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HISTORICAL ABANDONED GAS WELL INVESTIGATION

AND

REGULATORY COMPLIANCE REVIEW

At

**0TH FORKS ROAD
PORT COLBORNE, ON**

**PREPARED:
XUE JU (JACK) ZHENG
2789475 ONTARIO INC.**

April 15, 2026

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1 Introduction

This report presents a review of historical gas well records and a King EPCM site visit in year 2025 field reconnaissance undertaken to confirm the presence, condition, and potential environmental risk associated with legacy gas wells within the subject property at 0th Forks Rd, Port Colborne, ON (LOT#25, Welland).

The objective of this study is to assess whether abandoned wells pose any constraint or hazard to future site development and to evaluate the findings in the context of applicable Ontario regulatory requirements, including the **Oil, Gas and Salt Resources Act (OGSRA)** administered by the **Ministry of Natural Resources and Forestry (MNRF)**.

2 Regulatory Framework

2.1 Oil, Gas and Salt Resources Act (OGSRA)

The OGSRA governs:

- Drilling, operation, and abandonment of oil and gas wells in Ontario
- Requirements for well plugging and sealing
- Protection of groundwater and surface environment
- Maintenance of well records within the provincial registry (MNRF Oil, Gas and Salt Resources Library).

2.2 Ministry of Natural Resources and Forestry (MNRF)

MNRF maintains:

- Historical well database and licensing records
- Abandonment records for legacy wells
- Technical guidance on well integrity and public safety considerations

2.3 Legacy Well Considerations (Pre-modern Standards)

Wells drilled between 1900–1960s were commonly abandoned using:

- Portland cement plugs at multiple depths
- Mechanical bridge supports (wood/stone or early bridge plugs)
- Surface casing cut and site reconditioning

Modern verification methods (e.g., cement bond logs, pressure testing, methane monitoring) were not consistently available at that time; therefore, legacy wells are assessed using a combination of historical records and field verification.

3 Historical Well Records

Three abandoned gas wells were identified in the MNRF registry within or near the property at 0th Forks Road, Port Colborne. This three abandoned wall information is as follows:

- F014843 Gas well is located at this property Lot#25, remaining gas well at surrounding property.

Data Category	Well F014843	Well F014849	Well F014857	Well F014989
Well Name	Montreal & Welland Land Co.	Consumer's No. 4389	Sterling Gas Co. M. Roxell	Alex Zinker No. 1
Operator	Sterling Gas Company Ltd.	St. Lawrence Seaway	Dominion Natural Gas Co.	Provincial Natural Gas & Fuel
Well Type / Status	Natural Gas Well – Abandoned	Location Well – Abandoned	Location Well – Abandoned	Location Well – Abandoned
Plugging Date	Not Available	June 27, 1967	December 12, 1931	December 12, 1931
Plugging Contractor	Not Available	R. McPherson	Dominion Natural Gas	Dominion Natural Gas
Primary Plugging Materials	Not Available	Cement, drilling mud, and lead plug	Sand, clay, cement, and stone	Sand, clay, cement, and stone
Plug Depth #1	Not Available	573 ft (lead and cement plug)	584 ft (clay and cement)	584 ft (clay and cement)
Plug Depth #2	Not Available	460 ft (cement plug)	564 ft (clay and cement)	564 ft (clay and cement)
Plug Depth #3	Not Available	Surface (cement plug)	554 ft (clay and cement)	554 ft (clay and cement)
Casing Removal / Treatment	Not Available	All 8 in. and 5½ in. casing removed	Not specified	Drive pipe cut approximately 0.9 m (3 ft) below ground surface
Well Filling Method	Not Available	Bridge installation followed by mud infill	Bottom-up placement of sand fill	Bottom-up placement of sand fill

- **Documented Abandonment Methods (Reviewed Wells)**

Based on available MNRF records for the reviewed wells (F014843, F014849, F014857, and F014989), the following abandonment methods were identified:

- As of lake of information about gas well F014843, not enough information about the decommission and decommissioning year.
- Use of multi-material plugging systems, including cement, sand, clay, stone, and, in some cases, lead plugs

- Implementation of multi-stage sealing at various depths (where records are available), including intermediate and upper-level plugs
- Application of bridge and mud fill techniques in certain wells to support plug placement
- Use of bottom-up fill methods (particularly for older wells), involving progressive placement of sealing materials from the base upward
- Partial or full removal of casing, or cutting of drive pipe below ground surface (approximately 3 ft), followed by site restoration

4 Field Investigation Findings

King EPCM have been conducted site visit on October 1, 2025. A site reconnaissance was conducted covering the subject property and a **100 m radius buffer zone** around historical well locations.

Field Observations

- No visible wellheads, casing stubs, vents, or markers were observed
- No evidence of localized subsidence or soil disturbance
- No indications of gas venting (odour, bubbling, or stressed vegetation)
- Area conditions appear stable and consistent with long-term surface redevelopment

Gas Well Location (Ontario Petroleum, oil, gas and salt resources Library)

As shown in the figure provided in the Appendix I, all identified gas wells in the vicinity of the proposed development are located at a minimum distance of approximately 350 m or more from the subject site.

An exception is gas well F014843, for which a record of decommissioning is not available in either online databases or on-site physical records. However, this well is also situated more than 350 m away from the proposed development area.

Based on the available information and the significant separation distance, no adverse impacts are anticipated on the proposed shallow foundation system or construction activities.

5 Engineering interpretation

5.1 Surface Condition Assessment

The absence of visible infrastructure indicates that:

- Surrounding wells were likely properly abandoned and restored in accordance with practices of their time.
- No surface evidence of the on-site well (F014843) was identified.
- A 100 m radius around the mapped location was investigated with no detectable indication of the well.
- It is likely that the well has been buried or obscured due to long-term grading and site development.

5.2 Subsurface Integrity Considerations

Based on historical records:

- Cement plugging was installed at multiple depths to isolate producing zones
- Surface plugs provide a barrier against upward migration pathways
- However, no modern verification data (e.g., cement bond logs, pressure testing, or gas migration monitoring) is available.

6 Risk Assessment

6.1 Potential Risks Considered

- Limited data of decommission of gas well F014843
- Methane migration through degraded cement or casing corrosion
- Preferential pathways along legacy wellbore
- Groundwater interaction with abandoned well structures

6.2 Observed Field Conditions

- No surface indicators of gas migration were identified
- No subsidence or instability features were observed
- Site conditions are consistent with stable post-development land use

6.3 Risk Conclusion

Based on the available evidence, the risk associated with legacy wells at surface level is considered low. However, subsurface uncertainty remains due to the lack of available abandonment records for gas well F014843 and the inability to physically locate the well during site reconnaissance.

Notwithstanding the above, gas well F014843 is located at a minimum distance of approximately 350 m from the proposed development area. Given this separation distance, no adverse effects are anticipated on the proposed building construction or shallow foundation system. It is also noted that the proposed design does not include a basement, which further limits potential interaction with deeper subsurface conditions.

7 Subsurface Gas Testing Methods

To assess subsurface gas conditions, gas concentrations should be evaluated at appropriate depths to determine whether any migration or leakage is occurring from historical abandoned gas wells. This assessment is required to support development planning and to demonstrate due diligence in accordance with the intent of the Ministry of Natural Resources and Forestry (MNRF) guidance and the Ontario Oil, Gas and Salt Resources Act (OGSRA) framework.

The following methods may be applied:

- Soil gas probe sampling: Measurement of methane (CH₄) and carbon dioxide (CO₂) concentrations in the shallow subsurface to identify potential gas migration pathways.
 - Groundwater sampling: Assessment of dissolved methane and relevant groundwater chemistry parameters to evaluate deeper subsurface gas presence and migration potential.
-

- Flux chamber testing: Measurement of gas flux at the ground surface to determine whether subsurface gases are actively migrating to surface conditions.

At a minimum, one appropriate method should be implemented to establish current baseline subsurface gas conditions at the property and to confirm that no active gas migration risk is present associated with historical abandoned wells.

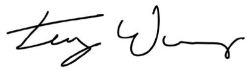
8 Conclusions

- Based on available historical records, Ministry of Natural Resources and Forestry (MNRF) well registry information, and 2025 field reconnaissance, no abandoned gas wells or associated surface infrastructure were identified within the subject property or within approximately 100 m of the mapped well locations.
- Historical records indicate that the identified wells were reportedly abandoned between 1931 and 1967 using practices consistent with standard methods at the time, including cement plugging, surface sealing, casing removal below grade, and site restoration.
- Field observations indicate generally stable ground conditions, with no visible evidence of wellheads, casing remnants, subsidence, or surface indicators of gas migration.
- It is recommended that subsurface gas testing be undertaken to confirm current ground gas conditions, given that subsurface well integrity cannot be verified through visual inspection alone and no modern abandonment verification records are available for these legacy wells, including Well F014843.
- Based on Ontario Petroleum Oil, Gas and Salt Resource information, the nearest identified gas well (Well F014843) is located approximately 350 m from the proposed development area. No direct impact to the proposed development is anticipated at this separation distance. The proposed design does not include a basement, which further reduces potential exposure to subsurface gas migration pathways.
- A potable water supply well is present on the property and is located approximately 400 m from Well F014843. No interaction between the gas well and the water supply well is anticipated based on the available separation distance and site conditions.
- It is recommended that water from the on-site water well be tested in accordance with Ontario Drinking Water Quality Standards (O. Reg. 169/03 under the Safe Drinking Water Act, 2002) to confirm continued compliance and to ensure that potable water quality is maintained. Based on the available information, no adverse impacts from the identified gas well are anticipated, and no effects on groundwater quality at the on-site drinking water well are expected given the site conditions and separation distance.

9 Closing

King EPCM believe that the information provided meets your current requirements. However, if you need further details or assistance, King EPCM are more than willing to review the contents of this report in greater depth. Please feel free to reach out to our office if you require additional services or support in this matter.

Reviewed by,



Tony Wang, P. Eng
Principal Engineer
King EPCM



APPENDIX I: GAS WELL LOCATED AT PROPERTY

0th Forks Rd

Write a description for your map.

Legend

 F014873

 Line Measure

 Property Boundary



**0TH FORK ROAD, LOT 23 TO 25,
PORT COLBORNE, ON.**

Sheet List	
A-000	Cover Page
A-001	Site Plan
A-101	Ground & First Floor Plan
A-201	Elevations
A-301	Section



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KEY MAP

TAES Architects Inc.

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XUE JU (JACK) ZHENG

INDUSTRIAL DEVELOPMENT

0TH FORK ROAD, LOTS 23 TO 25
PORT COLBORNE

Project No. T2023027

Drawn	Scale
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Checked	Date	2023-06-06
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Cover Page

Drawing No.

A-000

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PORT COLBORNE

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Drawing No.

A-101



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Drawing No.

A-201

1 FRONT ELEVATION
A-201 SCALE: 1:50

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0TH FORK ROAD, LOTS 23 TO 25
PORT COLBORNE

Drawing No.



Appendix II – GAS WELL RECORDS – F014843



Search

[Advanced Search](#) - [Well Location Map](#) - [Ontario Petroleum KMZ](#)

Results for F014843 ([Printable View](#))

- Well Card
- More...
- Plugging Record
- Production Records
- Geophysical Logs
- Fluid Analyses
- Scans

LICENCE #: F014843

WELLNAME: Montreal & Welland Land Co.

OPERATOR: Sterling Gas Company Ltd.

CTY: Welland

TWP: Humberstone

LOT: 25

CON: IV

LE BLOCK:

LE TRACT:

WELL TYPE: Natural Gas Well

CLASS: DEV

WELL MODE: Abandoned Well

TARGET:

TD FORM:



DRILLING DATA	DATES	COORDINATES	SAMPLES
RIG TYPE:	LIC. ISSUED:	N/S BOUNDARY: 473.09 N	TRAY:
GRND ELEV: 180.26	SPUD DATE:	E/W BOUNDARY: 89.22 W	
KB ELEV: 180.56	TD DATE: 1908-03-01	NAD 83	POOL
TVD: 191.72	CMP DATE:	SUR LAT: 42.93307833	Welland Pool
PBTD:	WO DATE:	SUR LONG: -79.23585333	
	PLUG DATE:	BOT LAT: 42.93307833	
		BOT LONG: -79.23585333	
LOCATION COMMENTS			

DATE	ACCURACY	METHOD OBTAINED
	Within 200 metres	Well Records (pre 1921)

INITIAL GAS RECORD - (0)

Member Content

User name:

Password:

Appendix III – GAS WELL RECORS – F014849



2025

Search

[Advanced Search](#) - [Well Location Map](#) - [Ontario Petroleum KMZ](#)

Results for F014849 ([Printable View](#))

- Well Card
- More...
- Plugging Record
- Production Records
- Geophysical Logs
- Fluid Analyses
- Scans

LICENCE #: F014849

WELLNAME: Consumer's #4389 St. Lawrence Seaway

OPERATOR: Unknown

CTY: Welland

LOT: 24

LE BLOCK:

WELL TYPE: Location

WELL MODE: Abandoned Well

TWP: Humberstone

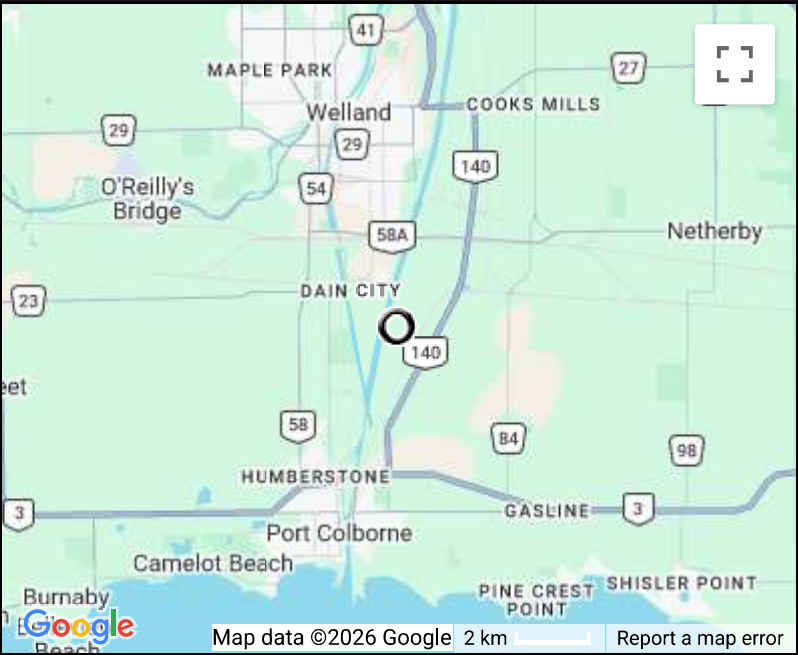
CON: IV

LE TRACT:

CLASS:

TARGET:

TD FORM:



DRILLING DATA	DATES	COORDINATES	SAMPLES
RIG TYPE:	LIC. ISSUED:	N/S BOUNDARY: 1010.41 N	TRAY:
GRND ELEV: 179.22	SPUD DATE:	E/W BOUNDARY: 122.97 W	
KB ELEV: 179.52	TD DATE:	NAD 83	POOL
TVD:	CMP DATE:	SUR LAT: 42.93792389	
PBTD:	WO DATE:	SUR LONG: -79.23108444	
	PLUG DATE: 1967-06-27	BOT LAT: 42.93792389	
		BOT LONG: -79.23108444	
LOCATION COMMENTS			

DATE	ACCURACY	METHOD OBTAINED
	Within 20 metres	Well Records (1954 to 1997)

INITIAL GAS RECORD - (0)

Member Content

User name:

Password:

Results for F014849

Well Card

More...

Plugging Record

Production Records

Geophysical Logs

Fluid Analyses

Core Analyses

Scans

Plugging Record Located:

PLUG CONTRACTOR	PLUG DATES	PLUG BACK DATES	DRIFT THICKNESS
The Consumers' Gas Company (James Drilling)	START DATE: Jun 19, 1967 END DATE: Jun 27, 1967	START DATE: END DATE:	m
PLUGGING NOTES			

Removed plugs to 525' and attempted to drill out bridge of cement, stone and steel without success. Tripped in open end tubing to 536' and circulated 9 sacks of 14.6#/gal cement slurry to plug interval from 536' to 486'. Tripped out open end tubing and set wood and stone bridge at 150'. Tripped in to bridge with open end tubing and circulated 45 sacks of 14.6#/gal cement slurry to plug interval from 150' to 0'. Tripped out open tubing and cut off drive pipe 3' below ground level and reconditioned well site.

PLUG NO.	TOP DEPTH (m)	BASE DEPTH (m)	CEMENT AMOUNT	CEMENT TYPE
1	148.13	163.37	9 sacks	
2	0.00	45.72	45 sacks	

Appendix IV – GAS WELL RECORDS – F014857



Search

[Advanced Search](#) - [Well Location Map](#) - [Ontario Petroleum KMZ](#)

Results for F014857 ([Printable View](#))

- Well Card
- More...
- Plugging Record
- Production Records
- Geophysical Logs
- Fluid Analyses
- Scans

LICENCE #: F014857

WELLNAME: Sterling Gas Co. M. Roxell

OPERATOR: Dominion Natural Gas Co. Ltd.

CTY: Welland

TWP: Humberstone

LOT: 23

CON: IV

LE BLOCK:

LE TRACT:

WELL TYPE: Location

CLASS:

WELL MODE: Abandoned Well

TARGET: CLI

TD FORM:



DRILLING DATA	DATES	COORDINATES	SAMPLES
RIG TYPE:	LIC. ISSUED:	N/S BOUNDARY: X	TRAY:
GRND ELEV:	SPUD DATE:	E/W BOUNDARY: X	
KB ELEV:	TD DATE: 1908-01-01	NAD 83	POOL
TVD: 238.05	CMP DATE:	SUR LAT: 42.93437111	Welland Pool
PBTD:	WO DATE:	SUR LONG: -79.22701694	
	PLUG DATE: 1931-12-12	BOT LAT: 42.93437111	
		BOT LONG: -79.22701694	

LOCATION COMMENTS		
DATE	ACCURACY	METHOD OBTAINED
2006-08-10	Unknown	Well Records (pre 1921)

INITIAL GAS RECORD - (0)

Member Content

User name:

Password:



Search

[Advanced Search](#) - [Well Location Map](#) - [Ontario Petroleum KMZ](#)

Results for F014857

- Well Card
- More...
- Plugging Record
- Production Records
- Geophysical Logs
- Fluid Analyses
- Core Analyses
- Scans

Plugging Record Located:

PLUG CONTRACTOR	PLUG DATES	PLUG BACK DATES	DRIFT THICKNESS
Dominion Natural Gas	START DATE: Dec 12, 1931 END DATE: Dec 12, 1931	START DATE: END DATE:	m
PLUGGING NOTES			

Filled from bottom with sand [to 1st plug at 584']
Hole filled with stone, clay and sand [from 3rd plug at 554' to surface]
*All plugs filled with clay and cement

PLUG NO.	TOP DEPTH (m)	BASE DEPTH (m)	CEMENT AMOUNT	CEMENT TYPE
1		584.00		
2		564.00		
3		554.00		

Appendix V – GAS WELL RECORS – F014989



Search

[Advanced Search](#) - [Well Location Map](#) - [Ontario Petroleum KMZ](#)

Results for F014989 ([Printable View](#))

- Well Card
- More...
- Plugging Record
- Production Records
- Geophysical Logs
- Fluid Analyses
- Scans

LICENCE #: F014989

WELLNAME: Dominion Natural Gas Co. Ltd. - Alex Zinker No. 1

OPERATOR: Provincial Natural Gas and Fuel Co.

CTY: WellandTWP: Humberstone

LOT: 23CON: IV

LE BLOCK:LE TRACT:

WELL TYPE: LocationCLASS: DEV

WELL MODE: Abandoned WellTARGET:

TD FORM:



DRILLING DATA	DATES	COORDINATES	SAMPLES
RIG TYPE:	LIC. ISSUED:	N/S BOUNDARY: 365.76 N	TRAY:
GRND ELEV: 175.32	SPUD DATE:	E/W BOUNDARY: 91.44 W	
KB ELEV: 175.62	TD DATE: 1931-01-01	NAD 83	POOL
TVD:	CMP DATE:	SUR LAT: 42.93220611	Welland Pool
PBTD:	WO DATE:	SUR LONG: -79.22564639	
	PLUG DATE: 1931-12-12	BOT LAT: 42.93220611	
		BOT LONG: -79.22564639	
LOCATION COMMENTS			

DATE	ACCURACY	METHOD OBTAINED
	Within 50 metres	Well Records (1921 to 1954)

INITIAL GAS RECORD - (0)

Member Content

User name:

Password:



2025

Search

[Advanced Search](#) - [Well Location Map](#) - [Ontario Petroleum KMZ](#)

Results for F014989

- Well Card
- More...
- Plugging Record
- Production Records
- Geophysical Logs
- Fluid Analyses
- Core Analyses
- Scans

Plugging Record Located:

PLUG CONTRACTOR	PLUG DATES	PLUG BACK DATES	DRIFT THICKNESS
Dominion Natural Gas Company	START DATE: Dec 12, 1931 END DATE: Dec 12, 1931	START DATE: END DATE:	m
PLUGGING NOTES			

Plug#1: 584' filled with clay and cement, filled from bottom with sand

Plug#2: 564 filled with clay and cement

Plug#3: 554' filled with clay and cement; hole filled with stone clay and sand.

Pole derrick used. Drive pipe could not be pulled so hole was cemented at rock and top of drive pipe cut off about 3' below ground, so that it will never interfere with cultivation.

PLUG NO.	TOP DEPTH (m)	BASE DEPTH (m)	CEMENT AMOUNT	CEMENT TYPE
1	178.00			
2	171.91			
3	168.86			