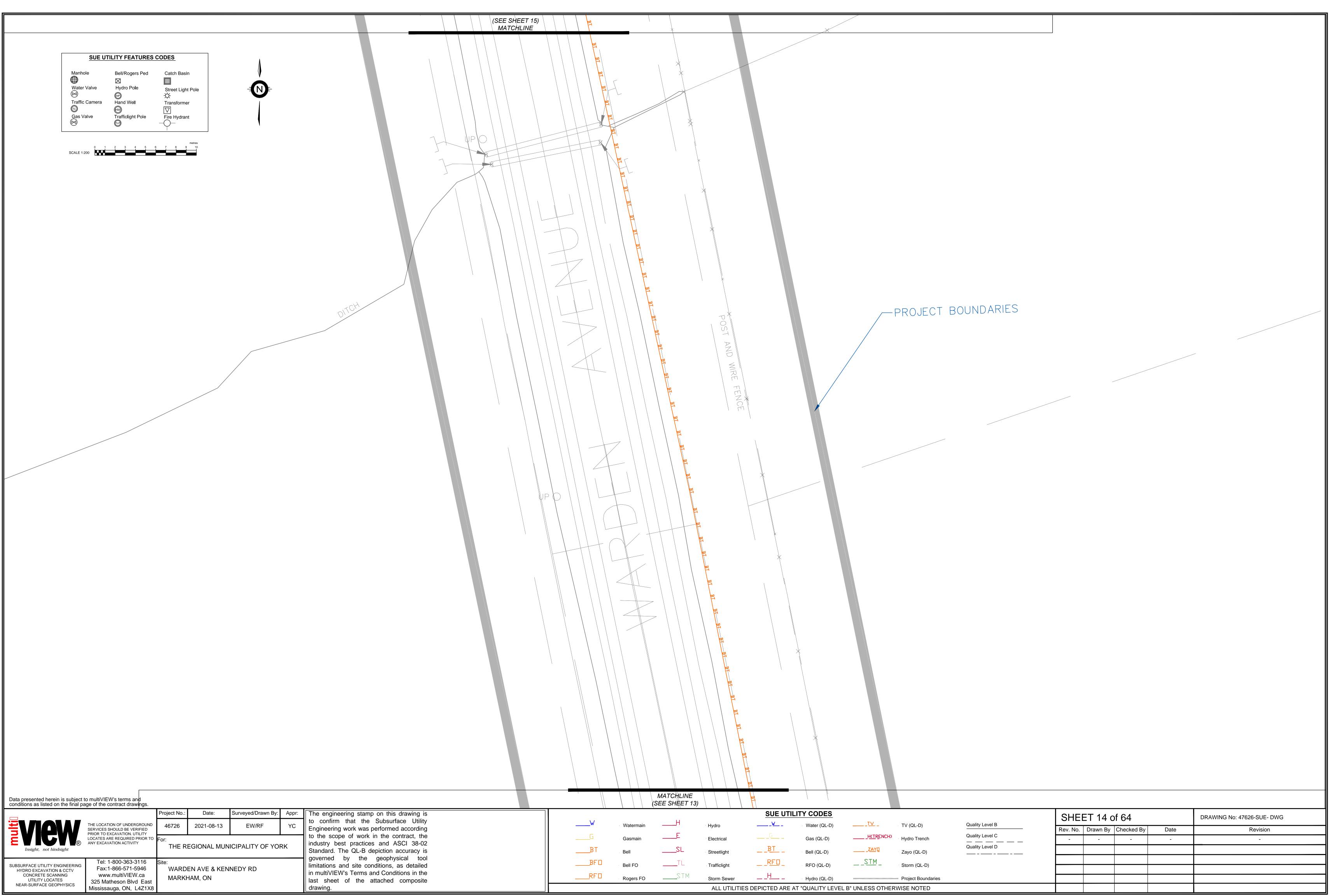


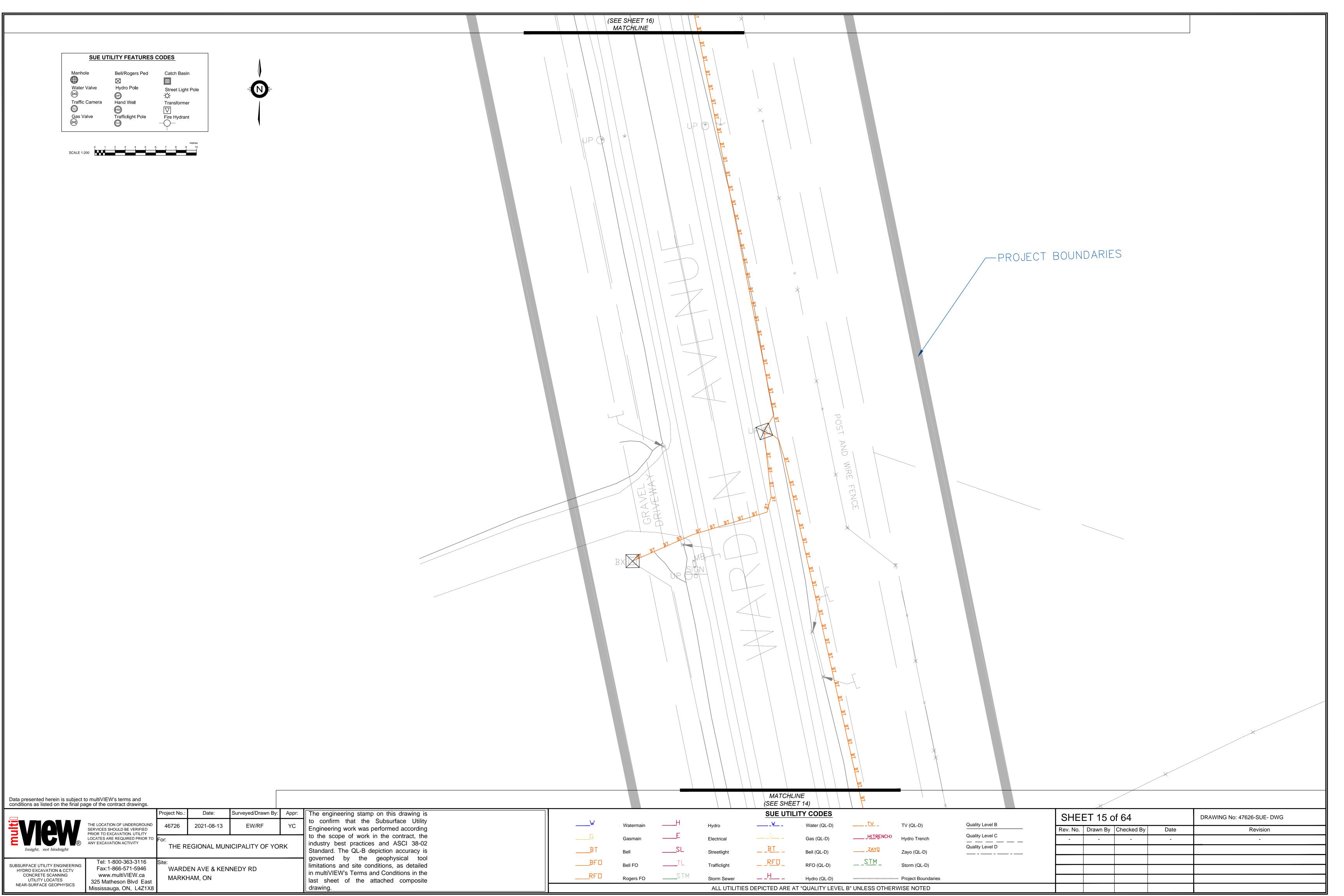


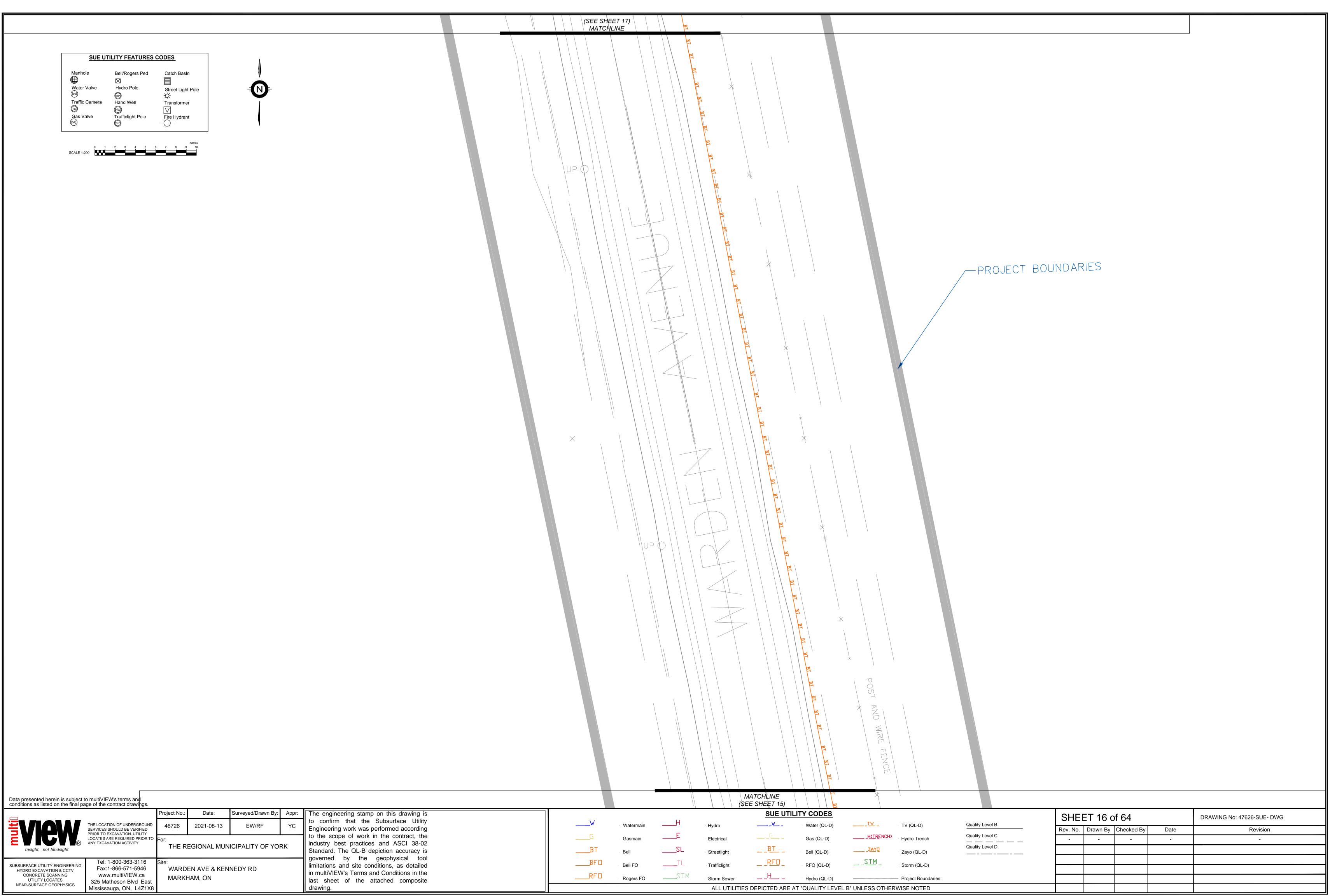


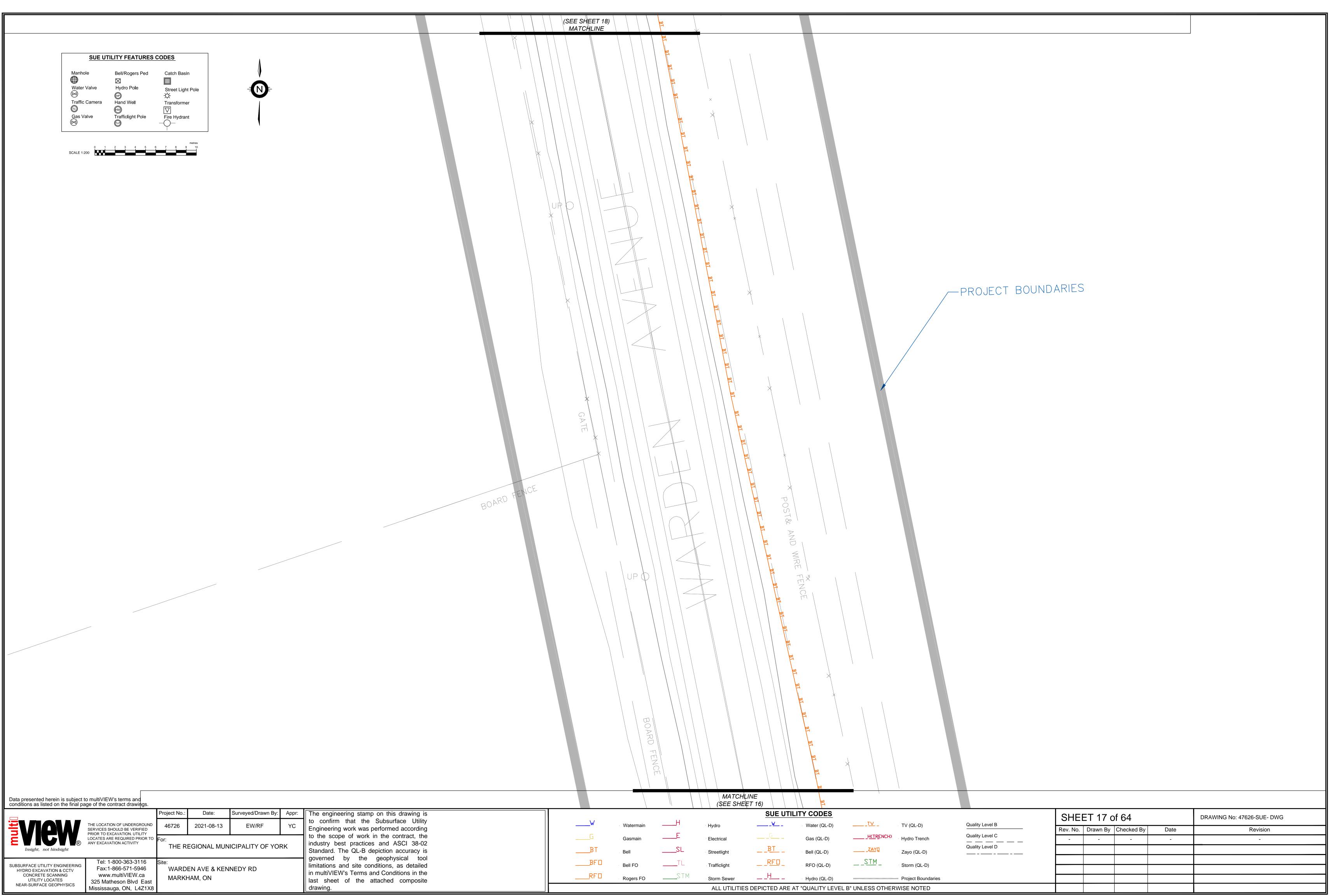


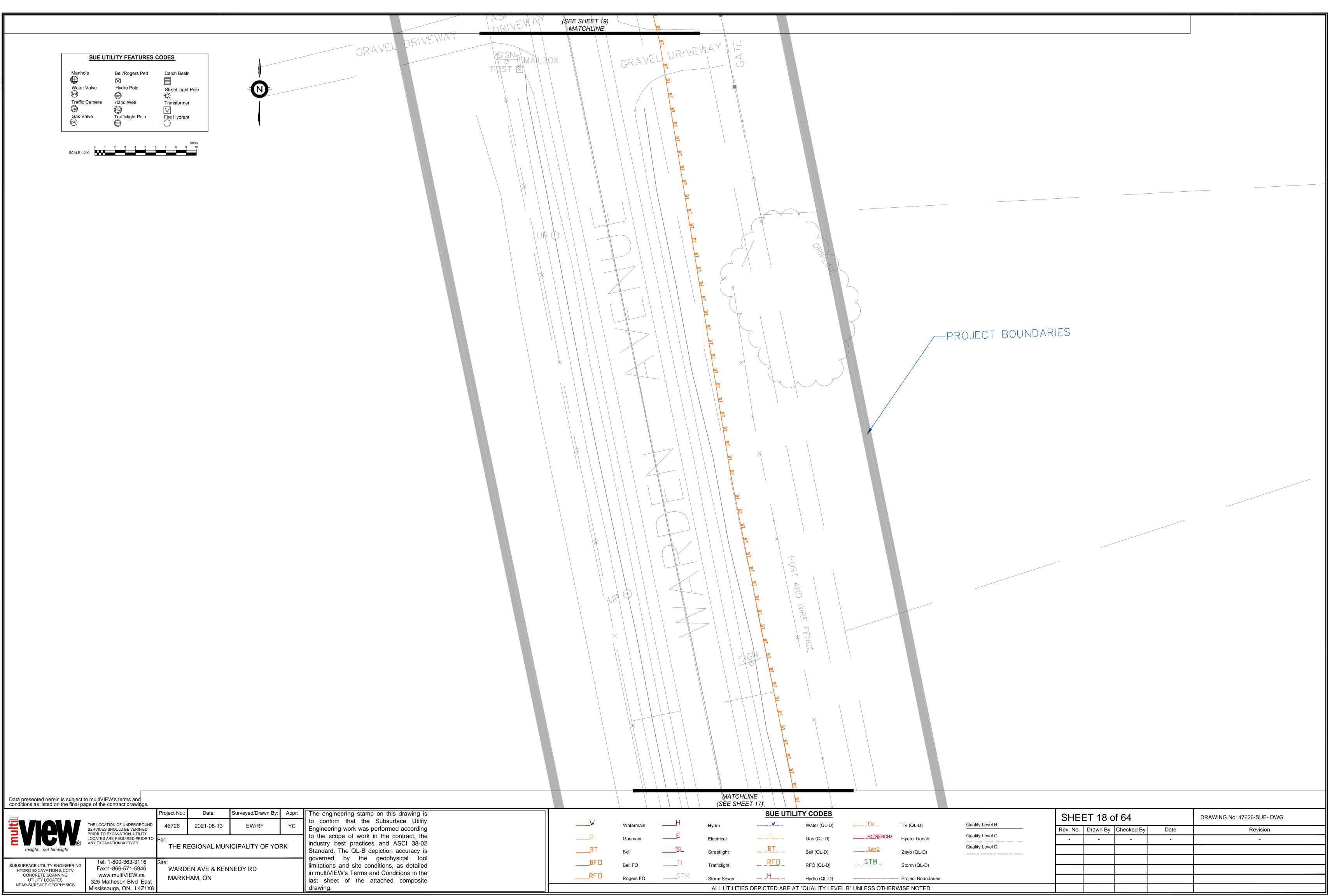


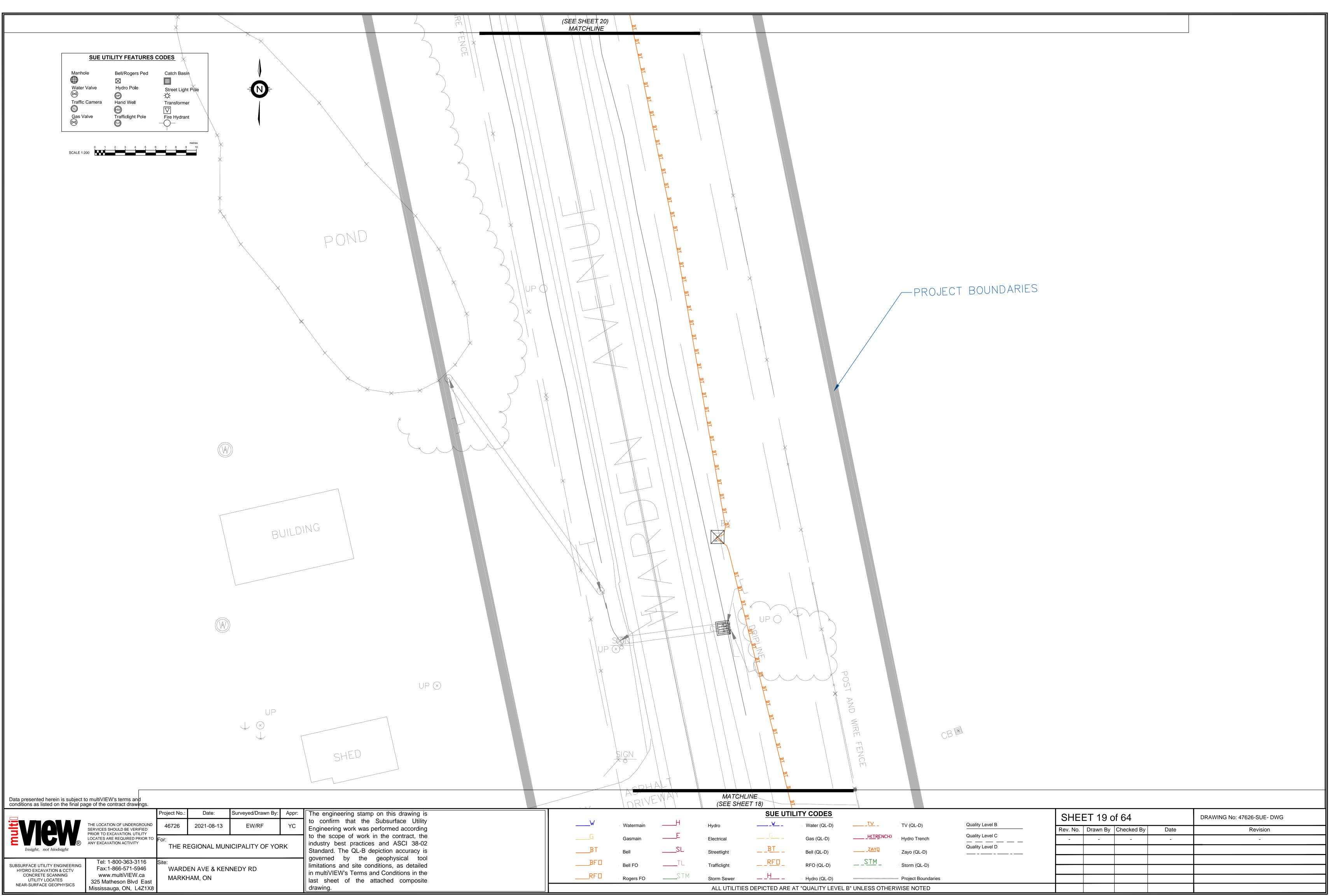


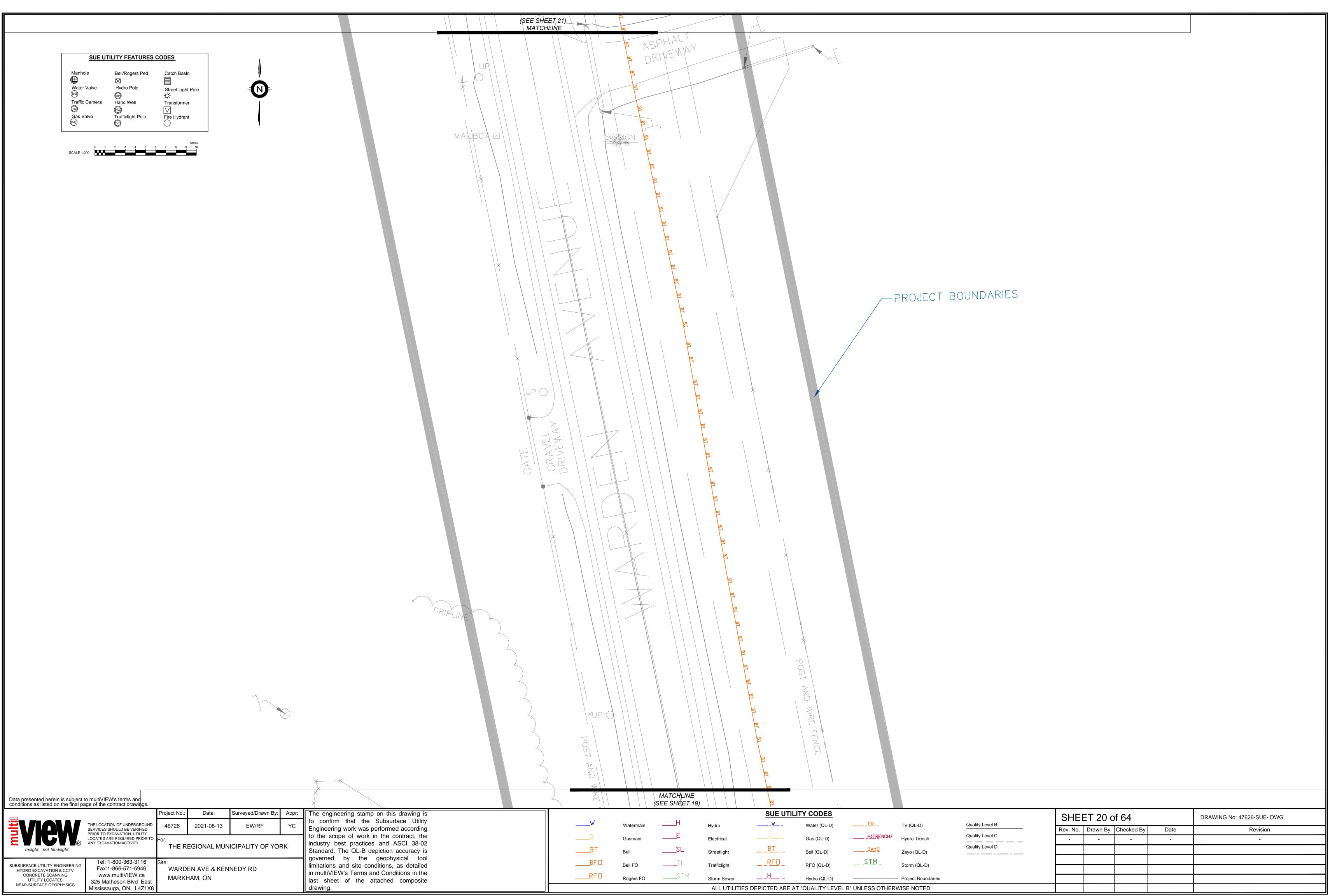


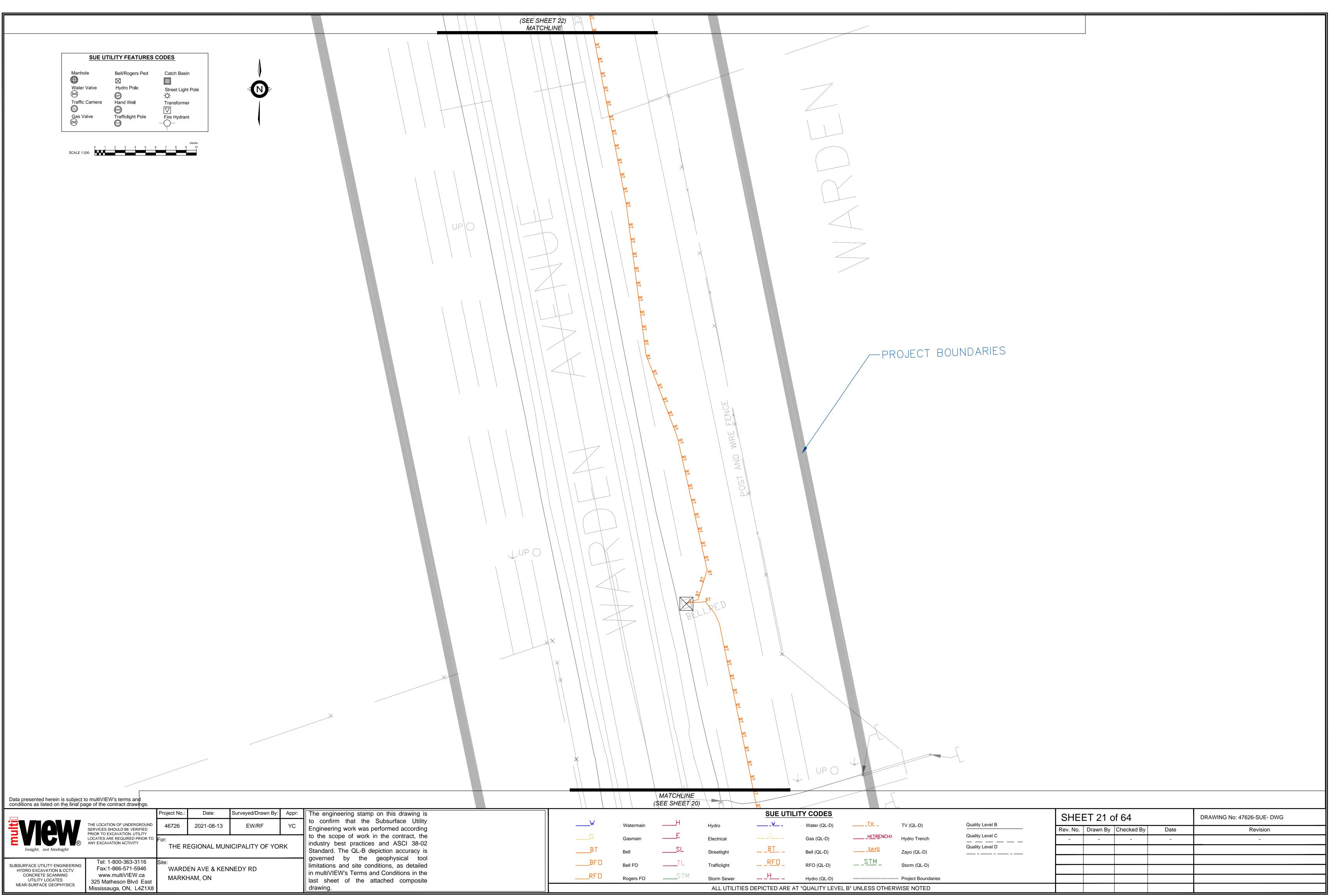


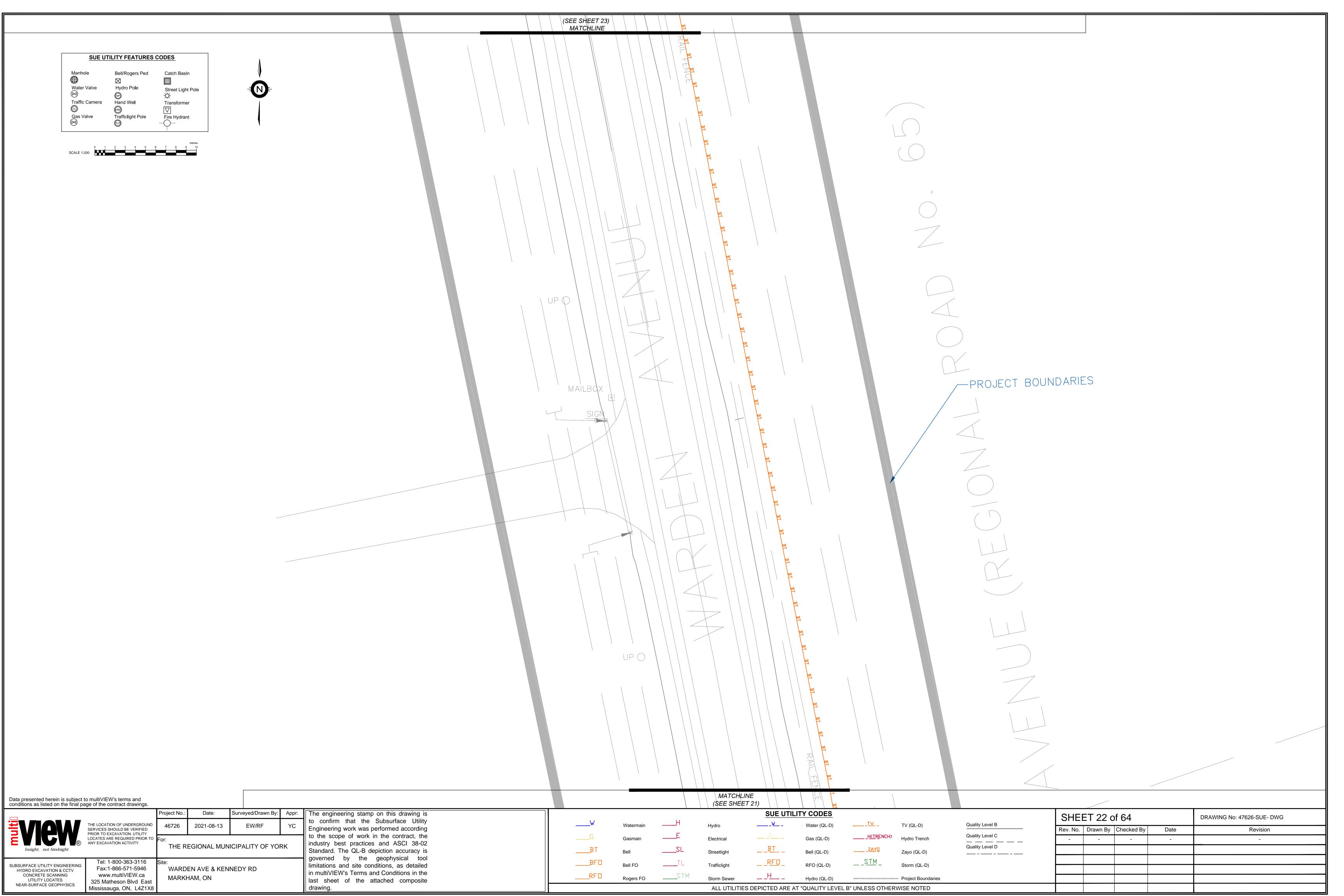












(SEE SHEET 24) MATCHLINE SUE UTILITY FEATURES CODES Water Valve Street Light Pole Traffic Camera Gas Valve Fire Hydrant SCALE 1:200 SCALE 1:200 MATCHLINE Data presented herein is subject to multiVIEW's terms and conditions as listed on the final page of the contract drawings. (SEE SHEET 22) Surveyed/Drawn By: Appr: The engineering stamp on this drawing is **SUE UTILITY CODES** SHEET 23 of 64 DRAWING No: 47626-SUE- DWG to confirm that the Subsurface Utility THE LOCATION OF UNDERGROUND SERVICES SHOULD BE VERIFIED PRIOR TO EXCAVATION. UTILITY LOCATES ARE REQUIRED PRIOR TO ANY EXCAVATION ACTIVITY

46
For: ______<u>TV</u>__ Quality Level B 2021-08-13 EW/RF Water (QL-D) TV (QL-D) Engineering work was performed according Rev. No. | Drawn By | Checked By | Revision to the scope of work in the contract, the Quality Level C ________H(TRENCH) Gas (QL-D) industry best practices and ASCI 38-02 THE REGIONAL MUNICIPALITY OF YORK Quality Level D <u>__BT__</u> Standard. The QL-B depiction accuracy is _____Z<u>AY</u>D Bell (QL-D) Zayo (QL-D) governed by the geophysical tool Tel: 1-800-363-3116 Site: SUBSURFACE UTILITY ENGINEERING HYDRO EXCAVATION & CCTV CONCRETE SCANNING UTILITY LOCATES NEAR-SURFACE GEOPHYSICS limitations and site conditions, as detailed Storm (QL-D) Fax:1-866-571-5946 WARDEN AVE & KENNEDY RD in multiVIEW's Terms and Conditions in the Rogers FO ____STM

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Hydro (QL-D)

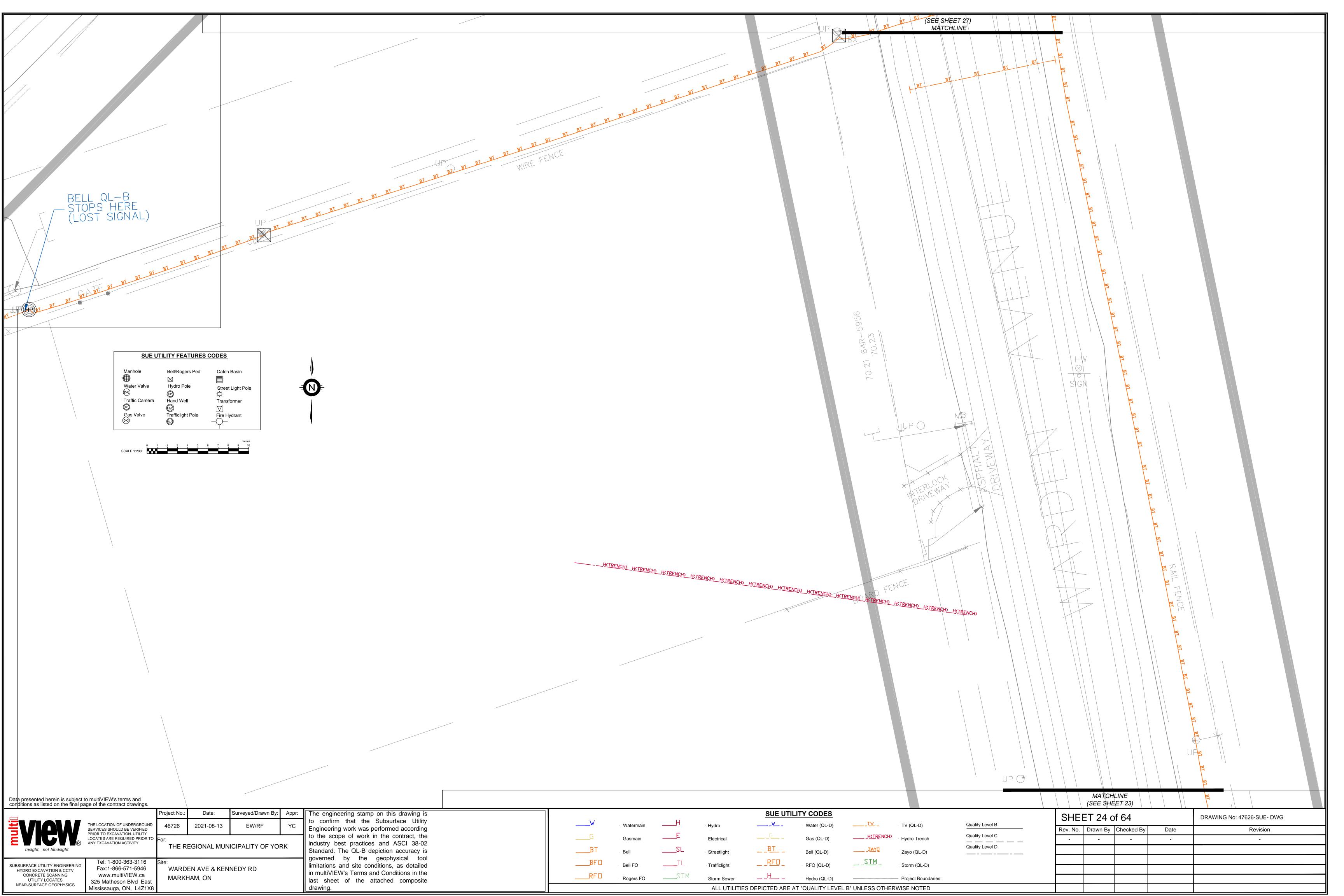
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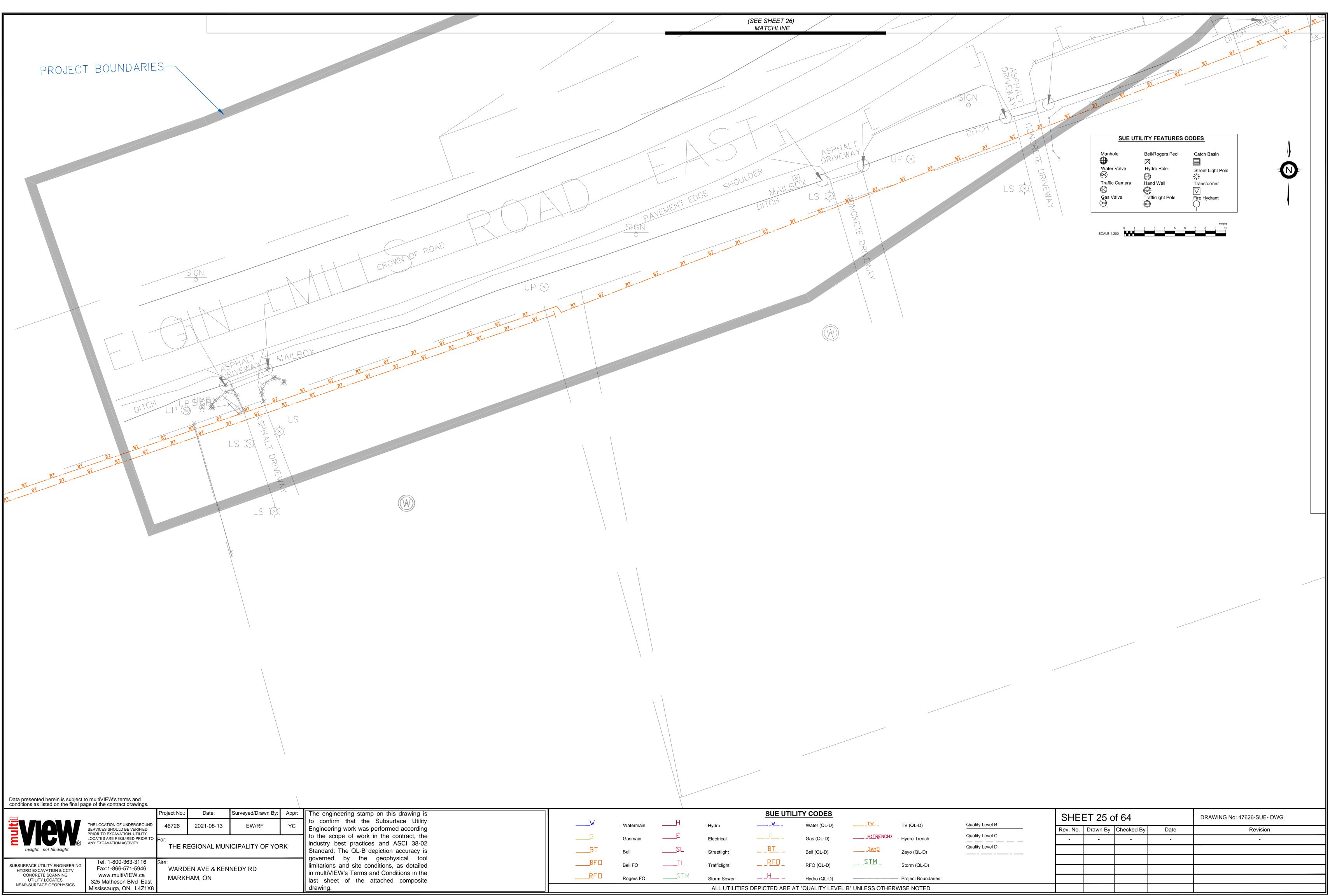
www.multiVIEW.ca

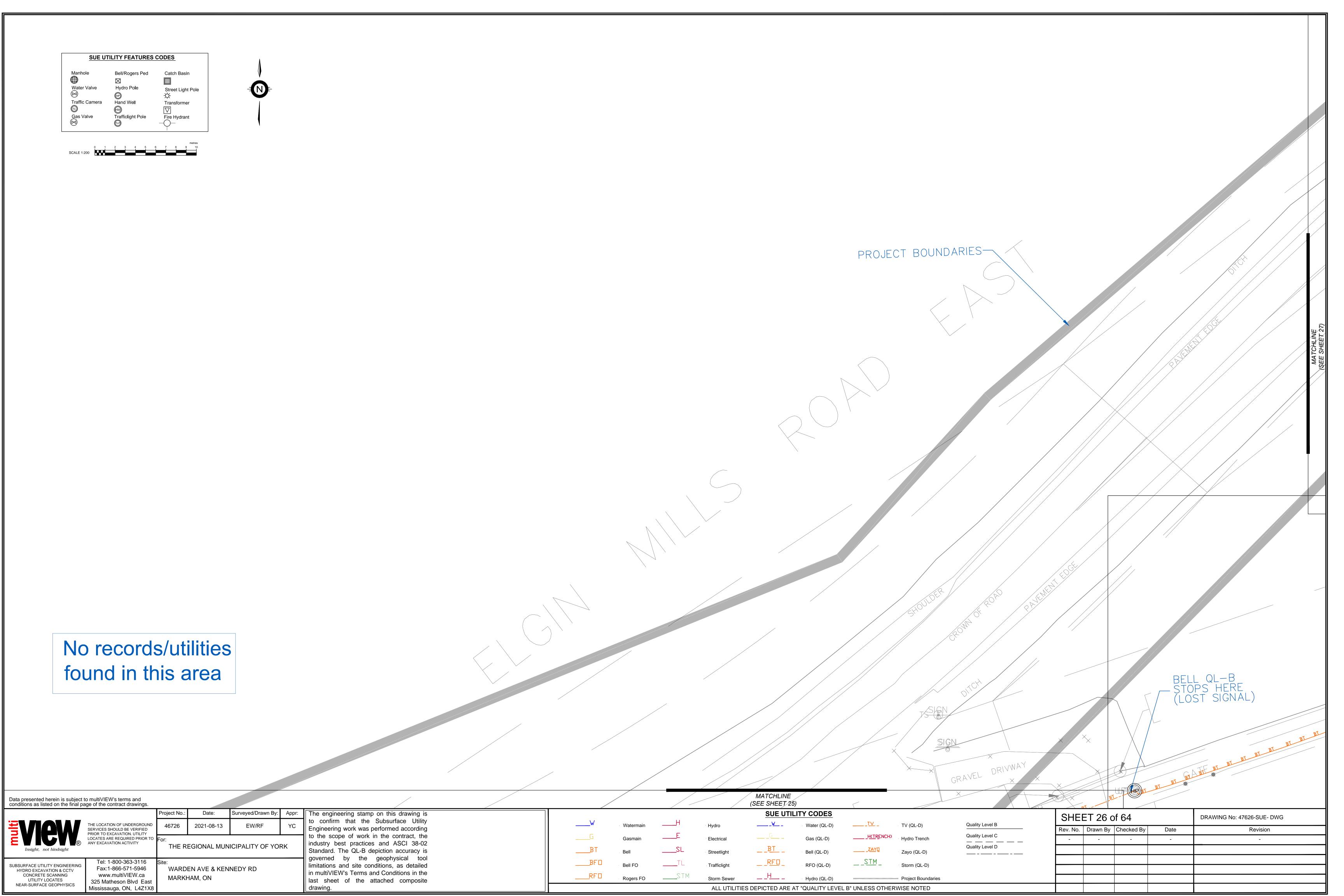
325 Matheson Blvd East Mississauga, ON, L4Z1X8

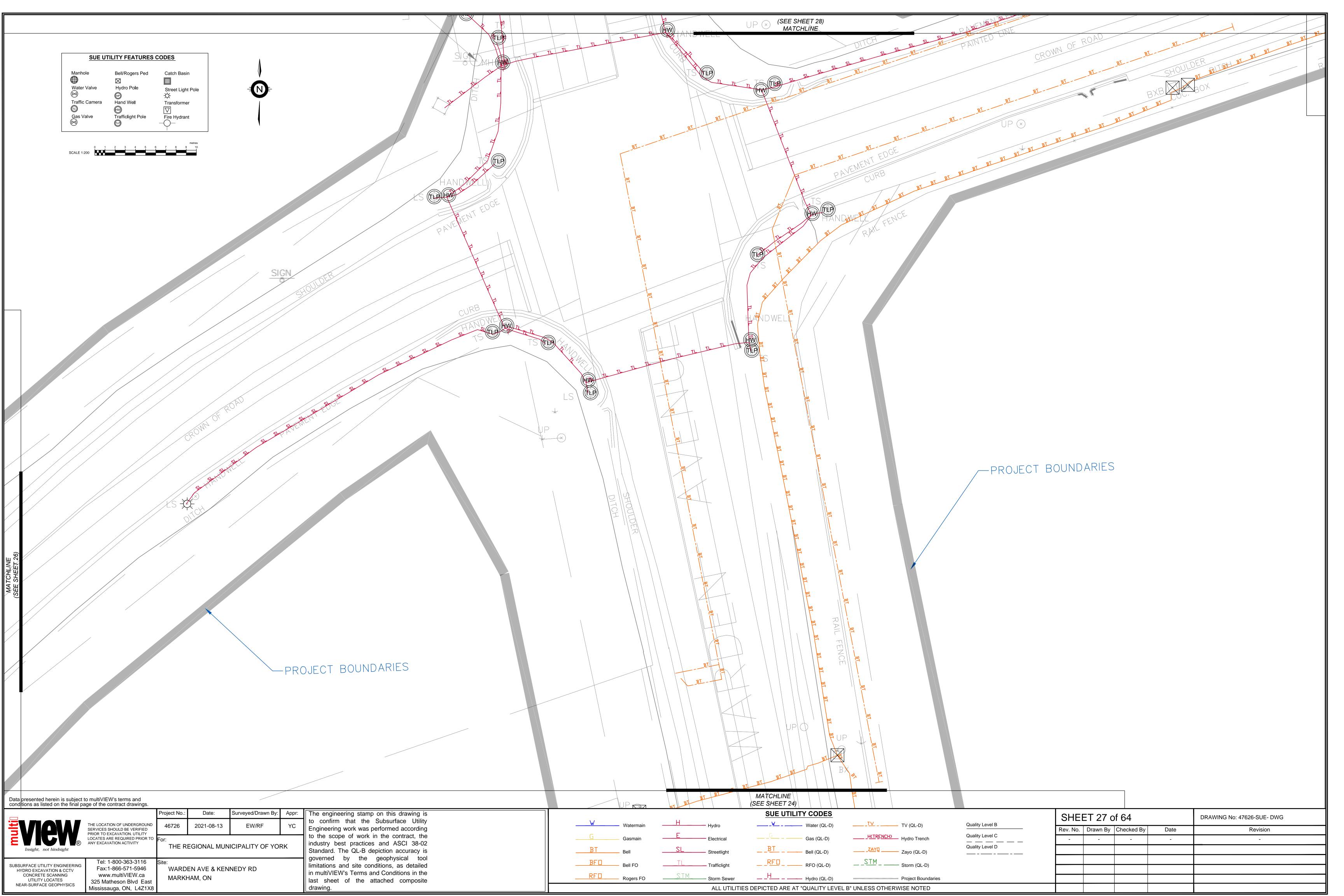
MARKHAM, ON

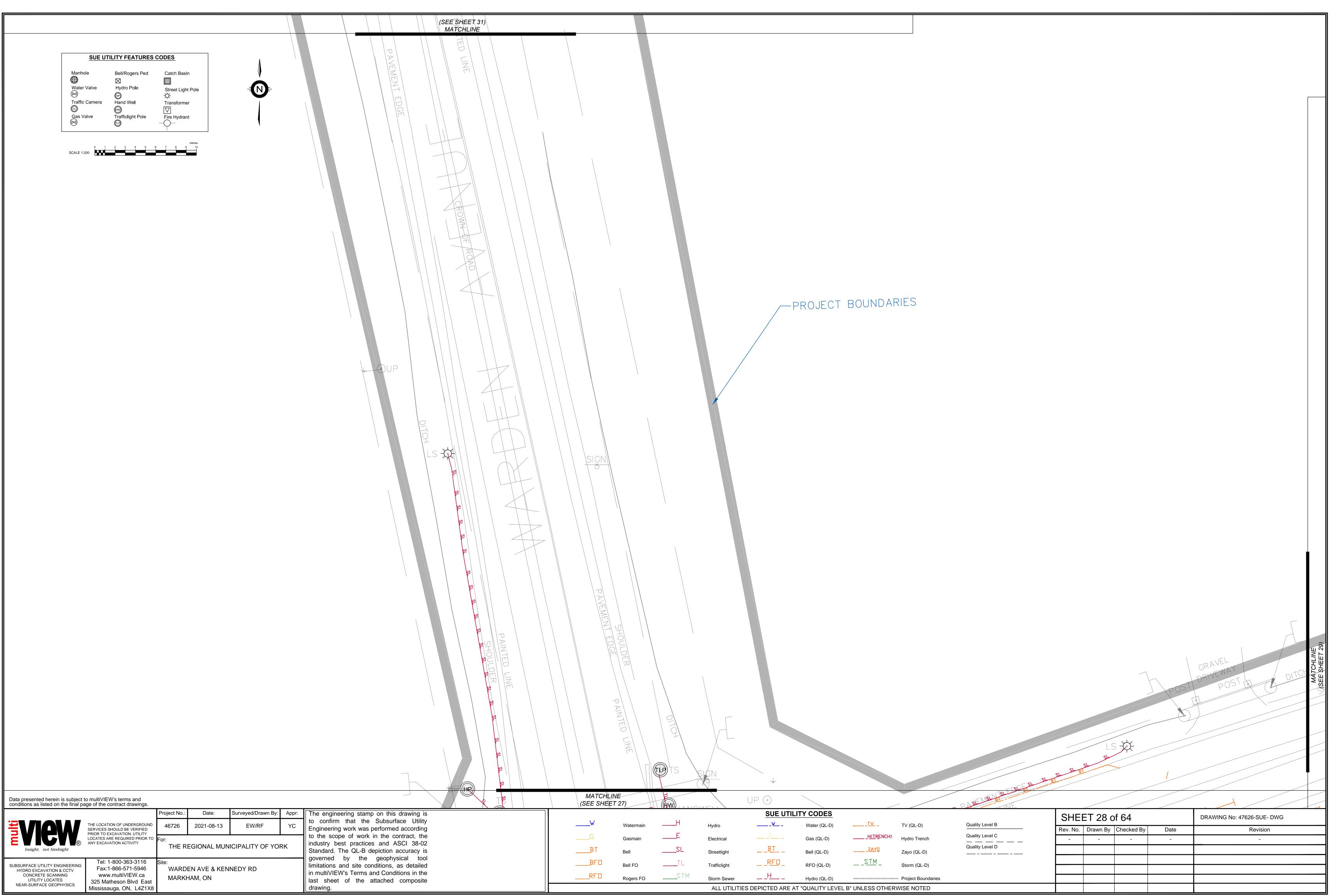
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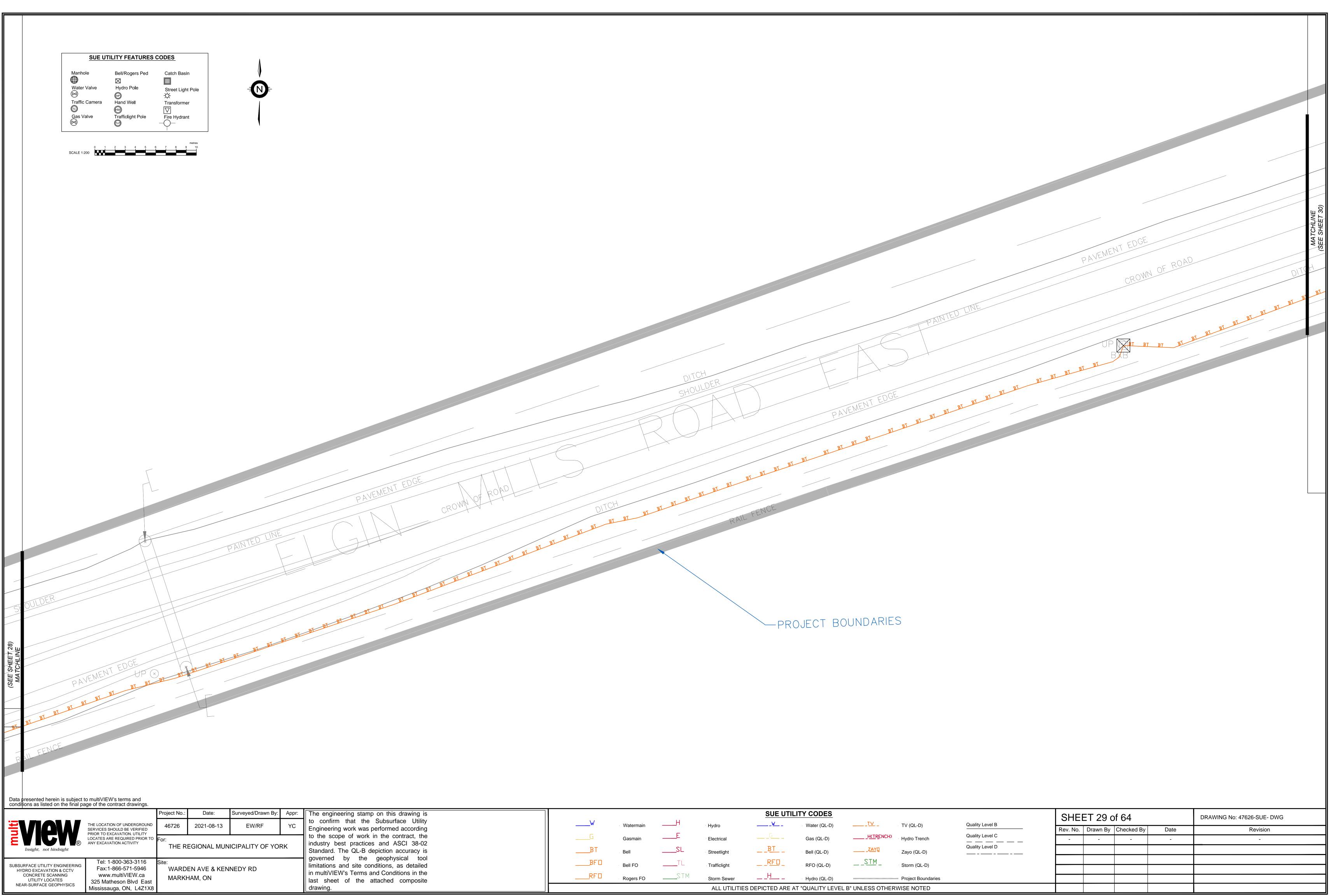


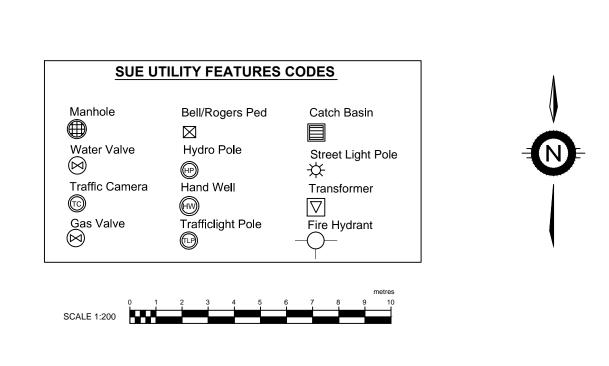


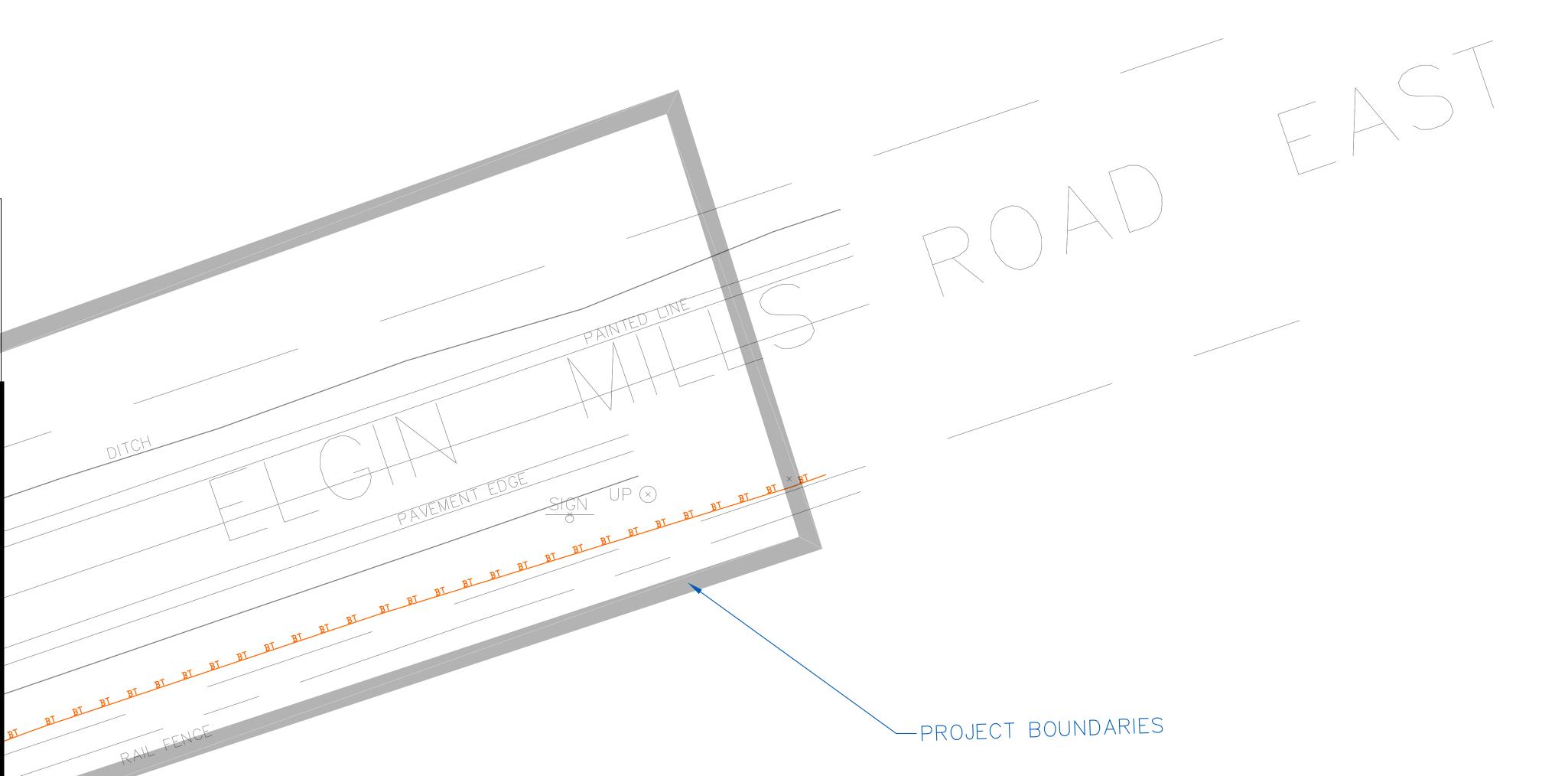












Data presented herein is subject to multiVIEW's terms and conditions as listed on the final page of the contract drawings.

SUBSURFACE UTILITY ENGINEERING HYDRO EXCAVATION & CCTV CONCRETE SCANNING UTILITY LOCATES NEAR-SURFACE GEOPHYSICS

THE LOCATION OF UNDERGROUND SERVICES SHOULD BE VERIFIED PRIOR TO EXCAVATION. UTILITY LOCATES ARE REQUIRED PRIOR TO ANY EXCAVATION ACTIVITY

46

For:

Tel: 1-800-363-3116 Site: Fax:1-866-571-5946

www.multiVIEW.ca

WARDEN AVE & KENNEDY RD MARKHAM, ON 325 Matheson Blvd East Mississauga, ON, L4Z1X8

THE REGIONAL MUNICIPALITY OF YORK

Date:

2021-08-13

EW/RF

46726

Surveyed/Drawn By: Appr: The engineering stamp on this drawing is to confirm that the Subsurface Utility Engineering work was performed according to the scope of work in the contract, the industry best practices and ASCI 38-02 Standard. The QL-B depiction accuracy is governed by the geophysical tool limitations and site conditions, as detailed in multiVIEW's Terms and Conditions in the last sheet of the attached composite

W	Watermain	H
G	Gasmain	E
BT	Bell	SL
BFO	Bell FO	TL
RFD	Rogers FO	STM

	Water (QL-D)	<u></u>	TV (QL-D)
<u> </u>	Gas (QL-D)	H(TRENCH)	Hydro Trench
<u>BT_</u> _	Bell (QL-D)	<u>ZAY</u> O	Zayo (QL-D)
RFD_	RFO (QL-D)	STM_	Storm (QL-D
1.1			

ALL UTILITIES DEPICTED ARE AT "QUALITY LEVEL B" UNLESS OTHERWISE NOTED

SUE UTILITY CODES

Electrical

Streetlight

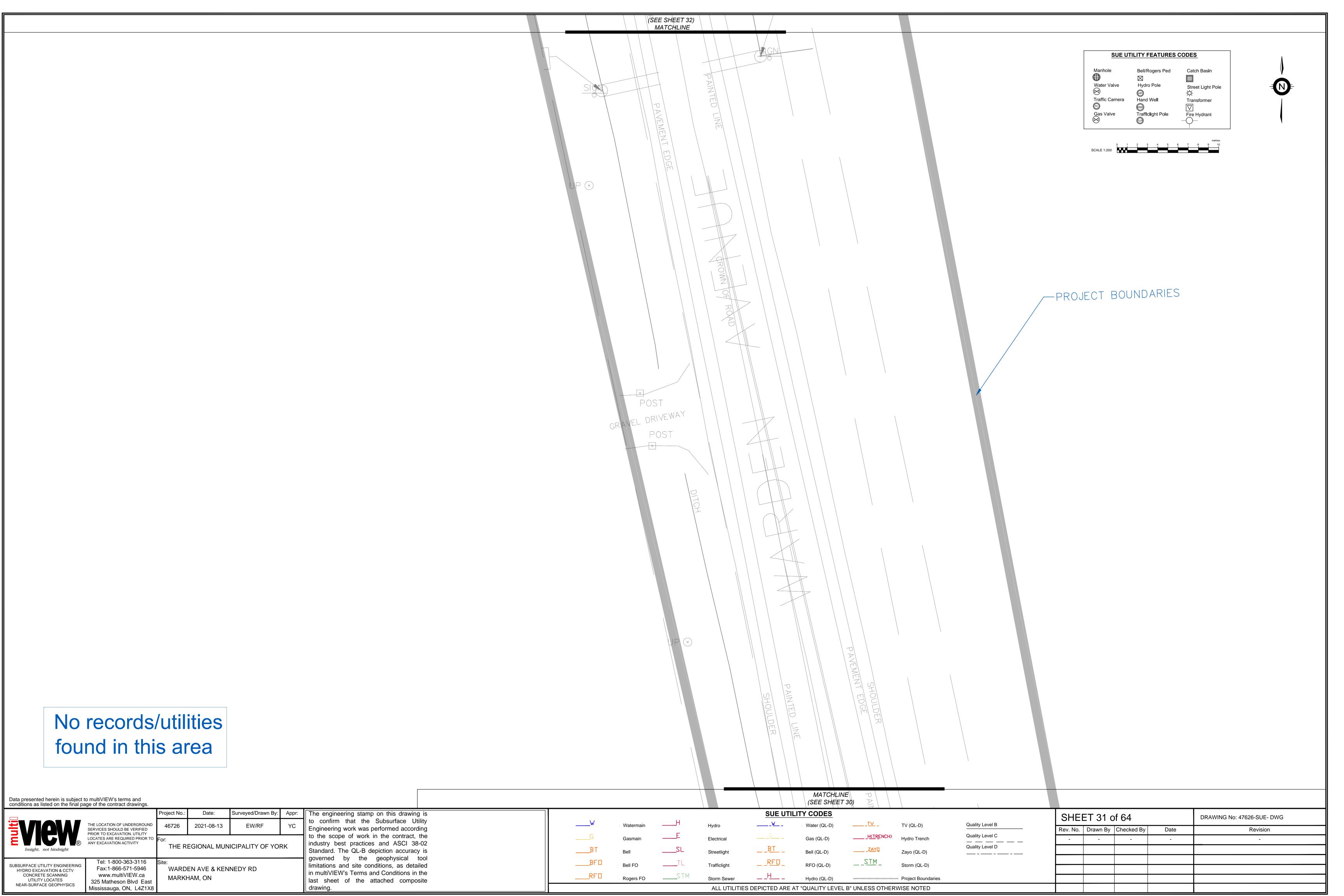
Trafficlight

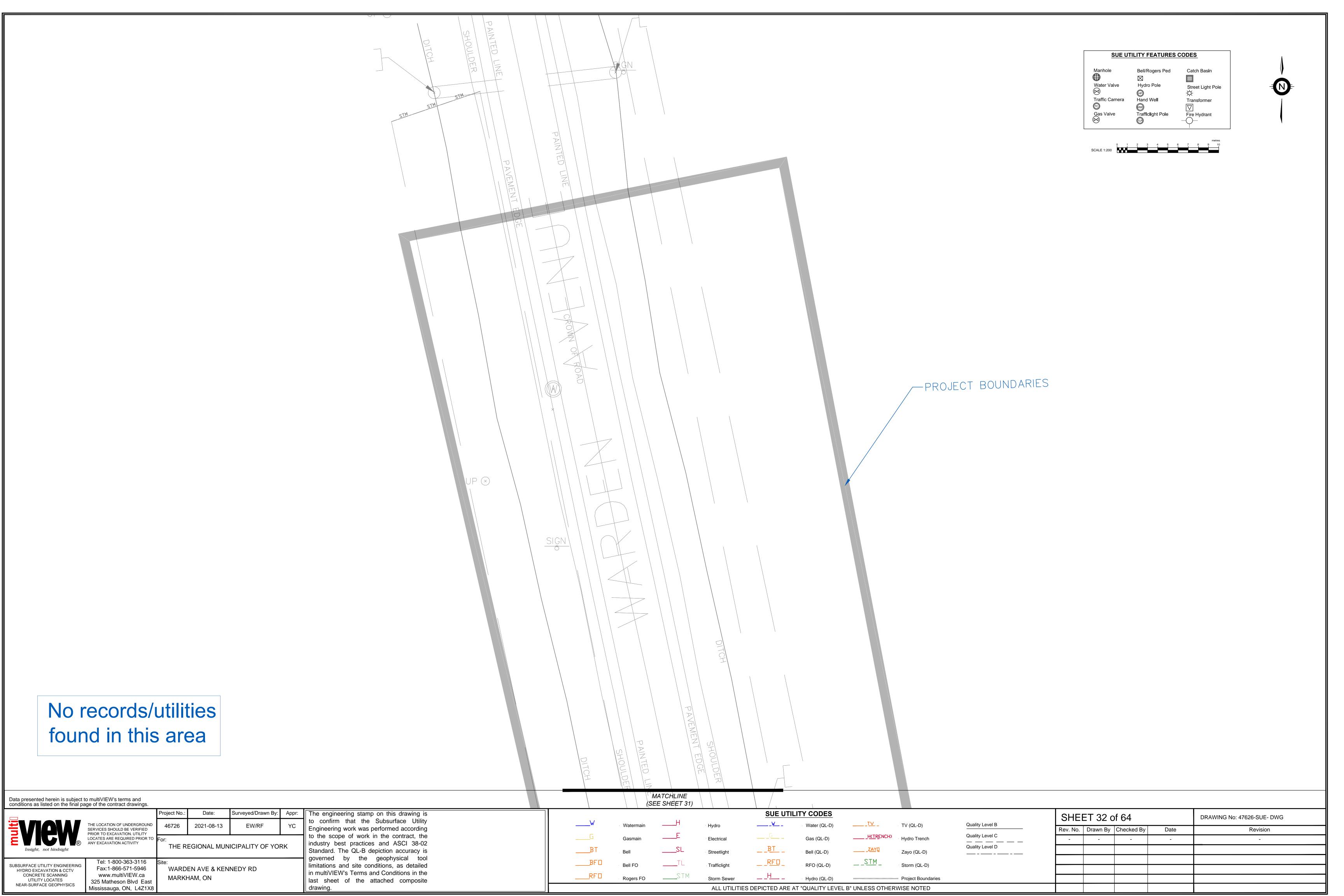
Storm Sewer

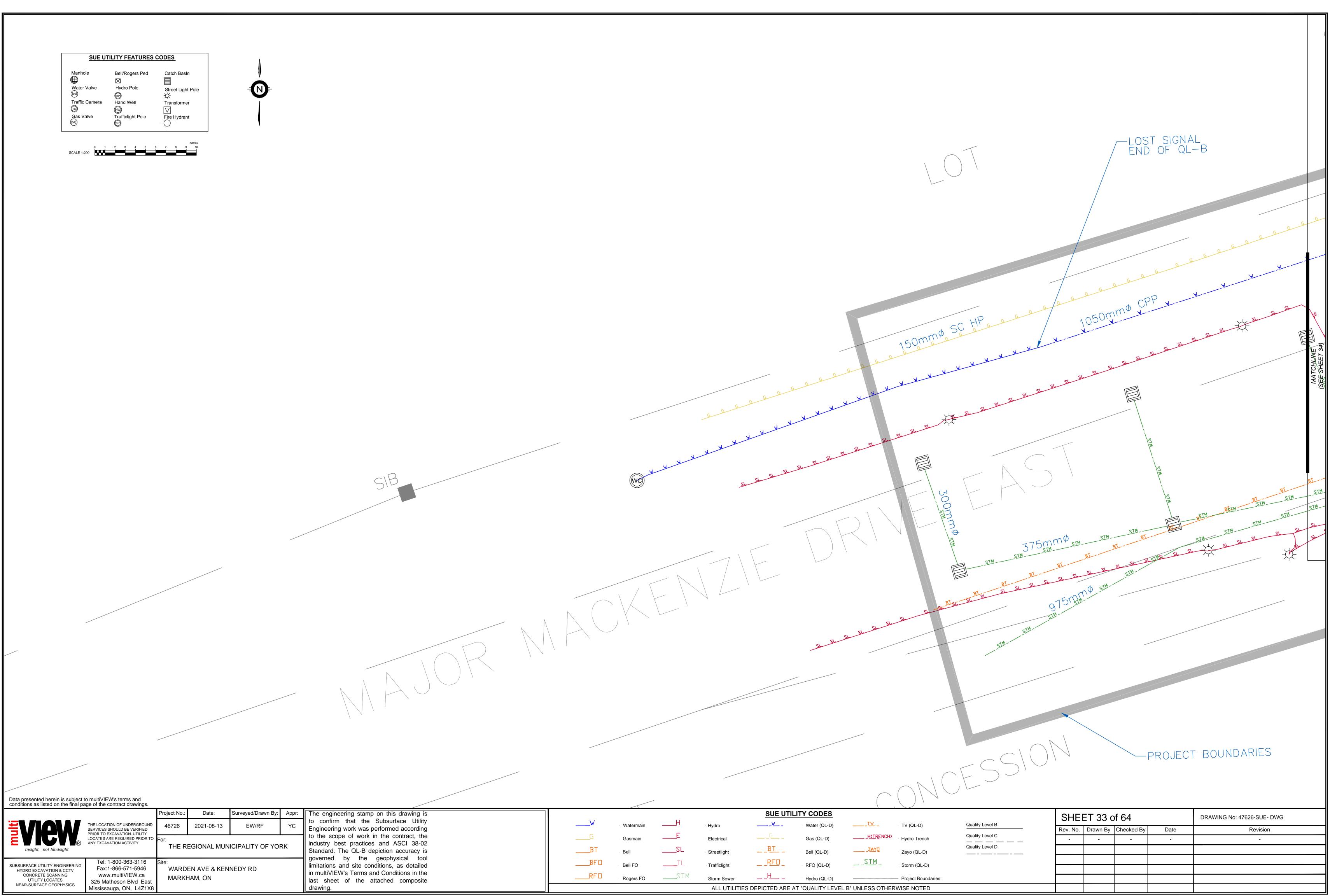
Gas (QL-D)	H(TRENCH)	Hydro Trench
Bell (QL-D)	ZAYO	Zayo (QL-D)
RFO (QL-D)	STM_	Storm (QL-D)
Hydro (QL-D)		Project Boundaries

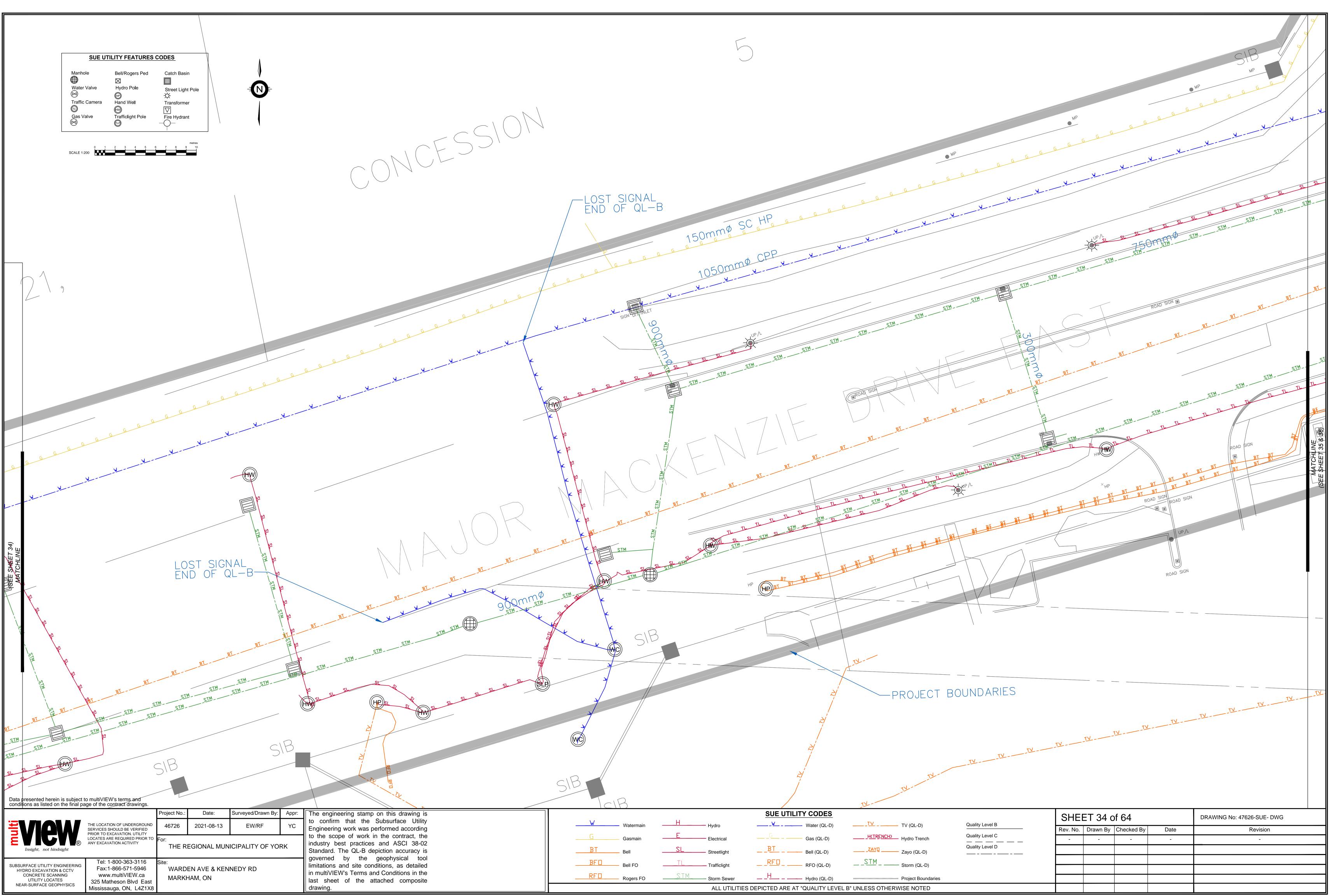
Quality Level B	
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Quality Level C	
Quality Level D	

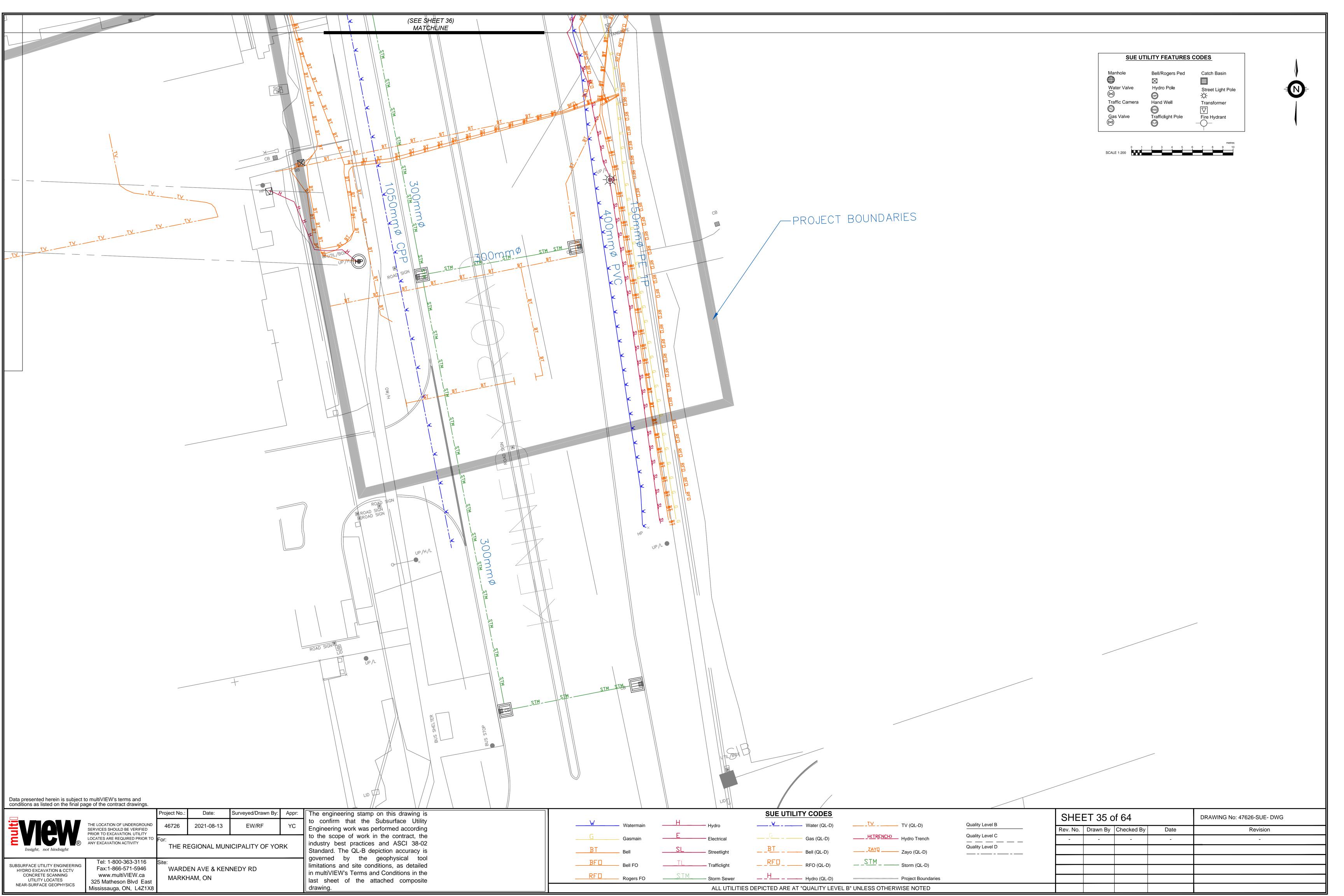
SHEET 30 of 64			DRAWING No: 47626-SUE- DWG	
Rev. No.	Drawn By	Checked By	Date	Revision
-	-	-	-	-

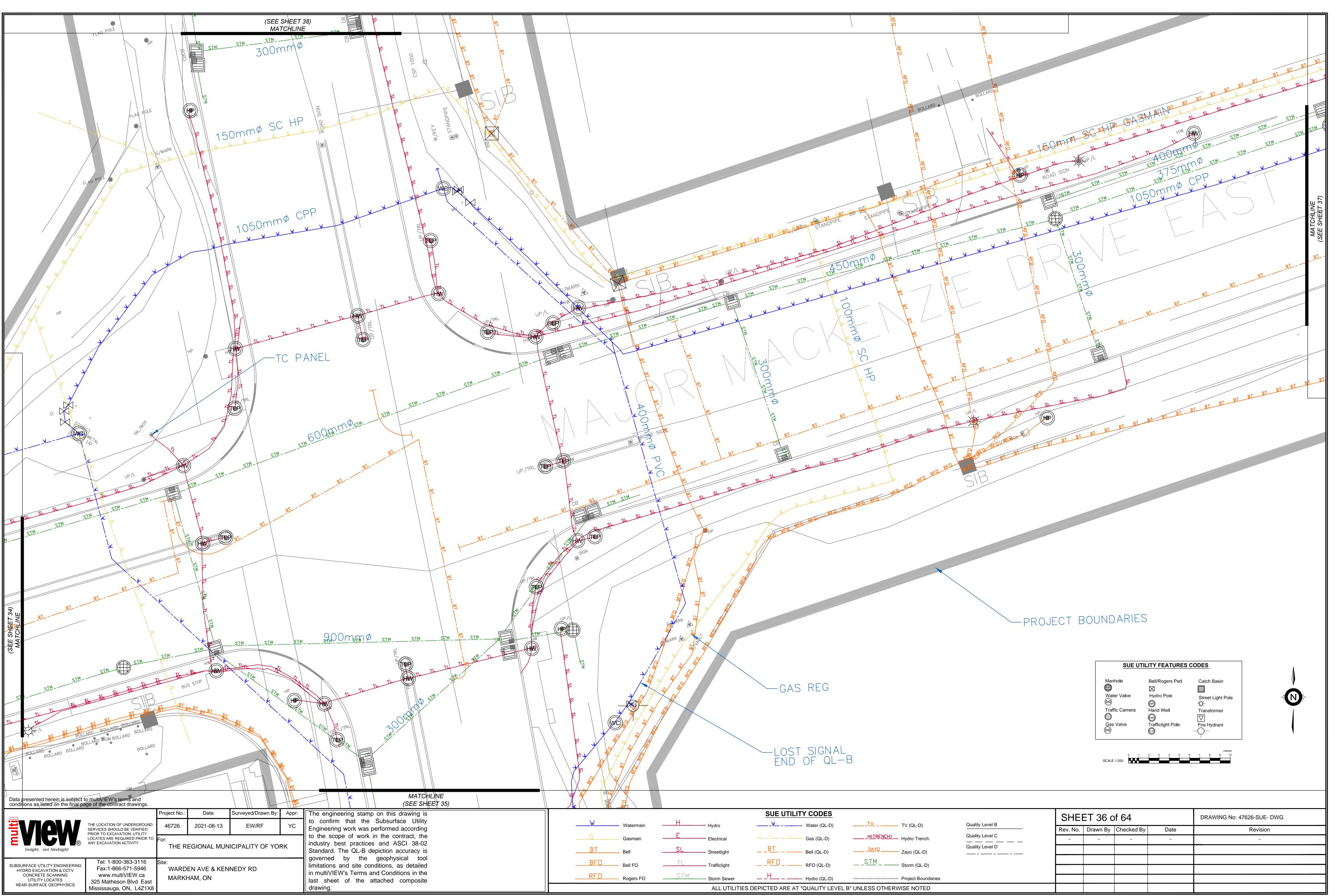


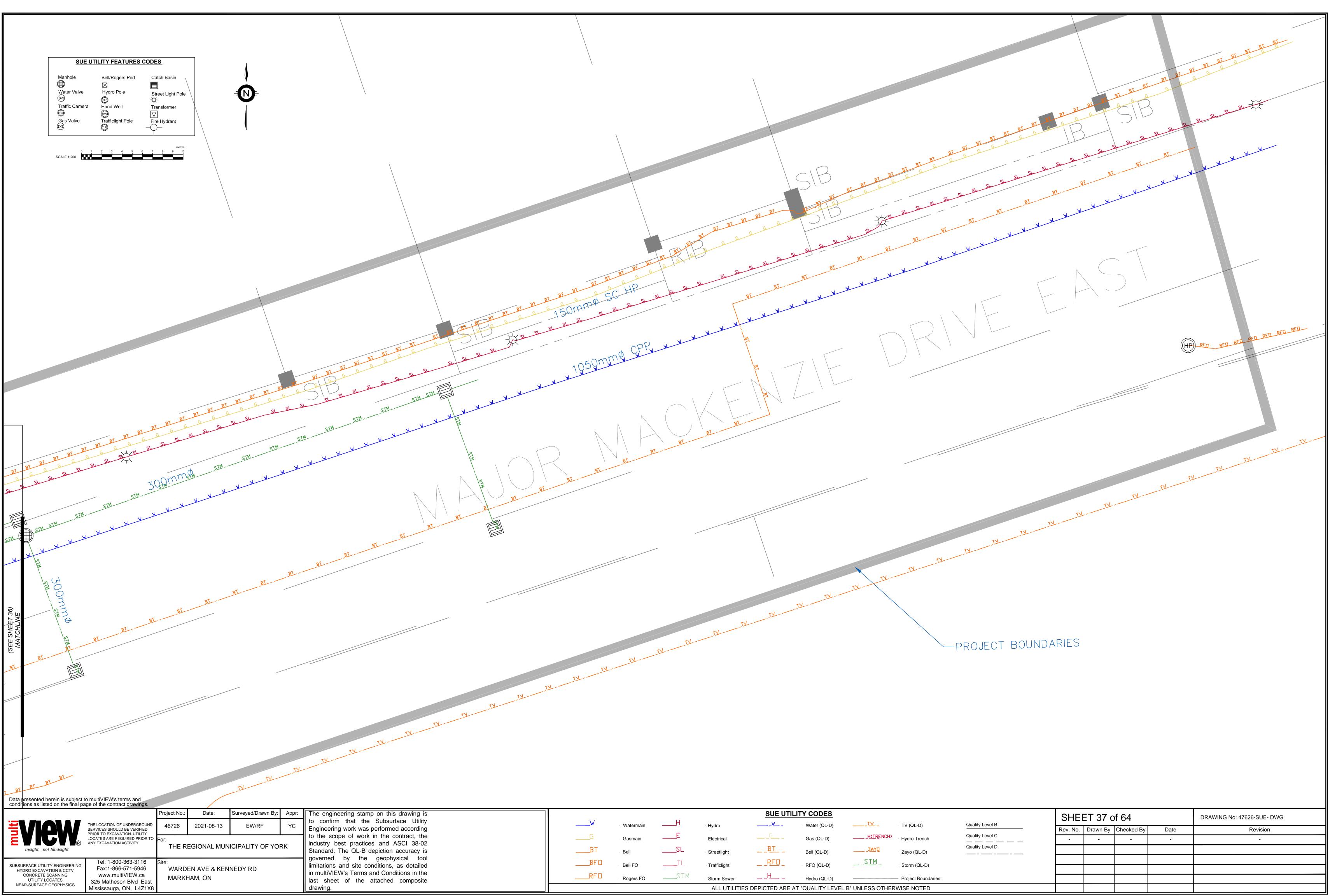


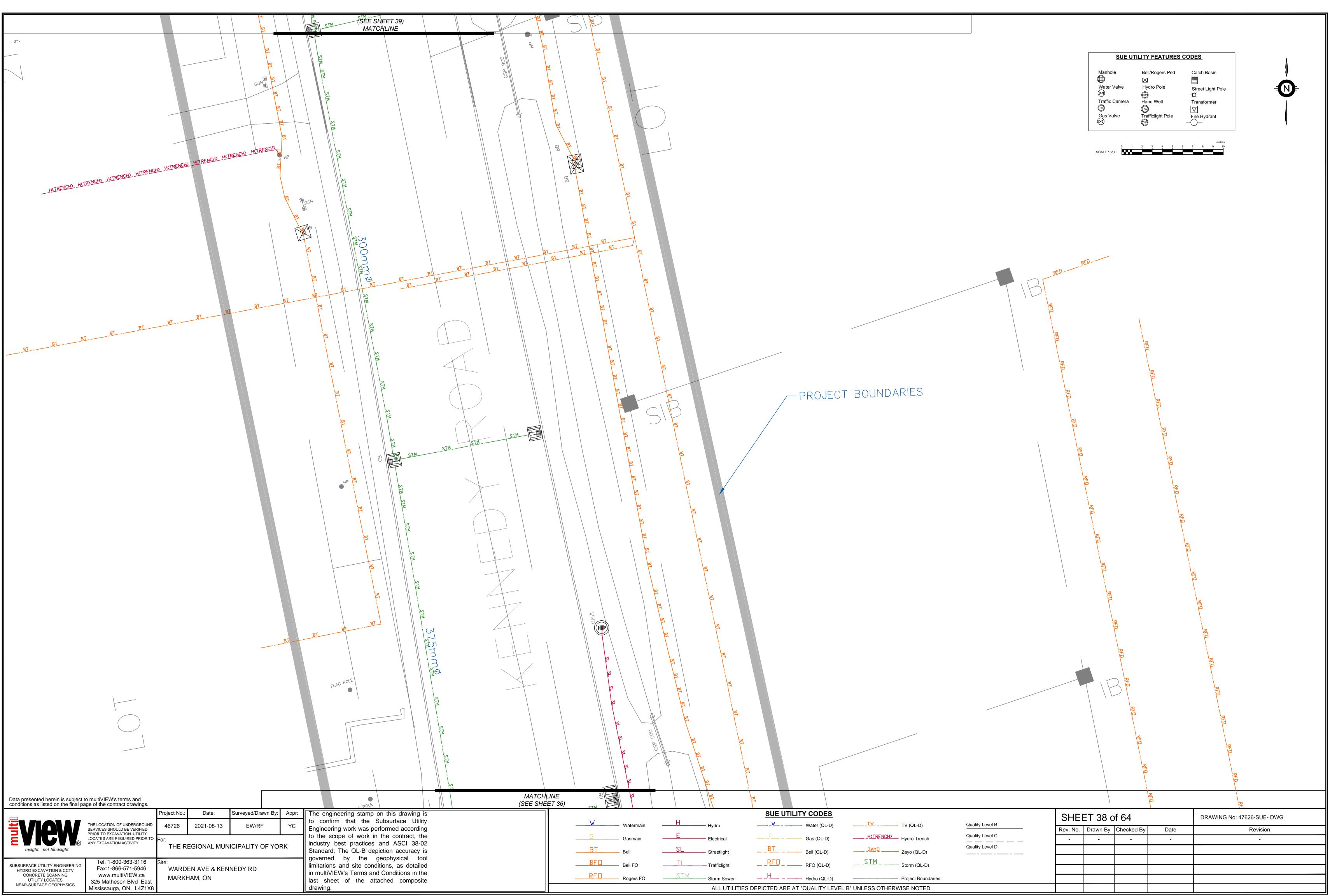


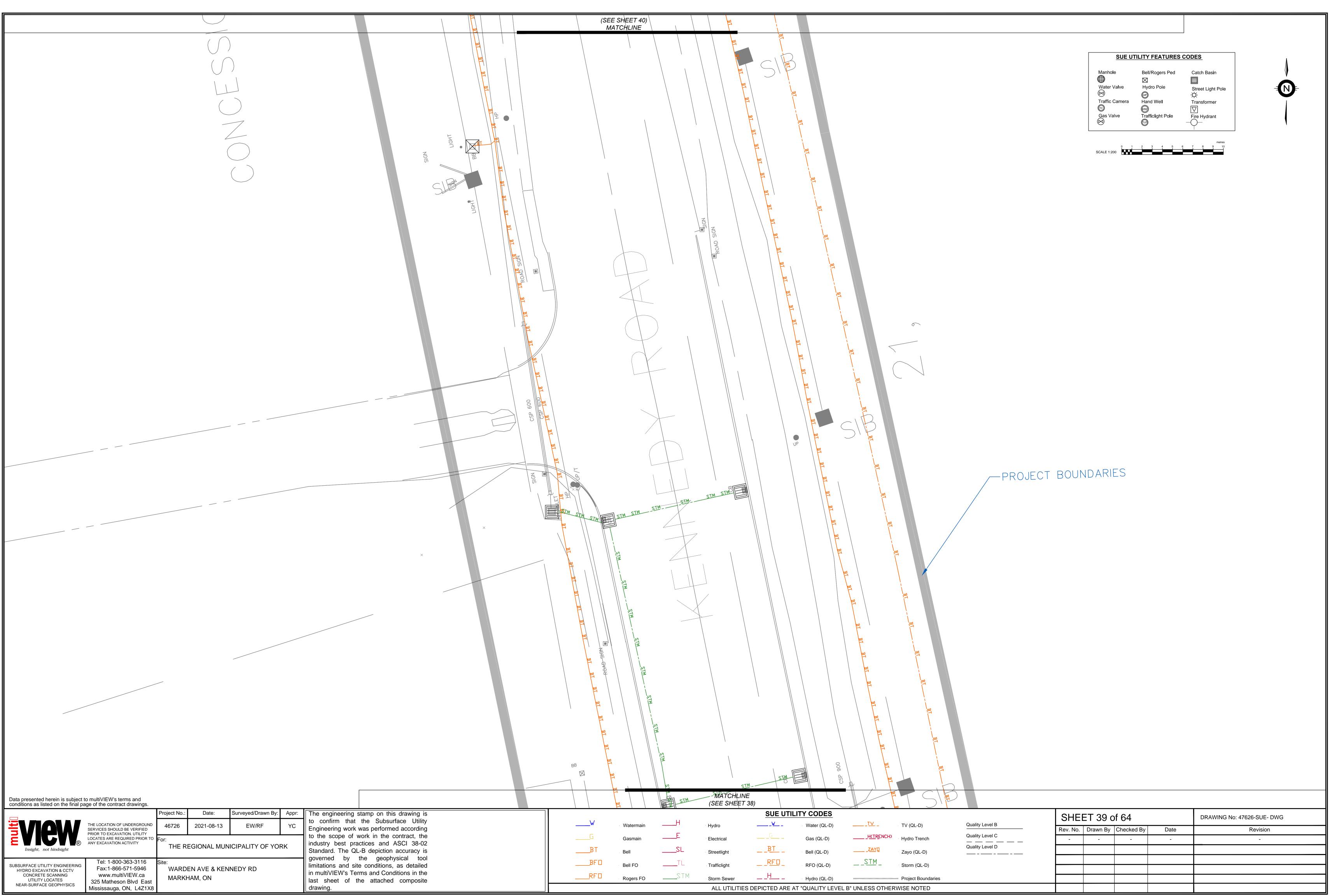


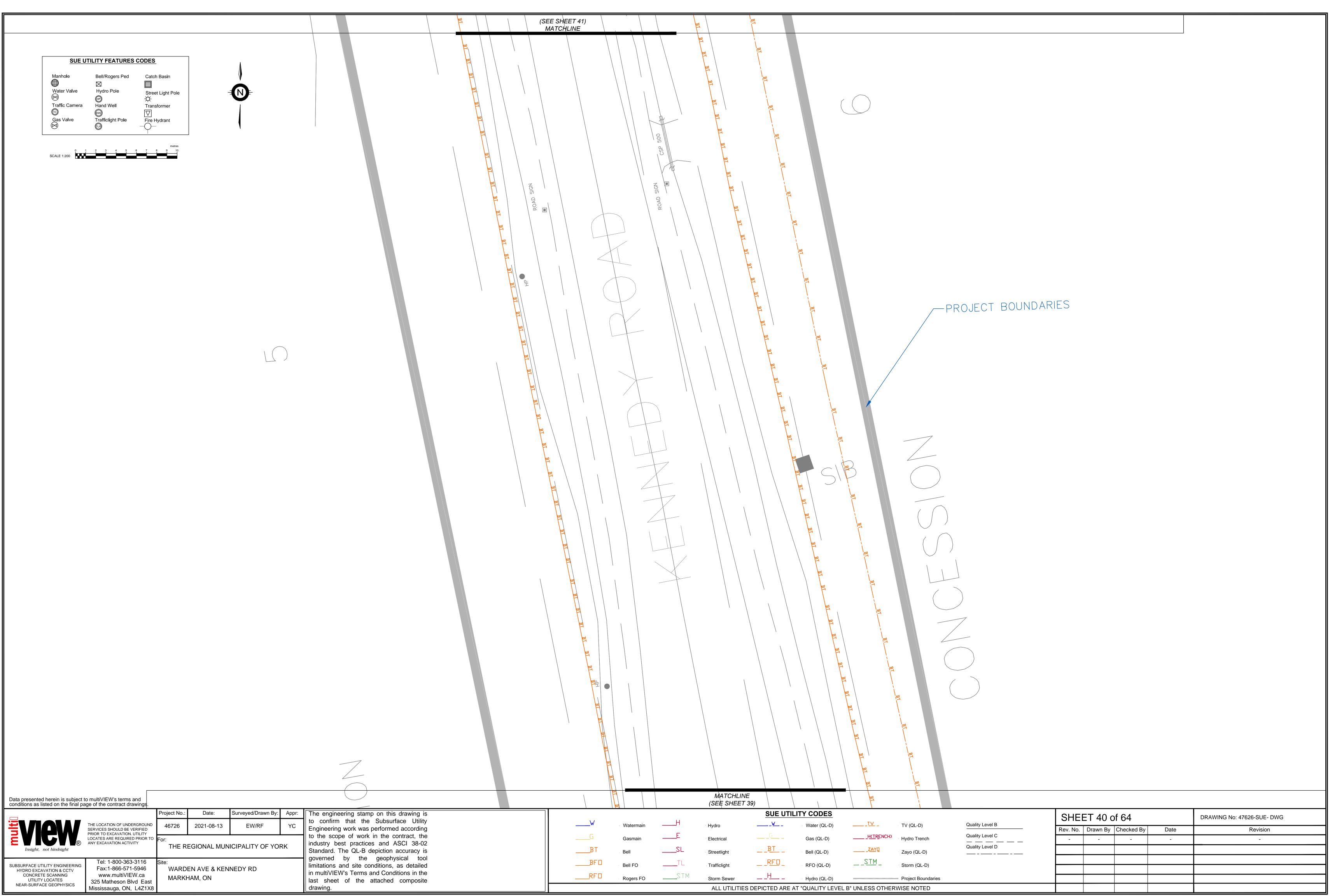


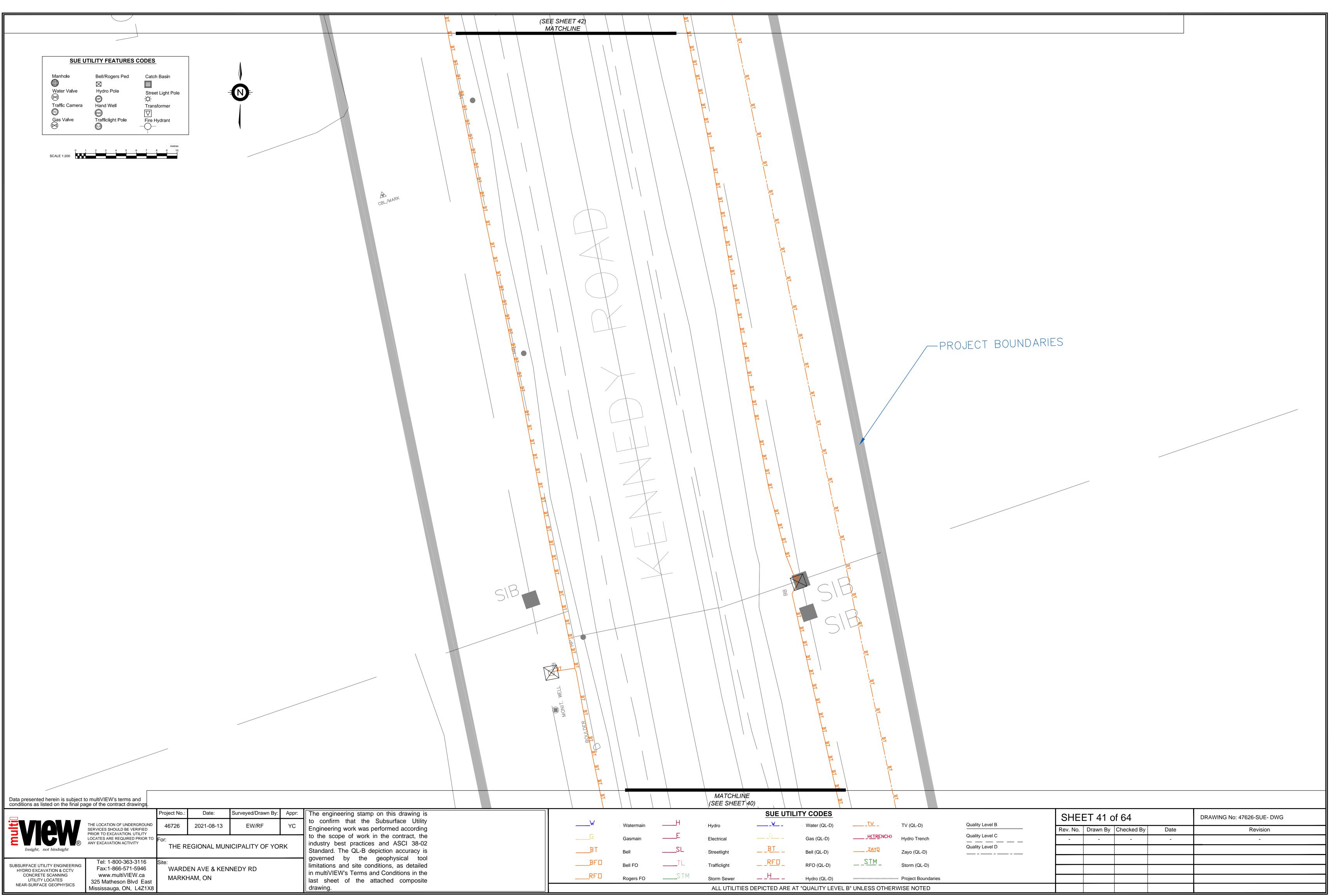


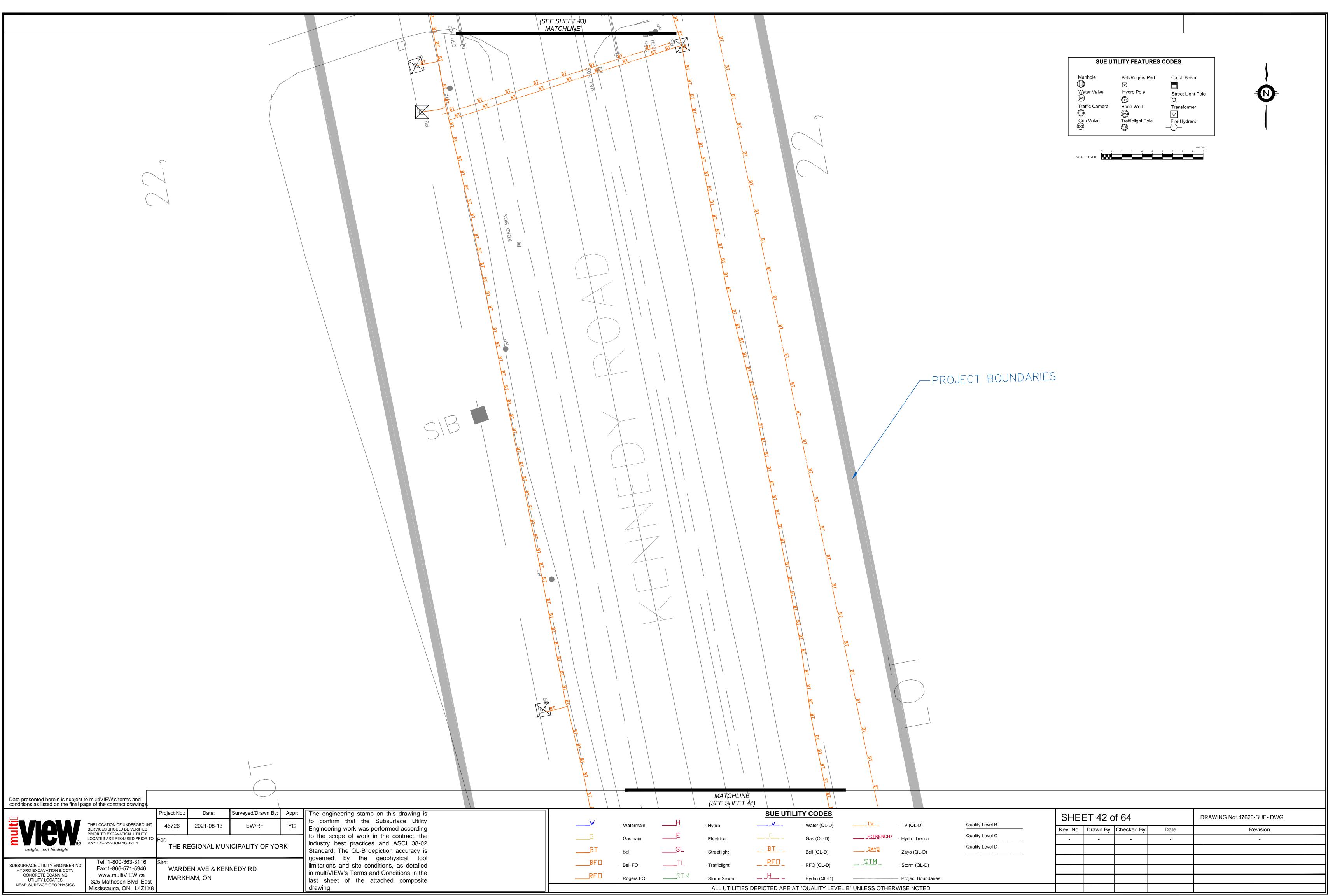


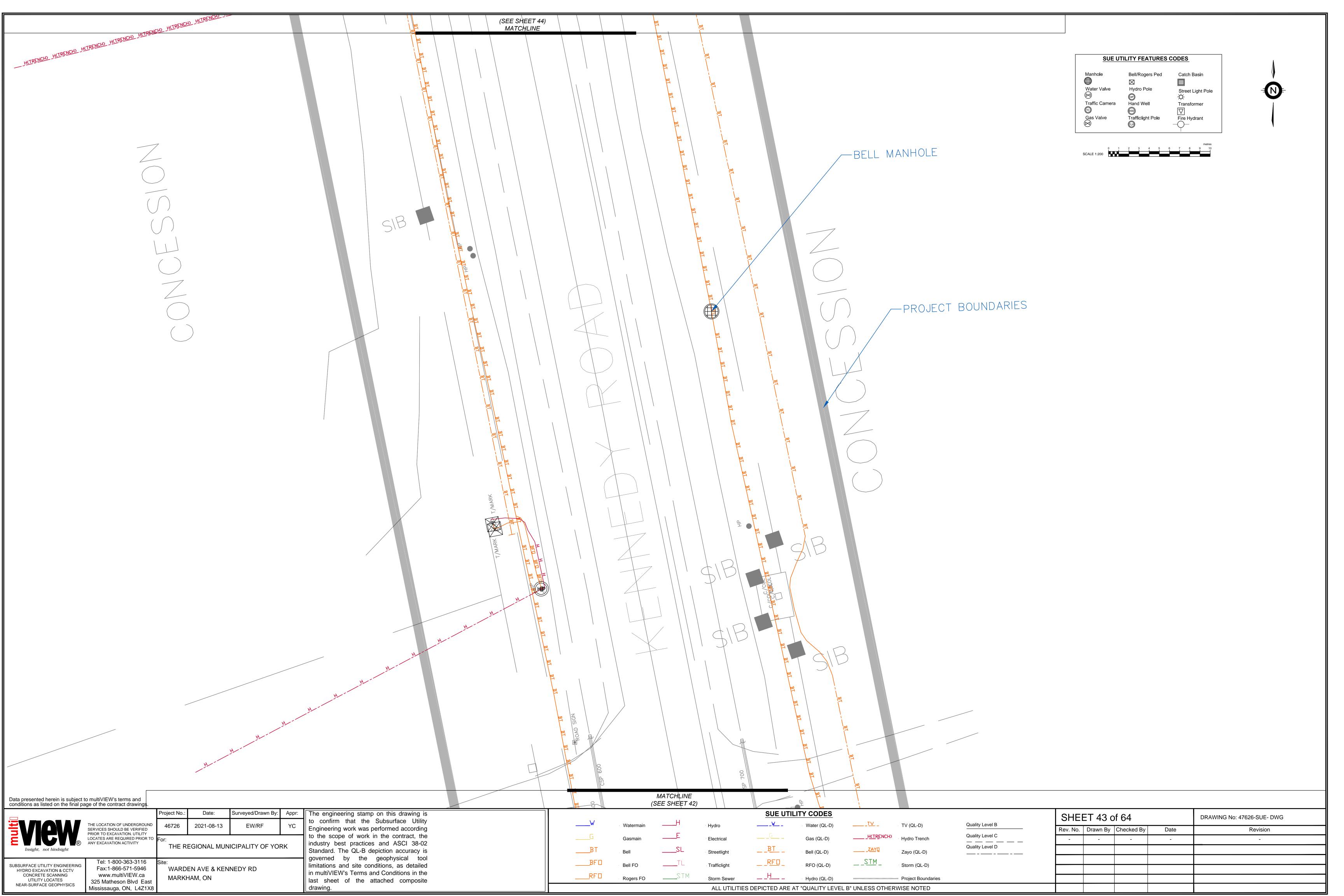


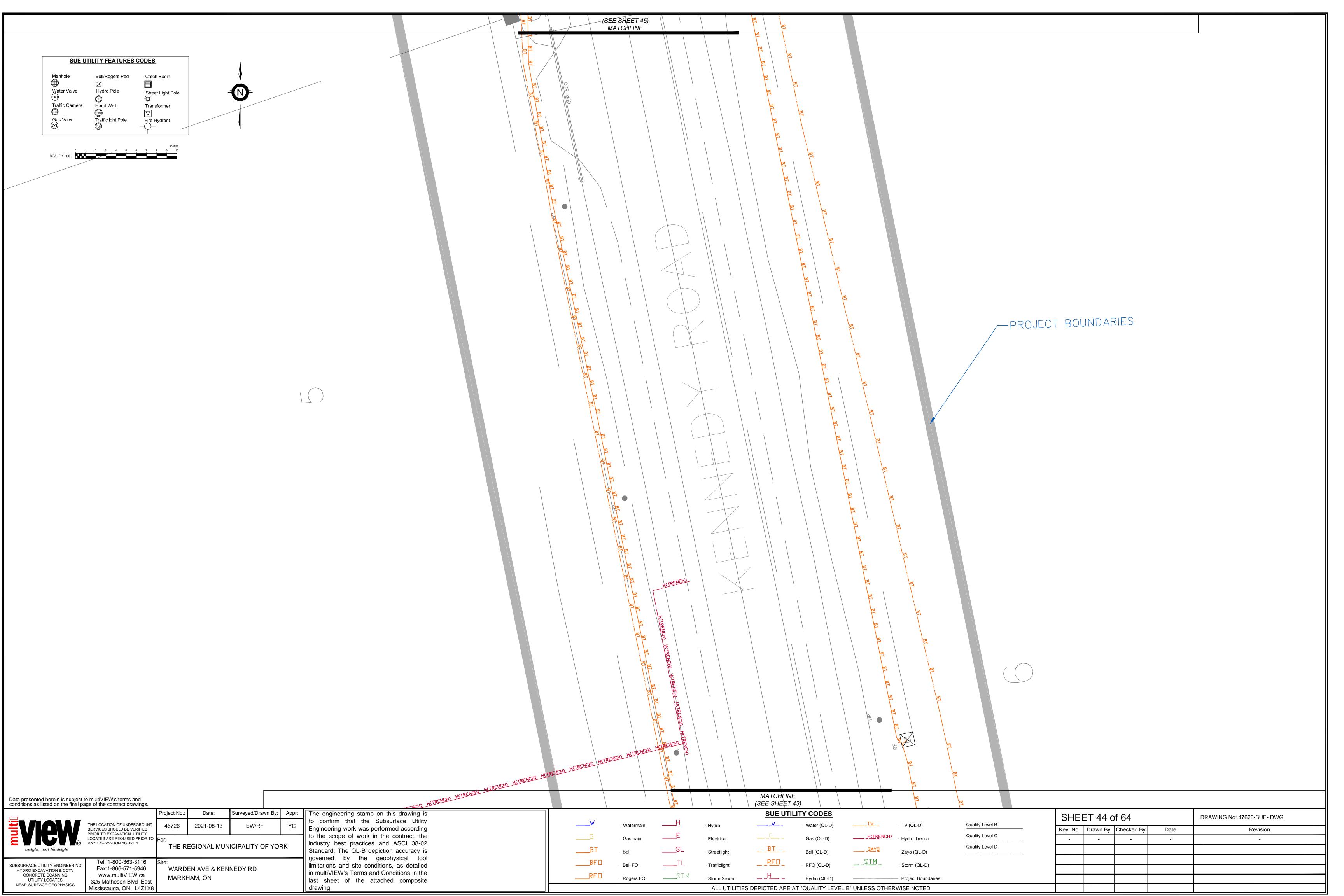


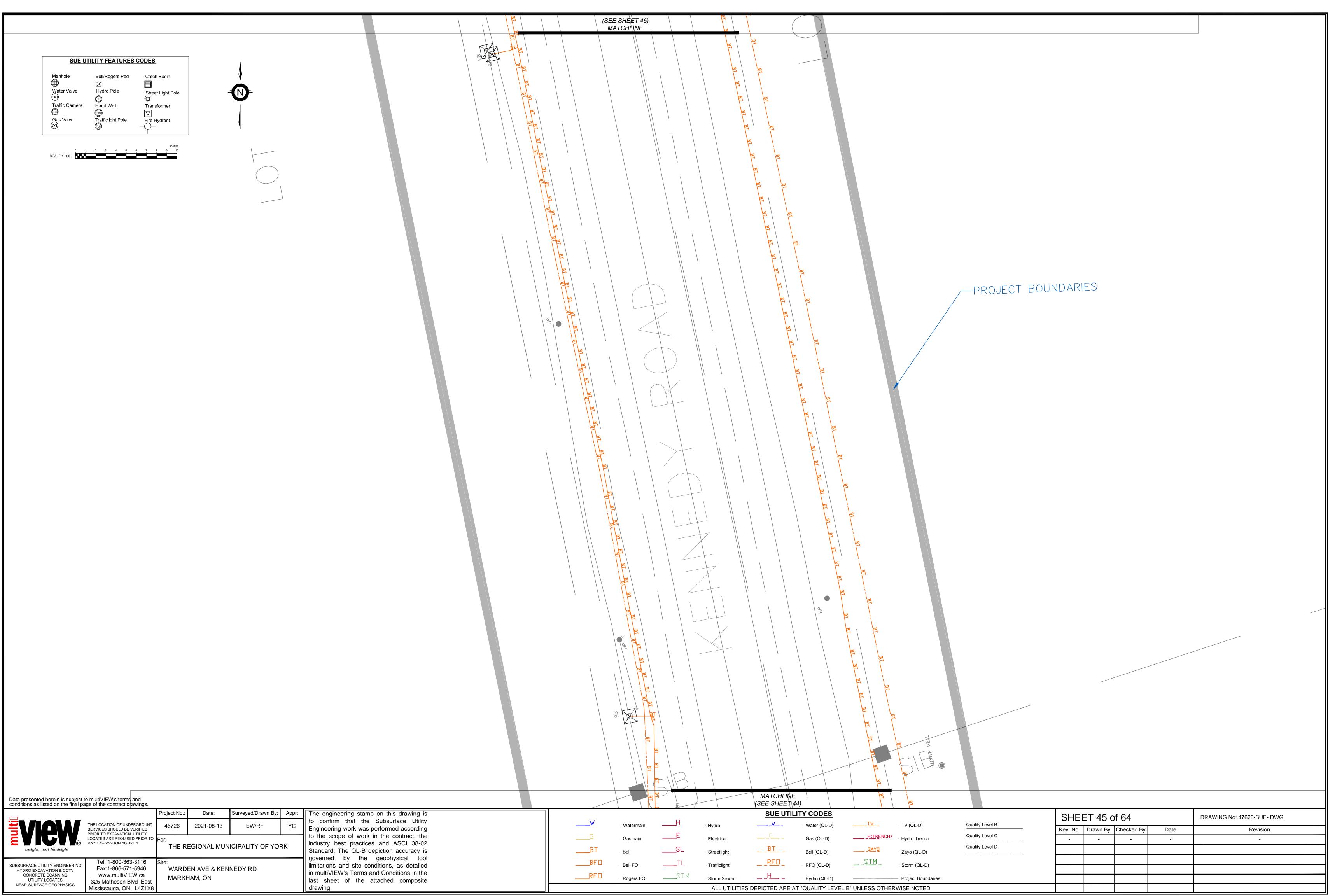


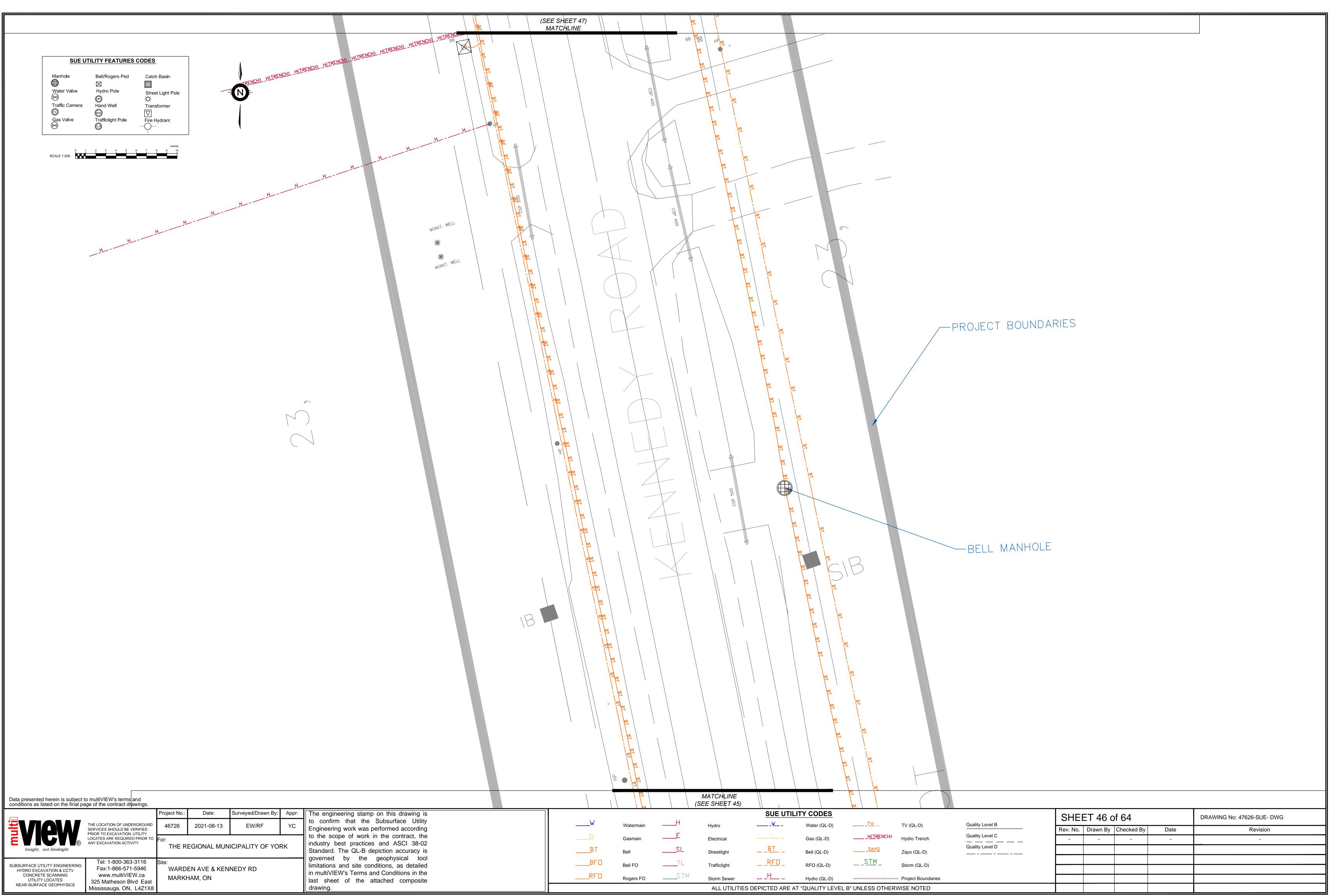


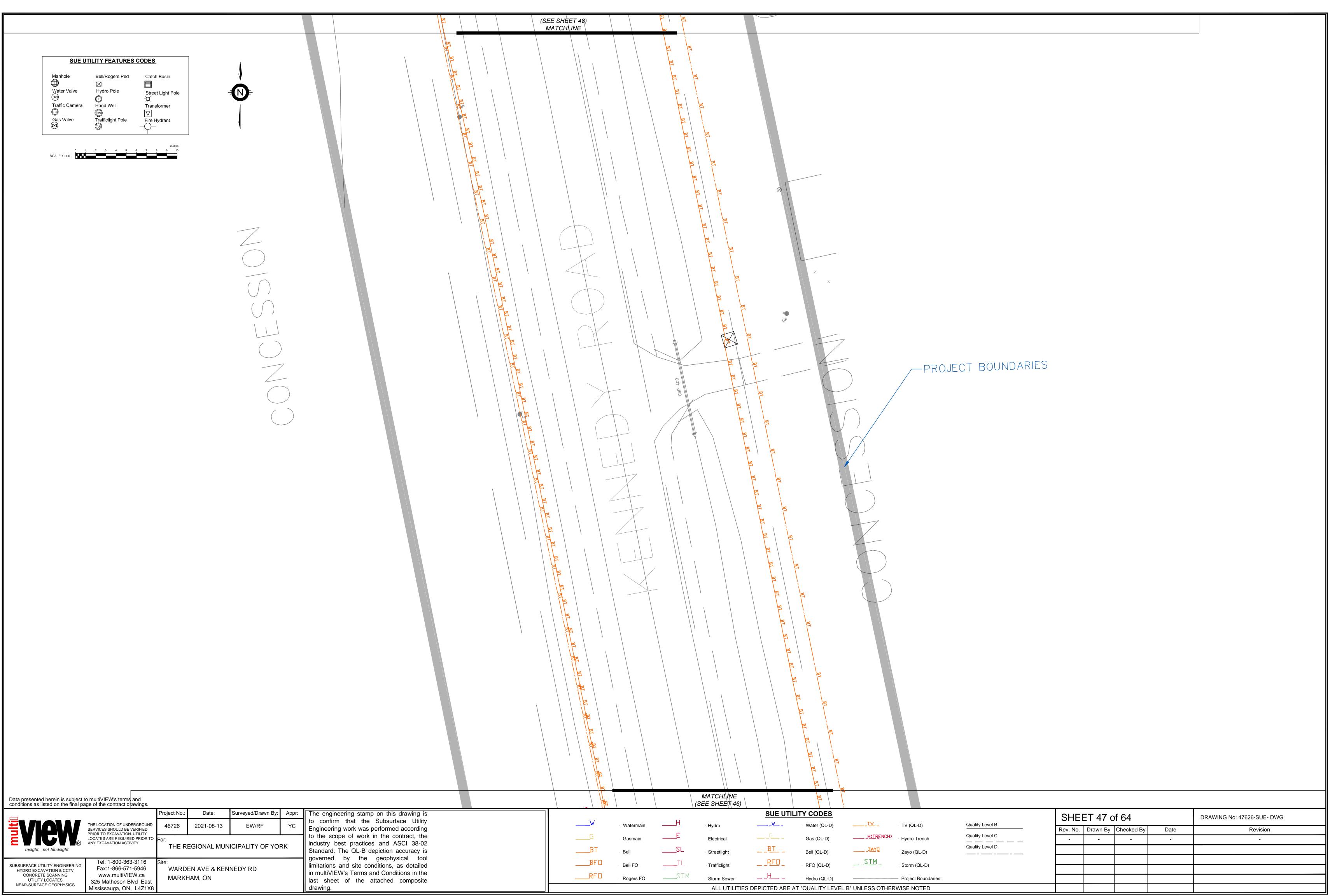


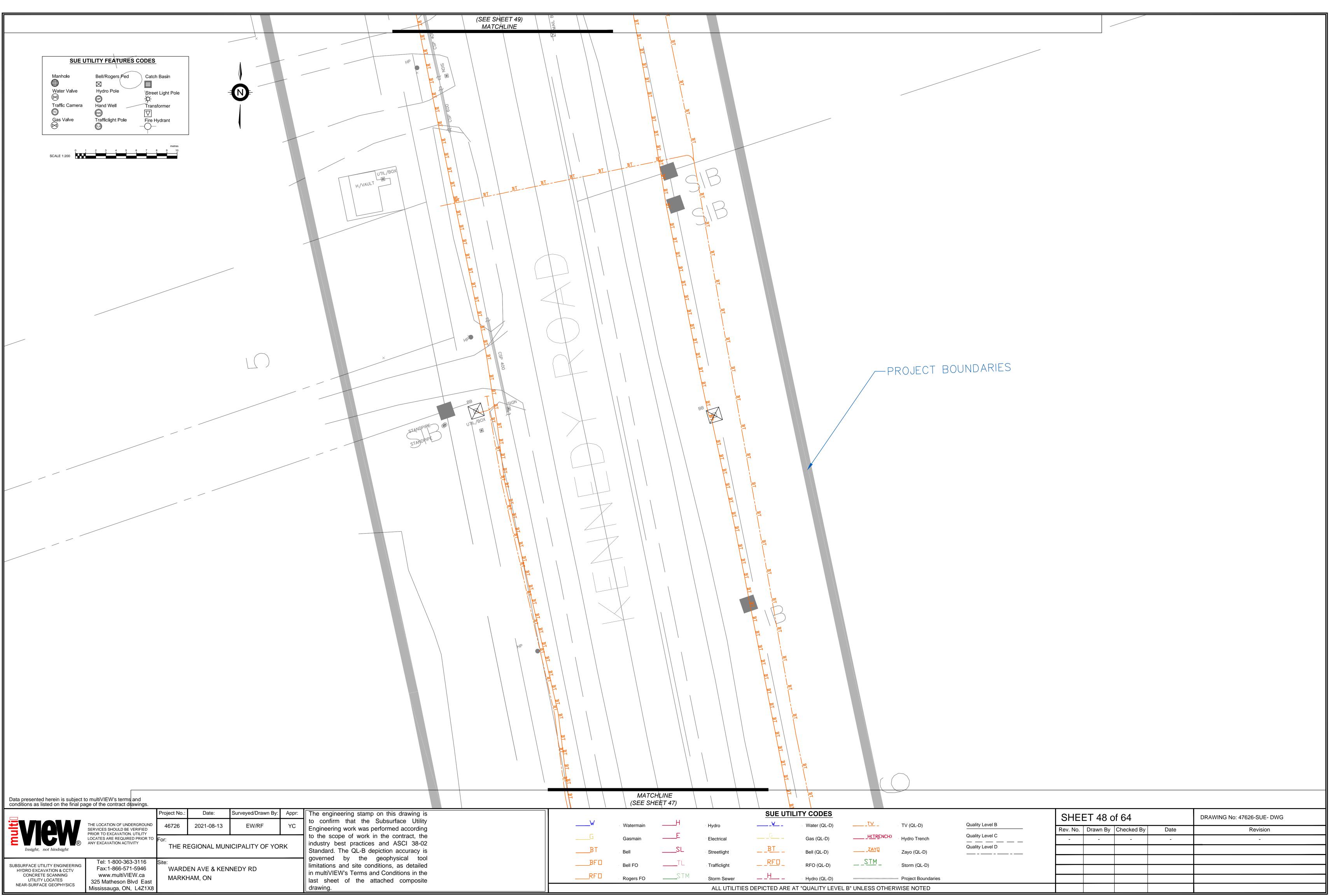


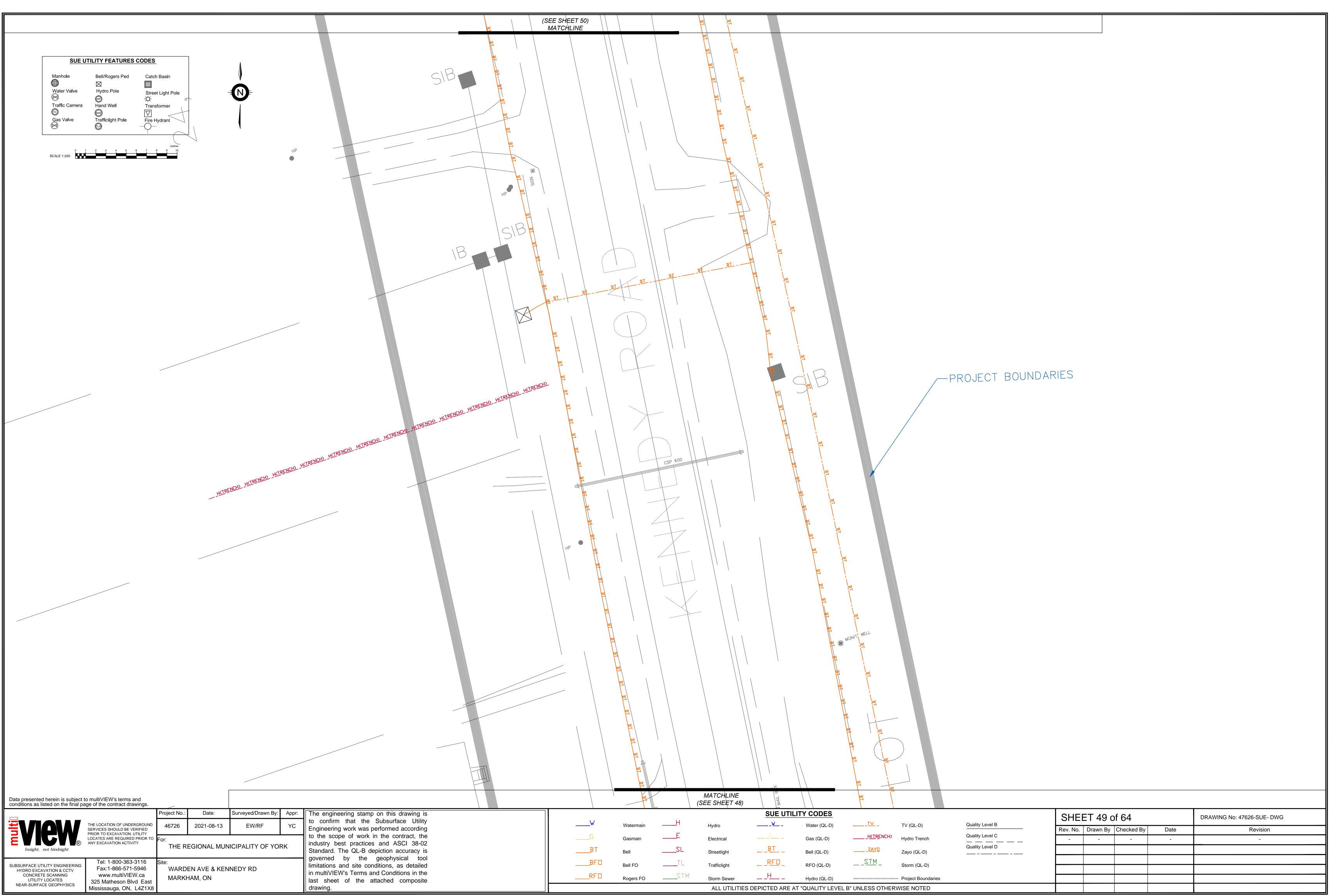


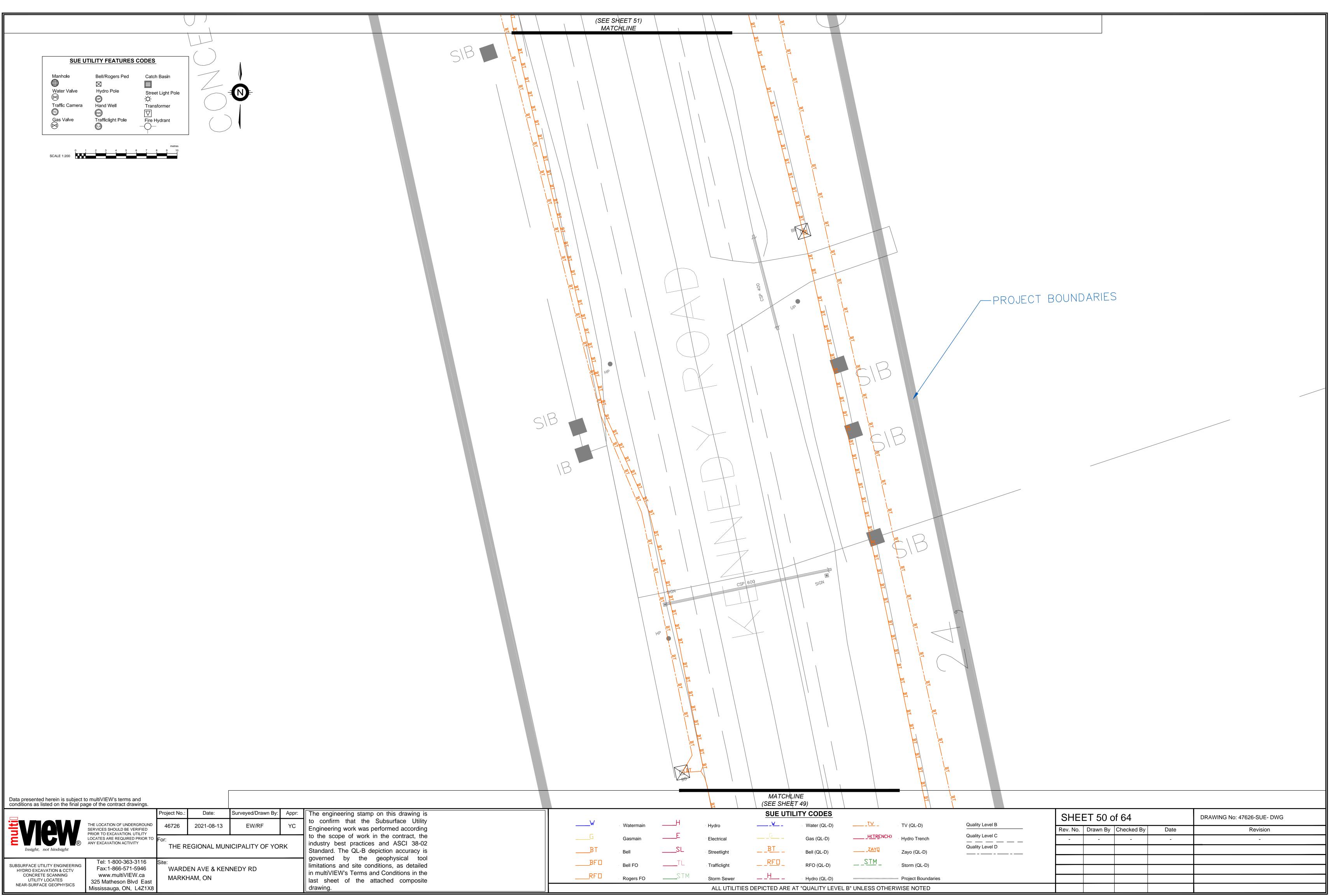


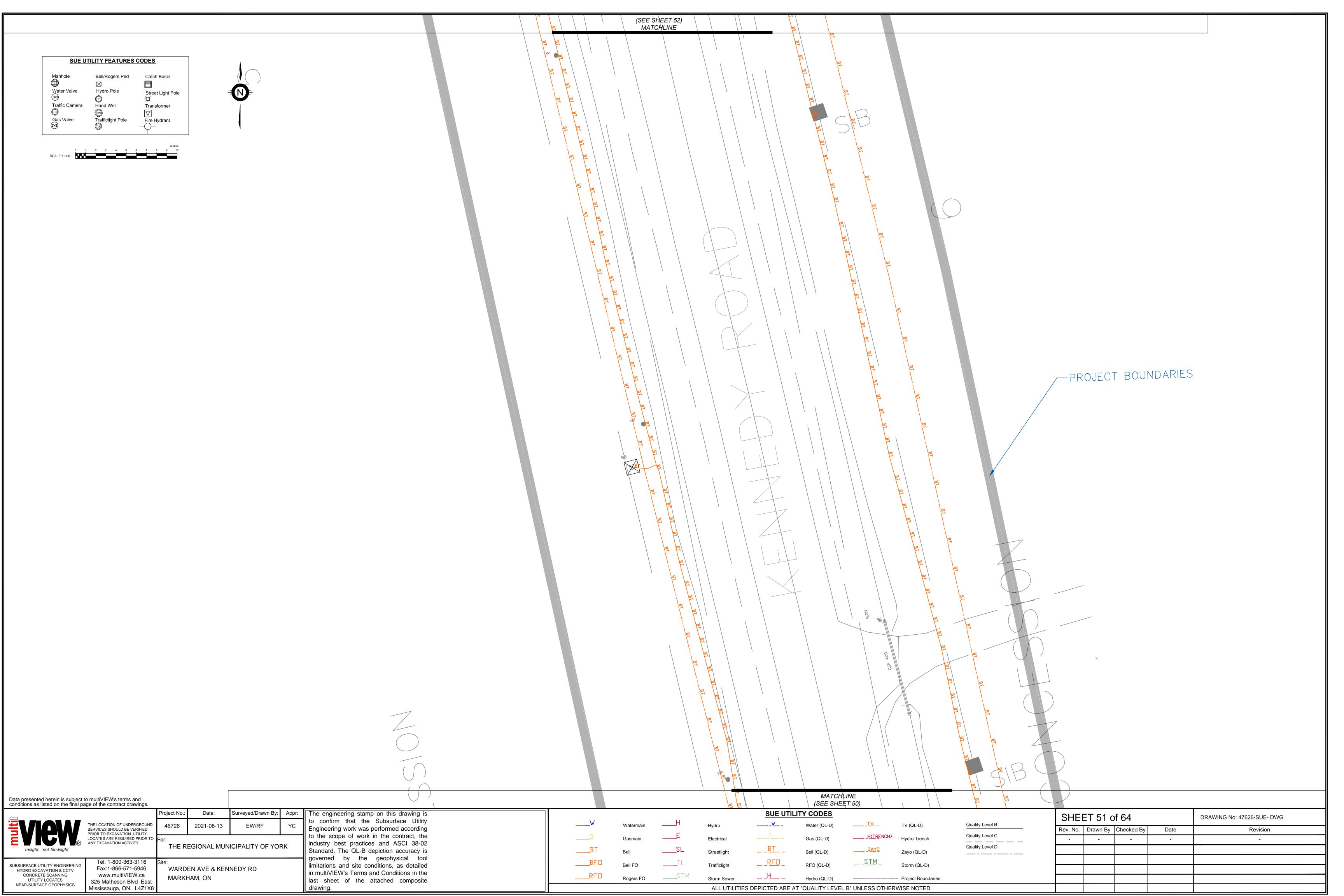


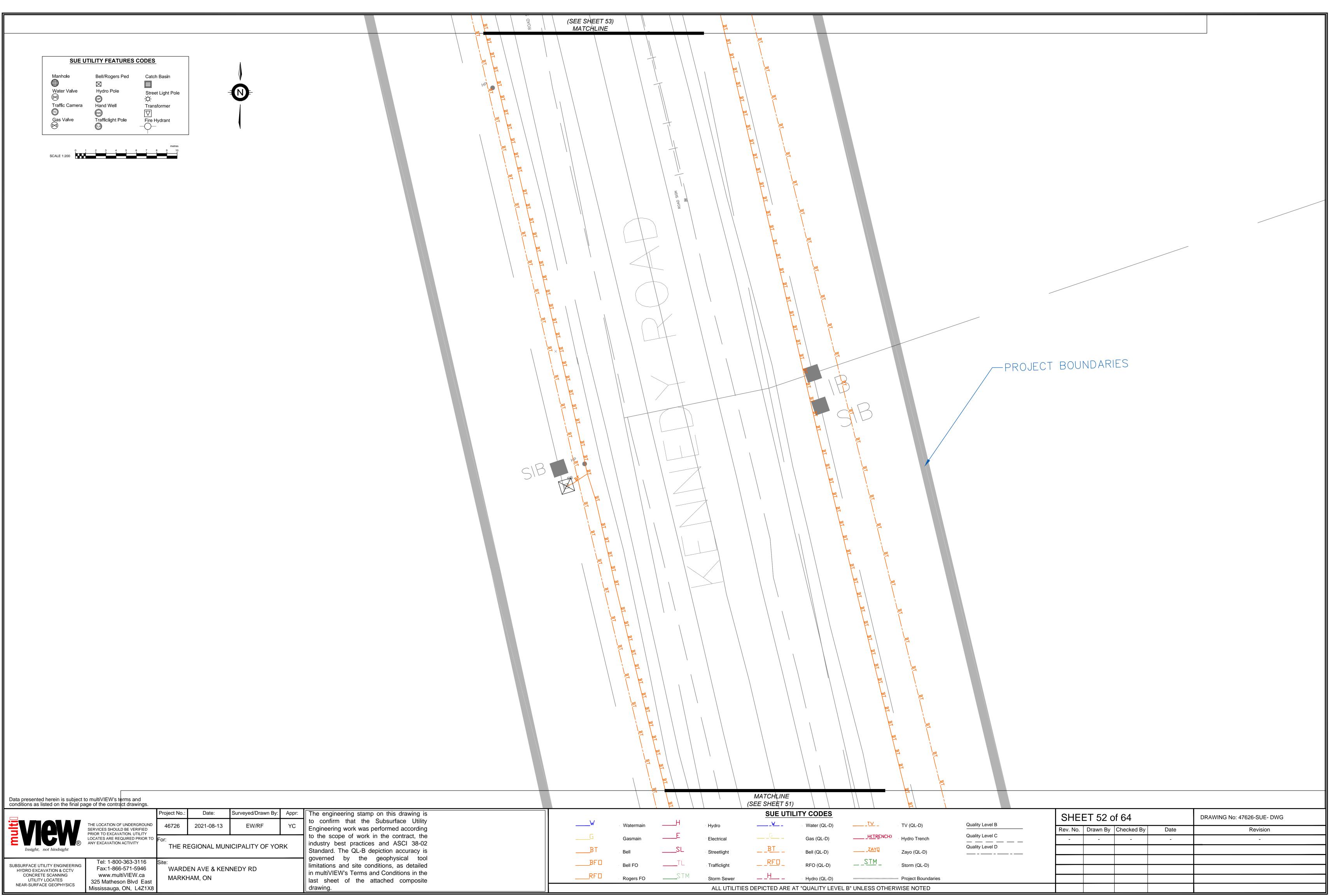


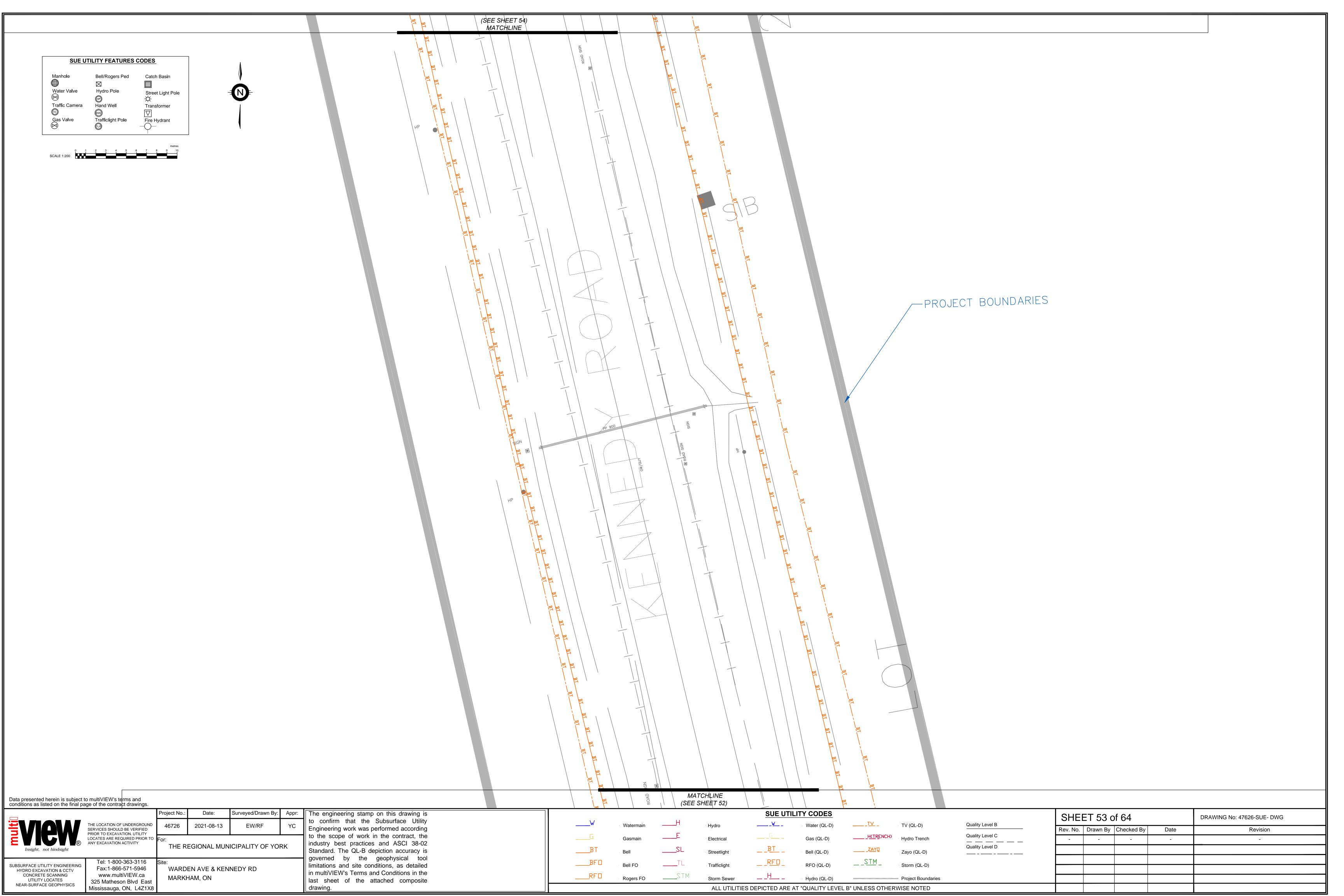


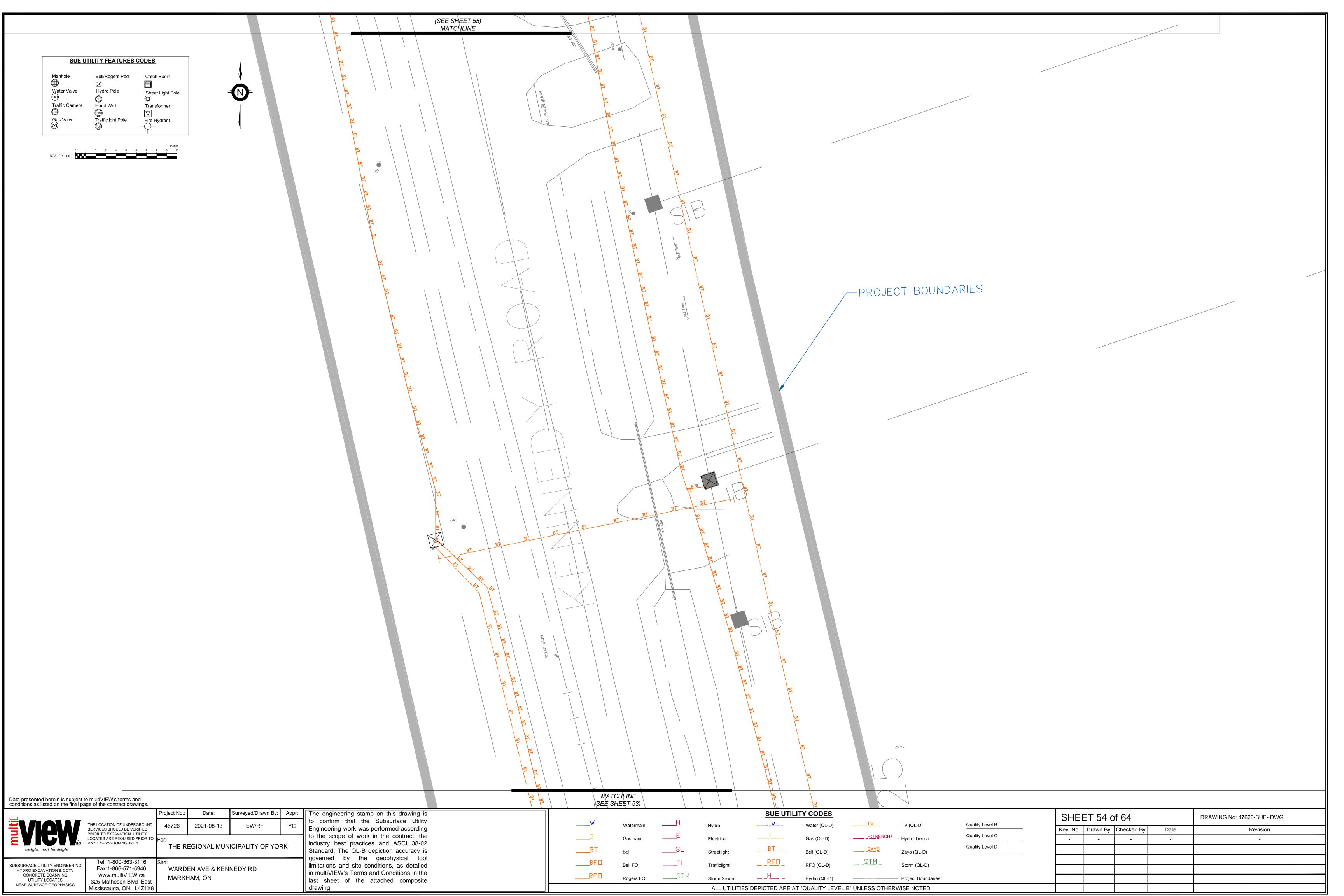


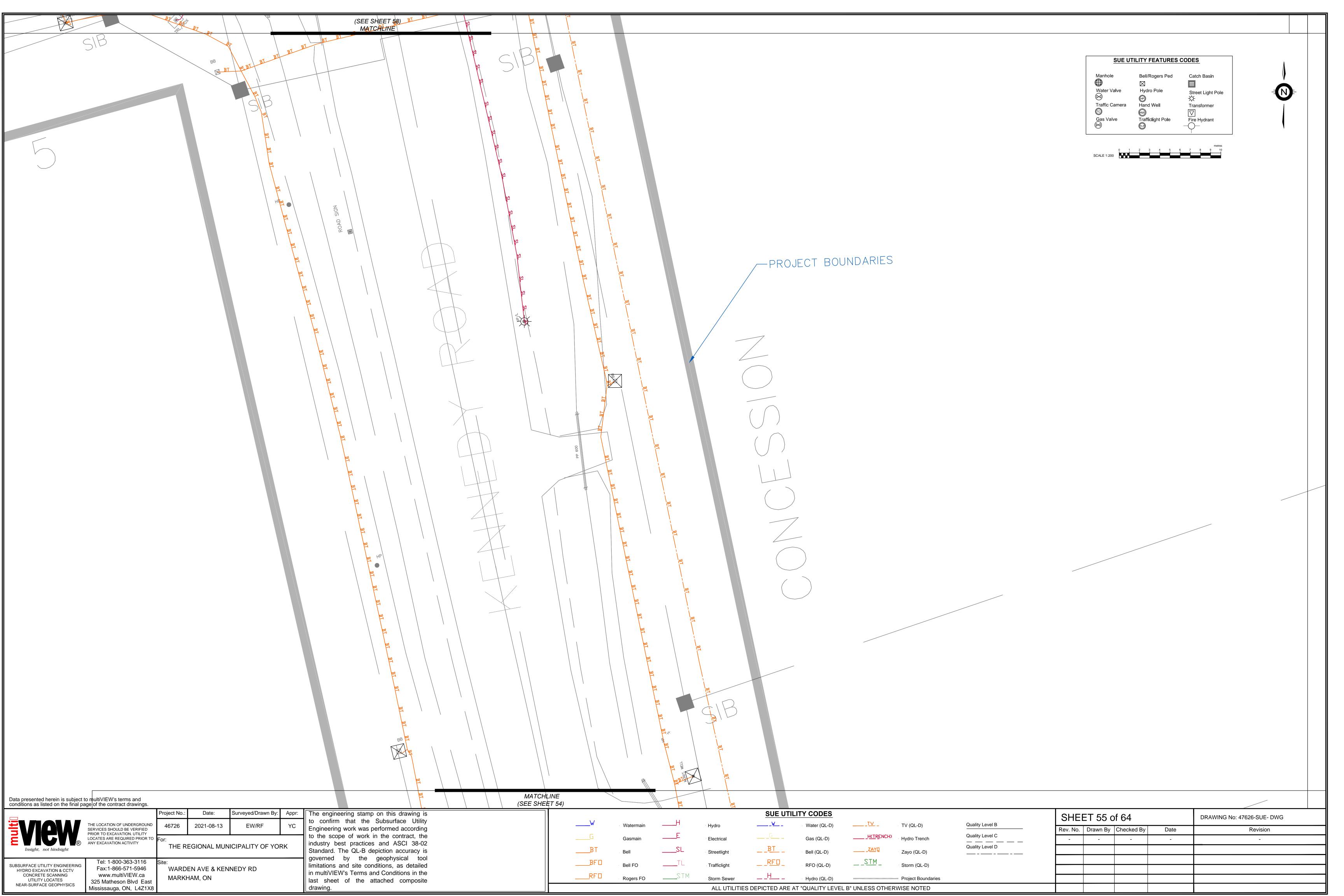


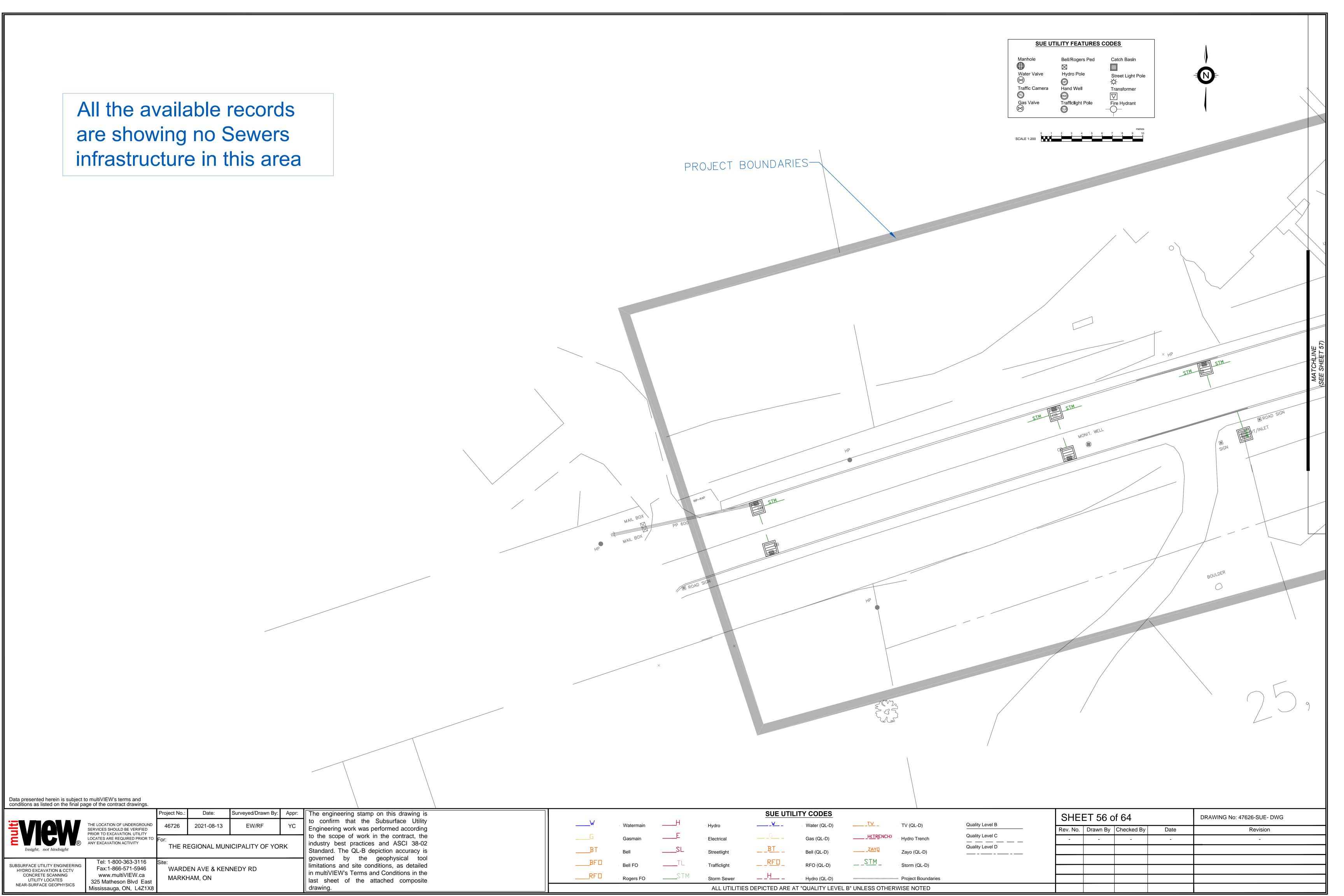


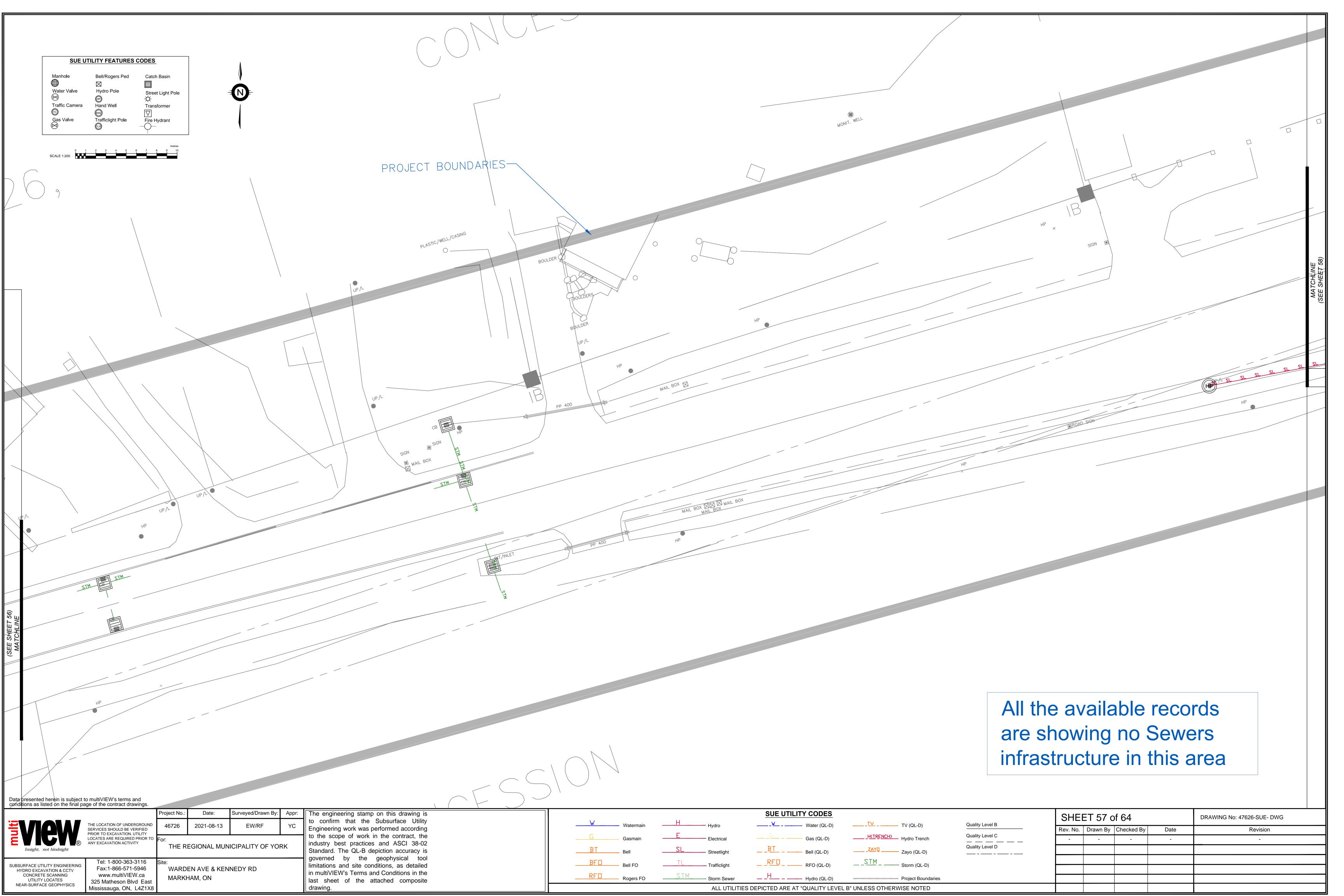


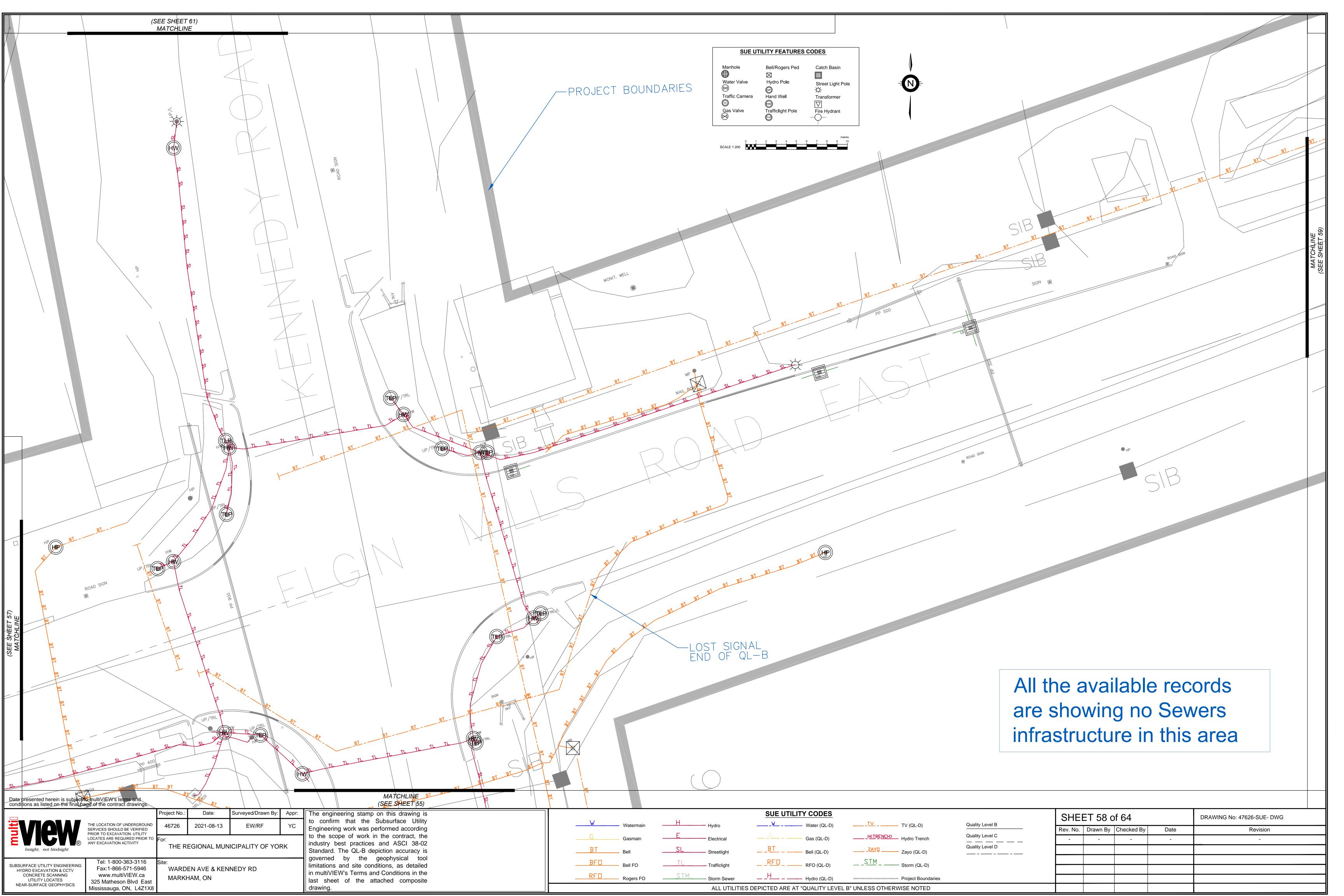


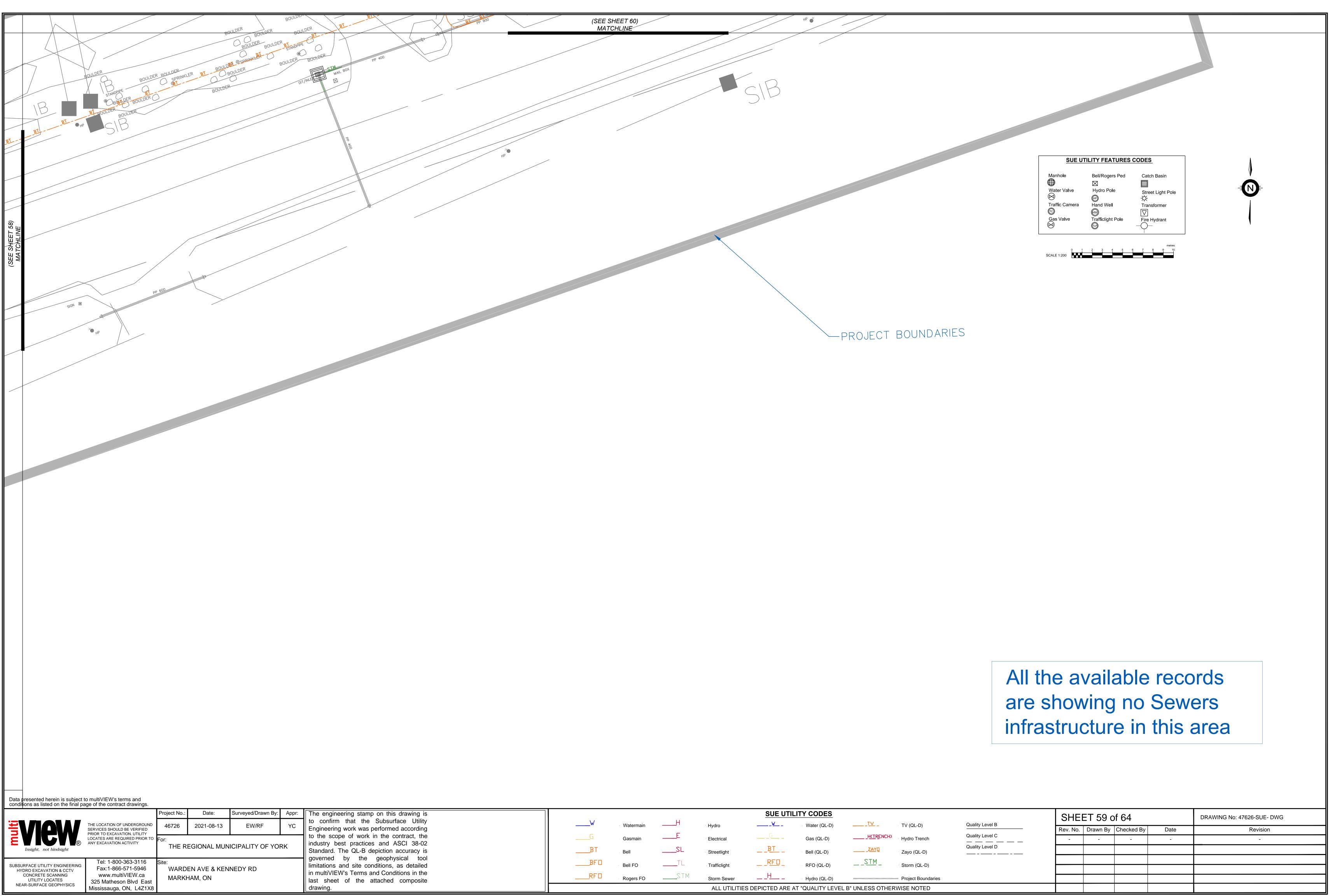






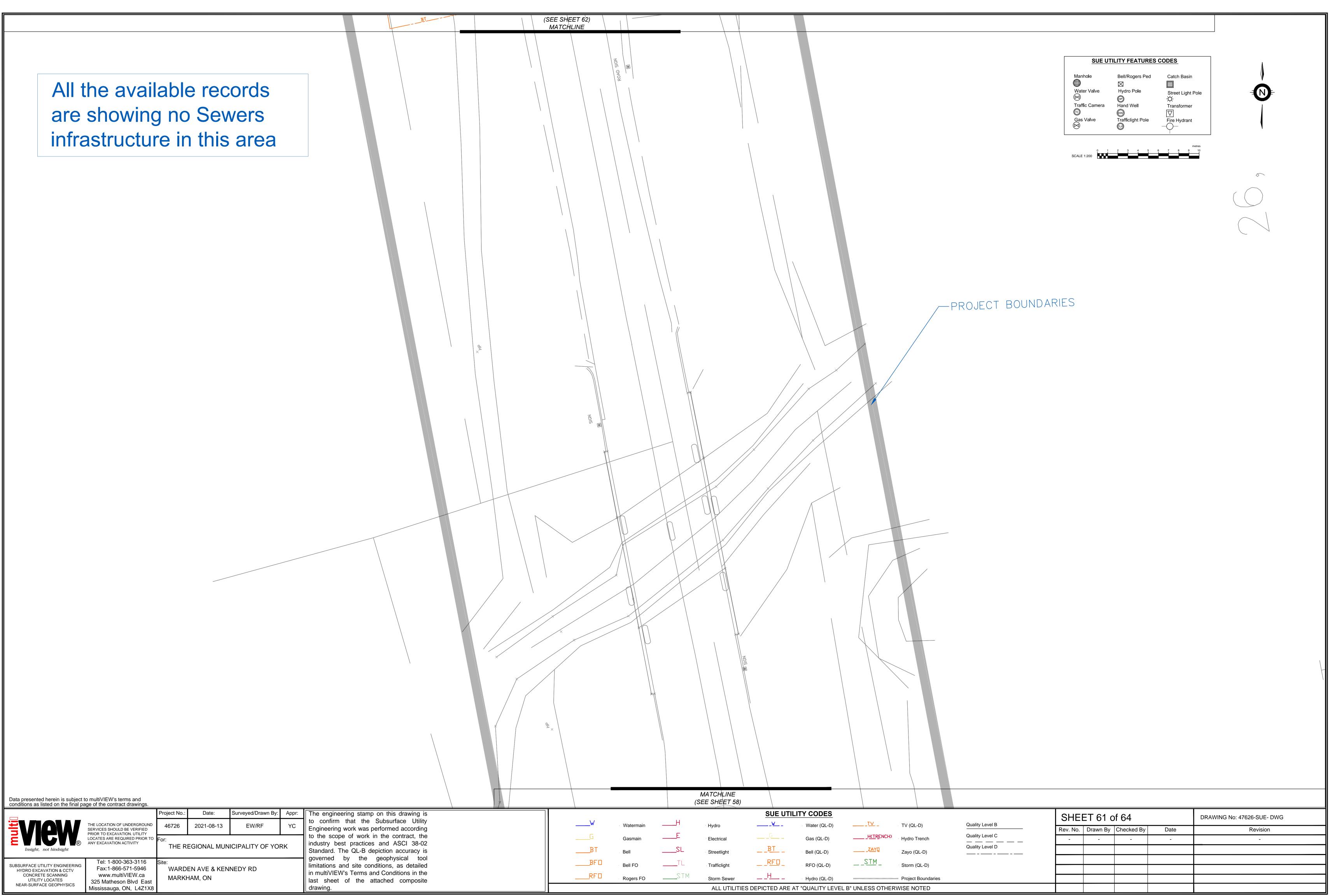


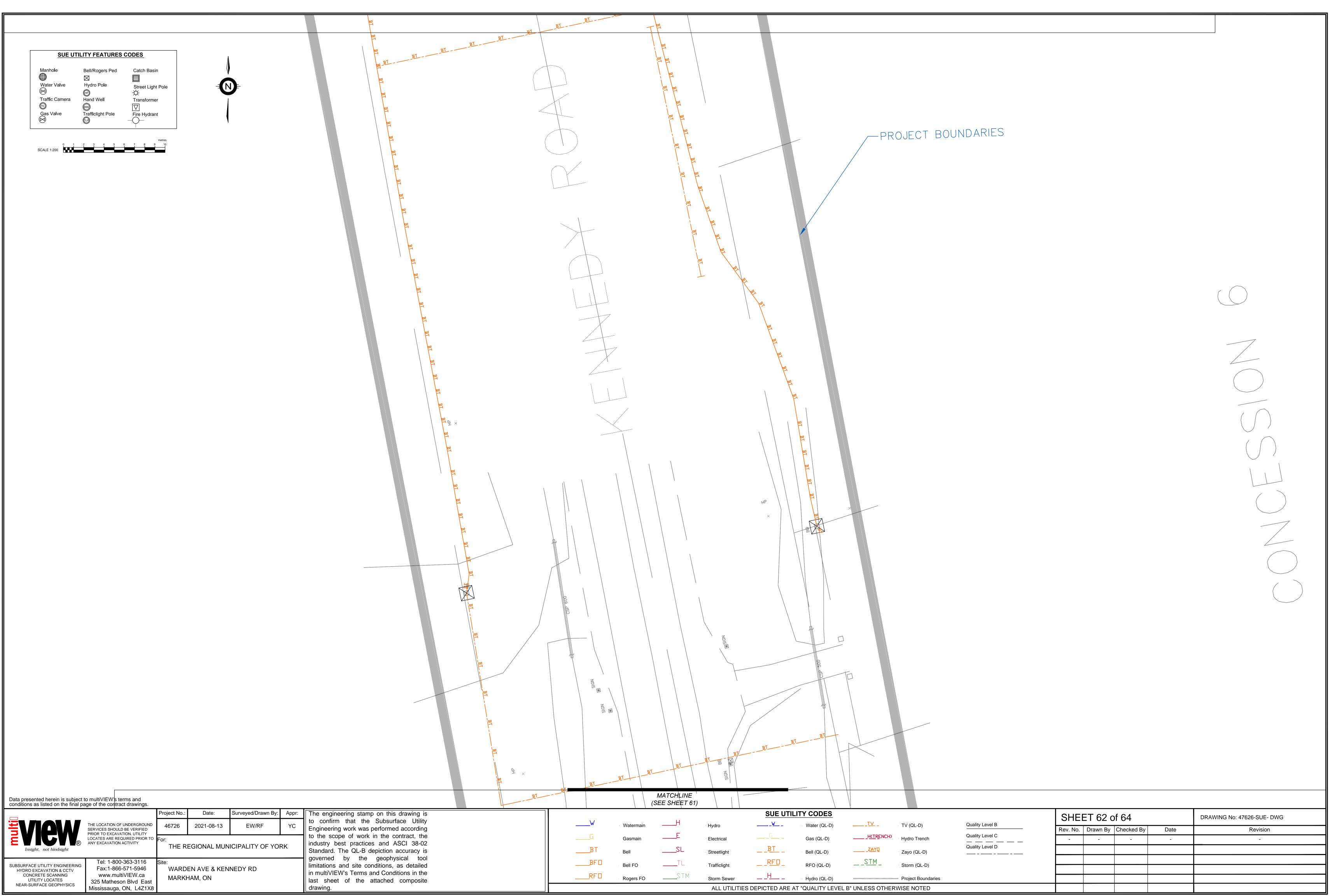


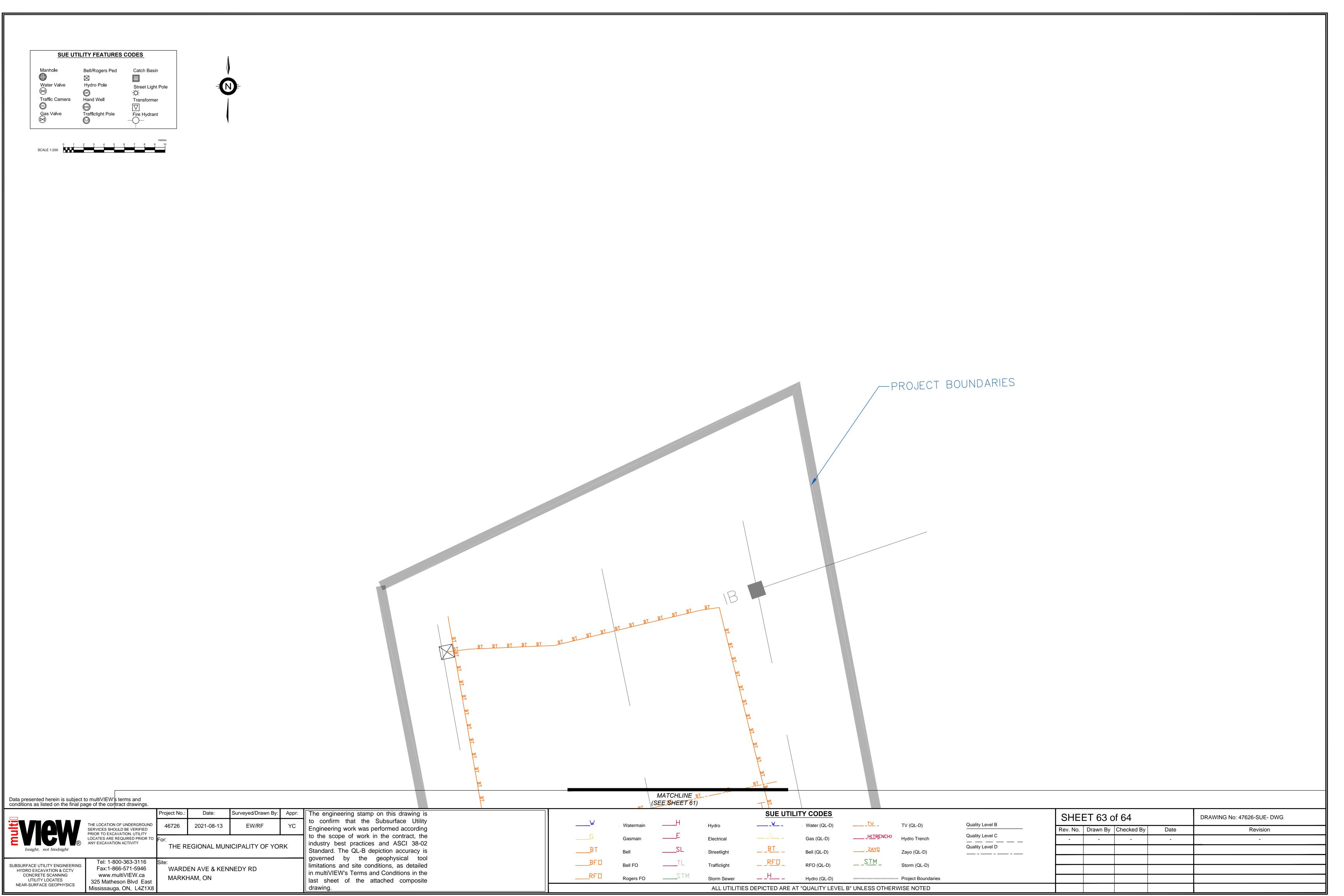


All the available records are showing no Sewers infrastructure in this area MATCHLINE Data presented herein is subject to multiVIEW's terms and conditions as listed on the final page of the contract drawings. (SEE SHEET 59) Surveyed/Drawn By: Appr: The engineering stamp on this drawing is **SUE UTILITY CODES** SHEET 60 of 64 DRAWING No: 47626-SUE- DWG to confirm that the Subsurface Utility THE LOCATION OF UNDERGROUND SERVICES SHOULD BE VERIFIED PRIOR TO EXCAVATION. UTILITY LOCATES ARE REQUIRED PRIOR TO ANY EXCAVATION ACTIVITY

46
For: Quality Level B 2021-08-13 Engineering work was performed according Rev. No. | Drawn By | Checked By | Revision to the scope of work in the contract, the industry best practices and ASCI 38-02 THE REGIONAL MUNICIPALITY OF YORK Quality Level D Standard. The QL-B depiction accuracy is _____ governed by the geophysical tool Tel: 1-800-363-3116 Site Fax:1-866-571-5946 SUBSURFACE UTILITY ENGINEERING
HYDRO EXCAVATION & CCTV
CONCRETE SCANNING limitations and site conditions, as detailed WARDEN AVE & KENNEDY RD in multiVIEW's Terms and Conditions in the www.multiVIEW.ca MARKHAM, ON UTILITY LOCATES
NEAR-SURFACE GEOPHYSICS last sheet of the attached composite 325 Matheson Blvd East Mississauga, ON, L4Z1X8 ALL UTILITIES DEPICTED ARE AT "QUALITY LEVEL B" UNLESS OTHERWISE NOTED







Technical Limitations

- 1. Throughout this schedule, "multiVIEW" is the corporate entity multiVIEW Locates Inc.
- 2. Pipe, cable, conduit, rebar, post-tension cables, anchors, containers, vaults, tanks and similar objects that are buried under the ground or embedded within a structure are referred to in multiVIEW's terms and conditions as Buried Assets
- 3. Subsurface conditions such as depth to bedrock, change in soil type, presence of karst, voids, contaminated soil or ground water, residual construction or industrial debris or buried waste are referred to in multiVIEW's terms and conditions as Buried Liabilities.
- 4. The Client acknowledges that the laws of fundamental physics apply and acknowledge that sensing instruments can not detect all Buried Assets and Buried Assets and Buried Liabilities which are detectable by properly deployed and operated instruments are termed Locatable Buried Assets and Locatable Buried Liabilities. Buried Assets and Bur Unlocatable Buried Liabilities. multiVIEW follows industry best-practice procedures but is not responsible for determining the presence and location of Unlocatable Buried Assets or Unlocatable Buried Liabilities.
- 5. Instruments to locate Buried Assets use a variety of approaches to detect and infer the location of the Buried Assets. Standard pipe and cable locating instruments detect the magnetic fields associated with electrical current flowing in the Buried Asset. GPR (Ground Penetrating radar) techniques depend on the transmission of radio waves into the host material and detection of waves reflected back from the Buried Assets. Sonding methods require insertion of a source of magnetic field into the pipe or conduit and detection of the magnetic field created by source at the surface of the Work Area to locate the sonde position. For the purposes of this estimate, Locatable Buried Assets are normally characterized as:
 - a. metallic pipes, cables and conduits that are capable of carrying an electrical current and that can be physically accessed to allow an energizing current source to create an electrical current in the Buried Asset of sufficient magnitude as to be detectable by standard locating instruments;
 - b. metallic pipes, cables and conduits that actively carry an identifiable electric current that is sufficiently large and has suitable frequency as to be detectable by standard locating instruments;
 - c. metallic and non-metallic pipes, cables, conduits, rods, bars, wires, voids, and inclusions that represent a substantive electrical contrast to the host material and are embedded in a host material transparent to radio waves such that radio waves reflected from the feature are detectable by a GPR instrument;
 - d. non-metallic pipes, cables and conduits (i.e. composed of plastic, concrete, asbestos, clay, etc.) which have continuous associated tracer wire capable of carrying an electric current and that can be physically accessed to allow an energizing current source to create an electrical current in the tracer wire of sufficient magnitude as to be detectable by standard cable locating instruments;
 - e. non-metallic pipes, cables and conduits which have continuous associated tracer wire capable of carrying an electrical current of sufficient magnitude and suitable frequency as to be detectable by standard cable locating instruments;
 - f. open pipe and conduits that can be accessed by a sonde and are sufficiently shallow to permit detectable magnetic fields to be sensed at the surface of the Work Area;

Examples of Unlocatable Buried Assets include, but are not limited to, the following:

- g. pipes, cables and conduits whose depth of burial is too great to create and/or overlain by or in proximity to metallic material which results in signal distortion thus preventing physically measurable signals at the surface or where burial material interferes with current generation and signal emissions;
- h. normally Locatable Buried Assets situated in, or emerging from, an area which is an Inaccessible Area;
- i. normally Locatable Buried Assets with a break or breaks to the electrical continuity of any metallic pipe, cable or tracer wire (i.e. segmented lengths, corroded connections, sections of plastic repair, etc.);
- j. non-metallic pipe, cable and conduits which do not have a continuous and/or accessible associated tracer wire;
- k. the host material is opaque to radio waves;
- I. Buried Assets that are normally characterized as Locatable become Unlocatable when either ambient interfering electromagnetic fields or the material surrounding and/or above the Buried Asset disrupt the energizing current or the normal operation of the sensing instrument.
- 6. Instruments used to locate Buried Liabilities use a variety of approaches to detect and infer the location of the Buried Liability. Magnetometers detect the distortion in the local magnetic field induced by the presence of some types of Buried Liabilities. GPR (Ground
- Penetrating radar) techniques depend on the transmission of radio waves into the host material and detection of waves reflected back from the Buried Liability. In some cases the lack of reflected GPR signal can be a Buried Liability indicator. Electromagnetic induction methods use electromagnetic induction to induce current flow in the subsurface and detect the resulting magnetic fields that are associated with these induced currents to identify Buried Liabilities. Electrical resistivity measurements use direct connect to pass current through host material and map out distortions in the current flow to indicate changes in the subsurface that may indicate the presence of Buried Liabilities. For the purposes of this estimate, Locatable Buried Liabilities are normally characterized as those features that will create a discernable change to the response of the measuring instrument and which differ in character from the background surrounding environment (that is, the features create an Anomalous Response) when industry best practices are followed.
- 7. The Client acknowledges that the laws of fundamental physics apply and that equipment is subject to measurement distortions that are site specific resulting in limited precision when determining positional coordinates. multiVIEW will use best-practice procedures but is not responsible for determining the location of Buried Assets or Buried Liabilities to an accuracy better that what is typical of normal locate instruments.
- 8. Determination of type composition, depth or size of the Buried Assets or Buried Liabilities is not possible and does not constitute part of this service. Identification of the type (i.e. gas, electric, communications, etc) of a specific Buried Asset is not technically possible except by visual surface appurtenance or excavation and visual exposure of the Buried Asset. Inferences that may be drawn by correlation with records and as-built drawings may be offered but such inferences are provided on a best effort basis with no guarantee of
- 9. Client acknowledges the critical nature of having access to energize Buried Assets to enable locating and assumes full responsibility for identifying and provision of licensed plumbing, electrical or confined space entry personnel if required and which adhere to multiVIEW health and safety procedures) to any and all points necessary for the energization of the Buried Assets. multiVIEW accepts no responsibility for locating any Buried Asset for which access and/or appropriate workplace safety measures are not provided.
- Individual Locatable Buried Assets are deemed Unlocatable Buried Assets where there are numerous Buried Assets clustered together either vertically and/or horizontally ("Clustered Utilities") making identification of individual elements physically impossible. multiVIEW is not responsible for identifying the individual Buried Assets in such situations.
- 11. Non-metallic pipe and cable (i.e. fibre-optic systems, etc.) are Unlocatable Buried Assets for standard cable locating instruments unless either an unbroken tracer wire or continuous metallic sheathing surrounding such buried plant is easily accessible from the surface. The Client must provide direct and simple access to every traceable wire or continuous metallic sheathing. Otherwise, multiVIEW accepts neither liability nor responsibility for locating such features since they are deemed Unlocatable
- 12. Non-metallic pipe and conduits (i.e. plastic, concrete, asbestos, clay, etc.) under pressure (i.e. water, gas, forcemain systems, etc.) are Unlocatable Buried Assets for standard cable locating instruments unless an unbroken tracer wire is attached to the pipe and this tracer wire is easily accessible from the surface. The Client must provide direct and simple access to every traceable wire.
- 13. Non-pressurized, non-metallic (i.e. plastic, concrete, asbestos, clay, etc.) conduits or pipe (i.e. sewers, drains, empty ducts, etc.) are Unlocatable Buried Assets unless a transmitting sonde can be inserted throughout the full length of the pipe or conduit. It is the responsibility of the Client to identify and provide direct access (including provision of licensed plumbing, electrical or confined space entry personnel if required) to any and all access points for such lines. multiVIEW accepts no responsibility for locating such lines where the Client does not provide access and/or appropriate workplace safety measures.
- 14. Any Buried Asset incapable of generating a reflected radar wave detectable by a GPR instrument is an Unlocatable Buried Assets.

Project No.:

46726

- 15. All or part of a Work Area is defined as an Inaccessible Area when inaccessible for surveying Inaccessible Areas include the following: those covered by a structure or object (i.e. buildings, vehicles, debris, stockpiled snow, building materials, etc.); those covered by open water; those covered by woods, vegetation, or snow too thick to permit easy walking; those where the surface terrain slopes steeper than 1:2; those covered by snow; and, those where the safety of the operator is jeopardized (i.e. unstable footing, environmental hazards, uncontrolled roads, etc.). The final decision for defining an area as an Inaccessible Area rests with the multiVIEW Health & Safety Officer
- 16. Utility data depicted on QL-D CAD lines are derived via utility owners record data and shown only for reference.

LOCATION OF UNDERGROUND

Liability Limitations

- 1. azLocation and mapping services, marks, reports and results provided by multiVIEW cannot substitute as a legally defined Buried Asset location in jurisdiction where government regulation dictates that the Buried Asset owner is solely responsible for identifying and locating their own Buried Assets. In cases where multiVIEW is legally authorized to act on behalf of the Buried Asset owner to locate the owner's Buried Assets, any results provided by multiVIEW will clearly identify that the Buried Asset location is legally authorized on all records, documents, and reports.
- 2. multiVIEW's markings of Buried Asset or Buried Liability locations are provided as information to be input into the Client's decision making process and the provision of this information does not relieve the Client, or any other person, party, or corporation, from liability for damages for personal injury including death, or for property damage or liability caused to or from any Buried Asset or Buried Liability, within the Work Area.
- 3. Cables carrying DC voltages and/or small diameter cables (i.e. fire alarm or security systems, remote signal cables, inaccessible tracer wire, perfectly balanced AC cables, etc.) can only be detected by methods which create electrical currents and signals in the cables. Where a sensitive or dangerous connection is involved, the Client must provide qualified personnel to isolate and enable direct access to these systems. The Client is responsible for defining the impact of locating signals on sensitive electronics. multiVIEW accepts no responsibility for any damage to plant, or any third party, caused by locating signals. Technical information about locating signals is available from multiVIEW upon request.
- 4. multiVIEW is not liable for damages resulting from physical exposure of any Buried Assets or Buried Liability by the Client, its representatives, their sub-contractors or any other person or corporation.
- 5. multiVIEW will not accept any liability regarding inaccurate estimates of utility depth secured only by electronic means since multiVIEW recommends exposure of any such issues by vacuum excavating if any such depth information is critical to the design, engineering or construction of subsequent infrastructure.
- 6. multiVIEW accepts no responsibility and is not liable for damages suffered by any third party as a result of decisions or actions based on the performance of the statement of work by multiVIEW.
- 7. multiVIEW accepts no responsibility and is not liable for conduit blockage, or restoration of the site to pre-survey conditions, as a result of survey practices needed to fulfill the objectives of the Service provided.
- 8. The completeness of work carried out by multiVIEW is based on information provided by the Client at or prior to the earlier of the time of issuance of this Estimate. If the scope work or size and/or extent of the Work Area changes, a signed Change Order must be issued so that scope of work can be adjusted to address Client requirement changes. Documents and maps provided by multiVIEW are the definitive means legally defining the extent of the Work Area investigated.
- 9. multiVIEW accepts no responsibility for locating Buried Assets or Buried Liabilities outside the limit of the Work Area or in the Inaccessible Areas.
- 10.Except as written in this contract, multiVIEW disclaims any and all promises, representations, warranties and covenants, express, implied, statutory or otherwise.
- 11.multiVIEW shall not be liable for any amount in excess of the fees paid by the Client to multiVIEW for the work described in this estimate on account of any loss, injury, death, or damage whether resulting directly or indirectly to a person or property irrespective of the cause or origin of such loss, injury, death or damage including, without limitation, loss, injury, death or damage attributable to the negligence of multiVIEW, its employees and agents in the performance or non-performance of the Service.
- 12.In any action, claim, loss or damage arising out of the work for which this estimate is provided, the Client agrees that multiVIEW Locates Inc.'s liability will be 'several' and not 'joint and several' and the Client may only claim payment from multiVIEW Locates Inc of multiVIEW Locates Inc.'s proportionate share of the total liability based on degree of fault. Any action against multiVIEW Locates Inc must be commenced on or before the date which is the earlier of: i) eighteen months from the date on which the work in this estimate is completed and, ii) the date by which an action must be commenced under any applicable legislation other than limitation legislation. In no event shall multiVIEW Locates Inc be liable to the Client whether the claim be in tort, contract or otherwise, for an amount in excess of the fees paid by the Company for the services work provided. In no event shall multiVIEW Locates Inc be liable to the Client, whether a claim be in tort, contract or otherwise for any consequential, indirect, lost profit or similar damages, or failure to realize expected savings. multiVIEW Locates Inc will use all reasonable efforts to complete within any agreed upon timeframe the performance of the services described herein; however, multiVIEW Locates Inc shall not be liable for failures or delays in performance that arise from causes beyond its control, including the untimely performance or non-performance by the Client of its obligations.



UTILITY LOCATES

NEAR-SURFACE GEOPHYSICS

VICES SHOULD BE VERIFIED OR TO EXCAVATION. UTILITY CATES ARE REQUIRED PRIOR TO Y EXCAVATION ACTIVITY Tel: 1-800-363-3116 UBSURFACE UTILITY ENGINEERING HYDRO EXCAVATION & CCTV CONCRETE SCANNING

Fax:1-866-571-5946 WARDEN AVE & KENNEDY RD, MARKHAM, ON www.multiVIEW.ca **TERMS & CONDITIONS** 325 Matheson Blvd East Mississauga, ON, L4Z1X8

Date:

2021-08-13

THE REGIONAL MUNICIPALITY OF YORK

Surveyed/Drawn By: Checked

EW/RF

SHEET 64 of 64 Rev. No. | Drawn By | Checked By Revision