

Environmental Investigations at a Former Industrial Property



Outline

- Background
- Subject Property
- Scope of Work
- Challenges
- Summary

Background

- In late 2009/early 2010, XCG conducted a Supplemental Subsurface Investigation (Investigation) at a former industrial property in Guelph, Ontario for due diligence purposes in preparation for the purchase of the subject property.
- The purpose of the Investigation was to further investigate potential and confirmed environmental impairment issues previously identified in Phase I and II Environmental Site Assessment (ESA) reports previously completed for the subject site.

Subject Property

- The subject site historically manufactured farm equipment, tools, and freezers.
- Former W.C. Wood site in Guelph, Ontario.
- Manufactured and assembled freezers.
- Press shop fabricated the sheet metal liners, casings, and lids using heavy stamping machines.
- Units move along three main assembly lines.
- Cavity is filled with urethane foam in four foaming stations.

Subject Property

- Freezers liners and casings are finished in two electrostatic powder coating rooms.
- The assembled freezers are tested and packaged for storage in the warehouse.

Freezer Line



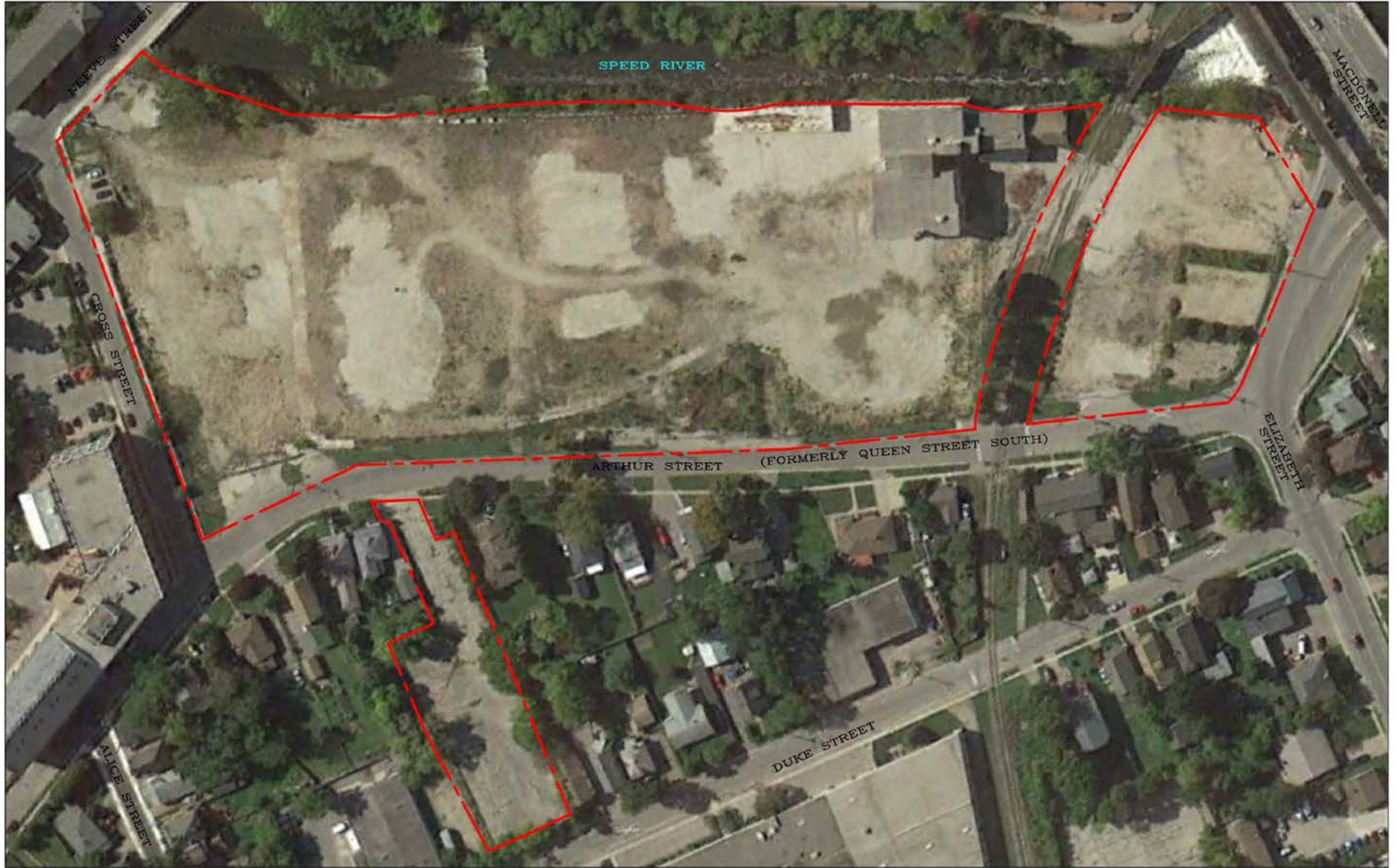
Finished Freezers



Structures

- Plant is on municipal water supply.
- Bounded on the west by the Speed River.
- Total of approximately 22 buildings.
- Reception, Offices, Cafeteria – 1850.
- Offices – 1920.
- Metal Fabrication, Warehouse, Machine Shop – 1940.
- Assembly, Finishing, Press Shop, Punch Presses – 1960s.
- Assembly, Warehouses – 1970s.





SPEED RIVER

NEREVE STREET

MACDONNELL STREET

CROSS STREET

ELIZABETH STREET

ARTHUR STREET

(FORMERLY QUEEN STREET SOUTH)

ALICE STREET

DUKE STREET

Historic Buildings



Historic Buildings



Subsurface Investigation

- Total of 41 boreholes advanced across the subject site.
- Nine boreholes instrumented as groundwater monitoring wells.
- Soil samples were collected from each borehole location and submitted for select chemical analyses.
- Metals, petroleum hydrocarbons (PHCs, Fractions F1 to F4), volatile organic compounds (VOCs), polynuclear aromatic hydrocarbons (PAHs), and/or polychlorinated biphenyls (PCBs).

Subsurface Investigation

- Existing and newly installed monitoring wells were developed and samples were collected for select chemical analysis of metals, PHCs (F1 to F4), VOCs, and/or PAHs.
- An initial remedial action plan considering residential and commercial uses was developed and EMPC proceeded with the purchase of the subject property.
- Demolition activities commenced at the subject property to remove the majority of the site structures.

Demolition Activities

- Several buildings in the north portion of the property were preserved, which were deemed to have cultural/historical/ architectural significance.
- The demolition activities included removal of the majority of the above-grade site structures, removal of the majority of the concrete floor slab of the former industrial facility, and removal of all subsurface features associated with the industrial activities (i.e. press pits, sumps, foundation walls, etc.).

Historical Building



Demolition Activities



Press Pits



Press Pits



Test Pit Program

- Following the demolition activities, a Test Pit Program (TP Program) was completed to further evaluate the soil quality across the subject site.
- A total of 63 test pits were excavated across the subject site on a 20-metre grid pattern.
- A Supplemental Groundwater Quality Investigation was also completed to further evaluate the shallow groundwater quality beneath the subject site.

Supplemental Investigation

- A total of 25 boreholes were advanced across the site (including three boreholes on the parking lot adjacent to the site, east of Arthur Street), all of which were instrumented as groundwater monitoring wells. Soil and groundwater samples were collected from each location and submitted for select chemical analysis of metals, PHCs (F1 to F4), VOCs, and/or PAHs.

Applicable Criteria

- The analytical results were compared to the Ontario Ministry of the Environment and Climate Change (MOECC)¹ in the document entitled "Soil, Ground Water, and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act," dated May 15, 2011 (2011 MOECC Standards).

¹ Previously also known as the Ministry of the Environment (MOE) and the Ministry of the Environment and Energy (MOEE).

Applicable Criteria

- Since the subject site is located adjacent to the Speed River (i.e. within 30 metres of a water body), XCG compared the results to both Table 2 (potable groundwater condition) and Table 8 (site located within 30 metres of a water body in a potable groundwater condition) soil and groundwater quality standards.

Soil Results

- Fill material was observed throughout the subject site, containing a varying percentage of foundry sand, slag material, brick fragments, metal, glass, and wood debris.
- Analytical data indicated that some areas of this fill also coincided with elevated concentrations of several metals and PAH parameters above the 2011 MOECC Table 2 and/or Table 8 soil quality standards.

Soil Results

- In addition, PHCs (F3 and F4) and several chlorinated volatile organic compounds (cVOCs) were detected at concentrations above the respective MOECC 2011 Table 2 and/or Table 8 soil quality standards.
- Based on the areal coverage of the testing locations across the site, the soil impacts across the site were delineated and figures illustrating the extent of the soil impacts were completed.

Groundwater Results

- Groundwater analytical results detected several VOCs, including trichloroethylene (TCE), tetrachloroethylene (PCE), 1,1,1-trichloroethane (TCA), and their associated degradation compounds, including 1,1-dichloroethane (DCA), 1,1-dichloroethylene (DCE), cis-1,2-DCE, and vinyl chloride (VC) above the applicable criteria.

Groundwater Results

- The analytical results indicate that the majority of the groundwater impacts were detected in the vicinity of the west property boundary, adjacent to the Speed River and close to the south property boundary.

Groundwater Results

- South of the subject site, other manufacturing industries were once present and these lands have been previously redeveloped for residential use. In the southeast corner of the subject site, elevated concentrations of PCE were detected, suggesting the presence of a possible off-site source of groundwater impact.

Preliminary Screening

- Preliminary screening level property-specific standards (PSS) for soil and groundwater located beyond the 30-metre set-back from the Speed River were developed.
- The preliminary screening level PSS were developed using the MOECC Modified Generic Risk Assessment (MGRA) Model (April 15, 2011 version), taking into account the planned site redevelopment as discussed below.

Risk Assessment

- A Risk Assessment (RA) was completed for the subject site, based on the results from the TP Program and Supplemental Groundwater Quality Investigation.
- Based on the results of the RA, revised PSS were developed for the subject site and a remedial action plan (RAP) was implemented to reduce the concentrations of on-site contaminants of concern (COCs) to levels below the RA-derived PSS.

Remedial Action Plan

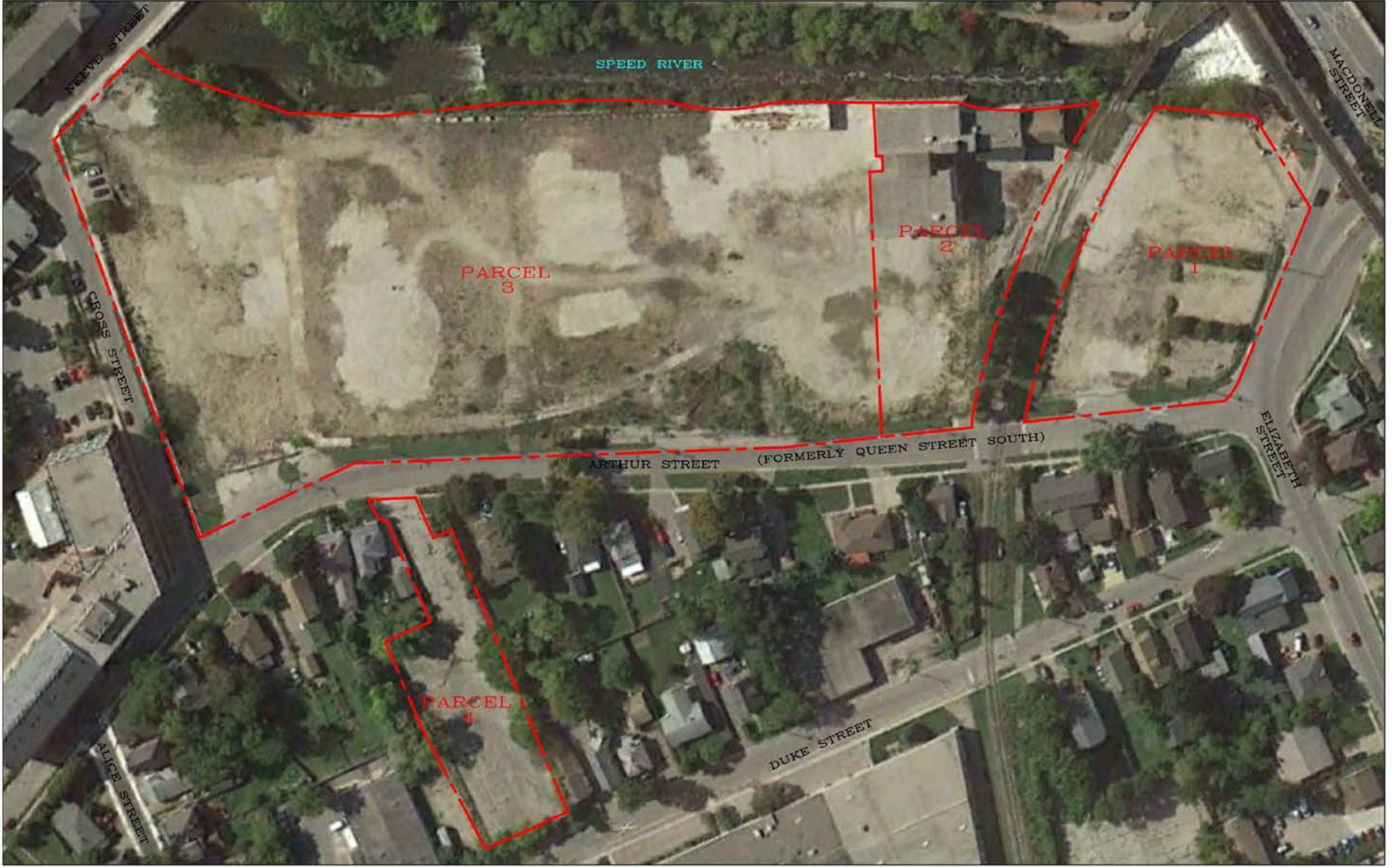
- Activities conducted under the RAP included the excavation and off-site disposal of impacted soil and in-situ treatment of VOC-impacted saturated soil and groundwater through emplacement of zero-valent iron (ZVI) at a depth below the water table. Confirmatory soil samples were collected in each area of remedial activities to ensure that all remaining in-situ soil contained concentrations of COCs below the RA-derived PSS.

Performance Monitoring

- Upon completion of the remedial activities, XCG completed a series of four quarterly groundwater sampling events to evaluate the groundwater quality at the subject site and confirm that all groundwater concentrations were below the RA-derived PSS.

Record of Site Condition

- XCG submitted all of the appropriate documentation in order to obtain a Record of Site Condition (RSC), which was required as part of the agreement of purchase and sale.
- As part of the RA approval and included in the RSC application process, a Certificate of Property Use (CPU) was issued for the subject site (Parcel 3).



SPEED RIVER

PARCEL 3

PARCEL 2

PARCEL 1

PARCEL 4

ARTHUR STREET

(FORMERLY QUEEN STREET SOUTH)

NEVILLE STREET

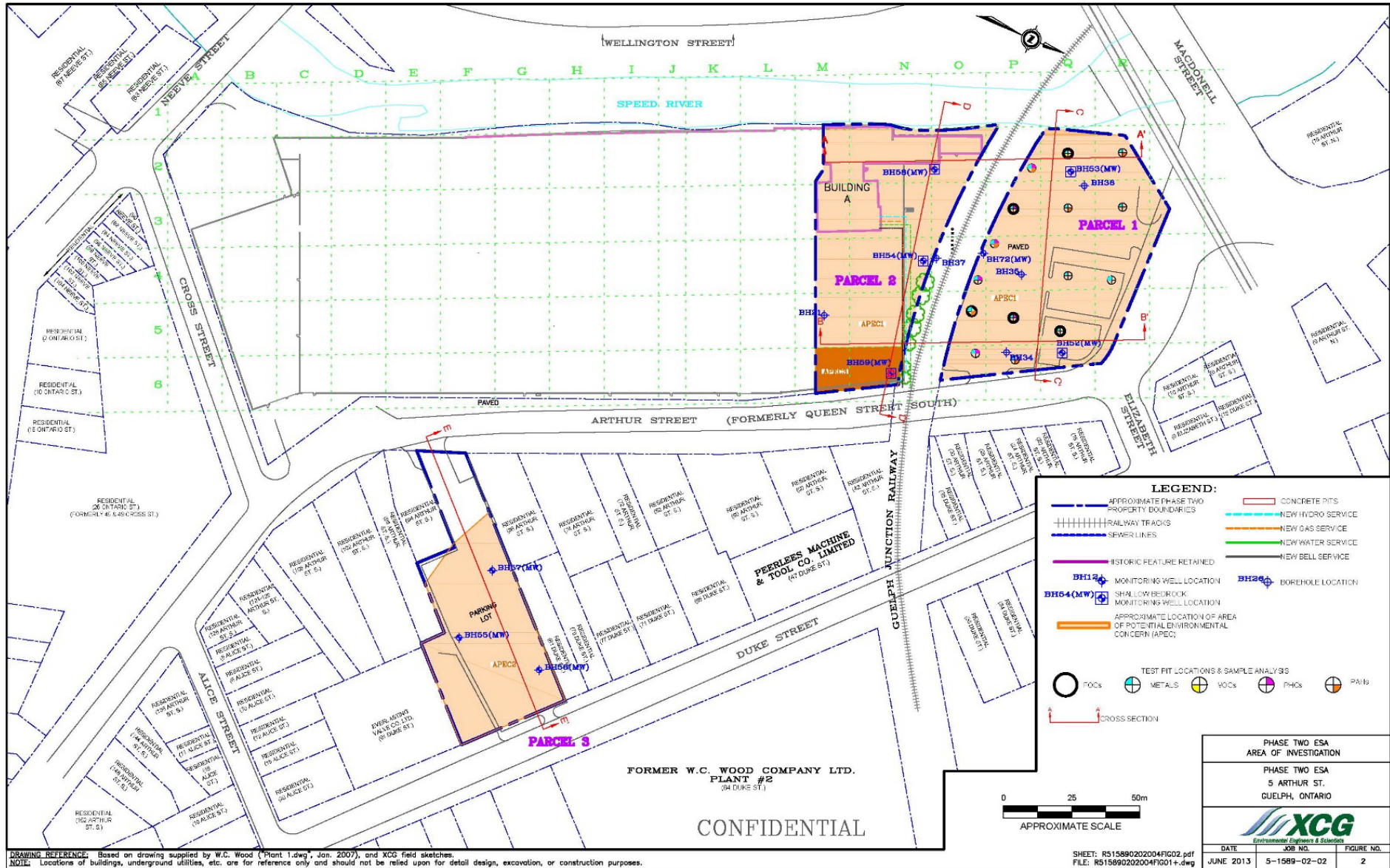
CROSS STREET

ALICE STREET

DUKE STREET

ELIZABETH STREET

MACDONNELL STREET

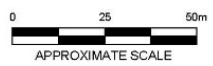


DRAWING REFERENCE: Based on drawing supplied by W.C. Wood ("Plant 1.dwg", Jan. 2007) and XCG field sketches.
 NOTE: Locations of buildings, underground utilities, etc. are for reference only and should not be relied upon for detail design, excavation, or construction purposes.

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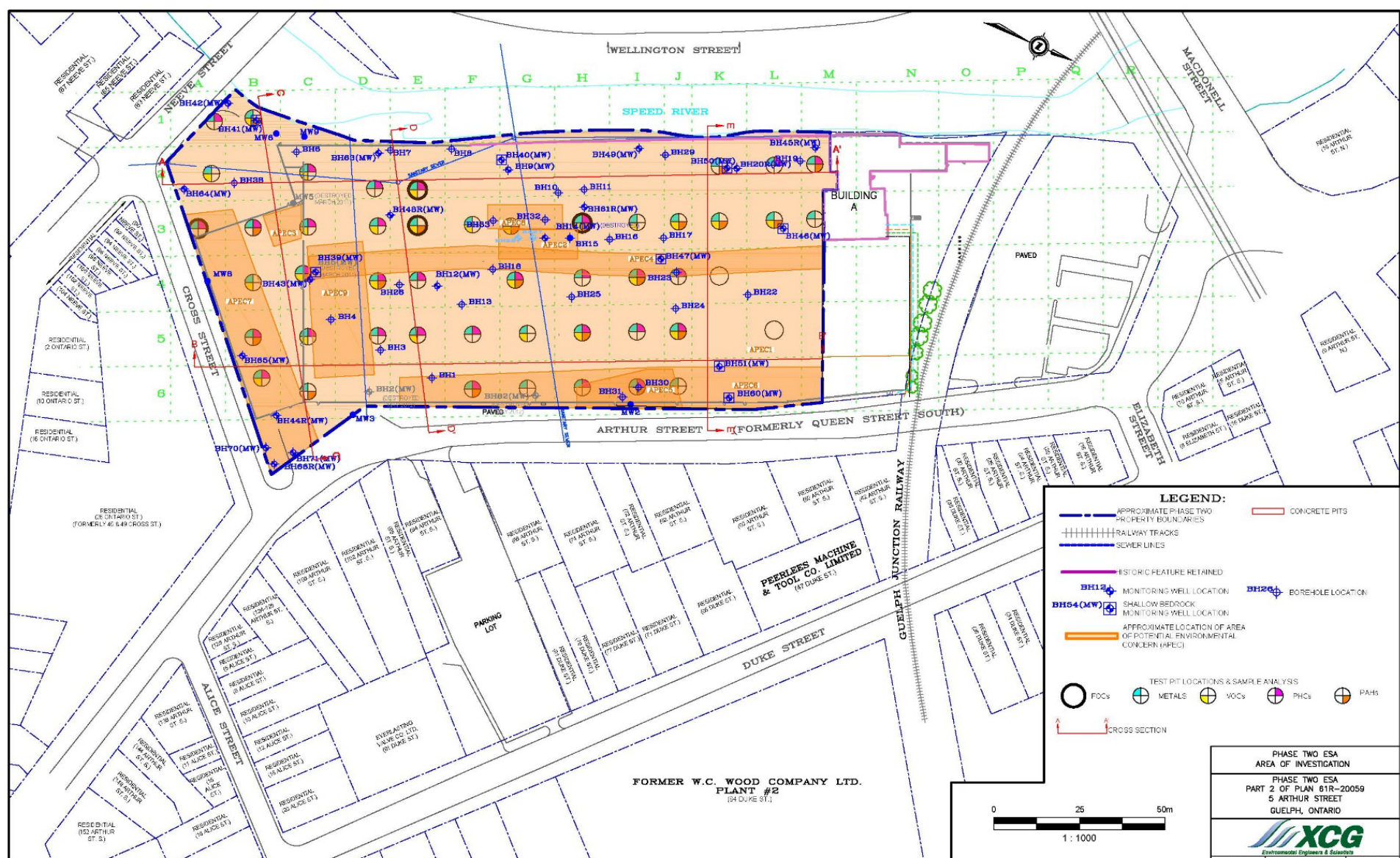
LEGEND:

- APPROXIMATE PHASE TWO PROPERTY BOUNDARIES
- CONCRETE PITS
- RAILWAY TRACKS
- NEW HYDRO SERVICE
- SEWER LINES
- NEW GAS SERVICE
- NEW WATER SERVICE
- HISTORIC FEATURE RETAINED
- NEW BELL SERVICE
- MONITORING WELL LOCATION
- BOREHOLE LOCATION
- SHALLOW BOREHOLE MONITORING WELL LOCATION
- APPROXIMATE LOCATION OF AREA OF POTENTIAL ENVIRONMENTAL CONCERN (APEC)
- FOCs
- TEST FIT LOCATIONS & SAMPLE ANALYSIS METALS
- VOCs
- PHCs
- PAHs
- CROSS SECTION



PHASE TWO ESA AREA OF INVESTIGATION		
PHASE TWO ESA 5 ARTHUR ST. GUELPH, ONTARIO		
DATE	JOB NO.	FIGURE NO.
JUNE 2013	5-1589-02-02	2

SHEET: R515890202004FIG02.pdf
 FILE: R515890202004FIG01+dwg



LEGEND:

- APPROXIMATE PHASE TWO PROPERTY BOUNDARIES
- CONCRETE PITS
- RAILWAY TRACKS
- SEWER LINES
- HISTORIC FEATURE RETAINED
- BH12 MONITORING WELL LOCATION
- BH54(MW) MONITORING WELL LOCATION
- BH26 BOREHOLE LOCATION
- APPROXIMATE LOCATION OF AREA OF POTENTIAL ENVIRONMENTAL CONCERN (APREC)
- FOCs
- METALS
- VOCs
- PHCs
- PAHs
- CROSS SECTION

FORMER W.C. WOOD COMPANY LTD.
 PLANT #2
 54 DUKE ST.

PHASE TWO ESA
 AREA OF INVESTIGATION
 PHASE TWO ESA
 PART 2 OF PLAN 61R-20059
 5 ARTHUR STREET
 GUELPH, ONTARIO



DATE	JOB NO.	FIGURE NO.
AUG. 2013	5-1589-02-02	2

DRAWING REFERENCE: Based on drawing supplied by W.C. Wood (Plant 1.dwg, Jan. 2007), and XCG field sketches.
 NOTE: Locations of buildings, underground utilities, etc. are for reference only and should not be relied upon for detail design, excavation, or construction purposes.

Record of Site Condition

- The CPU provides guidance for the implementation of risk management measures to allow for the future redevelopment of the subject site for residential/commercial purposes.

Challenges

- Completion of hydraulic assessment to meet requirements of City of Guelph to show potable groundwater pathway was incomplete.
- Consultation with MOECC and City of Guelph to complete Risk Assessment and get CPU for the property that would not limit development, but still provide appropriate risk management.

Challenges

- Incorporating several remedial approaches into one large scale remedial project (excavation, soil segregation, off-site disposal, in-situ amendment mixing, backfill, and compaction).
- Completion of soil segregation activities, collection and assessment of numerous soil samples to confirm residual soil quality, and assessment of the soil quality of accumulated stockpiles to minimize the quantity of soil removed from the site for disposal.

Challenges

- Completion of in-situ amendment mixing within areas of VOC impacts to ensure proper mixing ratio was achieved.
- Achieving generic remedial objective in the north portion of the property to allow for future redevelopment without any limitation on property use or construction methods.
- Heritage issues.
- General challenges with brownfield project.

Redevelopment

- Construction for the redevelopment of the subject site is scheduled to begin in 2016 and is anticipated to take approximately 10 years to complete.
- There are six phases (five buildings, 10 to 14 storeys in height, and one heritage building).
- Almost 700 new residential units.



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Future Development



Future Development



Great Team

- XCG Consultants Ltd.
- Kilmer Brownfield Equity Fund
- Fusion Homes
- Stantec
- Priestley Demolition
- Adventus
- Maxxam