



**A REVIEW OF ONTARIO'S WATER QUANTITY
MANAGEMENT FRAMEWORK:
WATER QUANTITY STUDY AREA REPORT**

Appendix A – Part 1

Prepared for:

Government of Ontario
Ministry of the Environment, Conservation and Parks
Standards Development Branch
7th Floor, 40 St Clair Avenue West
Toronto, ON M4V 1M2

Prepared by:

BluMetric Environmental Inc.
171 Victoria Street North
Kitchener, ON N2H 5C5

Project Number: 180107-06
Submission Date: 28 March 2019

This report has been separated in 5 sections for internet posting.

REPORT BODY AND APPENDIX C

APPENDIX A - PART 1

- FIGURES for Guelph – Centre Wellington, Orangeville and Norfolk Sand Plain Water Quantity Study Areas

APPENDIX A - PART 2

- FIGURES for Innisfil And Whitemans Creek Water Quantity Study Areas

APPENDIX A - PART 3

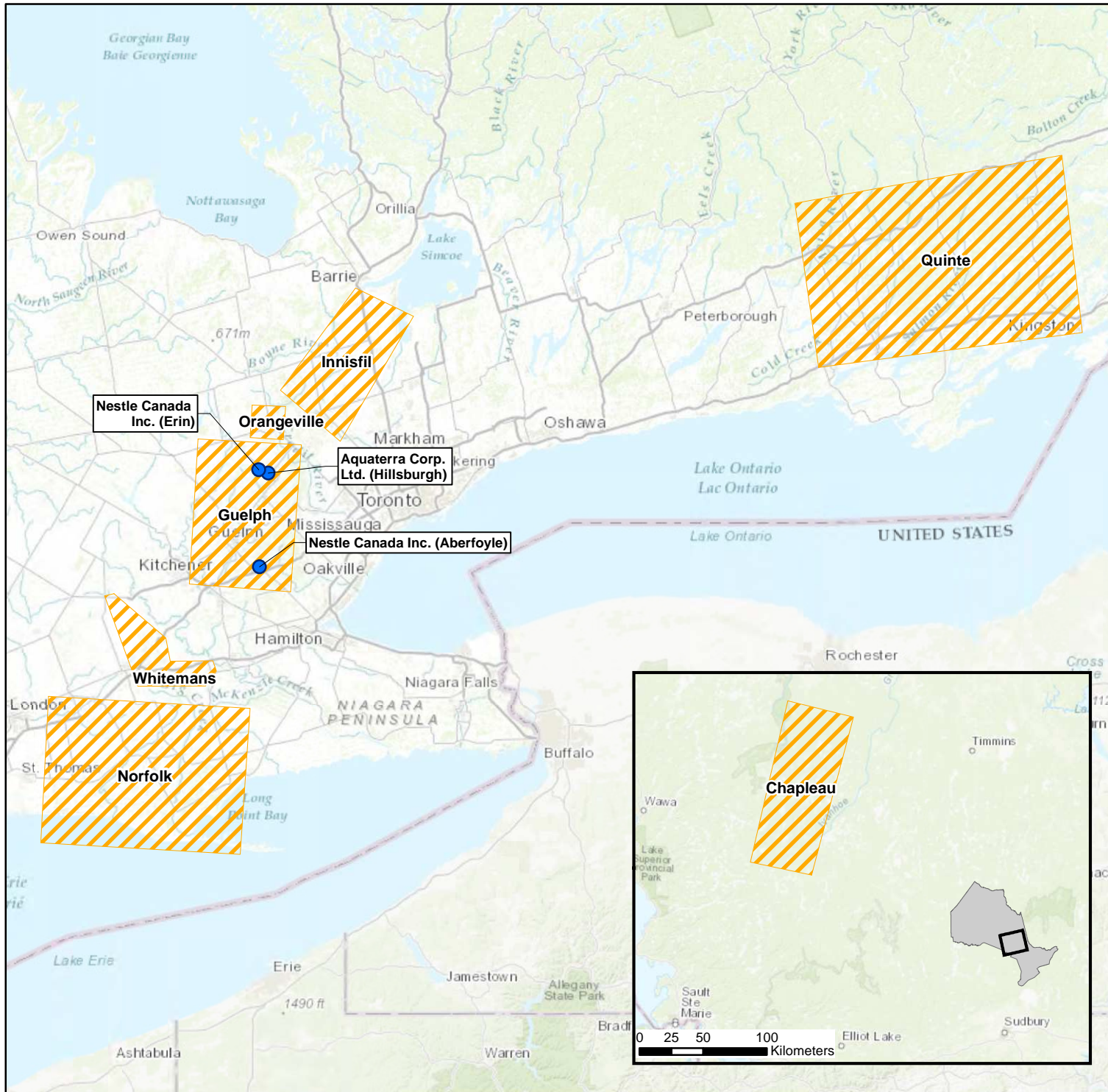
- FIGURES for Quinte Water Quantity Study Area

APPENDIX A - PART 4

- FIGURES for Chapleau Water Quantity Study Area

Appendix B has been removed from the posted report in accordance with privacy requirements.

(Inserted by the Ministry of the Environment, Conservation and Parks, June 2020)



LEGEND

- Water Bottlers
- ▨ Preliminary Water Quantity Study Areas (WQSAs)

1				
REV.	DESCRIPTION	YY/MM/DD	BY	CHK

REFERENCES
 PROPRIETARY INFORMATION MAY NOT BE REPRODUCED OR DIVULGED WITHOUT PRIOR WRITTEN CONSENT OF BLUMETRIC ENVIRONMENTAL INC. DO NOT SCALE DRAWING. THIS DRAWING MAY HAVE BEEN REDUCED. ALL SCALE NOTATIONS INDICATED ARE BASED ON 8.5"x11" FORMAT DRAWINGS.

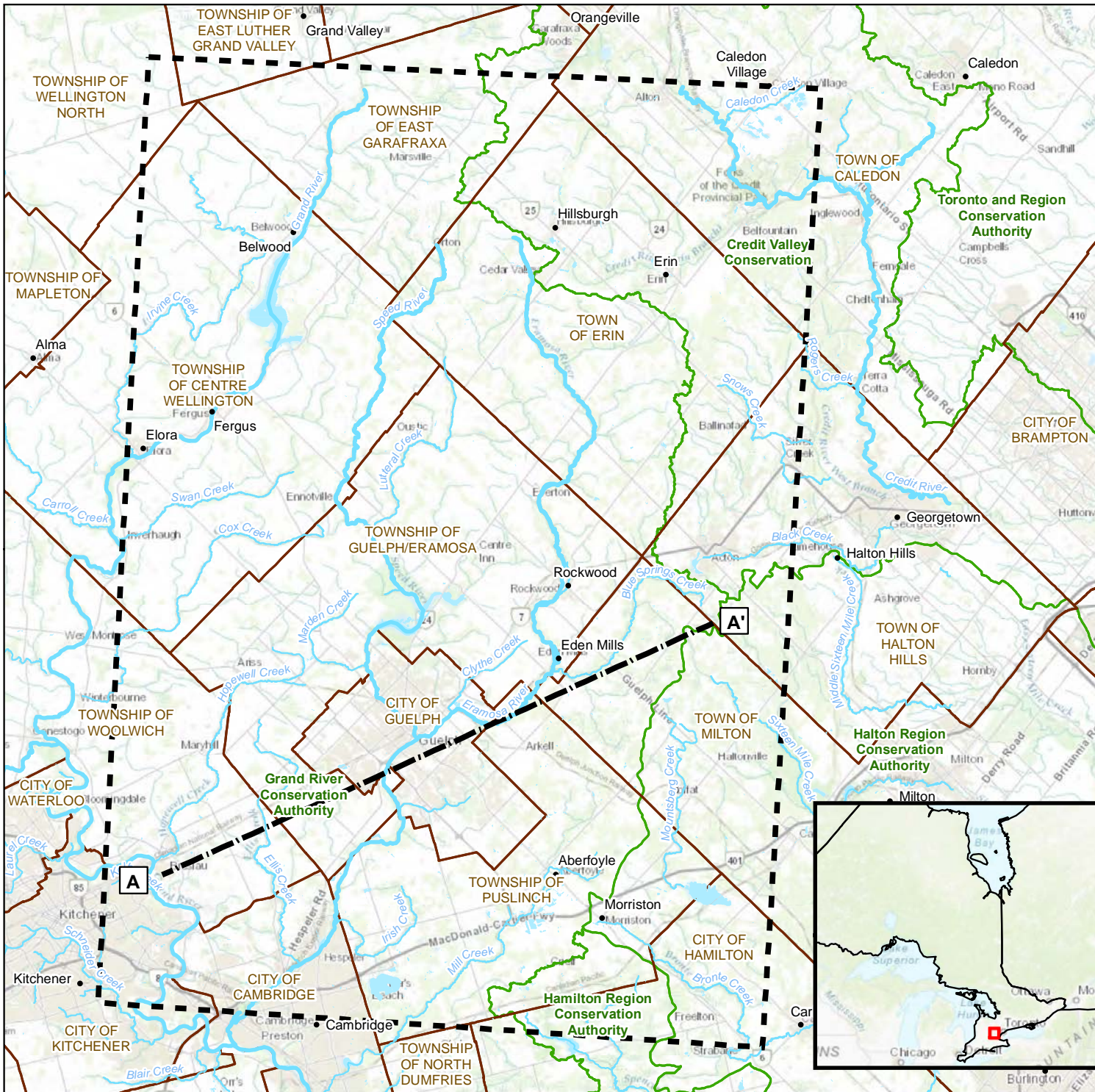
CLIENT
The Ministry of the Environment, Conservation and Parks (MECP)

PROJECT
Assessment of Water Resources to Support a Review of Ontario's Water Quantity Management Framework

TITLE
Preliminary Water Quantity Study Areas

BluMetric™ Environmental
 171 Victoria St. N.,
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 FAX: (519) 742-9810
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 Web: http://www.blumetric.ca

PROJECT # 180107-06	DATE January 10, 2019		
DRAWN KH	CHECKED FR	FIG NO. 1-1	REV 0



LEGEND

- Major Watercourse
- Watercourse
- Preliminary Water Quantity Study Area (WQSA)
- Municipalities
- Conservation Authority
- Hydrogeological Cross-section

1				
REV	DESCRIPTION	YY/MM/DD	BY	CHK

REFERENCES
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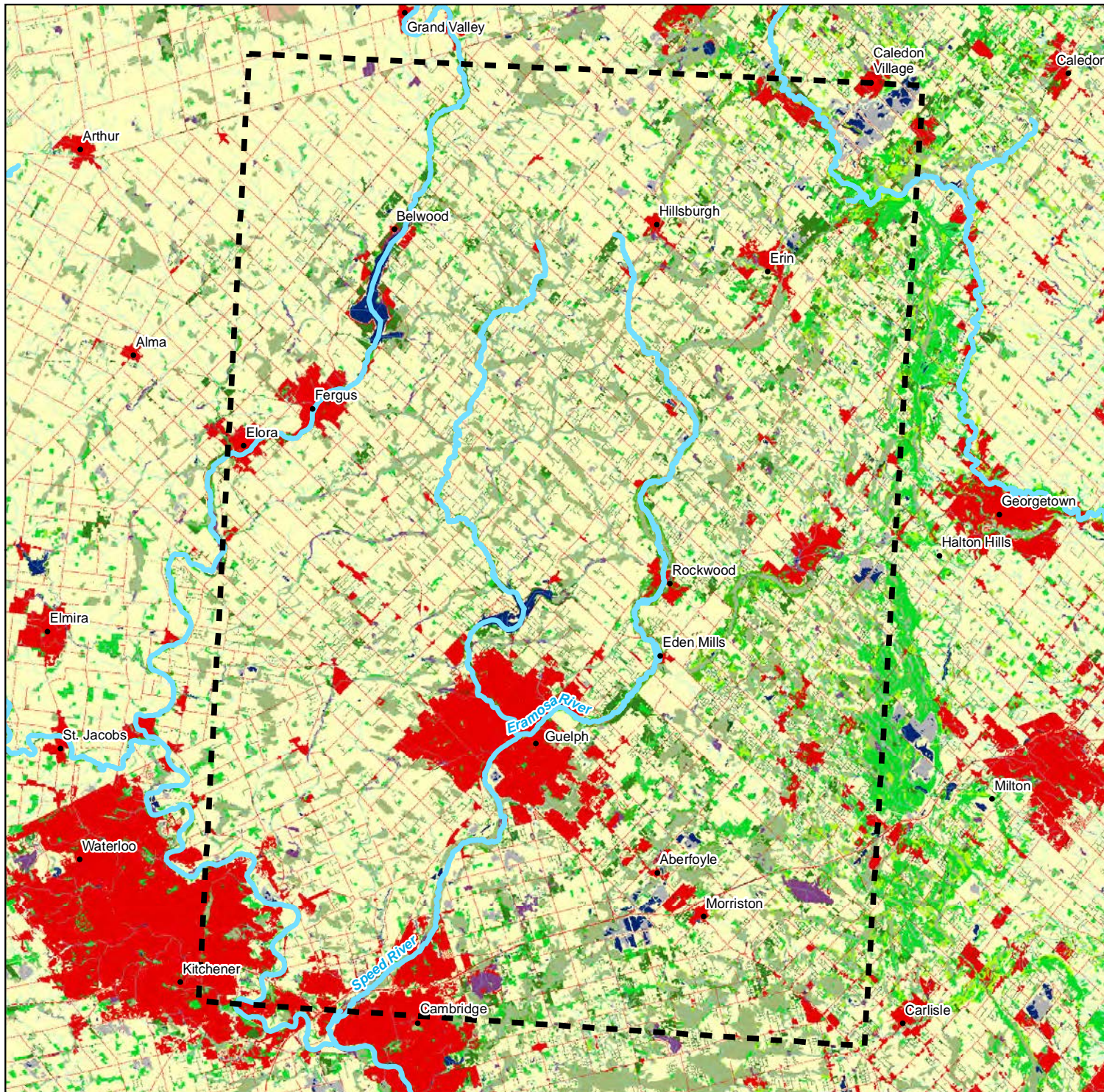
PROJECT
 Assessment of Water Resources to Support a Review of Ontario's Water Quantity Management Framework

TITLE
 Guelph Water Quantity Study Area Boundary

171 Victoria St. N.,
 Kitchener, Ontario, N2H 5C5
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LEGEND

- Preliminary Water Quantity Study Area (WQSA)
- Watercourse
- 1 - Clear Open Water
- 5 - Marsh
- 6 - Swamp
- 7 - Fen
- 8 - Bog
- 12 - Treed Upland
- 13 - Deciduous Treed
- 14 - Mixed Treed
- 15 - Coniferous Treed
- 16 - Plantations - Treed Cultivated
- 17 - Hedge Rows
- 25 - Sand/Gravel/Mine Tailings/Extraction
- 27 - Community/Infrastructure
- 28 - Agriculture and Undifferentiated Rural Land Use

1				
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PROJECT

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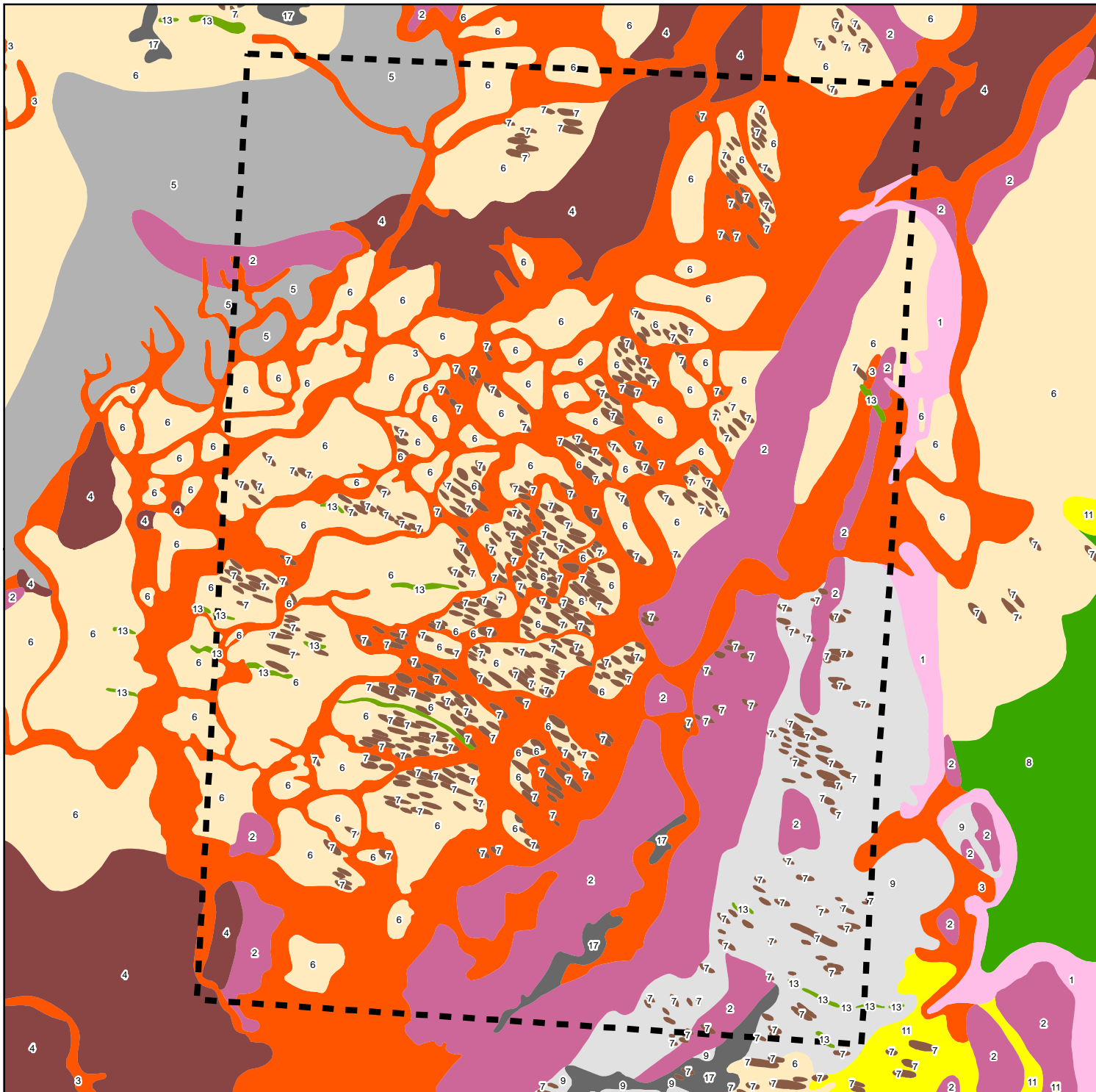
TITLE

Guelph Land Cover



171 Victoria St. N.,
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LEGEND

Preliminary Water Quantity Study Area (WQSA)

Southern Ontario Physiography

- 17: Peat And Muck
- 13: Eskers
- 11: Sand Plains
- 9: Limestone Plains
- 8: Bevelled Till Plains
- 7: Drumlins
- 6: Till Plains (Drumlinized)
- 5: Till Plains (Undrumlinized)
- 4: Kame Moraines
- 3: Spillways
- 2: Till Moraines
- 1: Escarpments

1				
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0 5 10 Kilometers

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 Ministry of the Environment, Conservation and Parks (MECP)

PROJECT
 Assessment of Water Resources to Support a Review of Ontario's Water Quantity Management Framework

TITLE
 Guelph Regional Physiography

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LEGEND

- Preliminary Water Quantity Study Area (WQSA)
- Tertiary Watershed Boundary
- Quaternary Watershed Boundary
- Major Water Course and Flow Direction
- Watercourse

Elevation Contours

- 100 m
- 50 m

1				
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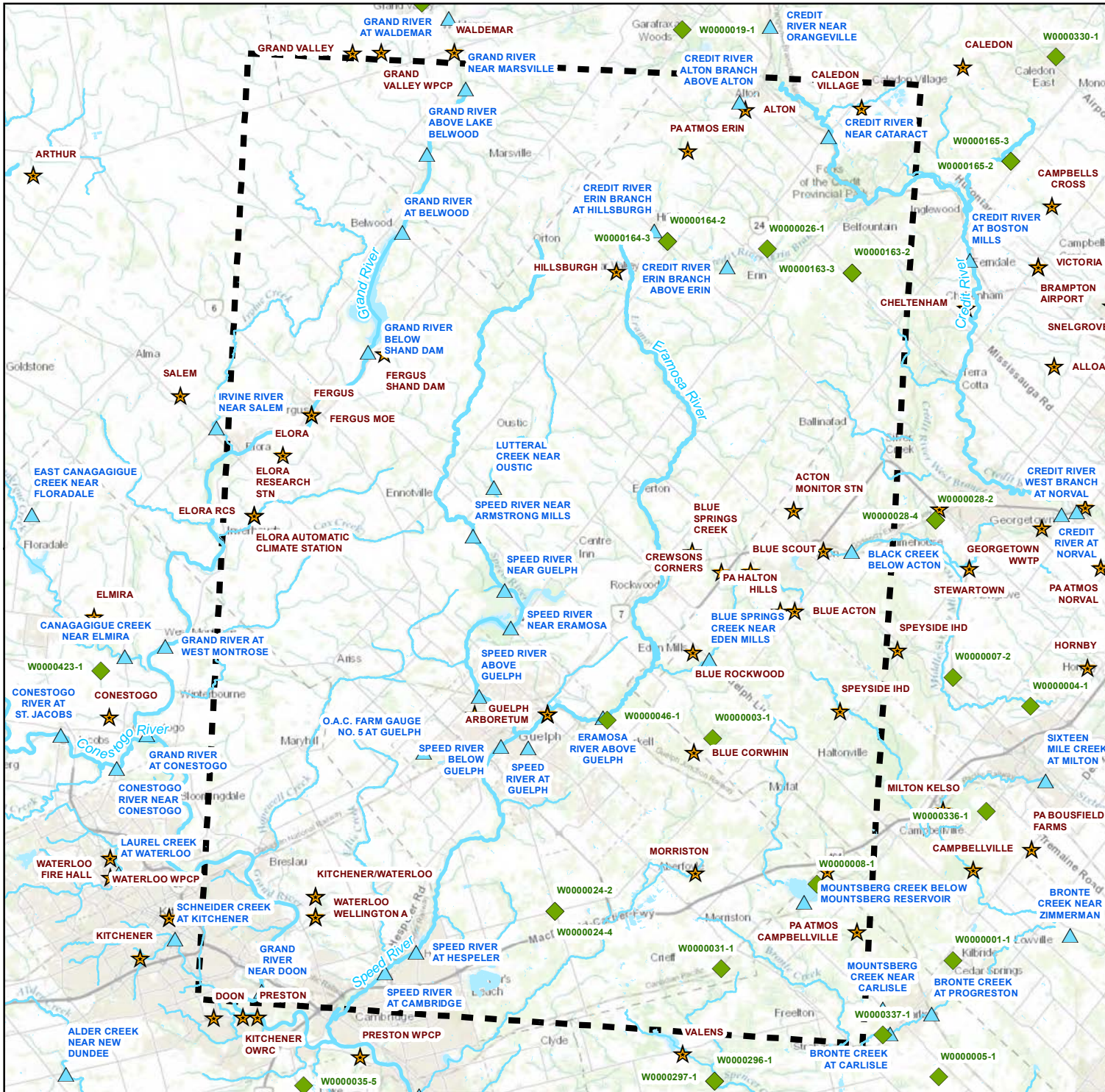
CLIENT
 Ministry of the Environment, Conservation and Parks (MECP)

PROJECT
 Assessment of Water Resources to Support a Review of Ontario's Water Quantity Management Framework

TITLE
 Guelph Regional Topography and Hydrology

171 Victoria St. N.,
 Kitchener, Ontario, N2H 5C5
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FIG NO. 4-4	REV 0



LEGEND

- ◆ Provincial Groundwater Monitoring Network Wells
- ▲ HYDAT Stations
- ★ Weather Stations
- Major Watercourse
- Watercourse
- Preliminary Water Quantity Study Area (WQSA)

1				
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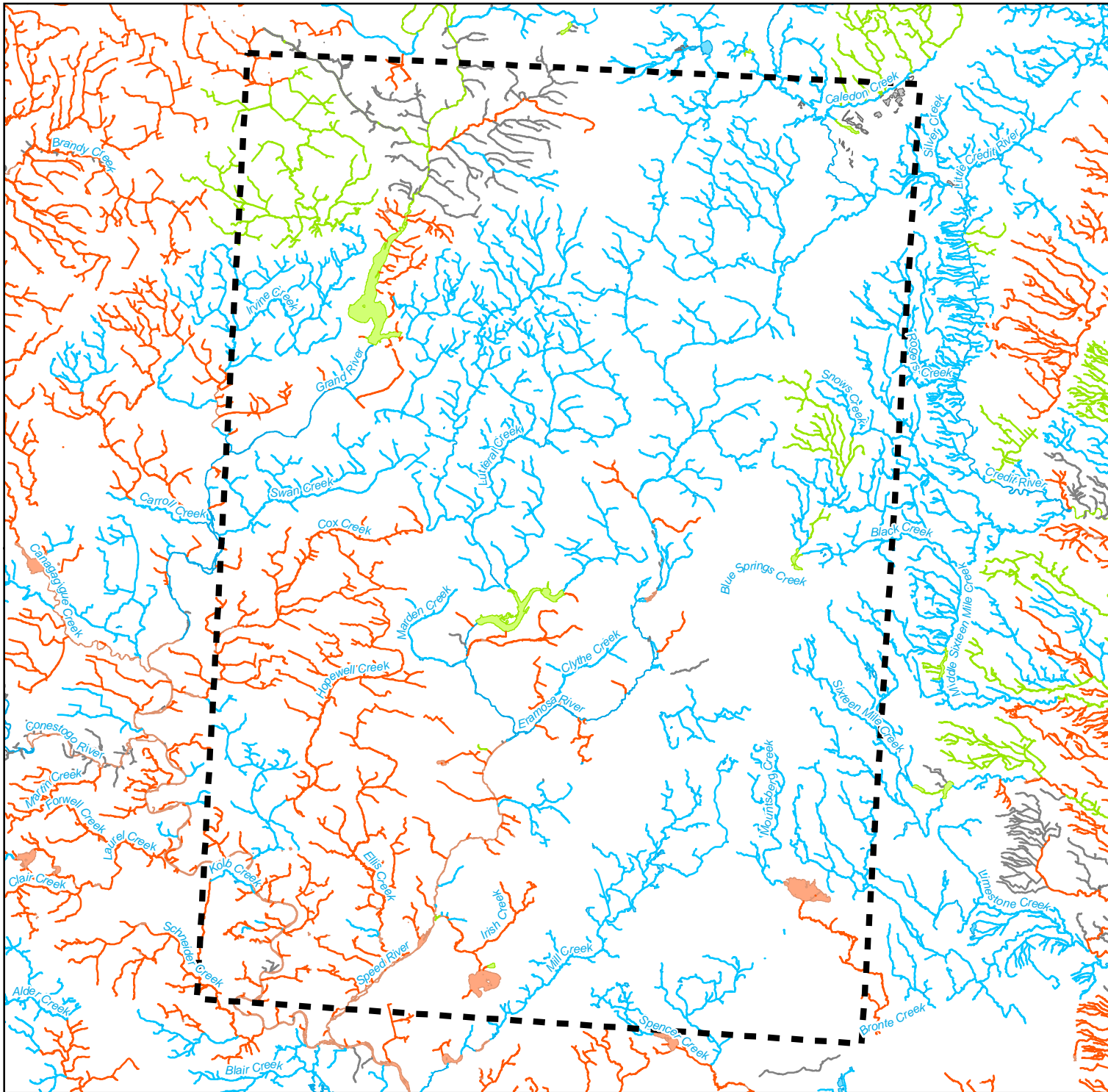
CLIENT
 Ministry of the Environment, Conservation and Parks (MECP)

PROJECT
 Assessment of Water Resources to Support a Review of Ontario's Water Quantity Management Framework

TITLE
 Guelph Meteorological Stations

171 Victoria St. N.,
 Kitchener, Ontario, N2H 5C5
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LEGEND

Preliminary Water Quantity Study Area (WQSA)

Thermal Regime

- Unknown
- Cold
- Cool
- Warm

Thermal Regime

- Unknown
- Cold
- Cool
- Warm

1				
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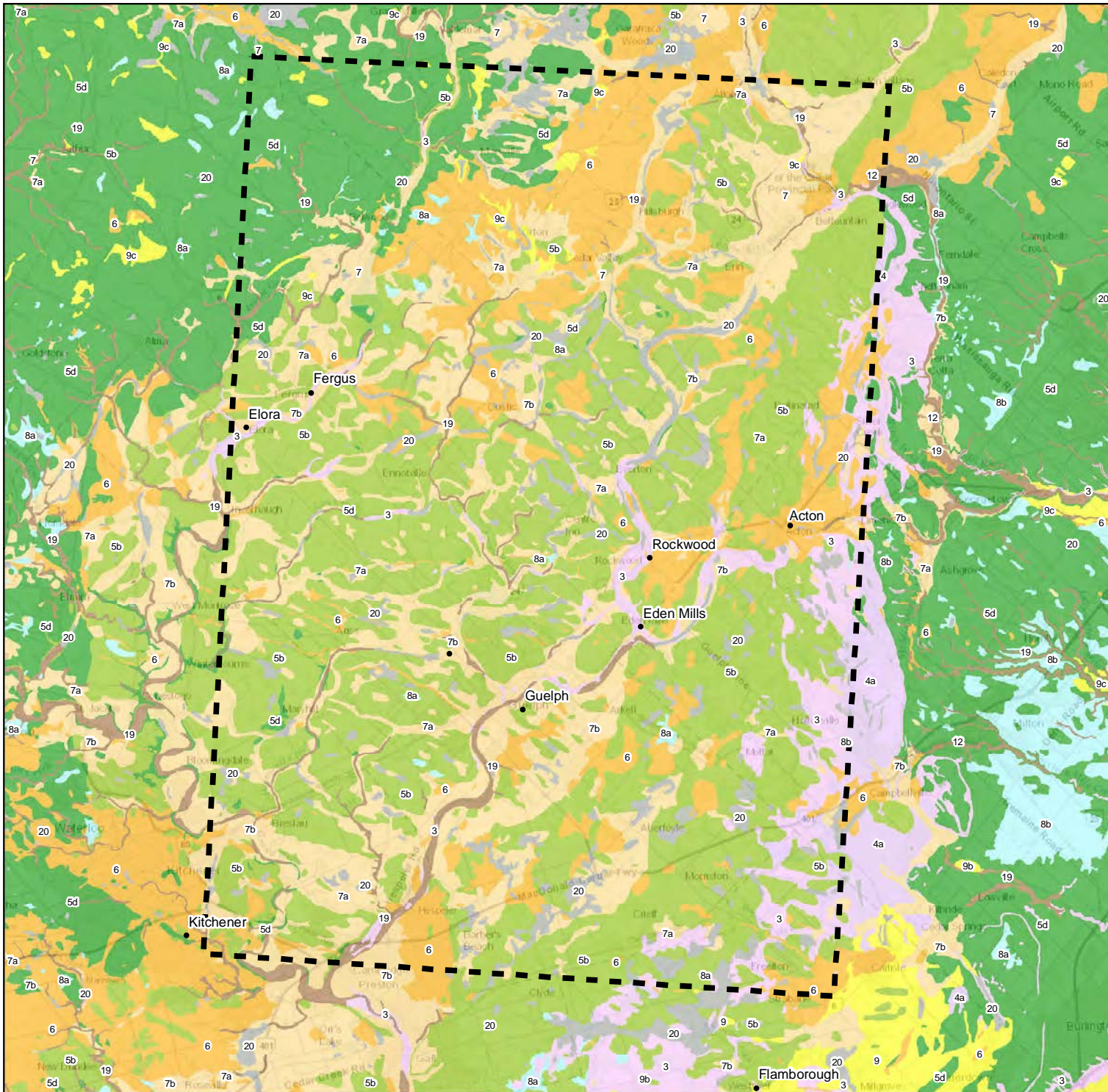
CLIENT
 Ministry of the Environment, Conservation and Parks (MECP)

PROJECT
 Assessment of Water Resources to Support a Review of Ontario's Water Quantity Management Framework

TITLE
 Guelph Aquatic Thermal Regions

171 Victoria St. N.,
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PROJECT # 180107-06		DATE January 11, 2019	
DRAWN KH	CHECKED HH/FAR	FIG NO. 4-6	REV 0



LEGEND

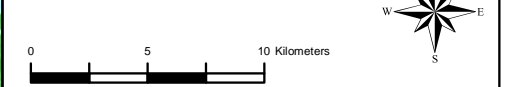
Preliminary Water Quantity Study Area (WQSA)

Surficial Geology (MNDM File - MRD128-REV)

- 3: Paleozoic bedrock
- 4: Bedrock-drift complex in Paleozoic terrain
- 4a: Primarily till cover
- 5b: Stone-poor, carbonate-derived silty to sandy till
- 5d: Glaciolacustrine-derived silty to clayey till
- 6: Ice-contact stratified deposits
- 7: Glaciofluvial deposits
- 7a: Sandy deposits
- 7b: Gravelly deposits
- 8a: Massive-well laminated
- 8b: Interbedded silt and clay and gritty, pebbly flow till and rainout deposits
- 9: Coarse-textured glaciolacustrine deposits
- 9a: Deltaic deposits
- 9b: Littoral-foreshore deposits
- 9c: Foreshore and basinal deposits
- 12: Older alluvial deposits
- 19: Modern alluvial deposits
- 20: Organic deposits

1				
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 Ministry of the Environment, Conservation and Parks (MECP)

PROJECT
 Assessment of Water Resources to Support a Review of Ontario's Water Quantity Management Framework

TITLE
 Guelph Surficial Geology



171 Victoria St. N.,
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LEGEND

- Preliminary Water Quantity Study Area (WQSA)
- Contact, Sharp, Trend, Interpreted
- Upper Ordovician - shale, limestone, dolostone, siltstone**
- 55a - Queenstone Formation
- Lower Silurian - sandstone, shale, dolostone, siltstone**
- 56a - Guelph Formation
- 56b - Lockport Formation
- 56c - Amabel Formation
- 56d - Clinton Group; Cataract Group
- Upper Silurian - limestone, dolostone, shale, sandstone, gypsum, salt**
- 57c - Salina Formation

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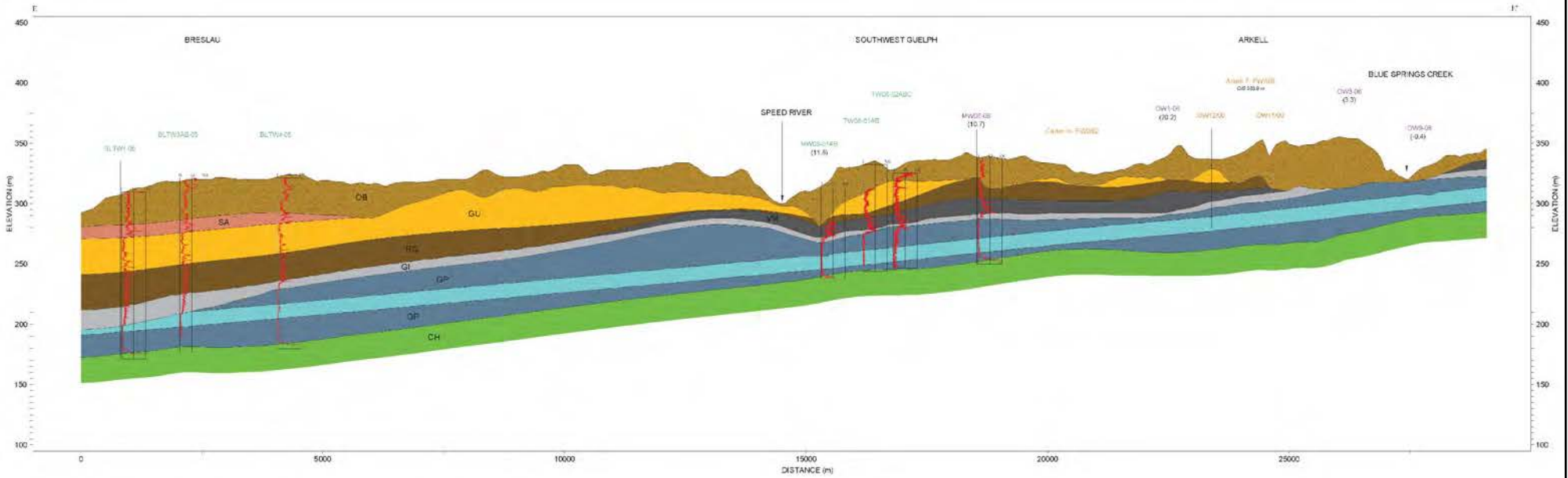
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 Ministry of the Environment, Conservation and Parks (MECP)

PROJECT
 Assessment of Water Resources to Support a Review of Ontario's Water Quantity Management Framework

TITLE
 Guelph Bedrock Geology

171 Victoria St. N.,
 Kitchener, Ontario, N2H 5C5
 TEL: (519) 742-6685
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LEGEND

OVERBURDEN	GOAT ISLAND FORMATION	MWS-04
SALINA FORMATION	GASPORT FORMATION	HIGH RELIABILITY BOREHOLE
GUELPH FORMATION	MIDDLE GASPORT LAYER	MEDIUM RELIABILITY BOREHOLE
ERAMOSIA - REFORMATORY QUARRY	CABOT HEAD FORMATION	(11.6)
ERAMOSIA - VINEMOUNT		



REFERENCES

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Figure 2-7 from Matrix Solutions Inc., 2011, City of Guelph and Township of Guelph/Eramosa Tier Three Water Budget and Local Risk Assessment, Lake Erie Source Protection Region

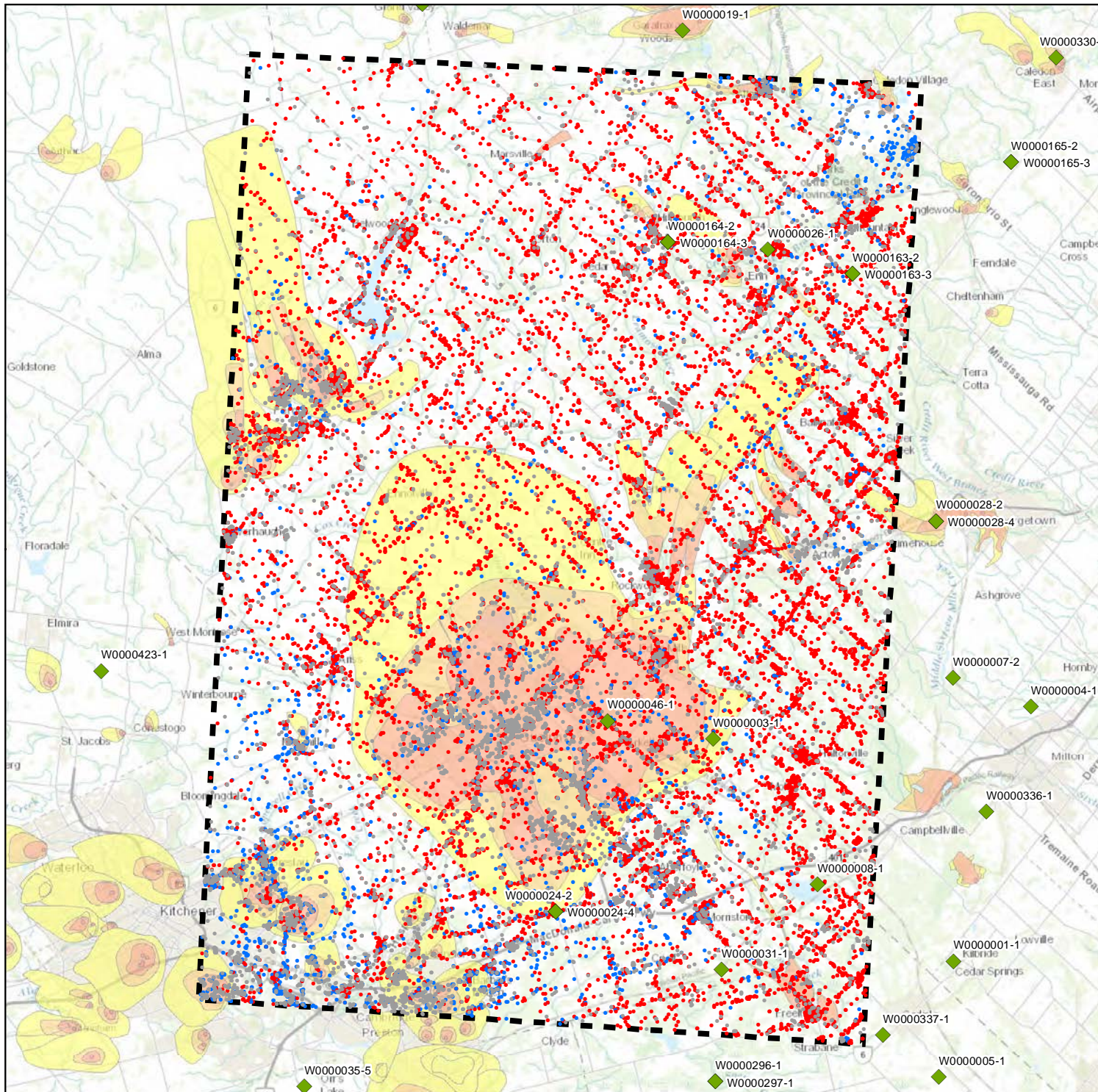
CLIENT
Ministry of the Environment, Conservation and Parks (MECP)

PROJECT
Assessment of Water Resources to Support a Review of Ontario's Water Quantity Management Framework

TITLE
Hydrogeological Cross-Section

171 Victoria St. N.,
Kitchener, Ontario, N2H 5C5
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PROJECT # 180107-06		DATE January 23, 2019	
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LEGEND

- ◆ Provincial Groundwater Monitoring Network Wells
- Bedrock Well
- Overburden Well
- Unknown Well Type
- ▭ Preliminary Water Quantity Study Area (WQSA)

Wellhead Protection Areas (Quality)

- A
- B
- C
- C1
- D
- F

1				
REV.	DESCRIPTION	YY/MM/DD	BY	CHK

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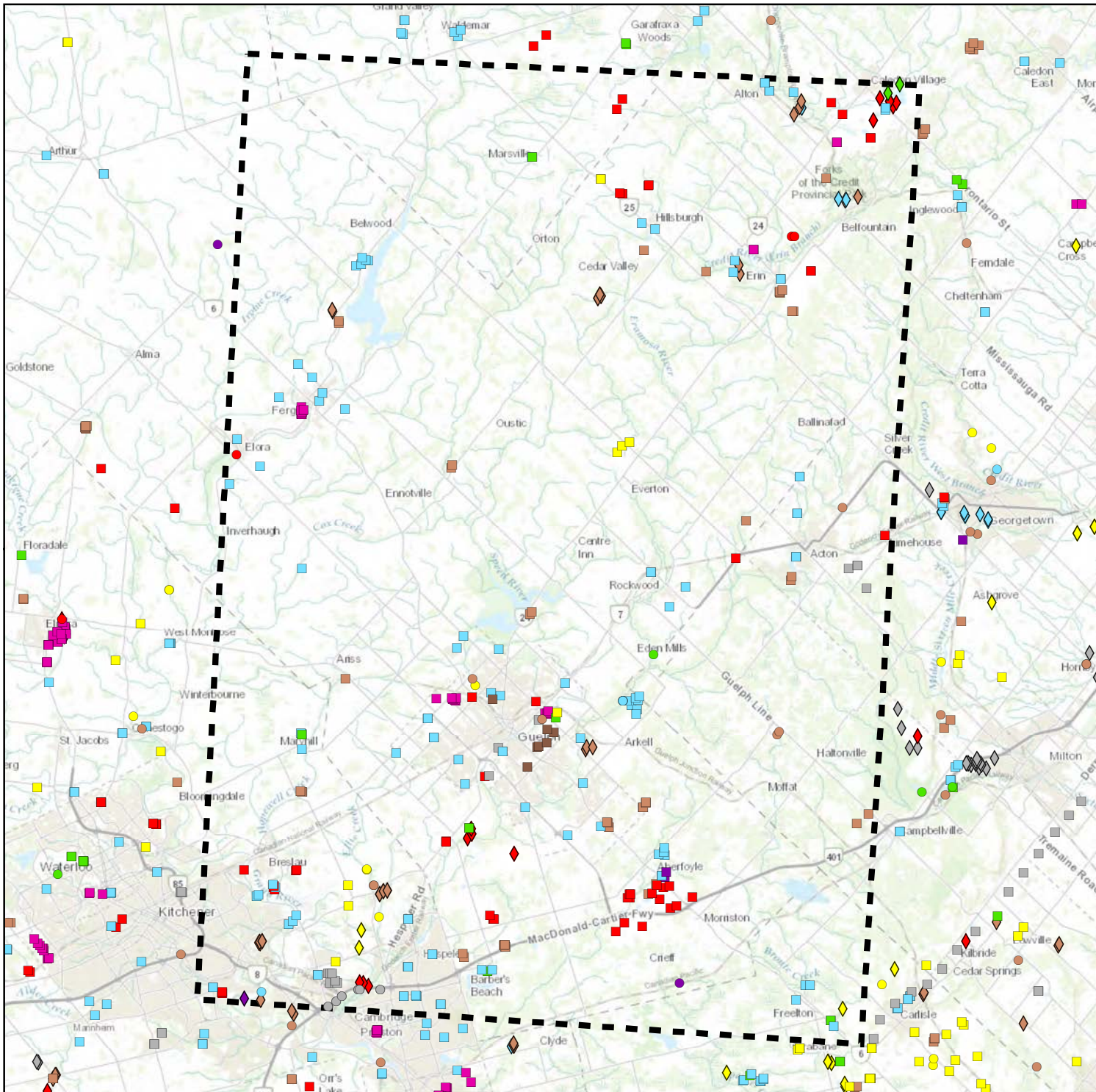
CLIENT
 Ministry of the Environment, Conservation and Parks (MECP)

PROJECT
 Assessment of Water Resources to Support a Review of Ontario's Water Quantity Management Framework

TITLE
 Guelph Water Well Information System and Provincial Groundwater Monitoring Network Wells

171 Victoria St. N.,
 Kitchener, Ontario, N2H 5C5
 TEL: (519) 742-6685
 FAX: (519) 742-9810
 Email: info@blumetric.ca
 Web: http://www.blumetric.ca

PROJECT # 180107-06		DATE January 23, 2019	
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LEGEND

Preliminary Water Quantity Study Area (WQSA)

Water Taking Permit by Type and Purpose

- Agricultural
- Commercial
- Dewatering
- Industrial
- Institutional
- Miscellaneous
- Recreational
- Remediation
- Surface Water
- Groundwater
- Both

1				
REV	DESCRIPTION	YY/MM/DD	BY	CHK

REFERENCES
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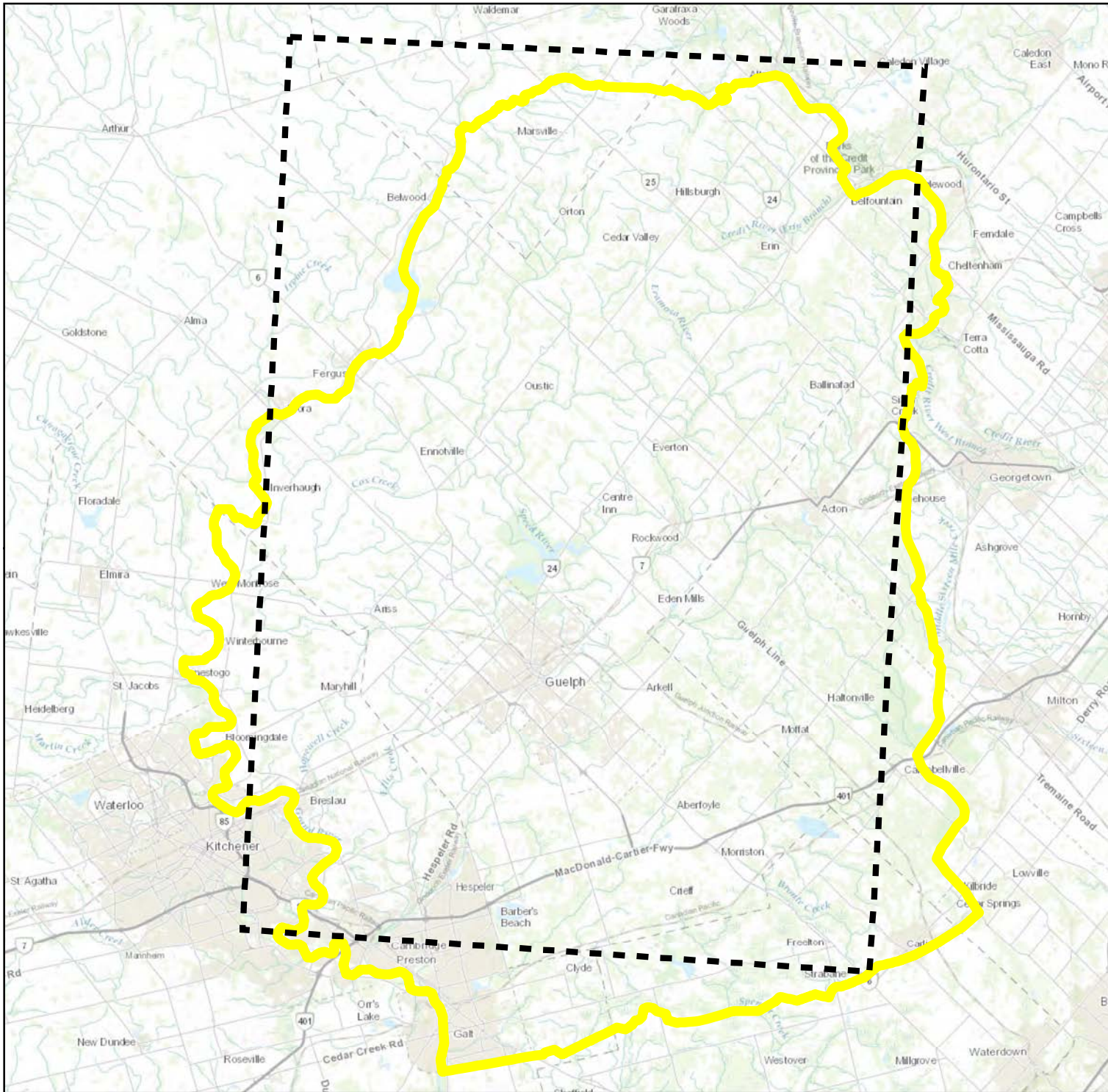
CLIENT
 Ministry of the Environment, Conservation and Parks (MECP)

PROJECT
 Assessment of Water Resources to Support a Review of Ontario's Water Quantity Management Framework



TITLE
 Guelph Permitted Water Takings

171 Victoria St. N.,
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 Web: http://www.blumetric.ca

PROJECT # 180107-06	DATE January 11, 2019		
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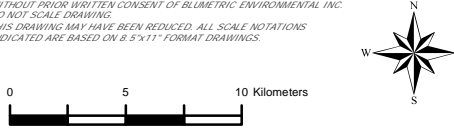


LEGEND

-  Preliminary Water Quantity Study Area (WQSA)
-  Revised WQSA Boundary/Tier Three Assessment Boundary

1				
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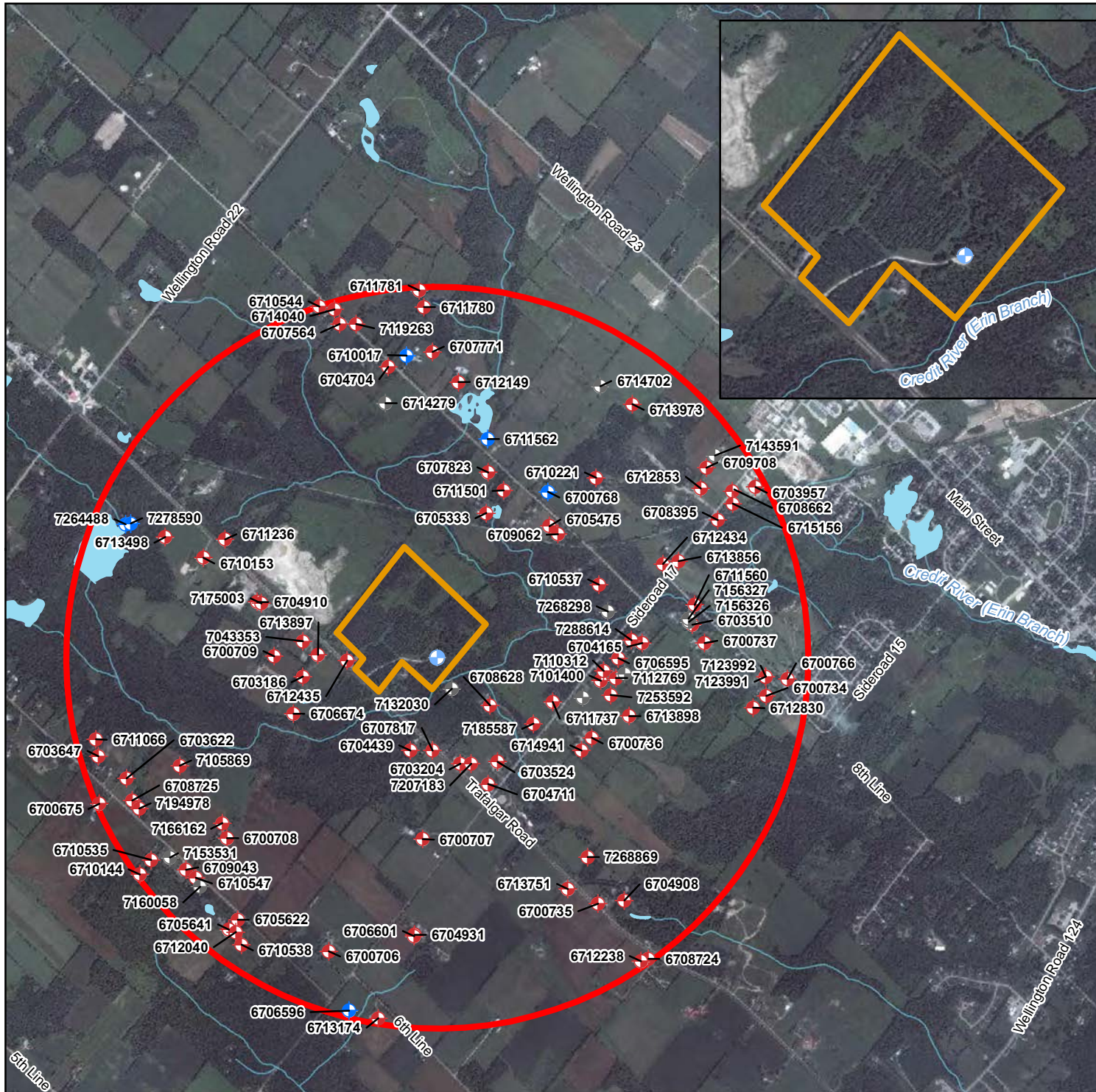
PROJECT
 Assessment of Water Resources to Support a Review of Ontario's Water Quantity Management Framework

TITLE
 Guelph Revised Water Quantity Study Area Boundary



171 Victoria St. N.,
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 Web: <http://www.blumetric.ca>

PROJECT # 180107-06		DATE January 11, 2019	
DRAWN KH	CHECKED HH/PAR	FIG NO. 4-12	REV 0



LEGEND

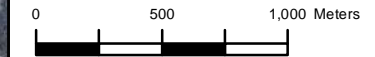
- SourceWell
- Bedrock Well
- Overburden Well
- Unknown Well Type
- Guelph Aquaterra 200m Radius
- Guelph Aquaterra Property Boundary

Note:
 MECP well records sourced from MECP, 2018.
 Source Well location sourced from AECOM Site Plan, Permit to Take Water 2016 Annual Report for Hillsburgh Site, March 2017.

1				
REV.	DESCRIPTION	YY/MM/DD	BY	CHK

REFERENCES

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PROJECT

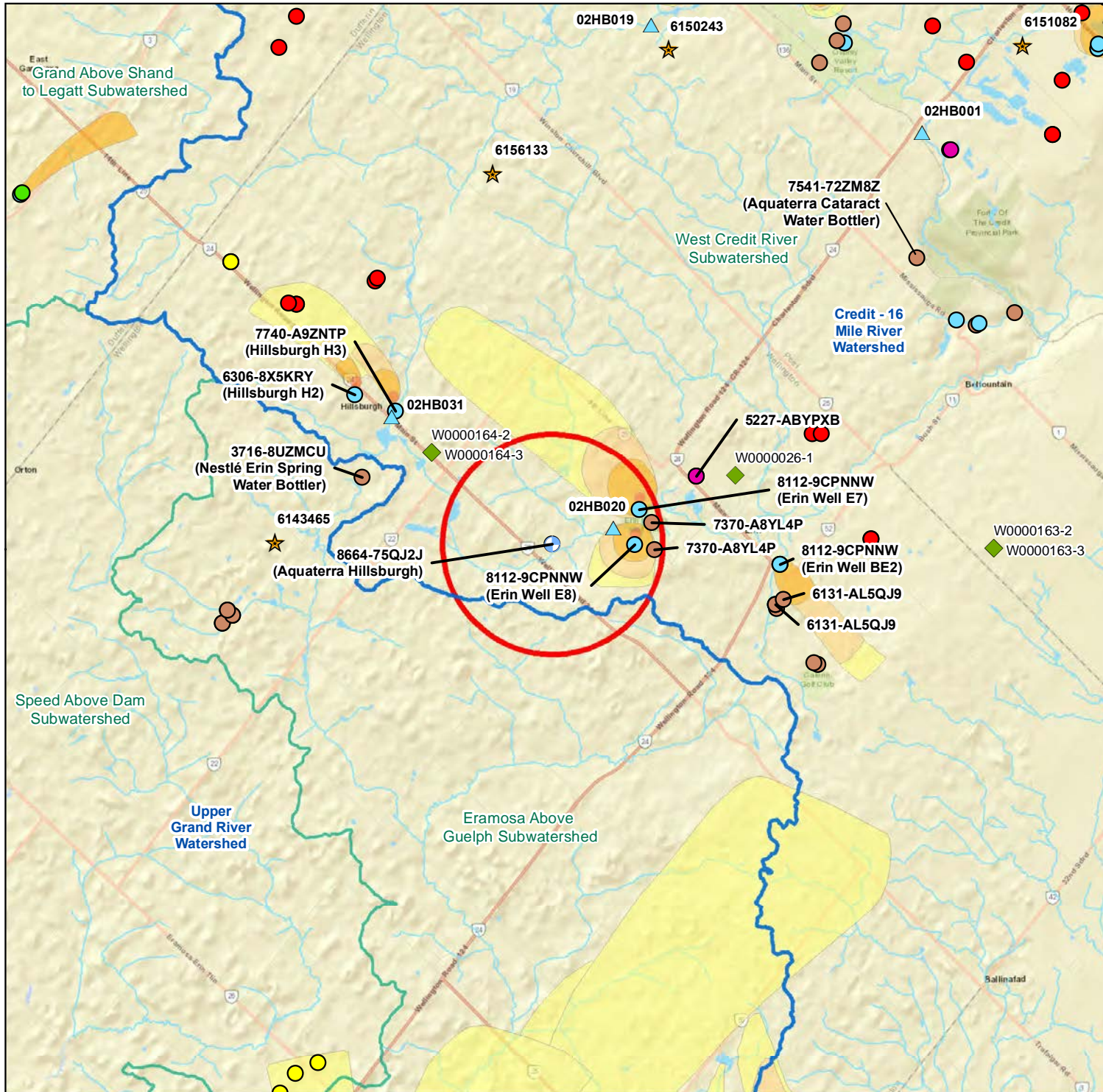
Assessment of Water Resources to Support a Review of Ontario's Water Quantity Management Framework

TITLE

Aquaterra Corporation Ltd. Hillsburgh Site Source Location and Site Plan

171 Victoria St. N.,
 Kitchener, Ontario, N2H 5C5
 TEL: (519) 742-6685
 FAX: (519) 742-9810
 Email: info@blumetric.ca
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PROJECT # 180107-06		DATE January 11, 2019	
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LEGEND

- Provincial Groundwater Monitoring Network Wells and ID
- Weather Stations and ID
- HYDAT Stations and ID
- SourceWell
- Tertiary Watershed Boundary
- Quaternary Watershed Boundary
- Guelph Aquaterra 2000m Radius
- WTRS (Active PTTW) and Use
 - Agricultural
 - Commercial
 - Industrial
 - Institutional
 - Miscellaneous
 - Recreational
 - Remediation
 - Water Supply
- Municipal Well Head Protection Areas - Quality
 - A - 100 m Radius
 - B - 2 Year Time of Travel
 - C - 5 Year Time of Travel
 - D - 25 Year Time of Travel

Note:
 Base Map: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan
 Municipal Wellhead Protection Areas: MECP, <http://www.applications.ene.gov.on.ca/swp/en/index.php>
 Active PTTWs: MECP, 2018. <https://www.ontario.ca/environment-and-energy/map-permitstake-water>
 Provincial Groundwater Monitoring Network: MECP, <https://www.ontario.ca/environment-and-energy/map-provincial-groundwater-monitoring-network>
 Weather Stations: Government of Canada, <http://climate.weather.gc.ca/>
 HYDAT stations: Government of Canada, <https://www.canada.ca/en/environment-climate-change/services/water-overview/quantity/monitoring/survey/data-products-services/nationalarchive-hydat.html>

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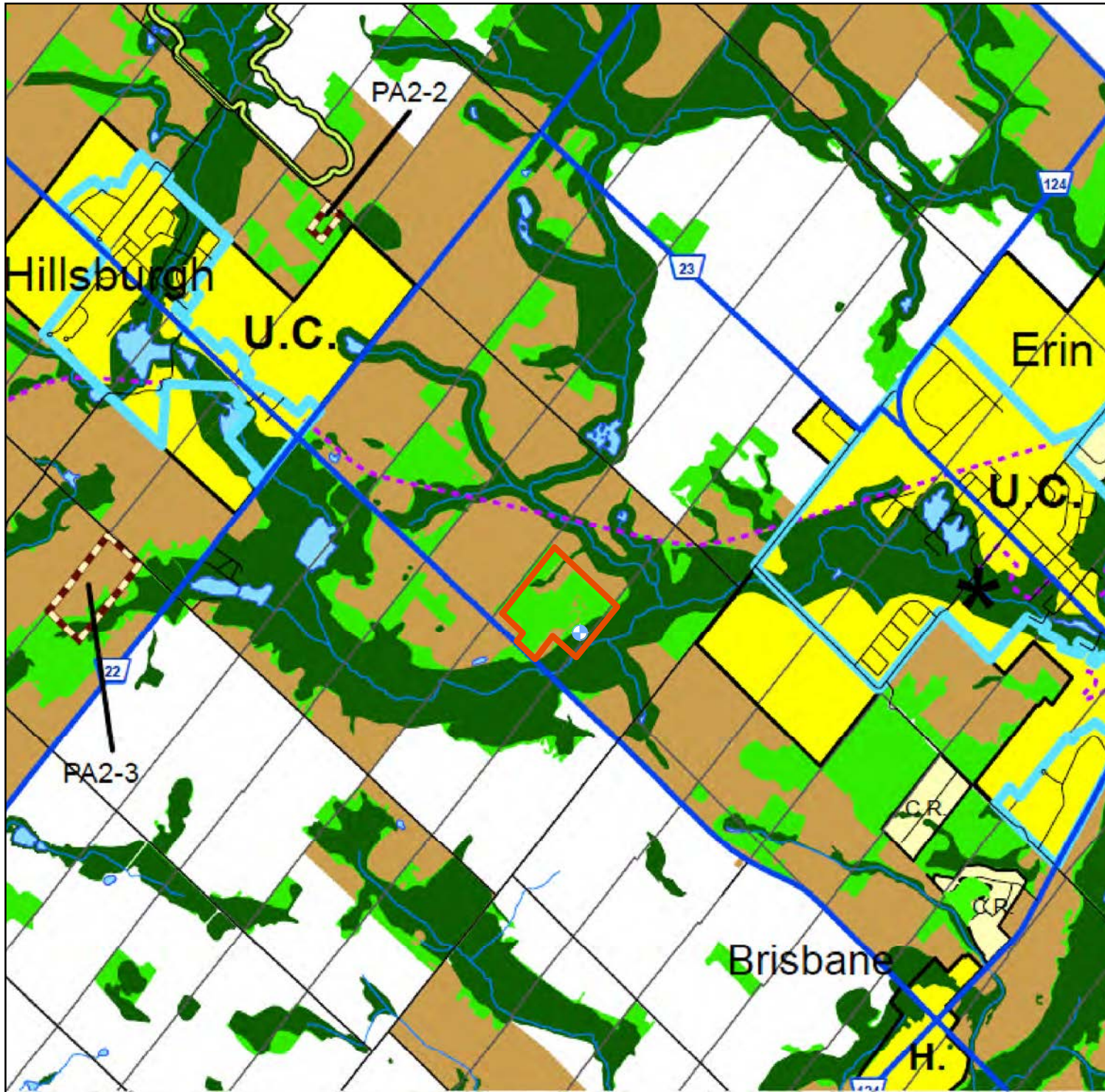
CLIENT
 Ministry of the Environment, Conservation and Parks (MECP)

PROJECT
 Assessment of Water Resources to Support a Review of Ontario's Water Quantity Management Framework

TITLE
 Aquaterra Corporation Ltd. Hillsburgh Site Regional Study Area

BluMetric Environmental
 171 Victoria St. N.,
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 Web: <http://www.blumetric.ca>

PROJECT # 180107-06	DATE January 24, 2019		
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LEGEND

- Source Well
- Guelph Aquaterra Property Boundary
- Land Use Classification**
- Core Greenlands
- Greenlands
- Earth Science ANSI
- Prime Agricultural
- Secondary Agricultural
- Country Residential
- Policy Area
- Hamlet Area
- Urban Centre
- Trail
- Landfill Site
- Built Boundary
- County Roads

Note:
Land Use information sourced from County of Wellington, Official Plan.
Schedule A2 – Erin, May 2018.

REV.	DESCRIPTION	YY/MM/DD	BY	CHK
1				

REFERENCES

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CLIENT

Ministry of the Environment, Conservation and Parks (MECP)

PROJECT

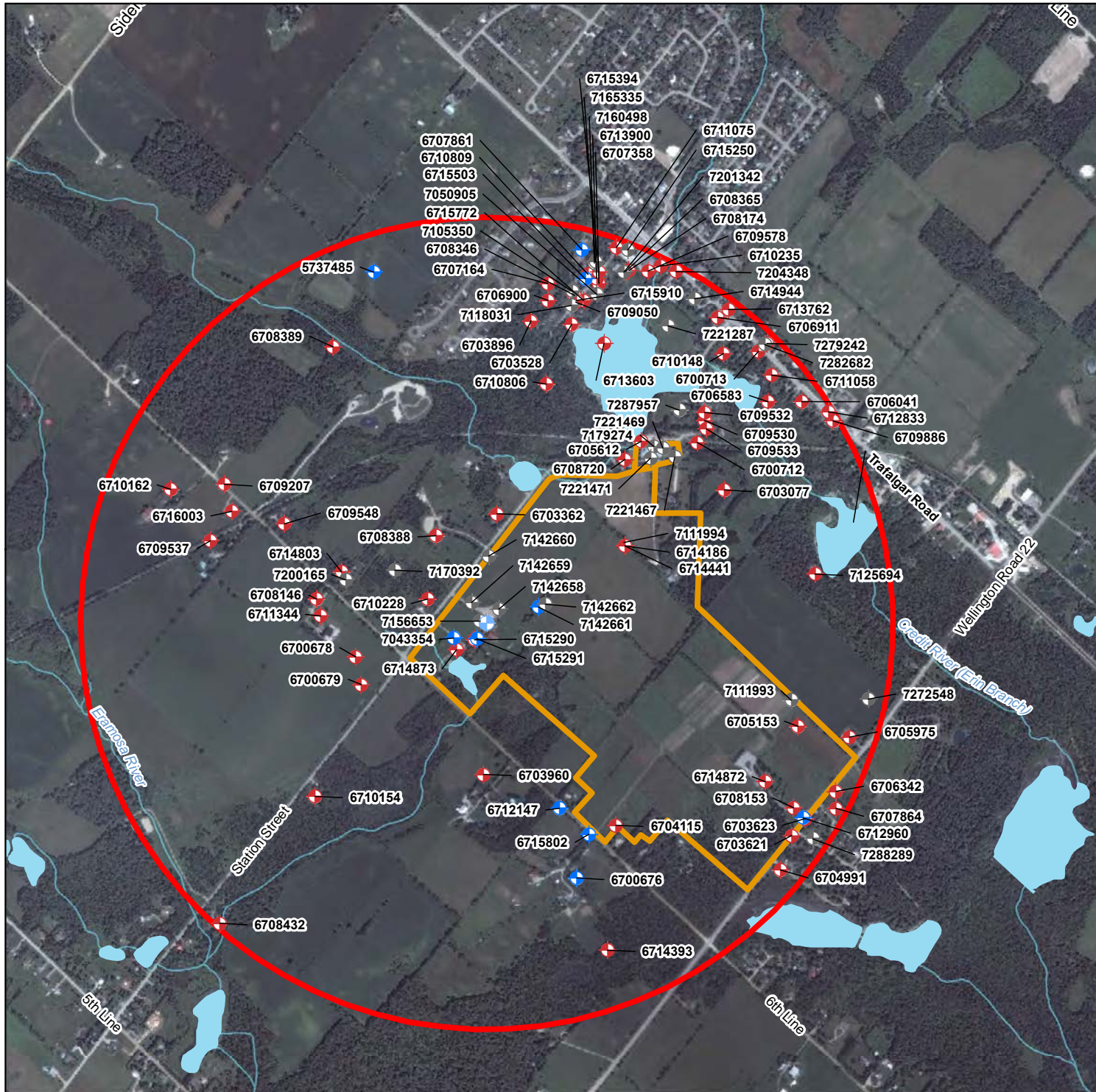
Assessment of Water Resources to Support a Review of Ontario's Water Quantity Management Framework

TITLE

Aquaterra Corporation Ltd. Hillsburgh Site Land Use Setting

171 Victoria St. N.,
 Kitchener, Ontario, N2H 5C5
 TEL: (519) 742-6685
 FAX: (519) 742-9810
 Email: info@blumetric.ca
 Web: http://www.blumetric.ca

PROJECT # 180107-06		DATE January 11, 2019	
DRAWN KH	CHECKED RH	FIG NO. 4-A-3	REV 0



LEGEND

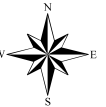
- Source Well
- ◆ Bedrock Well
- ⊕ Overburden Well
- ⊕ Unknown Well Type
- Guelph Nestle Erin 1200m Radius
- Guelph Nestle Erin Property Boundary

Note:
MECP well records sourced from MECP, 2018.

1				
REV.	DESCRIPTION	YY/MM/DD	BY	CHK

REFERENCES

PROPRIETARY INFORMATION MAY NOT BE REPRODUCED OR DIVULGED WITHOUT PRIOR WRITTEN CONSENT OF BLUMETRIC ENVIRONMENTAL INC. DO NOT SCALE DRAWING. THIS DRAWING MAY HAVE BEEN REDUCED. ALL SCALE NOTATIONS INDICATED ARE BASED ON U.S. 11" FORMAT DRAWINGS.



CLIENT

Ministry of the Environment, Conservation and Parks (MECP)

PROJECT

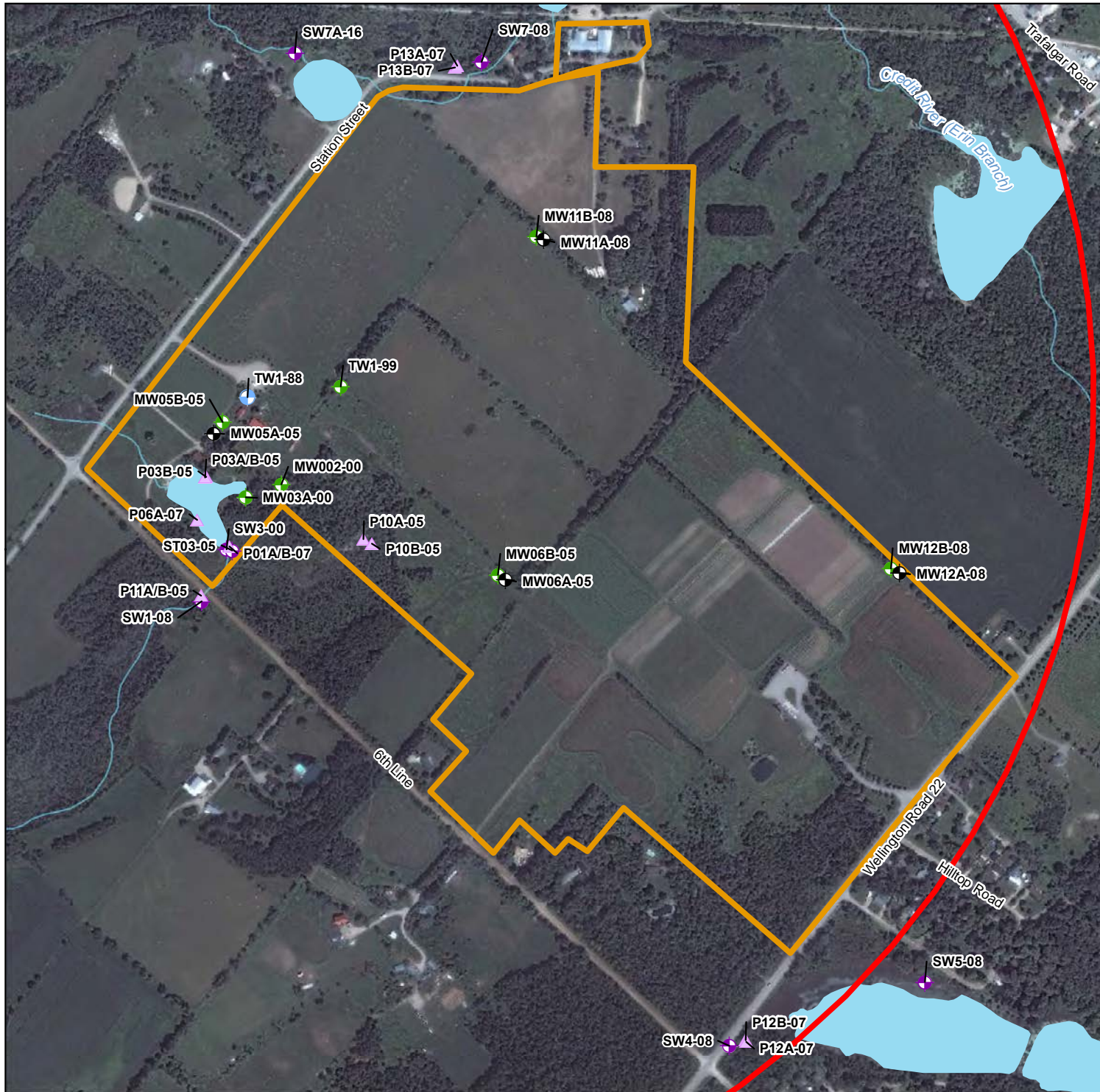
Assessment of Water Resources to Support a Review of Ontario's Water Quantity Management Framework

TITLE

Nestlé Waters Canada Erin Site Well Records

171 Victoria St. N.,
Kitchener, Ontario, N2H 5C5
TEL: (519) 742-6685
FAX: (519) 742-9810
Email: info@blumetric.ca
Web: http://www.blumetric.ca

PROJECT # 180107-06		DATE January 18, 2019	
DRAWN KH	CHECKED RH	FIG NO. 4-B-1a	REV 0



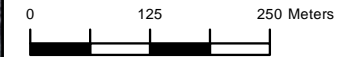
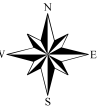
LEGEND

- SourceWell
- Groundwater Monitoring Location (Bedrock)
- Groundwater Monitoring Location (Overburden)
- Piezometer
- Surface Water Monitoring Location
- Guelph Nestlé Erin 1200m Radius
- Guelph Nestlé Erin Property Boundary

Note:
Groundwater and surfacewater monitoring locations, and piezometer locations sourced from Golder Associates Nestlé Waters Canada 2017 Annual Report, February 2018.

1				
REV.	DESCRIPTION	YY/MM/DD	BY	CHK

REFERENCES
 PROPRIETARY INFORMATION MAY NOT BE REPRODUCED OR DIVULGED WITHOUT PRIOR WRITTEN CONSENT OF BLUMETRIC ENVIRONMENTAL INC. DO NOT SCALE DRAWING. THIS DRAWING MAY HAVE BEEN REDUCED. ALL SCALE NOTATIONS INDICATED ARE BASED ON 8.5" X 11" FORMAT DRAWINGS.



CLIENT

Ministry of the Environment, Conservation and Parks (MECP)

PROJECT

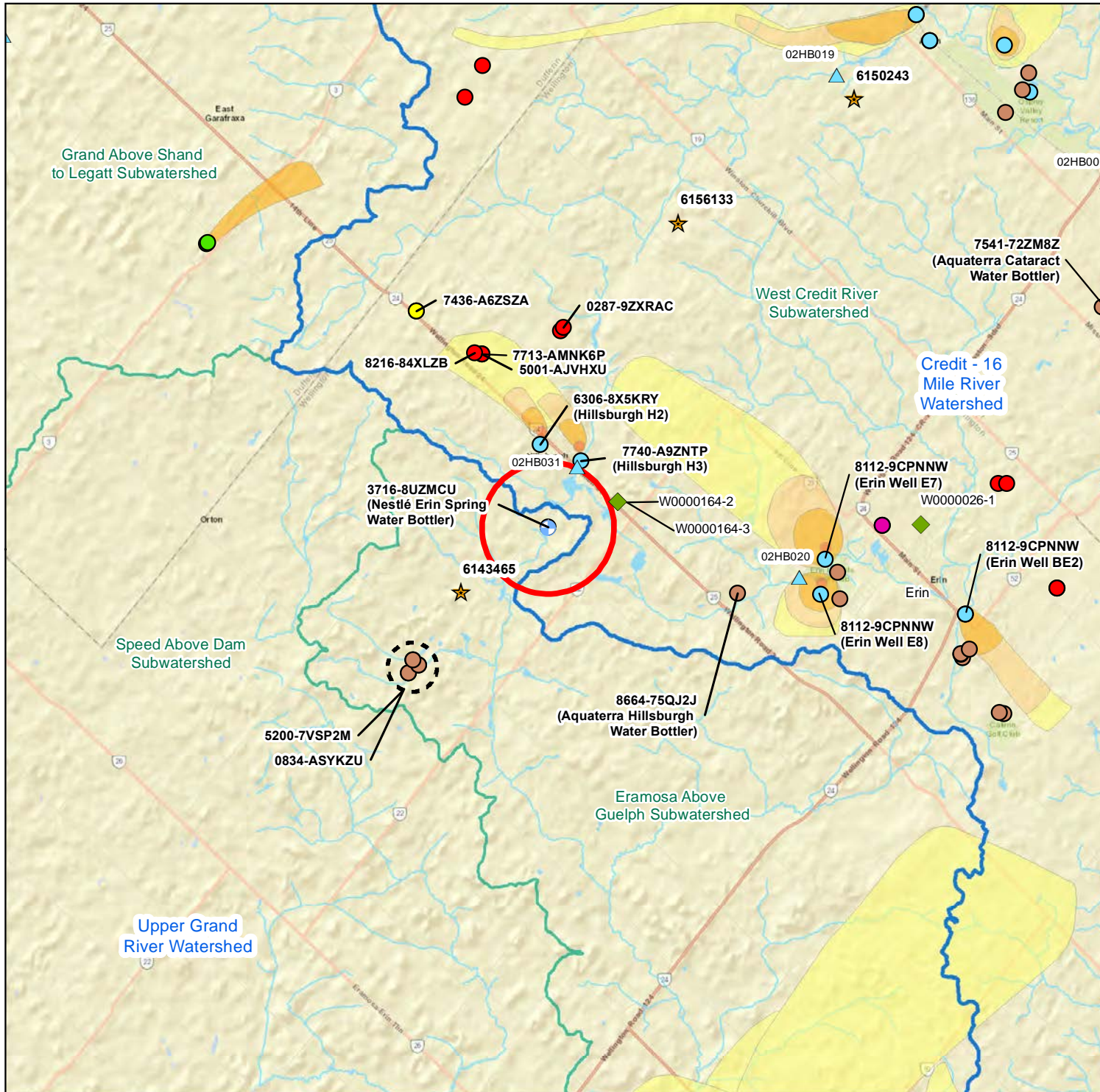
Assessment of Water Resources to Support a Review of Ontario's Water Quantity Management Framework

TITLE

Nestlé Waters Canada Erin Site Source Location and Site Plan

171 Victoria St. N.,
 Kitchener, Ontario, N2H 5C5
 TEL: (519) 742-6685
 FAX: (519) 742-9810
 Email: info@blumetric.ca
 Web: http://www.blumetric.ca

PROJECT # 180107-06		DATE January 18, 2019	
DRAWN KH	CHECKED RH	FIG NO. 4-B-1b	REV 0




LEGEND


- ◆ Provincial Groundwater Monitoring Network Wells and ID
 - ★ Weather Stations and ID
 - ▲ HYDAT Stations and ID
 - Source Well
 - Guelph Nestlé Erin 1200m Radius
 - Tertiary Watershed Boundary
 - Quaternary Watershed Boundary
- WTRS (Active PTTW) and Use
 - Agricultural
 - Commercial
 - Industrial
 - Institutional
 - Miscellaneous
 - Recreational
 - Remediation
 - Water Supply
 - Municipal Well Head Protection Areas - Quality**
 - A - 100 m Radius
 - B - 2 Year Time of Travel
 - C - 5 Year Time of Travel
 - D - 25 Year Time of Travel

Note:
 Base Map: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan
 Municipal Wellhead Protection Areas: MECP, <http://www.applications.ene.gov.on.ca/swp/en/index.php>
 Active PTTWs: MECP, 2018. <https://www.ontario.ca/environment-and-energy/map-permitstake-water>
 Provincial Groundwater Monitoring Network: MECP, <https://www.ontario.ca/environment-and-energy/map-provincial-groundwater-monitoring-network>
 Weather Stations: Government of Canada, <http://climate.weather.gc.ca/>
 HYDAT stations: Government of Canada, <https://www.canada.ca/en/environment-climate-change/services/water-overview/quantity/monitoring/survey/data-products-services/nationalarchive-hydat.html>

1				
REV.	DESCRIPTION	YY/MM/DD	BY	CHK

REFERENCES
 PROPRIETARY INFORMATION MAY NOT BE REPRODUCED OR DIVULGED WITHOUT PRIOR WRITTEN CONSENT OF BLUMETRIC ENVIRONMENTAL INC. DO NOT SCALE DRAWING. THIS DRAWING MAY HAVE BEEN REDUCED. ALL SCALE NOTATIONS INDICATED ARE BASED ON 8.5" X 11" FORMAT DRAWINGS.





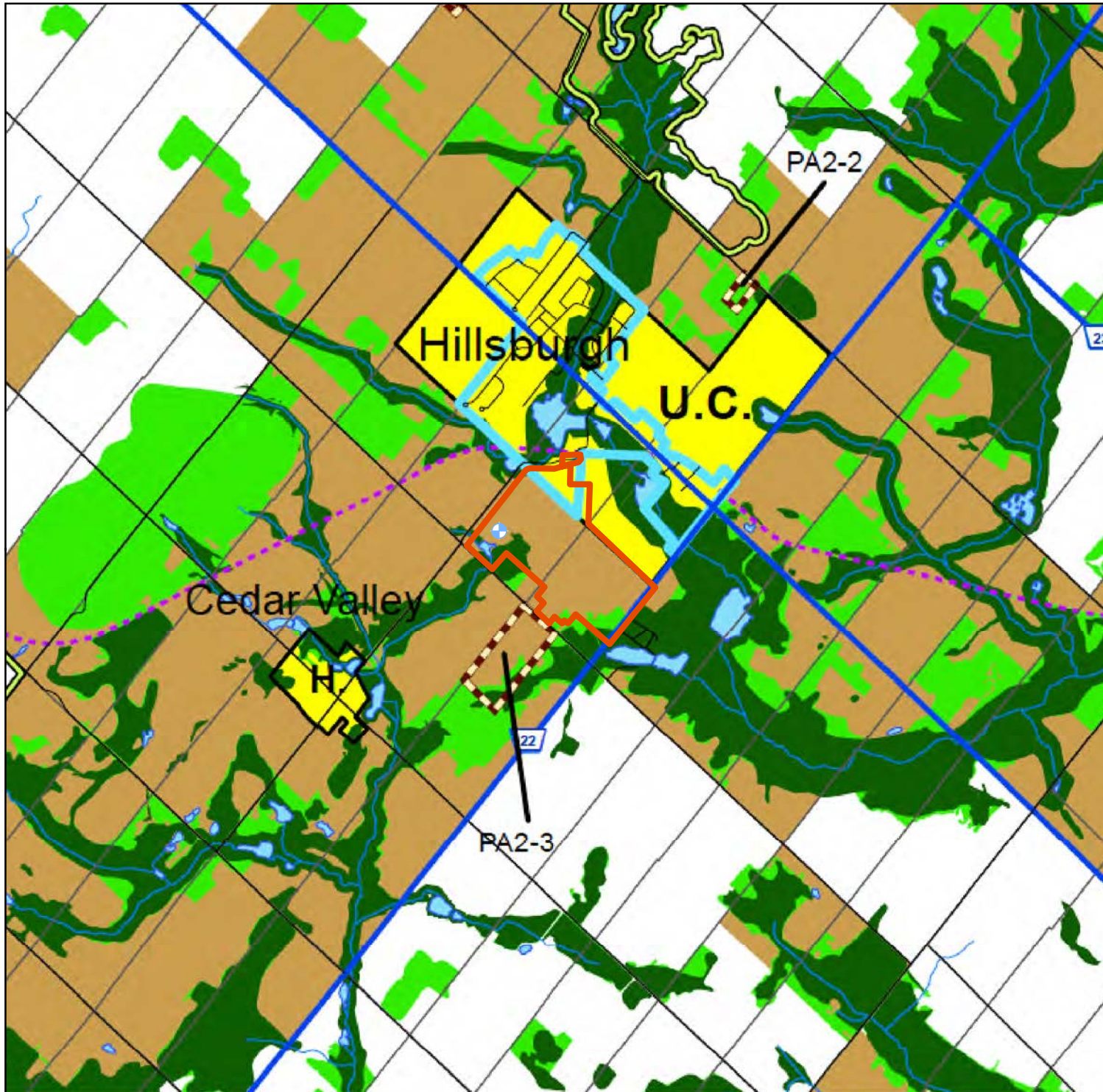
CLIENT
 Ministry of the Environment, Conservation and Parks (MECP)

PROJECT
 Assessment of Water Resources to Support a Review of Ontario's Water Quantity Management Framework

TITLE
 Nestlé Waters Canada Erin Site Regional Study Area

171 Victoria St. N.,
 Kitchener, Ontario, N2H 5C5
 TEL: (519) 742-6685
 FAX: (519) 742-9810
 Email: info@blumetric.ca
 Web: <http://www.blumetric.ca>

PROJECT # 180107-06		DATE January 30, 2019	
DRAWN KH	CHECKED RH	FIG NO. 4-B-2	REV 0



LEGEND

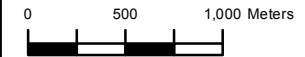
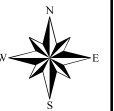
- Source Well
- Guelph Nestle Erin Property Boundary
- Land Use Classification**
- Core Greenlands
- Greenlands
- Earth Science ANSI
- Prime Agricultural
- Secondary Agricultural
- Country Residential
- Policy Area
- Hamlet Area
- Urban Centre
- Trail
- Landfill Site
- Built Boundary
- County Roads

Note:
Land Use information sourced from County of Wellington, Official Plan.
Schedule A2 – Erin, May 2018.

REV.	DESCRIPTION	YY/MM/DD	BY	CHK
1				

REFERENCES

PROPRIETARY INFORMATION MAY NOT BE REPRODUCED OR DIVULGED WITHOUT PRIOR WRITTEN CONSENT OF BLUMETRIC ENVIRONMENTAL INC. DO NOT SCALE DRAWING. THIS DRAWING MAY HAVE BEEN REDUCED. ALL SCALE NOTATIONS INDICATED ARE BASED ON 8.5"X11" FORMAT DRAWINGS.



CLIENT

Ministry of the Environment, Conservation and Parks (MECP)

PROJECT

Assessment of Water Resources to Support a Review of Ontario's Water Quantity Management Framework

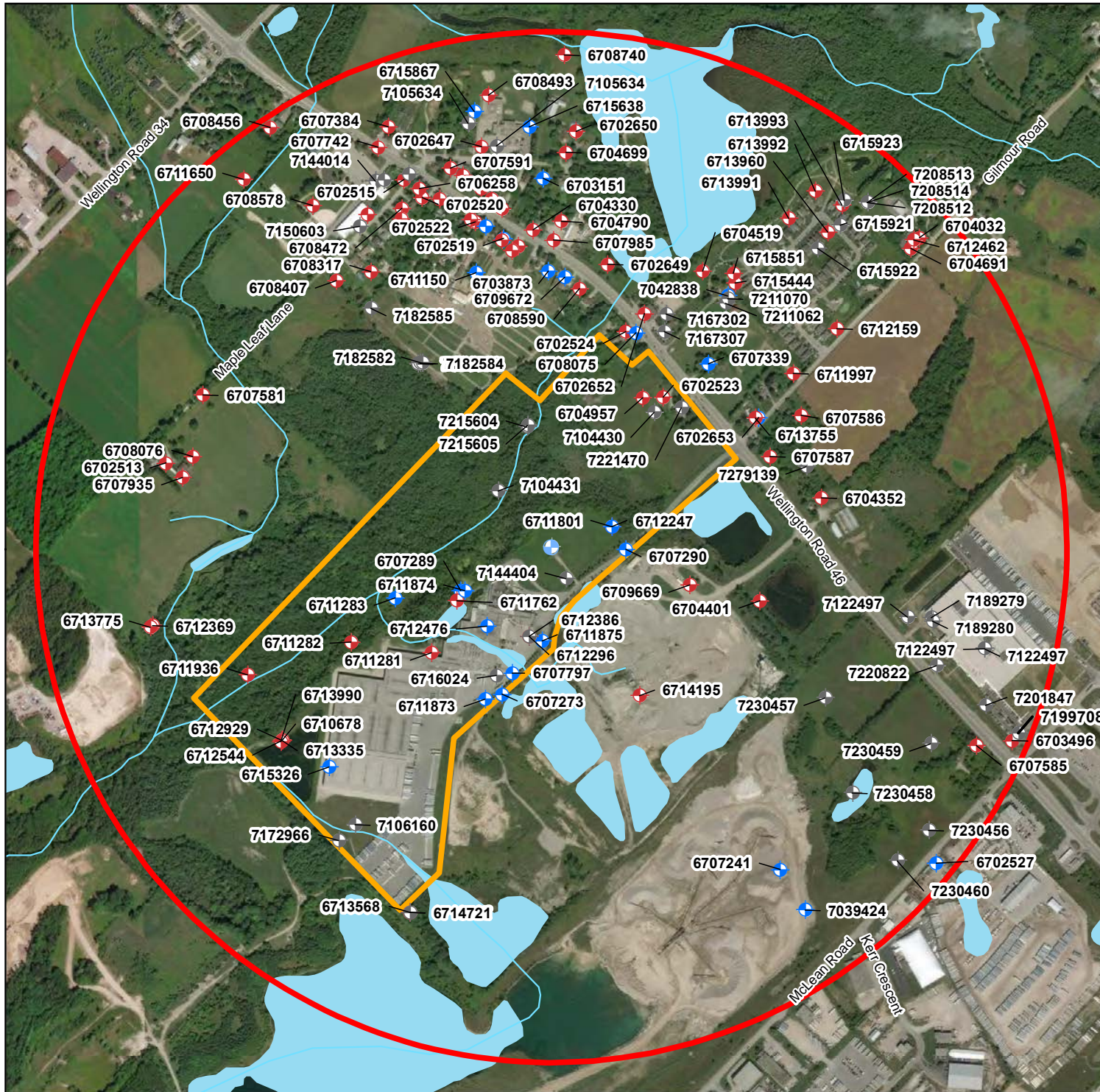
TITLE

Nestlé Waters Canada Erin Site Land Use Setting



171 Victoria St. N.,
Kitchener, Ontario, N2H 5C5
TEL: (519) 742-6685
FAX: (519) 742-9810
Email: info@blumetric.ca
Web: http://www.blumetric.ca

PROJECT #	DATE		
180107-06	January 11, 2019		
DRAWN	CHECKED	FIG NO.	REV
KH	RH	4-B-3	0



LEGEND

- Source Well
- Bedrock Well
- Overburden Well
- Unknown Well Type
- Guelph Nestlé Aberfoyle 1000m Radius
- Guelph Nestlé Aberfoyle Property Boundary

Note:
MECP well records sourced from MECP, 2018.

1				
REV.	DESCRIPTION	YY/MM/DD	BY	CHK

REFERENCES
 PROPRIETARY INFORMATION MAY NOT BE REPRODUCED OR DIVULGED
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 INDICATED ARE BASED ON 8.5 X 11" FORMAT DRAWINGS.



CLIENT

Ministry of the Environment, Conservation and Parks (MECP)

PROJECT

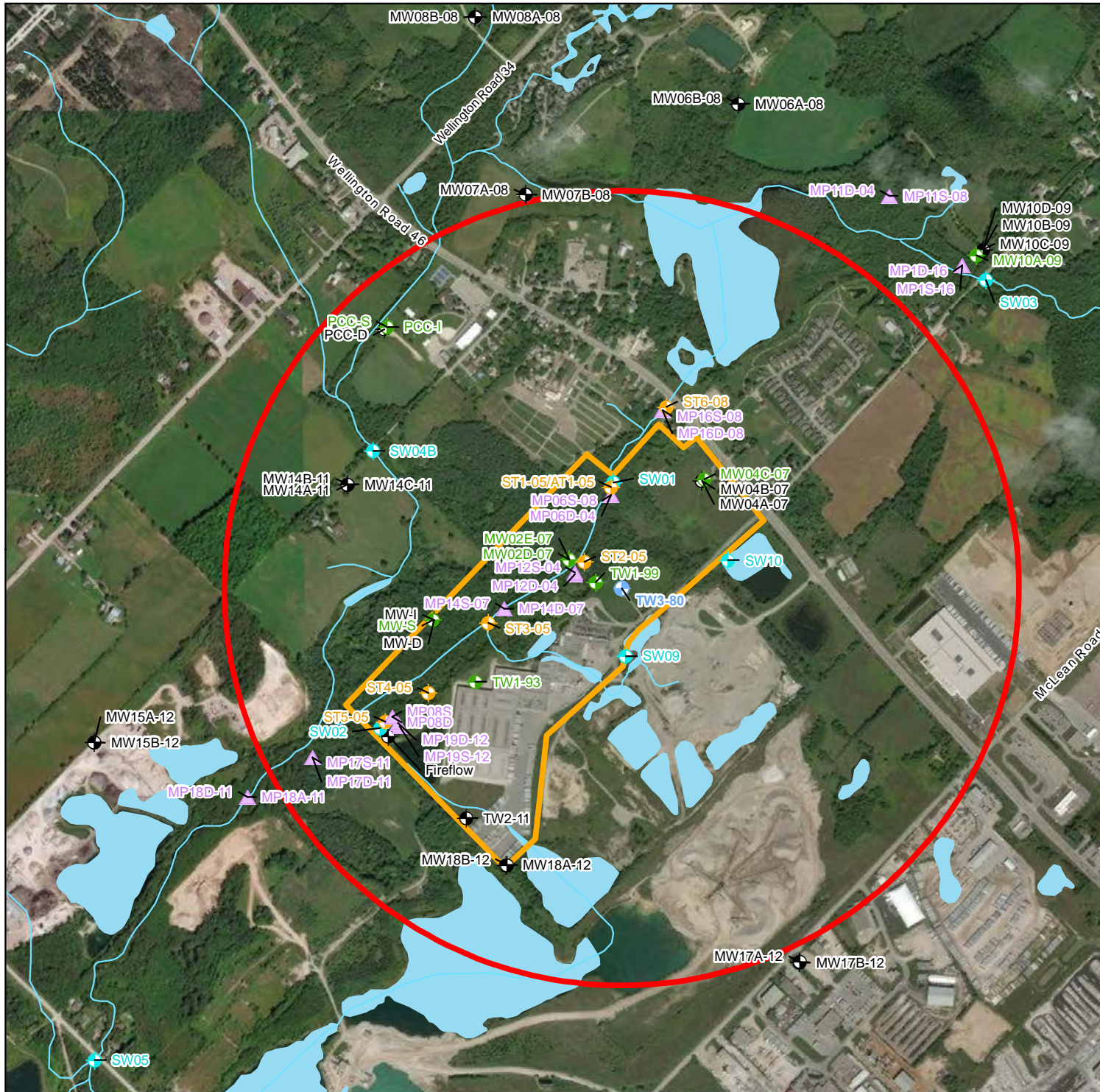
Assessment of Water Resources to Support a Review of Ontario's Water Quantity Management Framework

TITLE

Nestlé Waters Canada Aberfoyle Site Well Records

BluMetric™
 Environmental
 171 Victoria St. N.,
 Kitchener, Ontario, N2H 5C5
 TEL: (519) 742-6685
 FAX: (519) 742-9810
 Email: info@blumetric.ca
 Web: http://www.blumetric.ca

PROJECT # 180107-06		DATE January 18, 2019	
DRAWN KH	CHECKED RH	FIG NO. 4-C-1a	REV 0



LEGEND

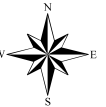
- Source Well
- Groundwater Monitoring Location (Bedrock)
- Groundwater Monitoring Location (Overburden)
- Piezometer
- Surface Water Monitoring Location
- Surface Water Temperature Station
- Guelph Nestlé Aberfoyle 1000m Radius
- Guelph Nestlé Aberfoyle Property Boundary

Note:
Groundwater and surface water monitoring locations, and piezometer locations sourced from Golder Associates Nestlé Waters Canada Aberfoyle Site 2016 Annual Monitoring Report, March 2017

REV.	DESCRIPTION	YY/MM/DD	BY	CHK
1				

REFERENCES

PROPRIETARY INFORMATION MAY NOT BE REPRODUCED OR DIVULGED WITHOUT PRIOR WRITTEN CONSENT OF BLUMETRIC ENVIRONMENTAL INC. DO NOT SCALE DRAWING. THIS DRAWING MAY HAVE BEEN REDUCED. ALL SCALE NOTATIONS INDICATED ARE BASED ON B5/S111 FORMAT DRAWINGS.



CLIENT

Ministry of the Environment, Conservation and Parks (MECP)

PROJECT

Assessment of Water Resources to Support a Review of Ontario's Water Quantity Management Framework

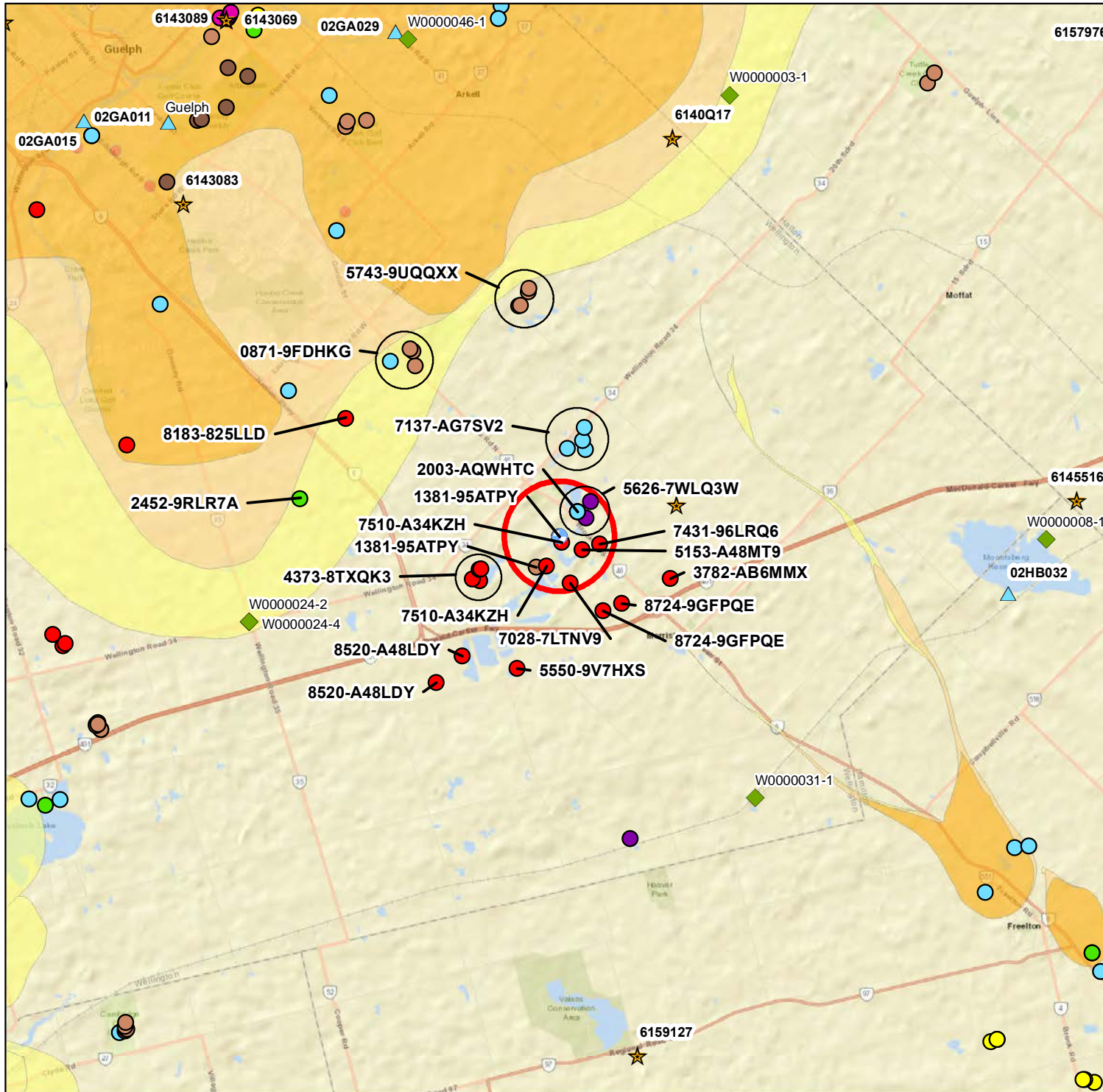
TITLE

Nestlé Waters Canada Aberfoyle Site Source Location and Site Plan



171 Victoria St. N.,
Kitchener, Ontario, N2H 5C5
TEL: (519) 742-6685
FAX: (519) 742-9810
Email: info@blumetric.ca
Web: http://www.blumetric.ca

PROJECT # 180107-06		DATE January 18, 2019	
DRAWN KH	CHECKED RH	FIG NO. 4-C-1b	REV 0



LEGEND

- Source Well
- Provincial Groundwater Monitoring Network Wells and ID
- Weather Stations and ID
- HYDAT Stations and ID
- Guelph Nestlé Aberfoyle 1000m Radius
- WTRS (Active PTTW) and Use
 - Agricultural
 - Commercial
 - Industrial
 - Institutional
 - Miscellaneous
 - Recreational
 - Remediation
 - Water Supply
- Municipal Well Head Protection Areas - Quality
 - A - 100 m Radius
 - B - 2 Year Time of Travel
 - C - 5 Year Time of Travel
 - D - 25 Year Time of Travel

Note:
 Base Map: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan
 Municipal Wellhead Protection Areas: MECP, <http://www.applications.ene.gov.on.ca/swp/en/index.php>
 Active PTTWs: MECP, 2018. <https://www.ontario.ca/environment-and-energy/map-permitstake-water>
 Provincial Groundwater Monitoring Network: MECP, <https://www.ontario.ca/environment-and-energy/map-provincial-groundwater-monitoring-network>
 Weather Stations: Government of Canada, <http://climate.weather.gc.ca/>
 HYDAT stations: Government of Canada, <https://www.canada.ca/en/environment-climate-change/services/water-overview/quantity/monitoring/survey/data-products-services/nationalarchive-hydat.html>

1				
REV.	DESCRIPTION	YY/MM/DD	BY	CHK
REFERENCES				
<small> PROPRIETARY INFORMATION MAY NOT BE REPRODUCED OR DIVULGED WITHOUT PRIOR WRITTEN CONSENT OF BLUMETRIC ENVIRONMENTAL INC. DO NOT SCALE DRAWING. THIS DRAWING MAY HAVE BEEN REDUCED. ALL SCALE NOTATIONS INDICATED ARE BASED ON 0.5"=1" FORMAT DRAWINGS. </small>				

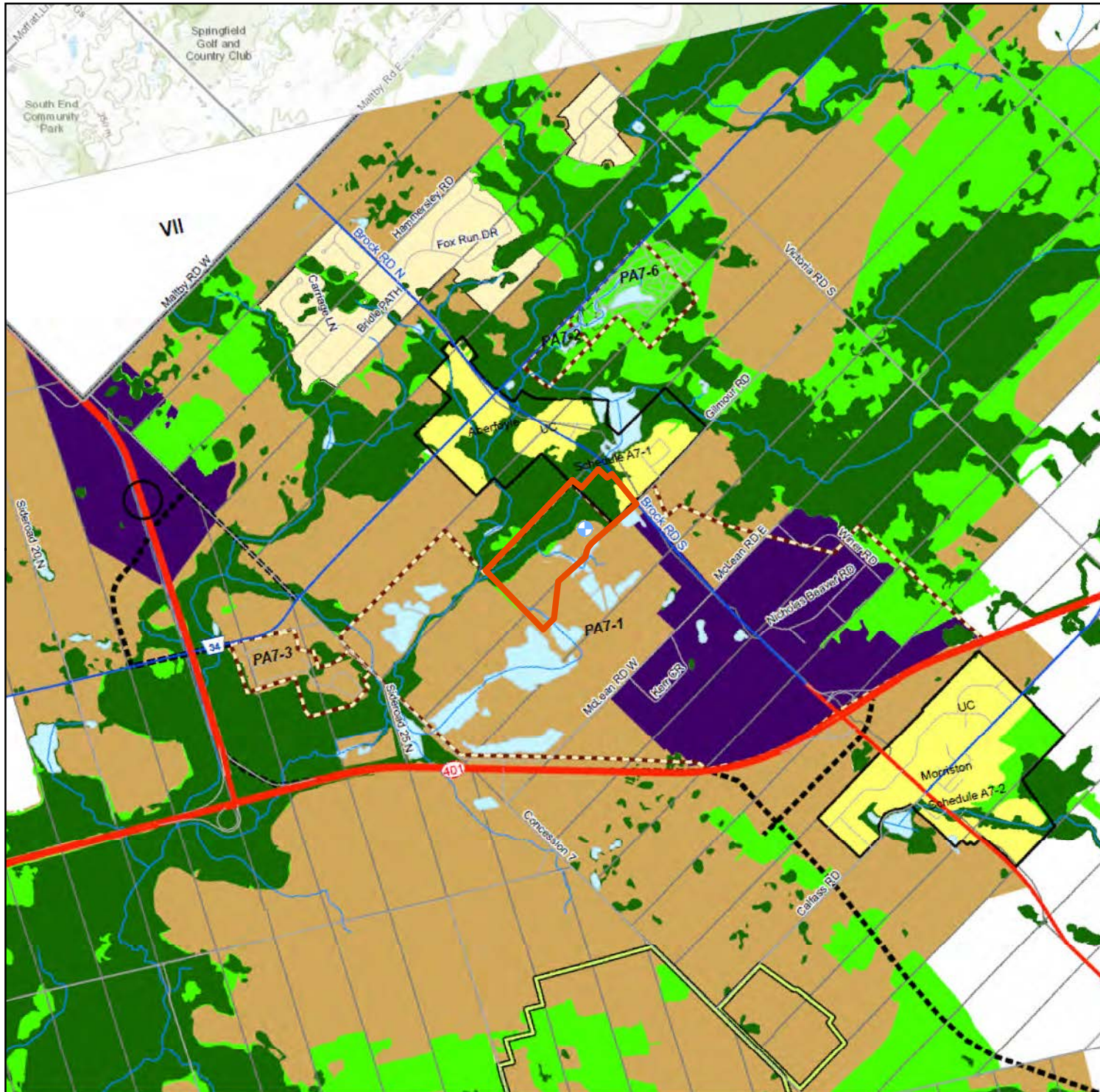
CLIENT
 Ministry of the Environment, Conservation and Parks (MECP)

PROJECT
 Assessment of Water Resources to Support a Review of Ontario's Water Quantity Management Framework

TITLE
 Nestlé Waters Canada Aberfoyle Site Regional Study Area

171 Victoria St. N.,
 Kitchener, Ontario, N2H 5C5
 TEL: (519) 742-6685
 FAX: (519) 742-9810
 Email: info@blumetric.ca
 Web: <http://www.blumetric.ca>

PROJECT # 180107-06		DATE January 24, 2019		
DRAWN KH	CHECKED RH	FIG NO. 4-C-2	REV 0	



LEGEND

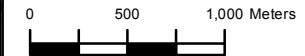
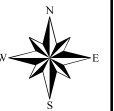
- Source Well
- Guelph Nestlé Aberfoyle Property Boundary
- Land Use Classification**
- Core Greenlands
- Greenlands
- Prime Agricultural
- Secondary Agricultural
- C.R. Country Residential
- PA Policy Area
- H. Hamlet Area
- U.C. Urban Centre
- Trail
- Landfill Site
- Proposed Interchange
- Proposed Major Roadways
- County Roads
- Provincial Highways

Note:
Land Use information sourced from County of Wellington, Official Plan, Schedule A7 – Puslinch, August 2016.

1				
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REV.	DESCRIPTION	YY/MM/DD	BY	CHK
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REFERENCES
 PROPRIETARY INFORMATION MAY NOT BE REPRODUCED OR DIVULGED WITHOUT PRIOR WRITTEN CONSENT OF BLUMETRIC ENVIRONMENTAL INC. DO NOT SCALE DRAWING.
 THIS DRAWING MAY HAVE BEEN REDUCED. ALL SCALE NOTATIONS INDICATED ARE BASED ON 8.5"X11" FORMAT DRAWINGS.



CLIENT

Ministry of the Environment, Conservation and Parks (MECP)

PROJECT

Assessment of Water Resources to Support a Review of Ontario's Water Quantity Management Framework

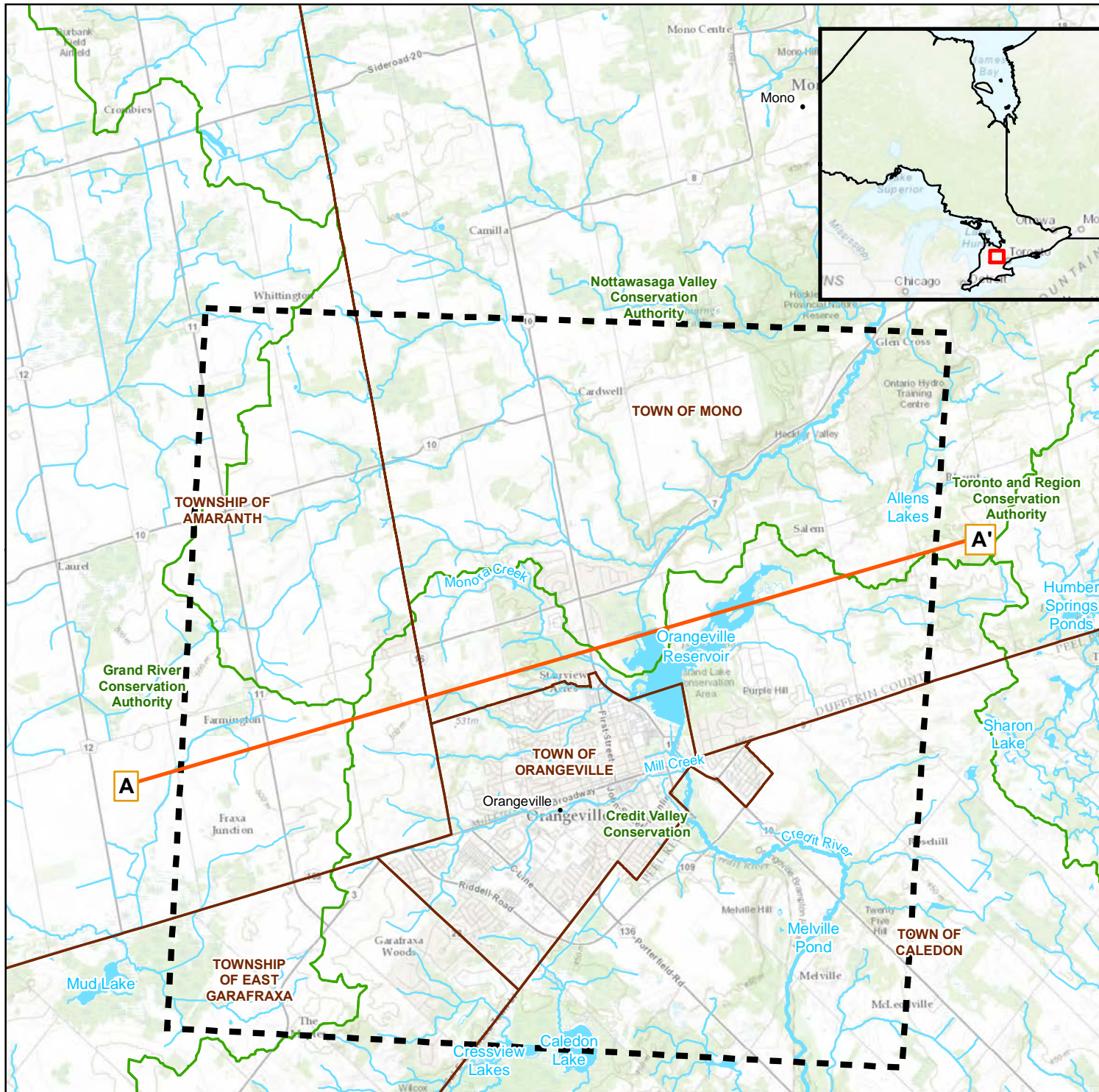
TITLE

Nestlé Waters Canada Aberfoyle Site Land Use Setting



171 Victoria St. N.,
 Kitchener, Ontario, N2H 5C5
 TEL: (519) 742-6685
 FAX: (519) 742-9810
 Email: info@blumetric.ca
 Web: http://www.blumetric.ca

PROJECT # 180107-06		DATE January 11, 2019	
DRAWN KH	CHECKED RH	FIG NO. 4-C-3	REV 0



- LEGEND**
- Preliminary Water Quantity Study Area (WQSA)
 - Municipalities
 - Conservation Authority
 - Major Watercourse
 - Watercourse

1					
REV	DESCRIPTION	YY/MM/DD	BY	CHK	

REFERENCES
 PROPRIETARY INFORMATION MAY NOT BE REPRODUCED OR DIVULGED WITHOUT PRIOR WRITTEN CONSENT OF BLUMETRIC ENVIRONMENTAL INC. DO NOT SCALE DRAWING. THIS DRAWING MAY HAVE BEEN REDUCED. ALL SCALE NOTATIONS INDICATED ARE BASED ON 8.5"x11" FORMAT DRAWINGS.

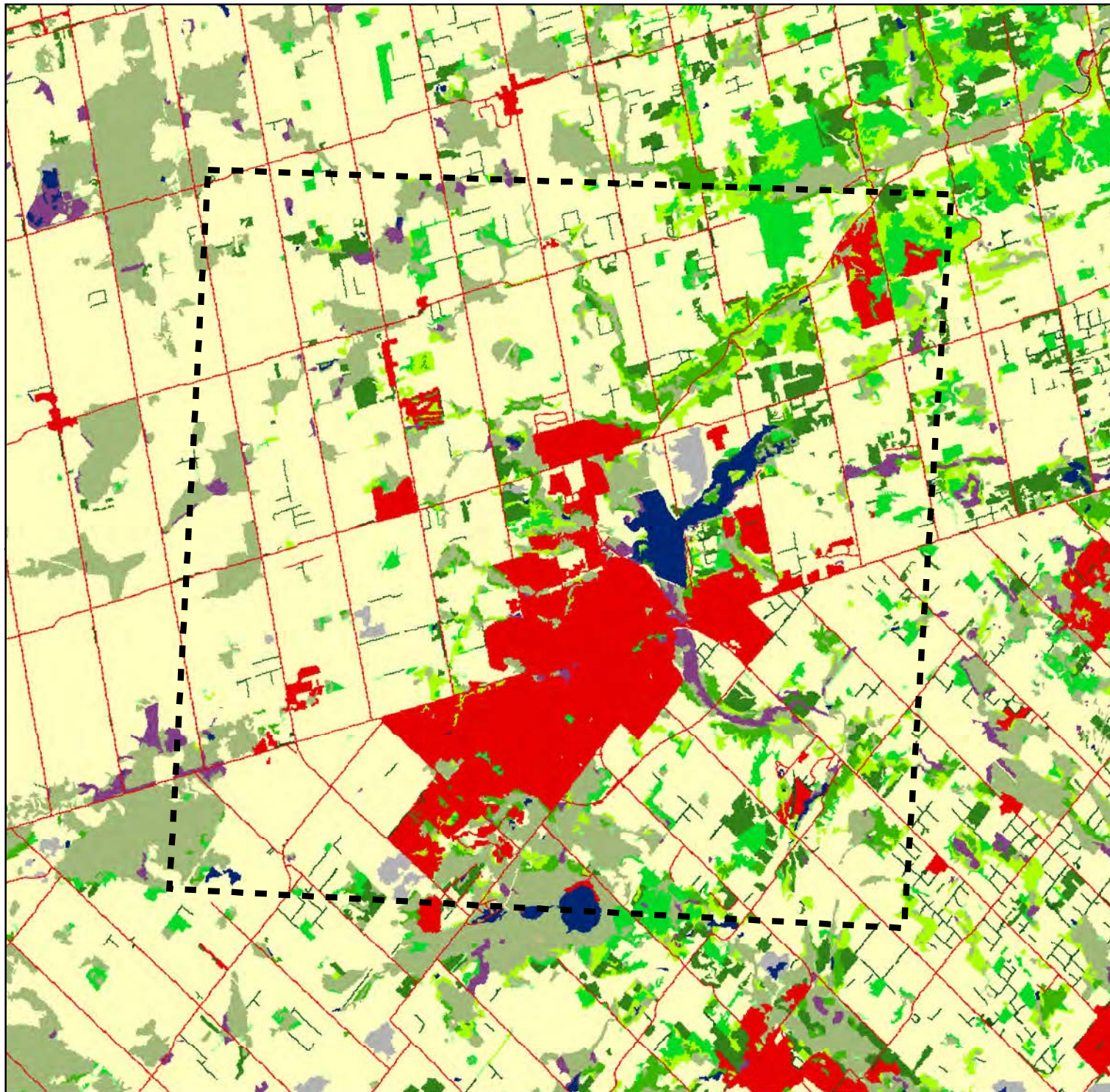
CLIENT
 Ministry of the Environment, Conservation and Parks (MECP)

PROJECT
 Assessment of Water Resources to Support a Review of Ontario's Water Quantity Management Framework

TITLE
 Orangeville Water Quantity Study Area Boundary

171 Victoria St. N.,
 Kitchener, Ontario, N2H 5C5
 TEL: (519) 742-6685
 FAX: (519) 742-9810
 Email: info@blumetric.ca
 Web: http://www.blumetric.ca

PROJECT # 180107-06		DATE January 11, 2019	
DRAWN KH	CHECKED HH/FAR	FIG NO. 5-1	REV 0





LEGEND

- Preliminary Water Quantity Study Area
- 1 - Clear Open Water
- 5 - Marsh
- 6 - Swamp
- 8 - Bog
- 12 - Treeed Upland
- 13 - Deciduous Treeed
- 14 - Mixed Treeed
- 15 - Coniferous Treeed
- 16 - Plantations - Treeed Cultivated
- 17 - Hedge Rows
- 25 - Sand/Gravel/Mine Tailings/Extraction
- 27 - Community/Infrastructure
- 28 - Agriculture and Undifferentiated Rural Land

1				
REV	DESCRIPTION	YY/MM/DD	BY	CHK

REFERENCES
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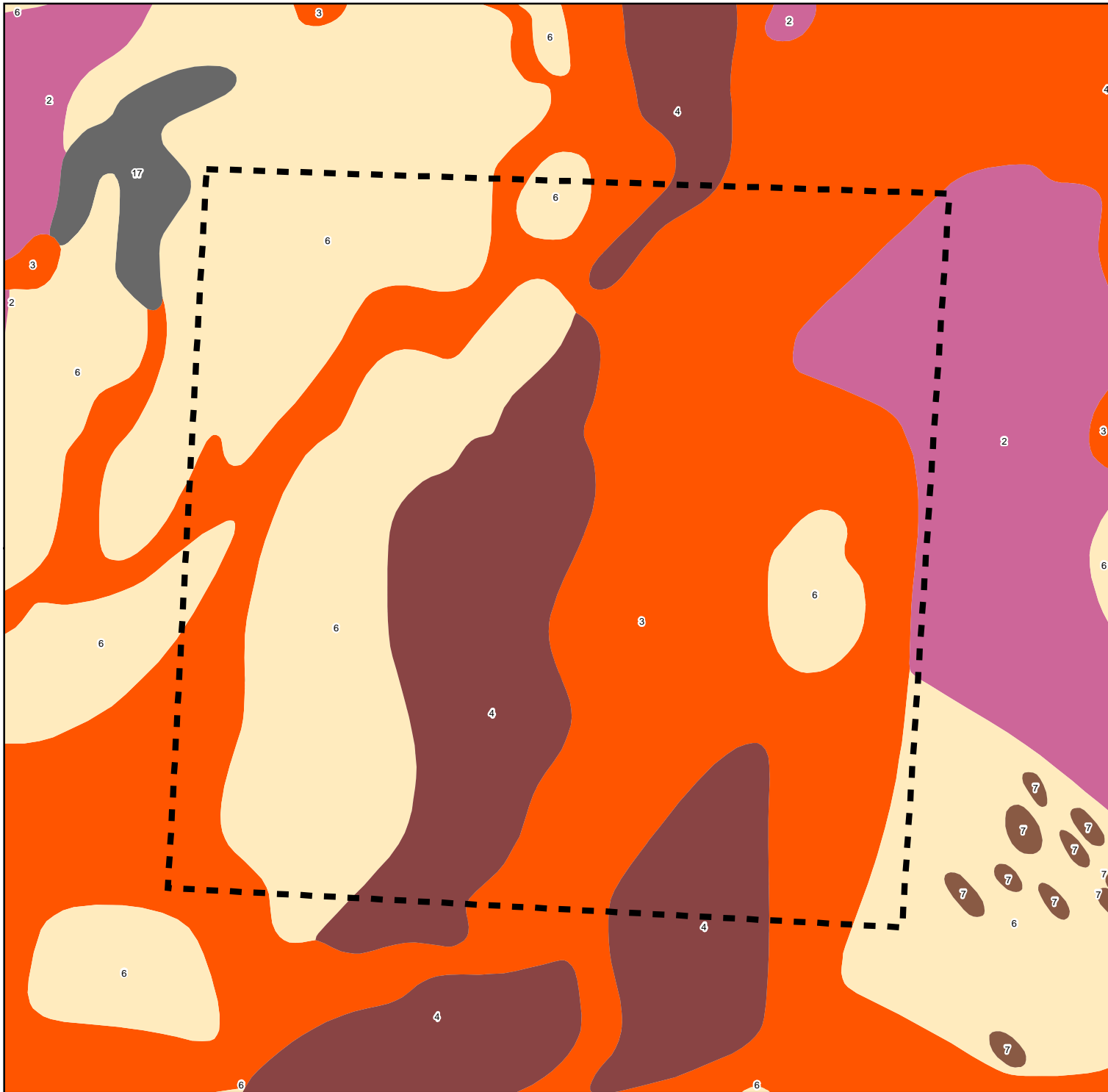
CLIENT
 Ministry of the Environment, Conservation and Parks (MECP)

PROJECT
 Assessment of Water Resources to Support a Review of Ontario's Water Quantity Management Framework

TITLE
 Orangeville Land Cover


 171 Victoria St. N.,
 Kitchener, Ontario, N2H 5C5
 TEL: (519) 742-6685
 FAX: (519) 742-9810
 Email: info@blumetric.ca
 Web: <http://www.blumetric.ca>

PROJECT # 180107-06	DATE January 11, 2019		
DRAWN KH	CHECKED HH/FAR	FIG NO. 5-2	REV 0



LEGEND
 ■ ■ Preliminary Water Quantity Study Area (WQSA)

Southern Ontario Physiography

- 17: Peat And Muck
- 7: Drumlins
- 6: Till Plains (Drumlinized)
- 4: Kame Moraines
- 3: Spillways
- 2: Till Moraines

REV	DESCRIPTION	YY/MM/DD	BY	CHK
1				

REFERENCES
 PROPRIETARY INFORMATION MAY NOT BE REPRODUCED OR DIVULGED WITHOUT PRIOR WRITTEN CONSENT OF BLUMETRIC ENVIRONMENTAL INC. DO NOT SCALE DRAWING. THIS DRAWING MAY HAVE BEEN REDUCED. ALL SCALE NOTATIONS INDICATED ARE BASED ON 8.5"x11" FORMAT DRAWINGS.

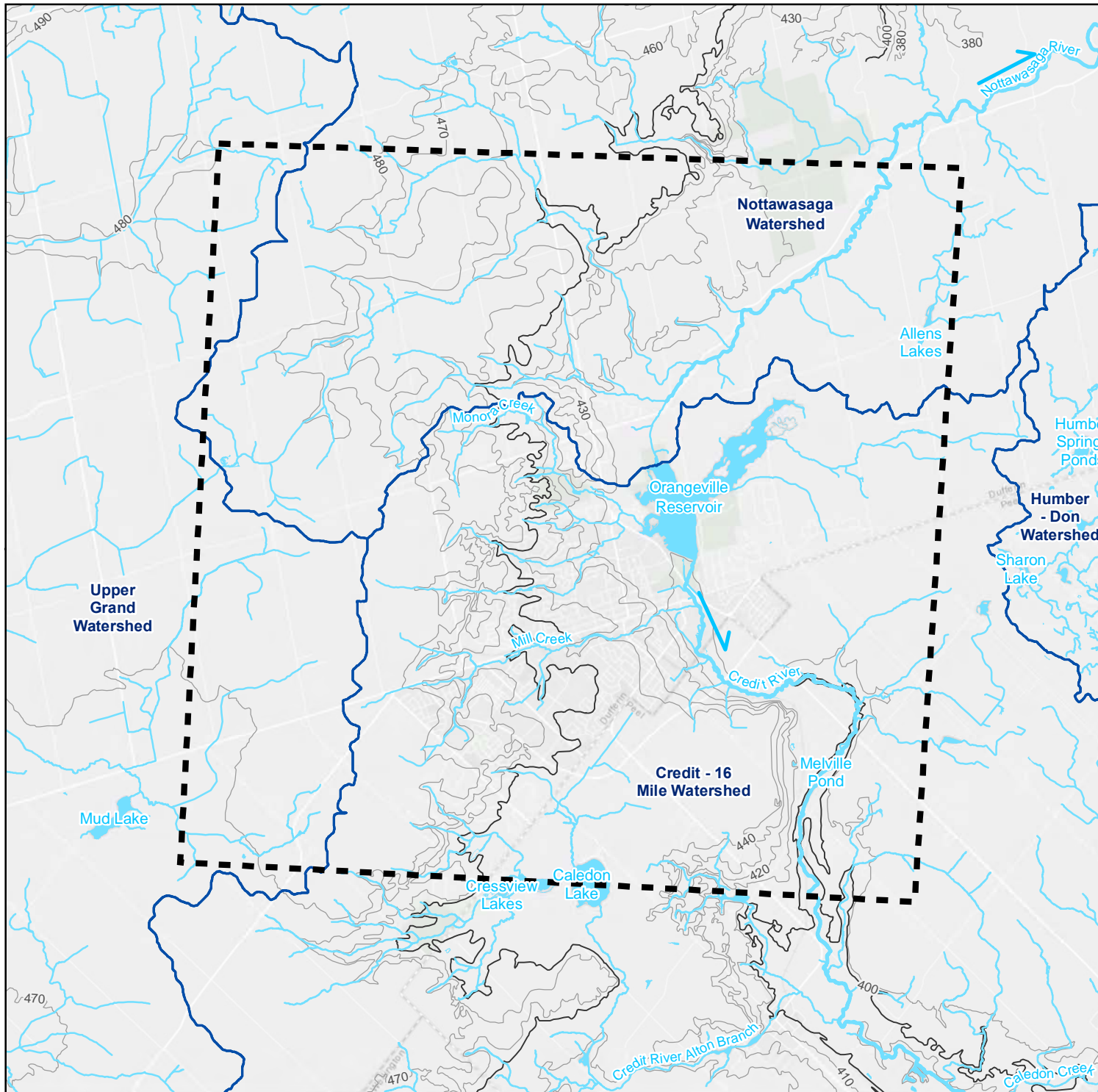
CLIENT
 Ministry of the Environment, Conservation and Parks (MECP)

PROJECT
 Assessment of Water Resources to Support a Review of Ontario's Water Quantity Management Framework

TITLE
 Orangeville Regional Physiography

BluMetric™ Environmental
 171 Victoria St. N.,
 Kitchener, Ontario, N2H 5C5
 TEL: (519) 742-6685
 FAX: (519) 742-9810
 Email: info@blumetric.ca
 Web: http://www.blumetric.ca

PROJECT # 180107-06		DATE January 11, 2019	
DRAWN KH	CHECKED HH/FAR	FIG NO. 5-3	REV 0



LEGEND

- Preliminary Water Quantity Study Area (WQSA)
- Watershed Boundary
- Major Watercourse and Flow Direction
- Watercourse
- Waterbody

Elevation Contours

- 10 m
- 50 m

1				
REV	DESCRIPTION	YY/MM/DD	BY	CHK

REFERENCES
 PROPRIETARY INFORMATION MAY NOT BE REPRODUCED OR DIVULGED WITHOUT PRIOR WRITTEN CONSENT OF BLUMETRIC ENVIRONMENTAL INC. DO NOT SCALE DRAWING. THIS DRAWING MAY HAVE BEEN REDUCED. ALL SCALE NOTATIONS INDICATED ARE BASED ON 8.5"x11" FORMAT DRAWINGS.

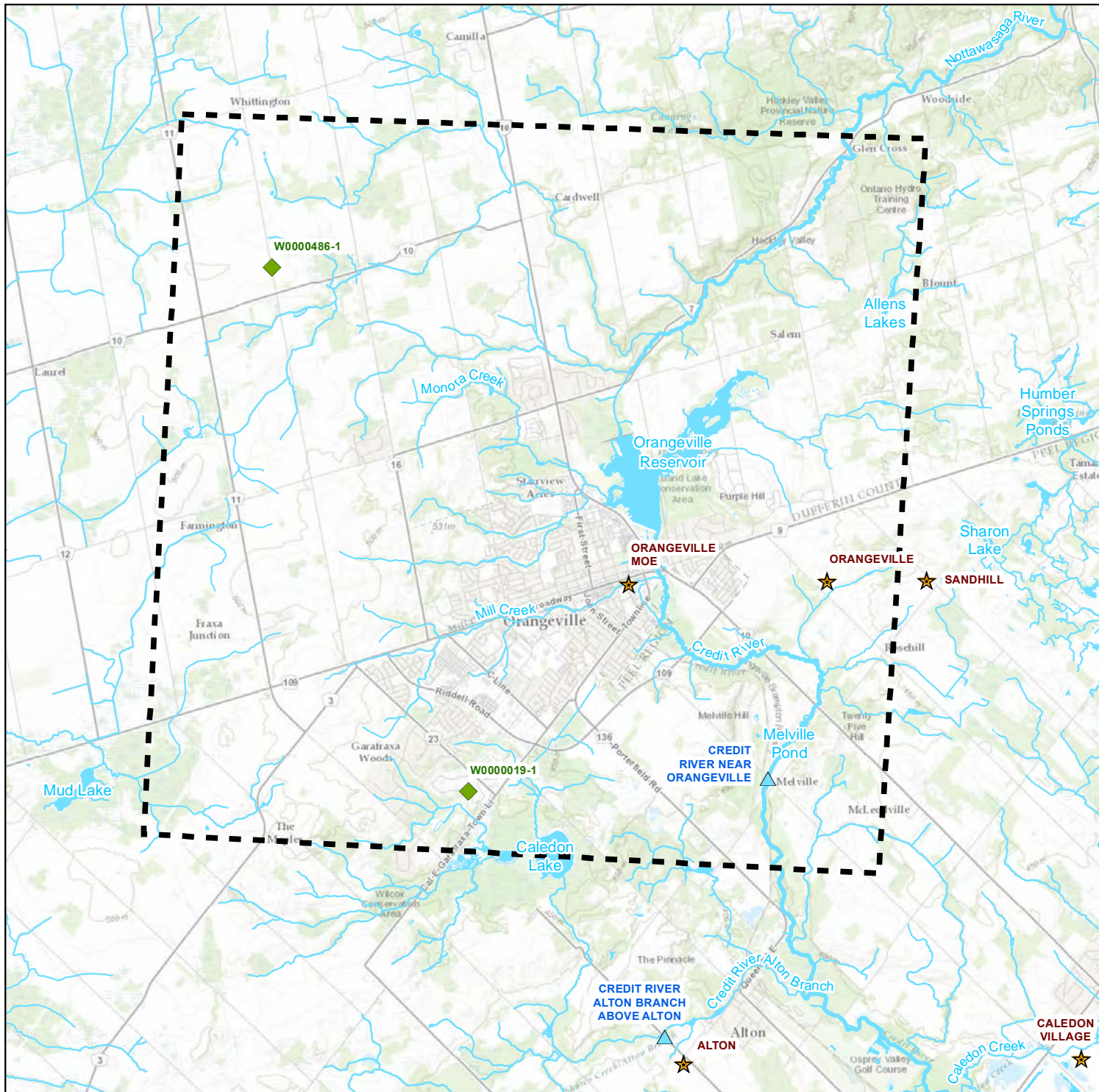
CLIENT
 Ministry of the Environment, Conservation and Parks (MECP)

PROJECT
 Assessment of Water Resources to Support a Review of Ontario's Water Quantity Management Framework

TITLE
 Orangeville Regional Topography and Hydrology

171 Victoria St. N.,
 Kitchener, Ontario, N2H 5C5
 TEL: (519) 742-6685
 FAX: (519) 742-9810
 Email: info@blumetric.ca
 Web: http://www.blumetric.ca

PROJECT # 180107-06		DATE January 11, 2019	
DRAWN KH	CHECKED HH/FAR	FIG NO. 5-4	REV 0



LEGEND

- ◆ Provincial Groundwater Monitoring Network Wells
- ★ Weather Stations
- ▲ HYDAT Stations
- Preliminary Water Quantity Study Area (WQSA)
- Major Watercourse
- Watercourse

1				
REV.	DESCRIPTION	YY/MM/DD	BY	CHK

REFERENCES
 PROPRIETARY INFORMATION MAY NOT BE REPRODUCED OR DIVULGED WITHOUT PRIOR WRITTEN CONSENT OF BLUMETRIC ENVIRONMENTAL INC. DO NOT SCALE DRAWING. THIS DRAWING MAY HAVE BEEN REDUCED. ALL SCALE NOTATIONS INDICATED ARE BASED ON 8.5"x11" FORMAT DRAWINGS.

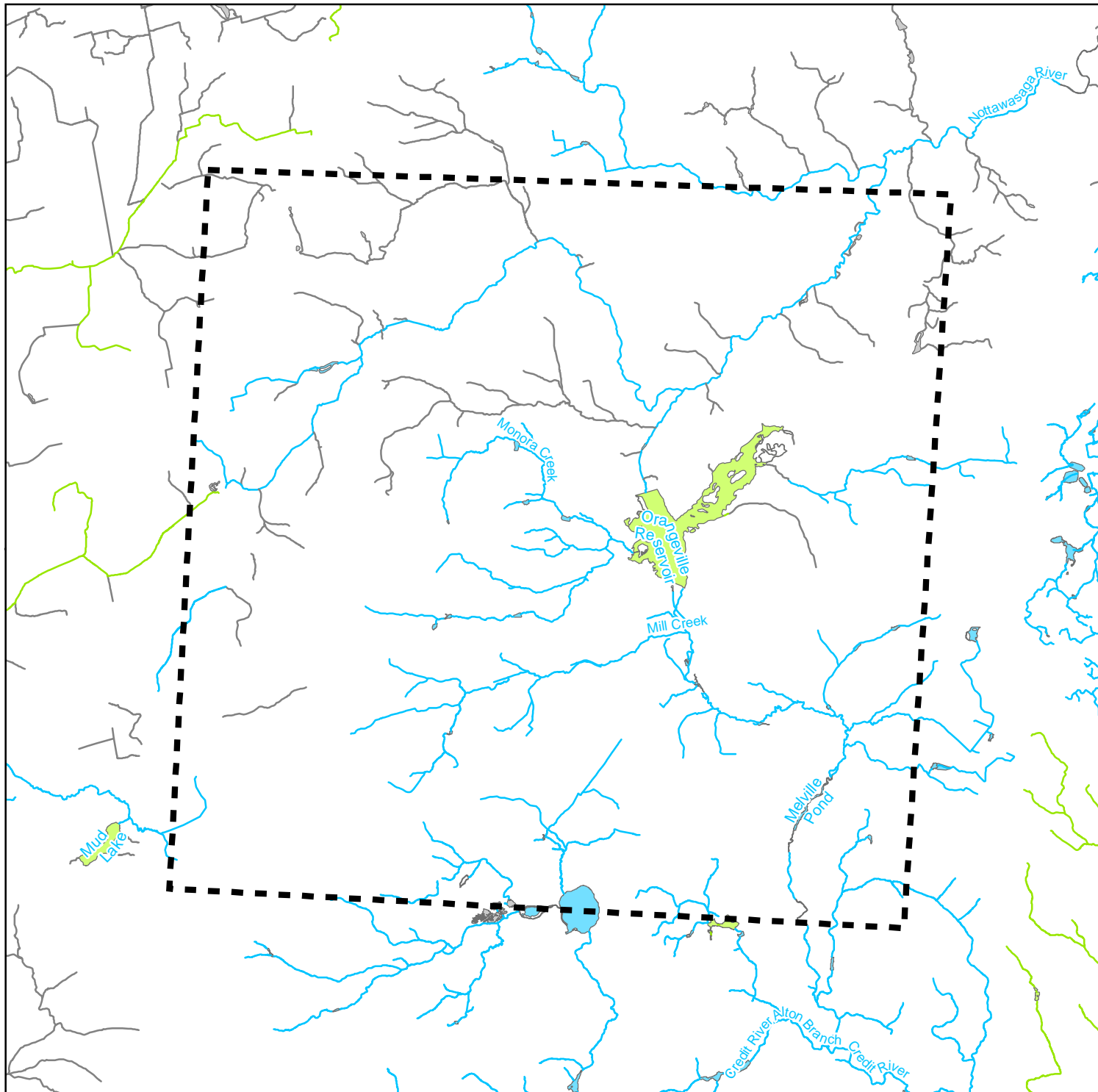
CLIENT
 Ministry of the Environment, Conservation and Parks (MECP)

PROJECT
 Assessment of Water Resources to Support a Review of Ontario's Water Quantity Management Framework

TITLE
 Orangeville Meteorological Stations

171 Victoria St. N.,
 Kitchener, Ontario, N2H 5C5
 TEL: (519) 742-6685
 FAX: (519) 742-9810
 Email: info@blumetric.ca
 Web: http://www.blumetric.ca

PROJECT # 180107-06		DATE January 14, 2019	
DRAWN KH	CHECKED RH	FIG NO. 5-5	REV 0



LEGEND

Preliminary Water Quantity Study Area (WQSA)
Thermal Regime
 Unknown
 Cold
 Cool
 Warm
Thermal Regime
 Unknown
 Cold
 Cool
 Warm

1				
REV	DESCRIPTION	YY/MM/DD	BY	CHK

REFERENCES
 PROPRIETARY INFORMATION MAY NOT BE REPRODUCED OR DIVULGED WITHOUT PRIOR WRITTEN CONSENT OF BLUMETRIC ENVIRONMENTAL INC. DO NOT SCALE DRAWING. THIS DRAWING MAY HAVE BEEN REDUCED. ALL SCALE NOTATIONS INDICATED ARE BASED ON 8.5"x11" FORMAT DRAWINGS.

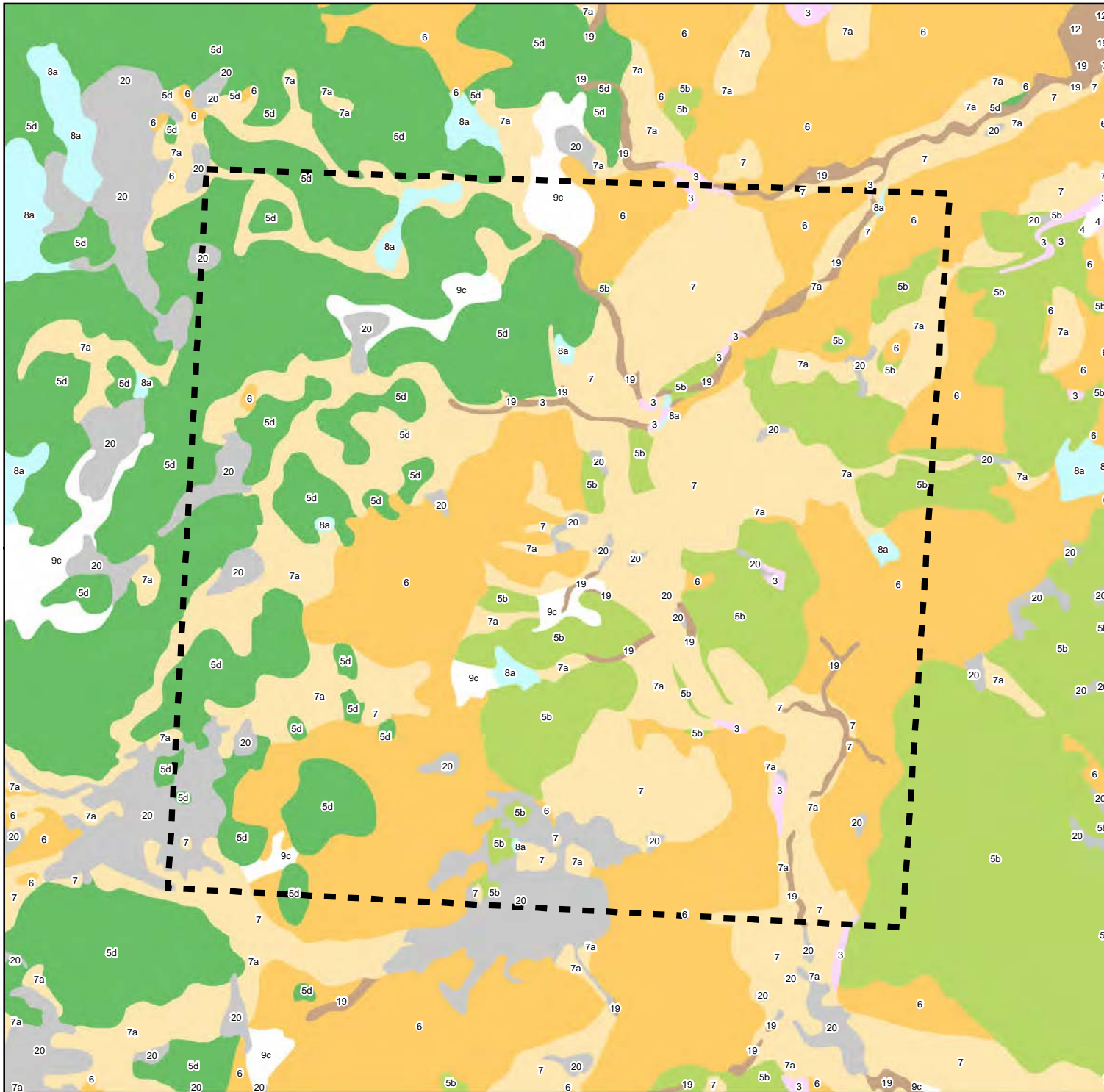
CLIENT
 Ministry of the Environment, Conservation and Parks (MECP)

PROJECT
 Assessment of Water Resources to Support a Review of Ontario's Water Quantity Management Framework

TITLE
 Orangeville Aquatic Thermal Regions

171 Victoria St. N.,
 Kitchener, Ontario, N2H 5C5
 TEL: (519) 742-6685
 FAX: (519) 742-9810
 Email: info@blumetric.ca
 Web: <http://www.blumetric.ca>

PROJECT # 180107-06		DATE January 11, 2019	
DRAWN KH	CHECKED HH/FAR	FIG NO. 5-6	REV 0



LEGEND

Preliminary Water Quantity Study Area (WQSA)

Surficial Geology (MNDM File - MRD128-REV)

- 3: Paleozoic bedrock
- 5b: Stone-poor, carbonate-derived silty to sandy till
- 5d: Glaciolacustrine-derived silty to clayey till
- 6: Ice-contact stratified deposits
- 7: Glaciofluvial deposits
- 7a: Sandy deposits
- 8a: Massive-well laminated
- 12: Older alluvial deposits
- 19: Modern alluvial deposits
- 20: Organic deposits

REV	DESCRIPTION	YY/MM/DD	BY	CHK
1				

REFERENCES
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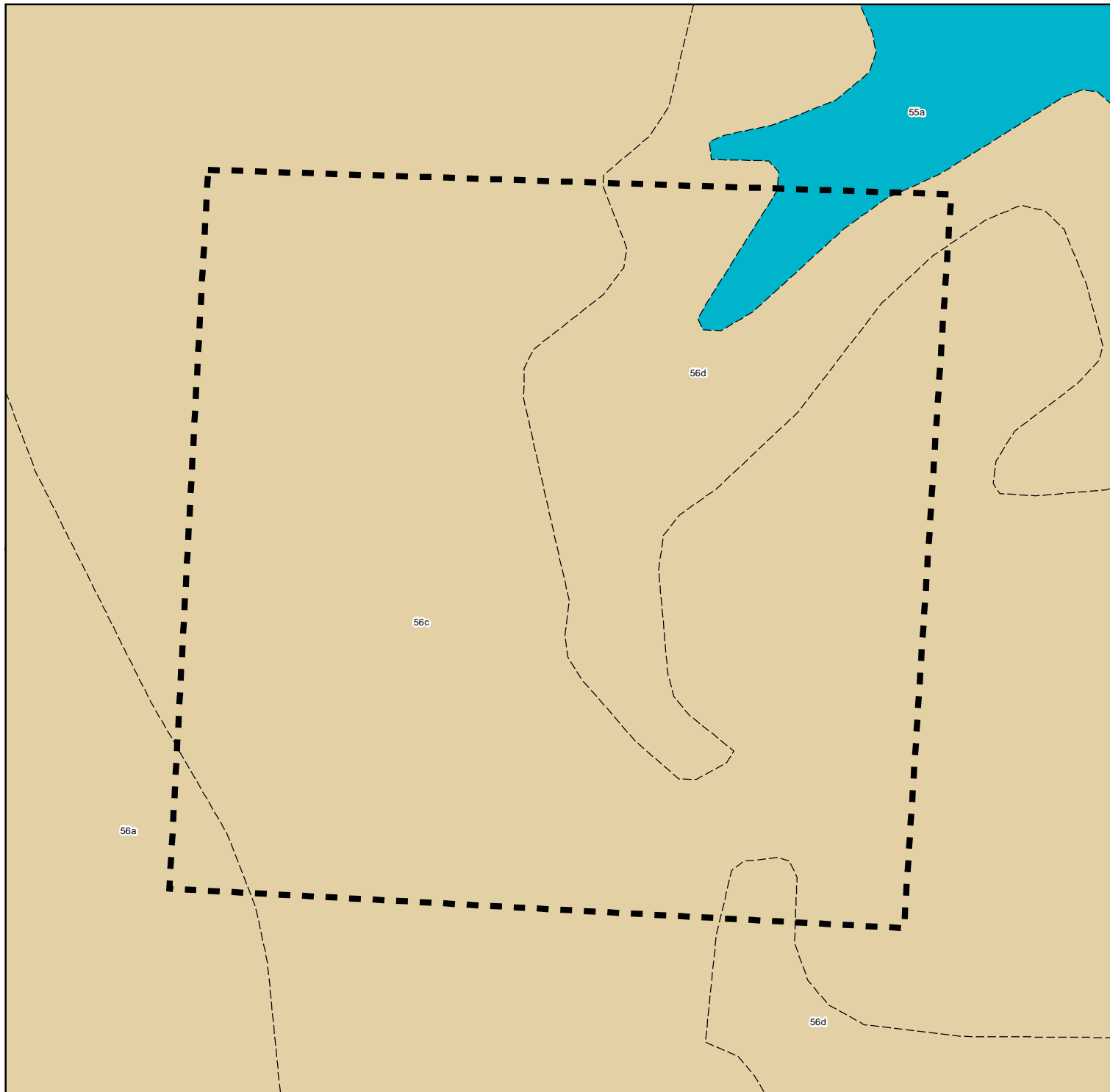
CLIENT
 Ministry of the Environment, Conservation and Parks (MECP)

PROJECT
 Assessment of Water Resources to Support a Review of Ontario's Water Quantity Management Framework

TITLE
 Orangeville Surficial Geology

171 Victoria St. N.,
 Kitchener, Ontario, N2H 5C5
 TEL: (519) 742-6685
 FAX: (519) 742-9810
 Email: info@blumetric.ca
 Web: http://www.blumetric.ca

PROJECT # 180107-06	DATE January 11, 2019		
DRAWN KH	CHECKED HH/FAR	FIG NO. 5-7	REV 0



LEGEND

- Preliminary Water Quantity Study Area (WQSA)
- Contact, Sharp, Trend, Interpreted
- Upper Ordovician - shale, limestone, dolostone, siltstone**
- 55a - Queenstone Formation
- Lower Silurian - sandstone, shale, dolostone, siltstone**
- 56a - Guelph Formation
- 56c - Armabel Formation
- 56d - Clinton Group; Cataract Group

1				
REV	DESCRIPTION	YY/MM/DD	BY	CHK

REFERENCES
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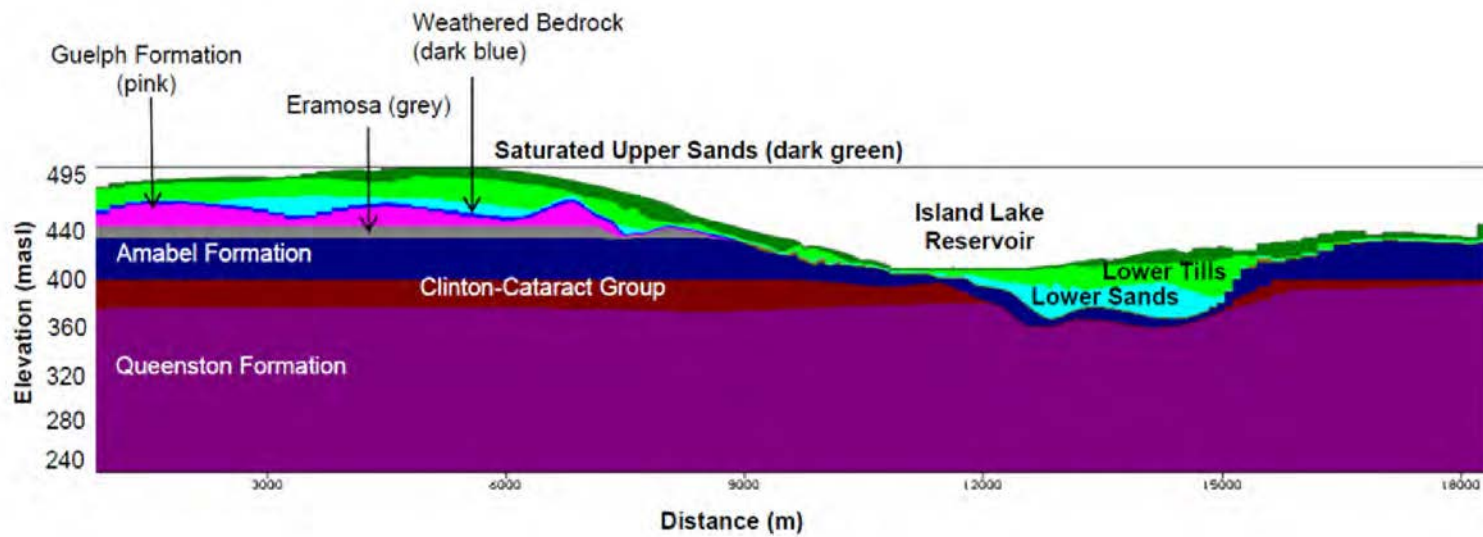
CLIENT
 Ministry of the Environment, Conservation
 and Parks (MECP)

PROJECT
 Assessment of Water Resources to Support
 a Review of Ontario's Water Quantity
 Management Framework

TITLE
 Orangeville
 Bedrock Geology

171 Victoria St. N.,
 Kitchener, Ontario, N2H 5C5
 TEL: (519) 742-6685
 FAX: (519) 742-9810
 Email: info@blumetric.ca
 Web: <http://www.blumetric.ca>

<i>PROJECT #</i> 180107-06		<i>DATE</i> January 11, 2019	
<i>DRAWN</i> KH	<i>CHECKED</i> HH/FAR	<i>FIG NO.</i> 5-8	<i>REV</i> 0



LEGEND

SOURCE

AquaResource Inc, (2011): Orangeville, Mono, and Amaranth Tier Three Water Budget and Local Area Risk Assessment - Figure 2-6

REV	DESCRIPTION	YY/MM/DD	BY	CHK
1				

REFERENCES

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Ministry of the Environment, Conservation and Parks (MECP)

PROJECT

Assessment of Water Resources to Support a Review of Ontario's Water Quantity Management Framework

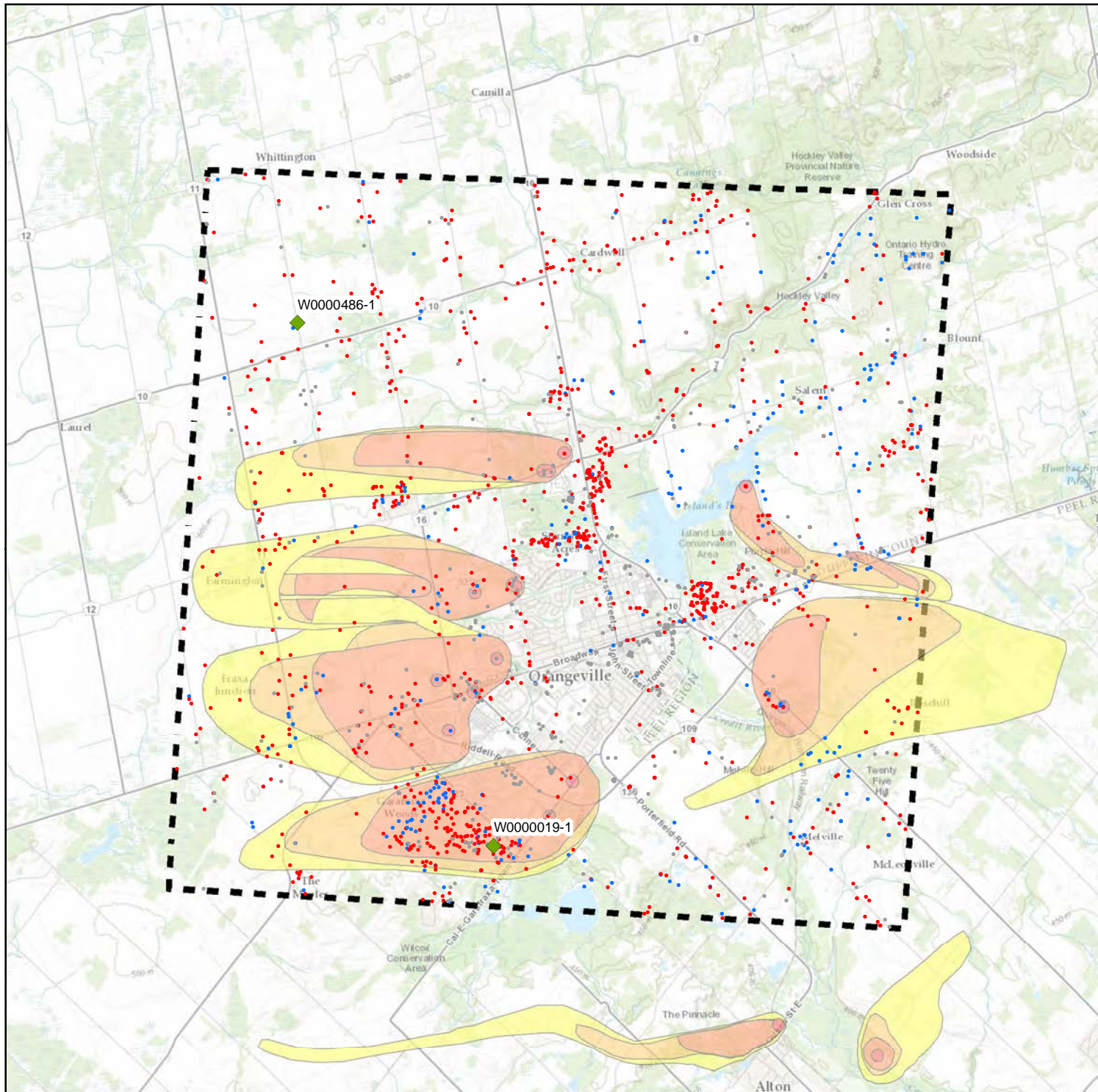
TITLE

Orangeville Hydrogeological Cross-Section



171 Victoria St. N.,
Kitchener, Ontario, N2H 5C5
TEL: (519) 742-6685
FAX: (519) 742-9810
Email: info@blumetric.ca
Web: http://www.blumetric.ca

PROJECT # 180107-06		DATE January 11, 2019	
DRAWN KH	CHECKED HH/PAR	FIG NO. 5-9	REV 0



LEGEND

- ◆ Provincial Groundwater Monitoring Network Wells
- Bedrock Well
- Overburden Well
- Unknown Well Type

Wellhead Protection Areas

- A
- B
- C
- C1
- D
- F

Preliminary Water Quantity Study Area (WQSA)

1				
REV	DESCRIPTION	YY/MM/DD	BY	CHK

REFERENCES
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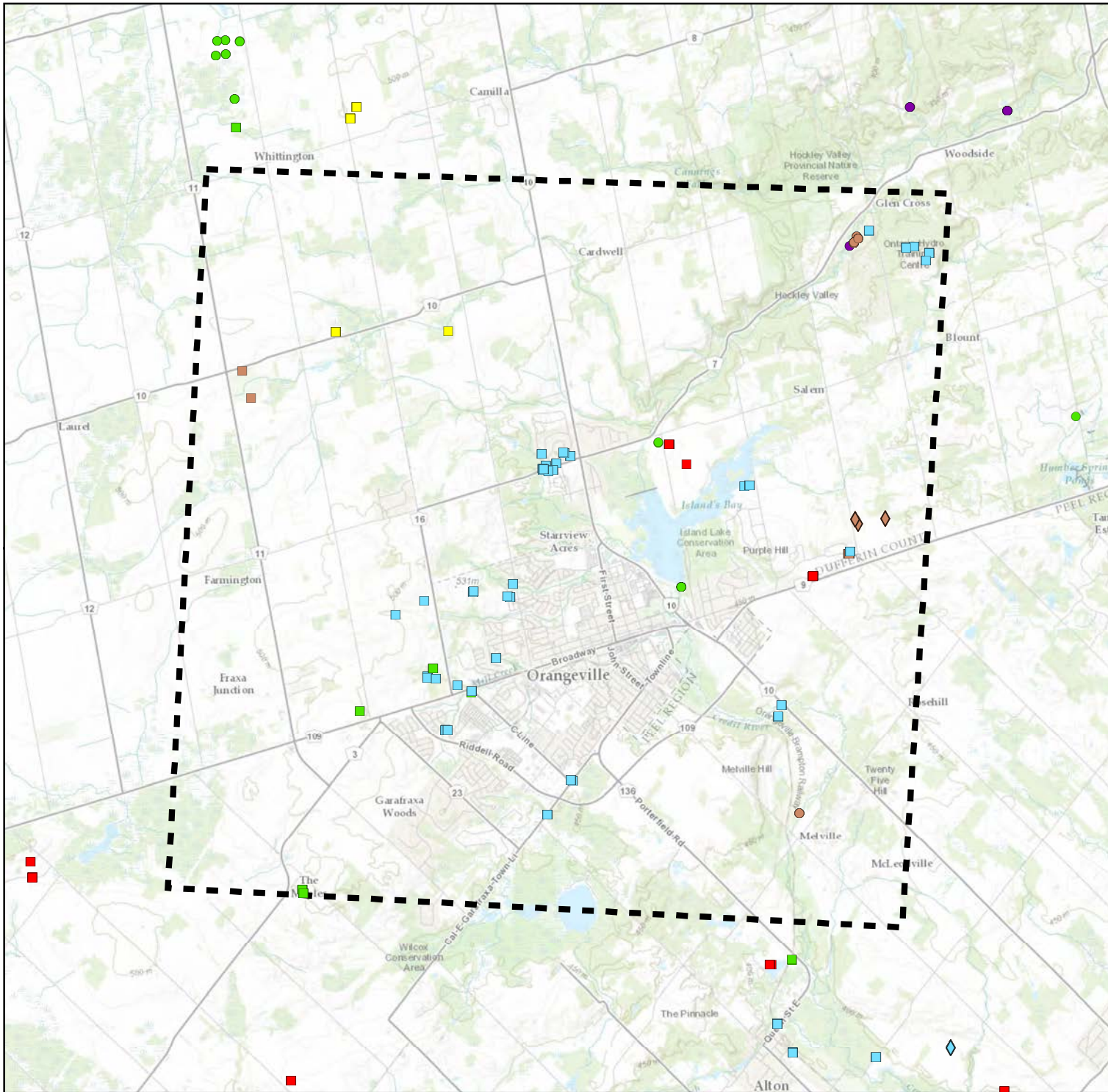
CLIENT
 Ministry of the Environment, Conservation and Parks (MECP)

PROJECT
 Assessment of Water Resources to Support a Review of Ontario's Water Quantity Management Framework

TITLE
 Orangeville Water Well Information System and Provincial Groundwater Monitoring Network Wells

171 Victoria St. N.,
 Kitchener, Ontario, N2H 5C5
 TEL: (519) 742-6685
 FAX: (519) 742-9810
 Email: info@blumetric.ca
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PROJECT # 180107-06		DATE January 11, 2019	
DRAWN KH	CHECKED HH/FAR	FIG NO. 5-10	REV 0



LEGEND

Preliminary Water Quantity Study Area

Water Taking Permit by Type and Purpose

- Agricultural
- Commercial
- Dewatering
- Industrial
- Institutional
- Miscellaneous
- Recreational
- Remediation
- Water Supply

Surface Water:

Groundwater:

Both:

REV	DESCRIPTION	YY/MM/DD	BY	CHK
1				

REFERENCES
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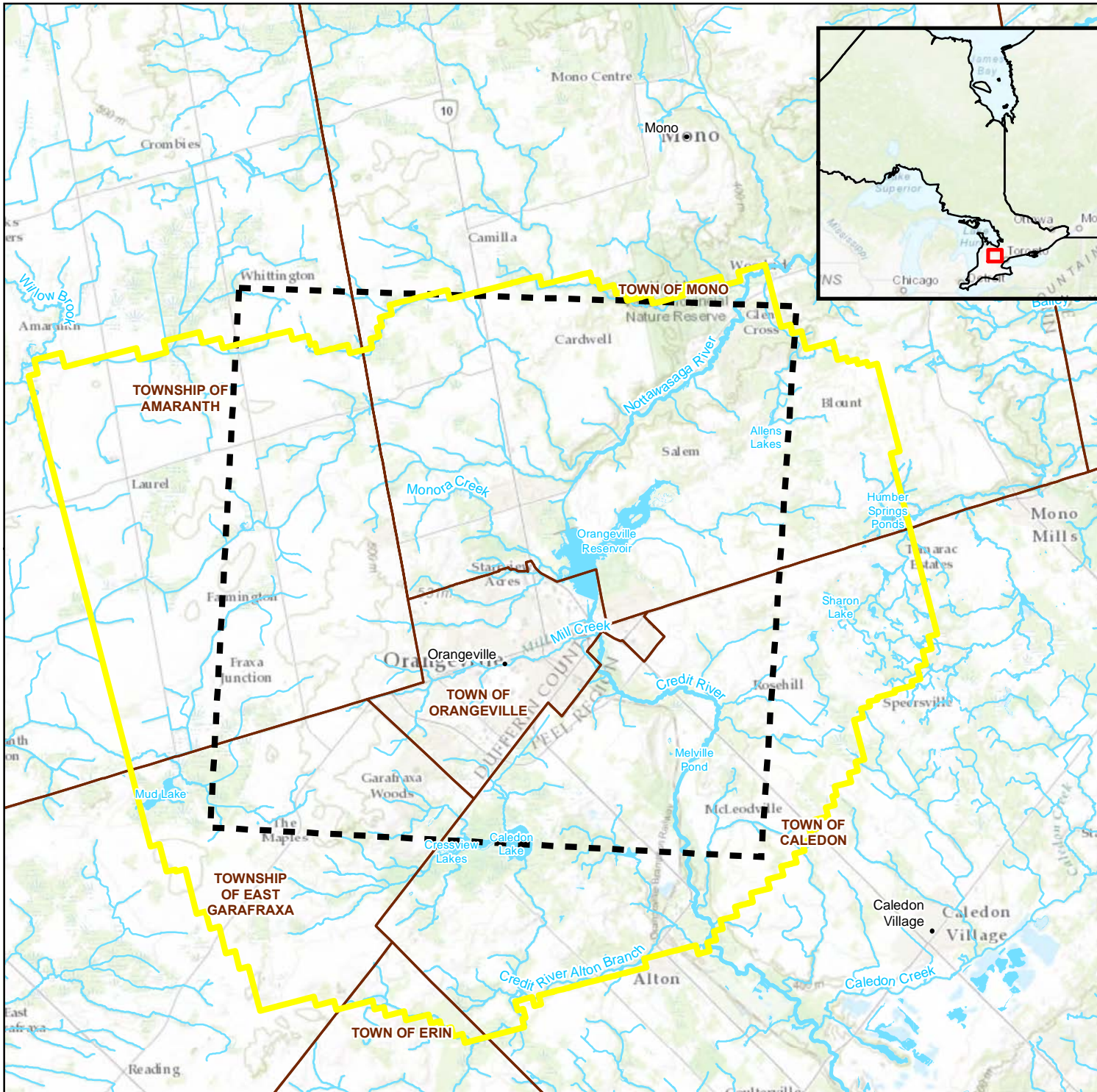
CLIENT
 Ministry of the Environment, Conservation and Parks (MECP)

PROJECT
 Assessment of Water Resources to Support a Review of Ontario's Water Quantity Management Framework

TITLE
 Orangeville Permitted Water Takings

171 Victoria St. N.,
 Kitchener, Ontario, N2H 5C5
 TEL: (519) 742-6685
 FAX: (519) 742-9810
 Email: info@blumetric.ca
 Web: <http://www.blumetric.ca>

PROJECT # 180107-06		DATE January 11, 2019	
DRAWN KH	CHECKED HH/PAR	FIG NO. 5-11	REV 0



LEGEND

- Revised Orangeville WQSA
- Preliminary Water Quantity Study Area (WQSA)
- Municipalities
- Major Watercourse
- Watercourse

1				
REV	DESCRIPTION	YY/MM/DD	BY	CHK

REFERENCES
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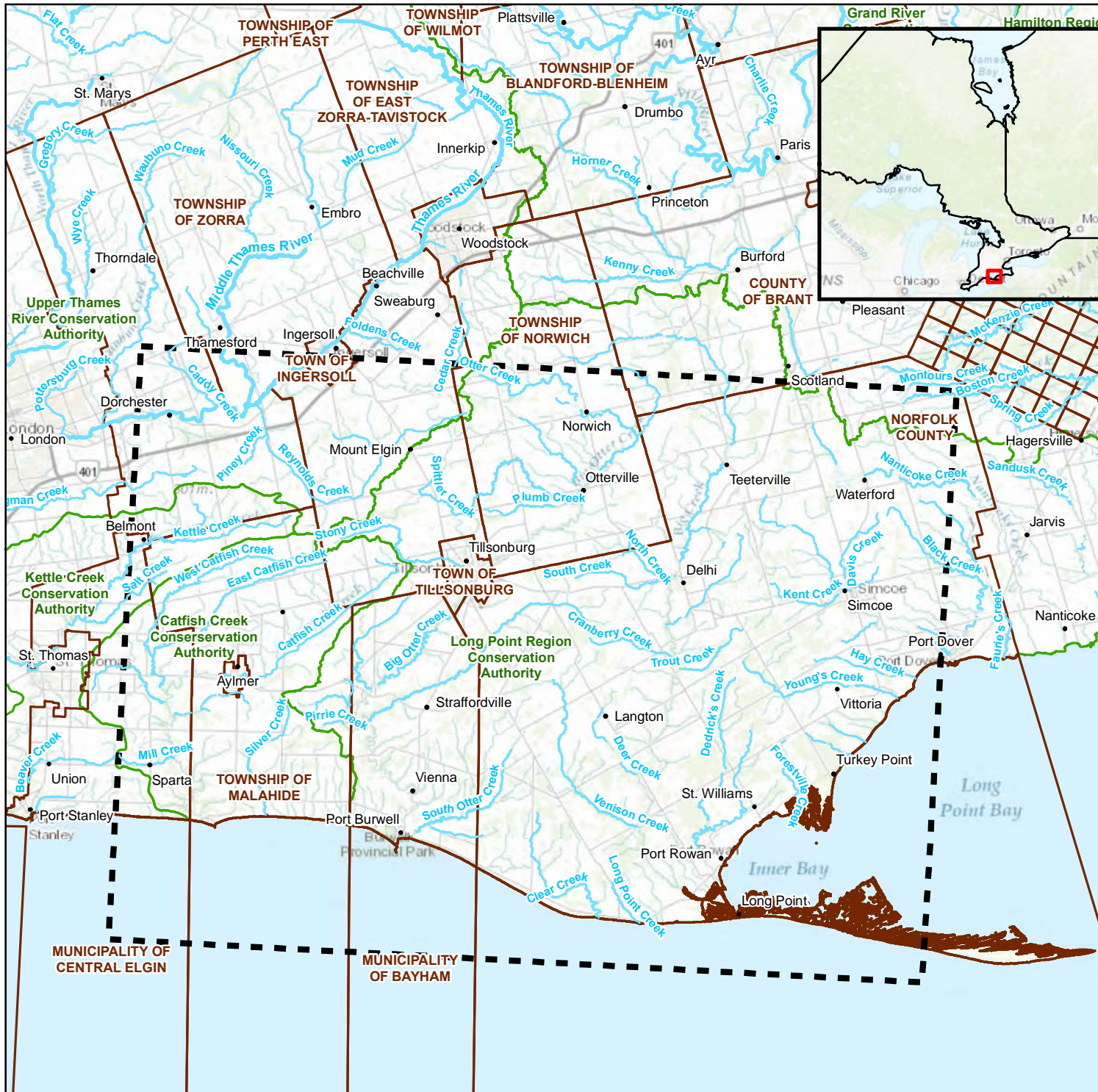
CLIENT
 Ministry of the Environment, Conservation and Parks (MECP)

PROJECT
 Assessment of Water Resources to Support a Review of Ontario's Water Quantity Management Framework

TITLE
 Orangeville Revised Water Quantity Study Area Boundary

171 Victoria St. N.,
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 FAX: (519) 742-9810
 Email: info@blumetric.ca
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PROJECT # 180107-06		DATE January 11, 2019	
DRAWN KH	CHECKED HH/FAR	FIG NO. 5-12	REV 0



LEGEND

- Major Watercourse
- Watercourse
- Preliminary Water Quantity Study Area (WQSA)
- Municipalities
- Conservation Authority

1				
REV	DESCRIPTION	YY/MM/DD	BY	CHK

REFERENCES
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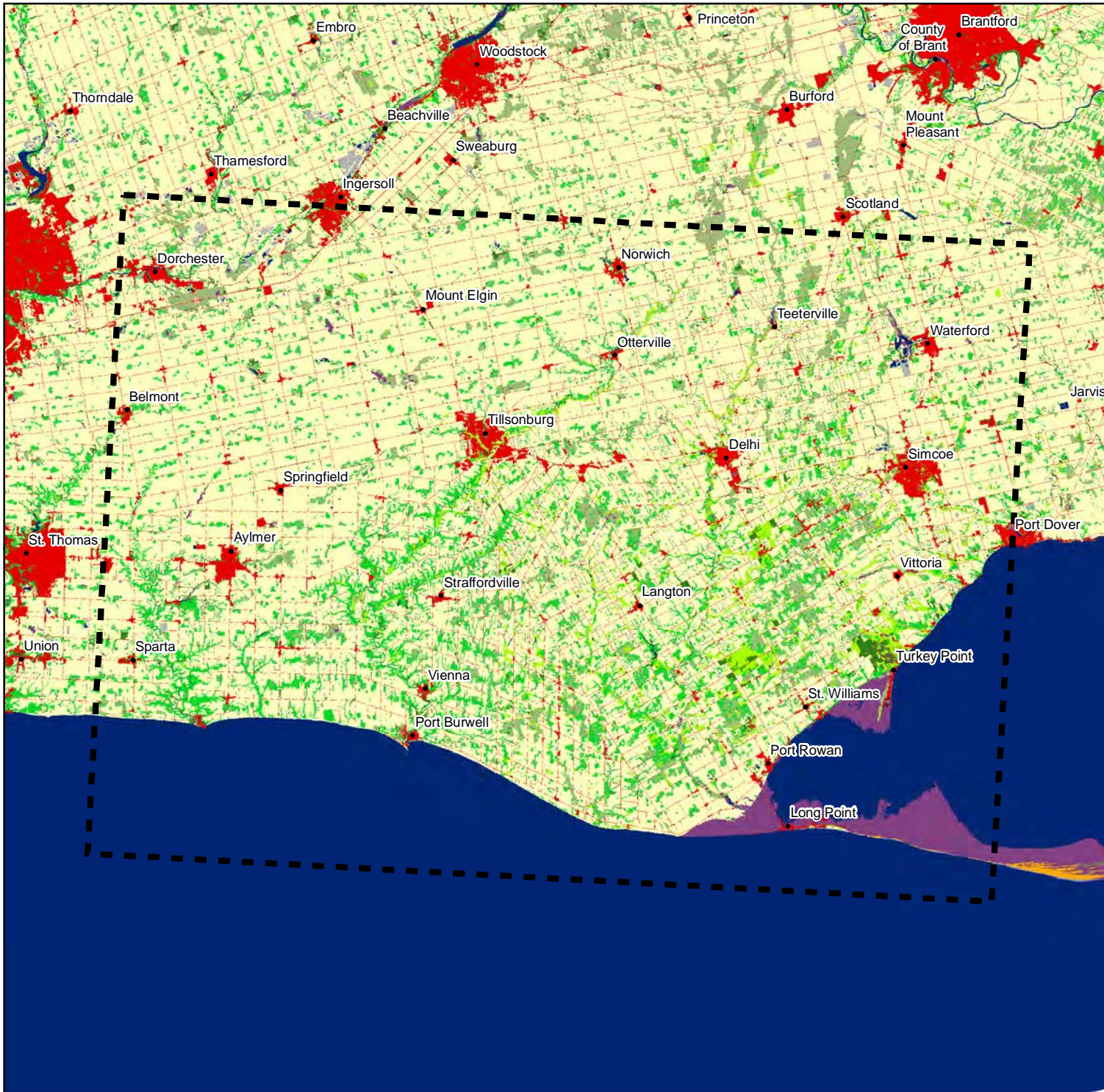
CLIENT
 Ministry of the Environment, Conservation and Parks (MECP)

PROJECT
 Assessment of Water Resources to Support a Review of Ontario's Water Quantity Management Framework

TITLE
 Norfolk Water Quantity Study Area Boundary

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 FAX: (519) 742-9810
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PROJECT # 180107-06		DATE January 11, 2019	
DRAWN GM	CHECKED HH/FAR	FIG NO. 6-1	REV 0



- LEGEND**
- Preliminary Water Quantity Study Area (WQSA)
 - 1 - Clear Open Water
 - 3 - Shoreline
 - 5 - Marsh
 - 6 - Swamp
 - 7 - Fen
 - 8 - Bog
 - 12 - Treed Upland
 - 13 - Deciduous Treed
 - 14 - Mixed Treed
 - 15 - Coniferous Treed
 - 16 - Plantations - Treed Cultivated
 - 17 - Hedge Rows
 - 21 - Sand Barren and Dune
 - 22 - Open Tallgrass Prairie
 - 23 - Tallgrass Savannah
 - 24 - Tallgrass Woodland
 - 25 - Sand/Gravel/Mine Tailings/Extraction
 - 27 - Community/Infrastructure
 - 28 - Agriculture and Undifferentiated Rural Land Use

1					
REV	DESCRIPTION	YY/MM/DD	BY	CHK	

REFERENCES
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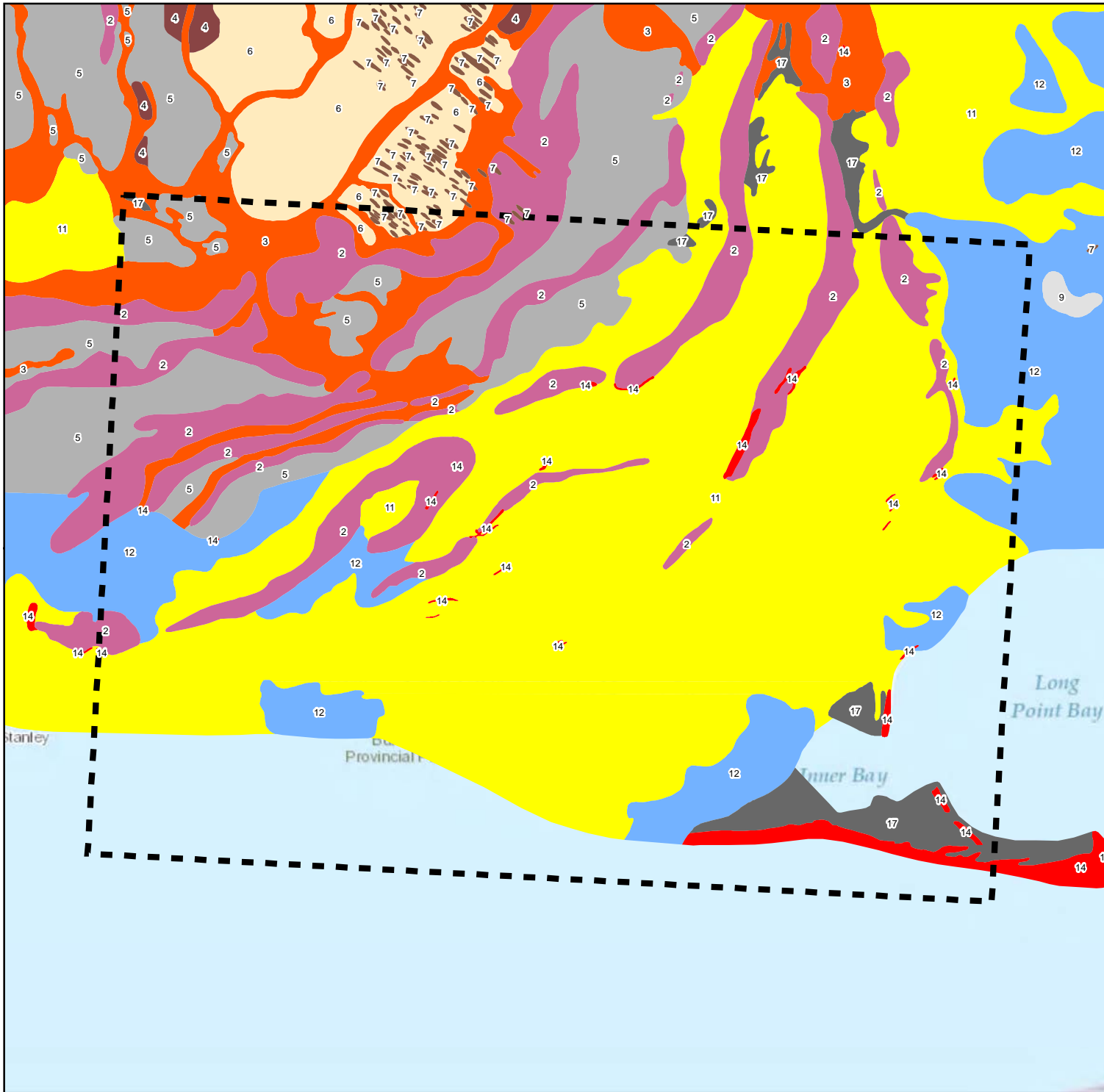
CLIENT
 Ministry of the Environment, Conservation and Parks (MECP)

PROJECT
 Assessment of Water Resources to Support a Review of Ontario's Water Quantity Management Framework

TITLE
 Norfolk Land Cover

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 Kitchener, Ontario, N2H 5C5
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 FAX: (519) 742-9810
 Email: info@blumetric.ca
 Web: http://www.blumetric.ca

PROJECT # 180107-06		DATE January 11, 2019	
DRAWN GM	CHECKED HH/FAR	FIG NO. 6-2	REV 0



LEGEND

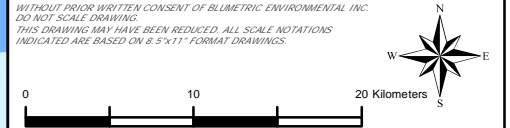
■ Preliminary Water Quantity Study Area (WQSA)

Southern Ontario Physiography

- 17: Peat And Muck
- 14: Beaches
- 12: Clay Plains
- 11: Sand Plains
- 9: Limestone Plains
- 7: Drumlins
- 6: Till Plains (Drumlinized)
- 5: Till Plains (Undrumlinized)
- 4: Kame Moraines
- 3: Spillways
- 2: Till Moraines

1				
REV	DESCRIPTION	YY/MM/DD	BY	CHK

REFERENCES
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CLIENT
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PROJECT
 Assessment of Water Resources to Support a Review of Ontario's Water Quantity Management Framework

TITLE
 Norfolk Regional Physiography

BluMetric™ Environmental
 171 Victoria St. N.,
 Kitchener, Ontario, N2H 5C5
 TEL: (519) 742-6685
 FAX: (519) 742-9810
 Email: info@blumetric.ca
 Web: http://www.blumetric.ca

PROJECT # 180107-06		DATE January 11, 2019	
DRAWN GM	CHECKED HH/FAR	FIG NO. 6-3	REV 0



LEGEND

- Major Water Courses and Flow Direction
- Watercourse
- Elevation Contours**
- 10 m
- 50 m
- Tertiary Watershed Boundary
- Quaternary Watershed Boundary
- Preliminary Water Quantity Study Area (WQSA)
- Water Bodies

1				
REV	DESCRIPTION	YY/MM/DD	BY	CHK

REFERENCES
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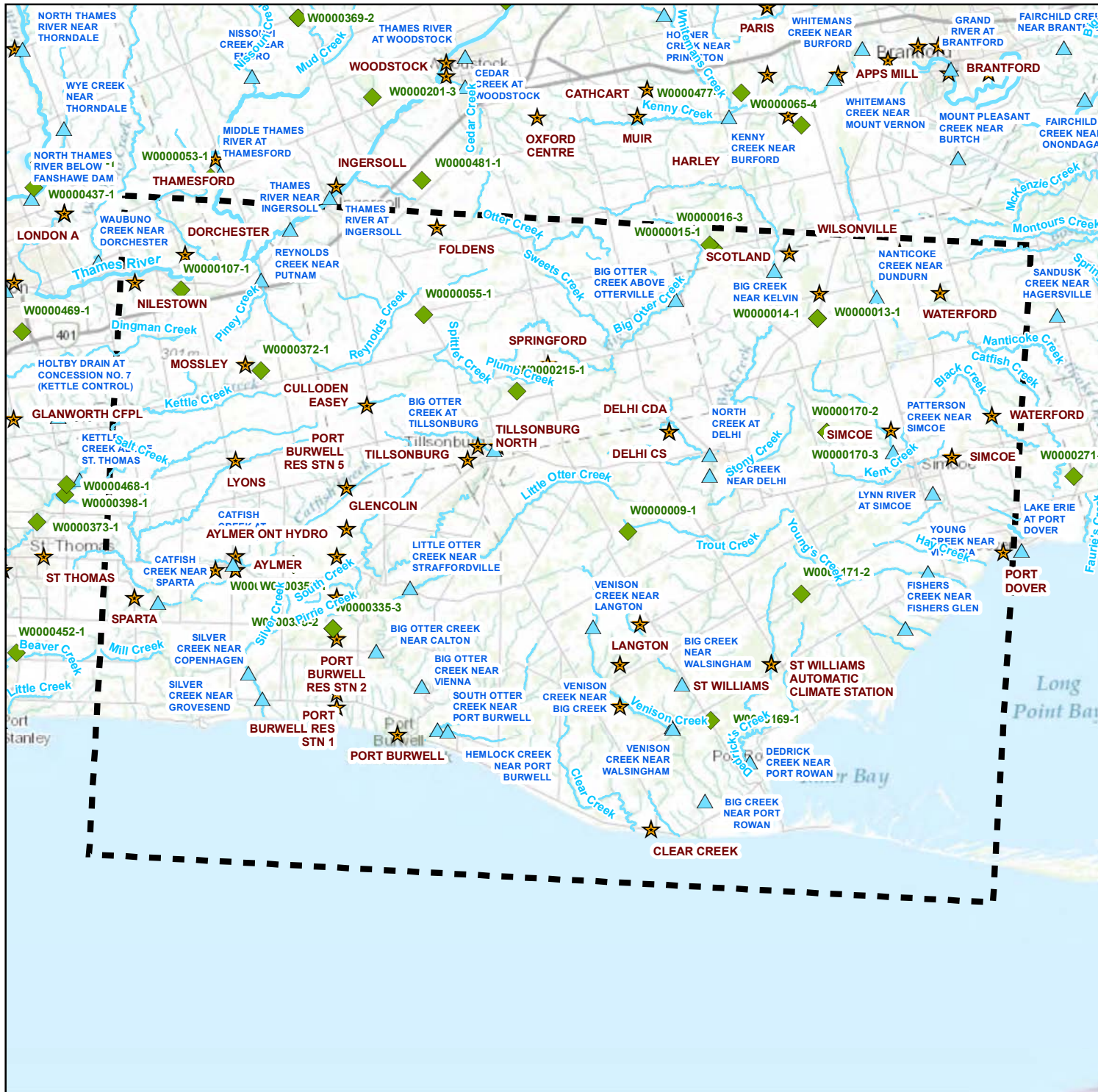
CLIENT
 Ministry of the Environment, Conservation and Parks (MECP)

PROJECT
 Assessment of Water Resources to Support a Review of Ontario's Water Quantity Management Framework

TITLE
 Norfolk Regional Topography and Hydrology

171 Victoria St. N.,
 Kitchener, Ontario, N2H 5C5
 TEL: (519) 742-6685
 FAX: (519) 742-9810
 Email: info@blumetric.ca
 Web: http://www.blumetric.ca

PROJECT # 180107-06		DATE January 11, 2019	
DRAWN GM	CHECKED HH/FAR	FIG NO. 6-4	REV 0



LEGEND

- ◆ Provincial Groundwater Monitoring Network Wells
- ▲ HYDAT Stations
- ★ Weather Stations
- Major Watercourse
- Watercourse
- Preliminary Water Quantity Study Area (WQSA)

1				
REV	DESCRIPTION	YY/MM/DD	BY	CHK

REFERENCES
 PROPRIETARY INFORMATION MAY NOT BE REPRODUCED OR DIVULGED WITHOUT PRIOR WRITTEN CONSENT OF BLUMETRIC ENVIRONMENTAL INC. DO NOT SCALE DRAWING. THIS DRAWING MAY HAVE BEEN REDUCED. ALL SCALE NOTATIONS INDICATED ARE BASED ON 8.5"x11" FORMAT DRAWINGS.

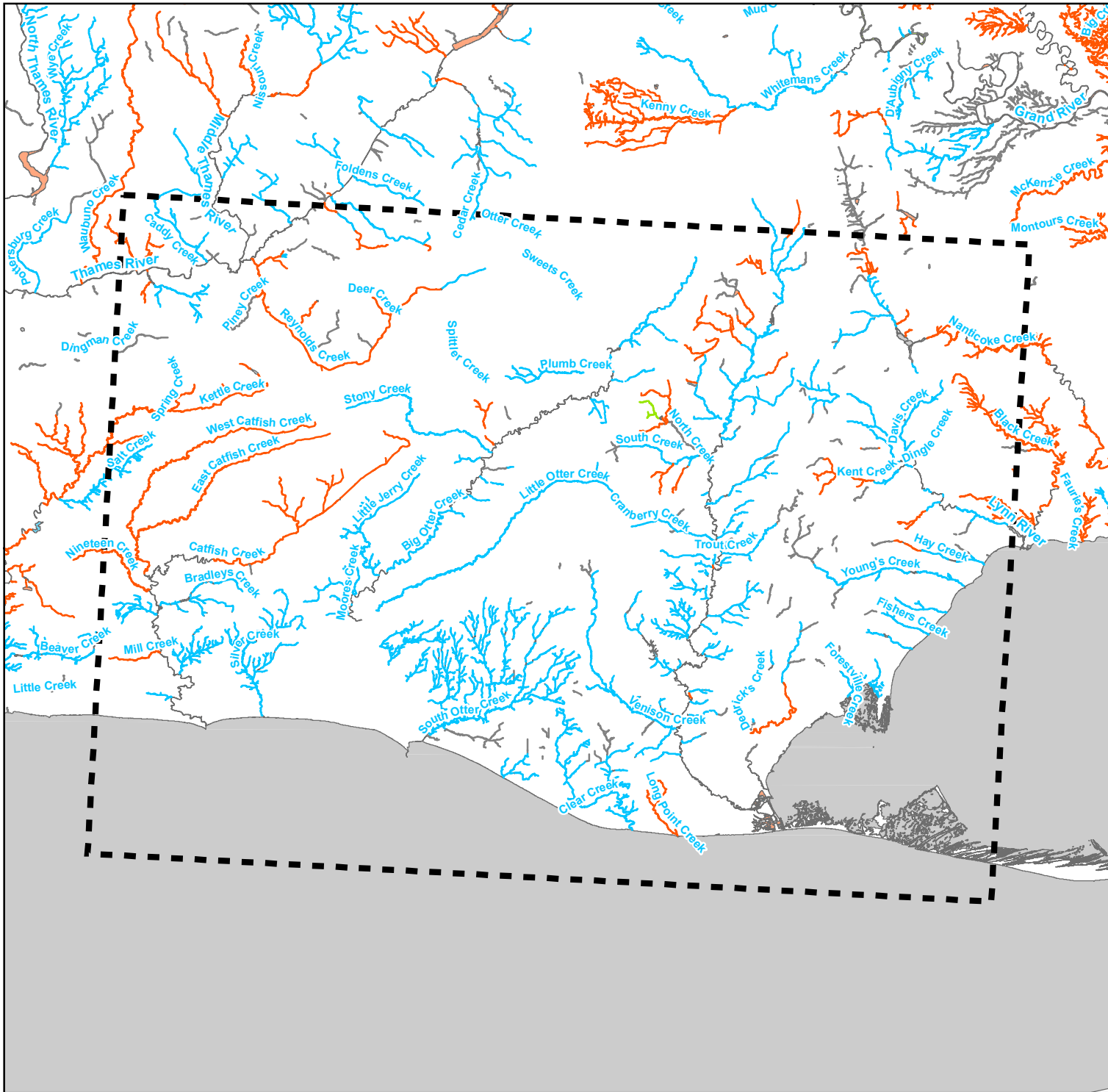
CLIENT
 Ministry of the Environment, Conservation and Parks (MECP)

PROJECT
 Assessment of Water Resources to Support a Review of Ontario's Water Quantity Management Framework

TITLE
 Norfolk Meteorological Stations

171 Victoria St. N.,
 Kitchener, Ontario, N2H 5C5
 TEL: (519) 742-6685
 FAX: (519) 742-9810
 Email: info@blumetric.ca
 Web: http://www.blumetric.ca

PROJECT # 180107-06		DATE January 11, 2019	
DRAWN GM	CHECKED RH	FIG NO. 6-5	REV 0



LEGEND

Preliminary Water Quantity Study Area (WQSA)

Thermal Regime

- Unknown
- Cold
- Cool
- Warm

Thermal Regime

- Unknown
- Cold
- Cool
- Warm

1				
REV	DESCRIPTION	YY/MM/DD	BY	CHK

REFERENCES
 PROPRIETARY INFORMATION MAY NOT BE REPRODUCED OR DIVULGED WITHOUT PRIOR WRITTEN CONSENT OF BLUMETRIC ENVIRONMENTAL INC. DO NOT SCALE DRAWING. THIS DRAWING MAY HAVE BEEN REDUCED. ALL SCALE NOTATIONS INDICATED ARE BASED ON 8.5"x11" FORMAT DRAWINGS.

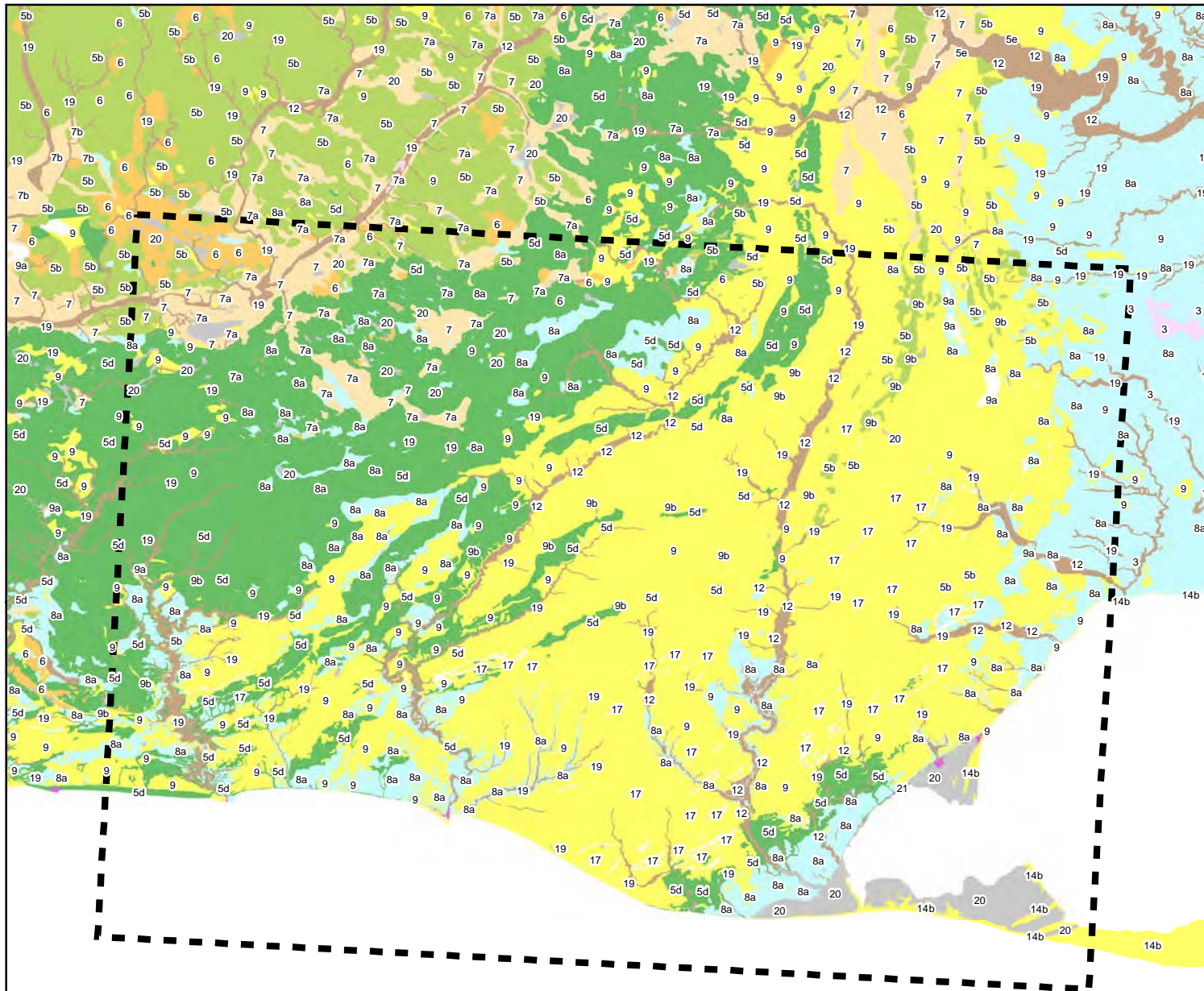
CLIENT
 Ministry of the Environment, Conservation and Parks (MECP)

PROJECT
 Assessment of Water Resources to Support a Review of Ontario's Water Quantity Management Framework

TITLE
 Norfolk Aquatic Thermal Regions

171 Victoria St. N.,
 Kitchener, Ontario, N2H 5C5
 TEL: (519) 742-6685
 FAX: (519) 742-9810
 Email: info@blumetric.ca
 Web: http://www.blumetric.ca

PROJECT # 180107-06		DATE January 11, 2019	
DRAWN GM	CHECKED HH/FAR	FIG NO. 6-6	REV 0



LEGEND

Preliminary Water Quantity Study Area (WQSA)

Surficial Geology (MNDM File - MRD128-REV)

- 3: Paleozoic bedrock
- 5b: Stone-poor, carbonate-derived silty to sandy till
- 5d: Glaciolacustrine-derived silty to clayey till
- 6: Ice-contact stratified deposits
- 7: Glaciofluvial deposits
- 7a: Sandy deposits
- 7b: Gravelly deposits
- 8a: Massive-well laminated
- 9: Coarse-textured glaciolacustrine deposits
- 9b: Littoral-foreshore deposits
- 12: Older alluvial deposits
- 14b: Littoral-foreshore deposits
- 19: Modern alluvial deposits
- 20: Organic deposits
- 21: Man-made deposits

1				
REV	DESCRIPTION	YY/MM/DD	BY	CHK

REFERENCES
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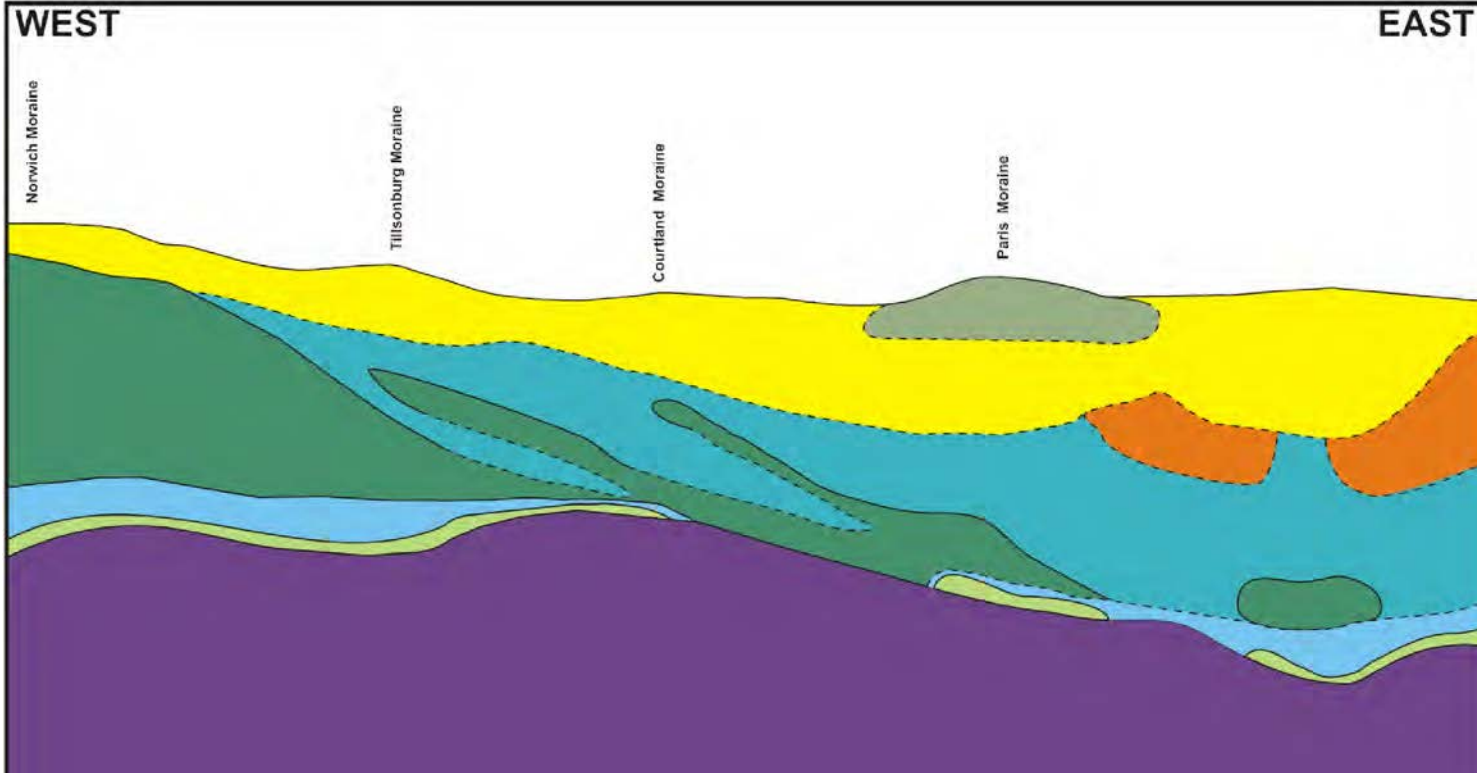
CLIENT
 Ministry of the Environment, Conservation and Parks (MECP)

PROJECT
 Assessment of Water Resources to Support a Review of Ontario's Water Quantity Management Framework

TITLE
 Norfolk Surficial Geology

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 Kitchener, Ontario, N2H 5C5
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PROJECT # 180107-06		DATE January 11, 2019	
DRAWN GM	CHECKED HH/FAR	FIG NO. 6-7	REV 0



LEGEND

- Paleozoic bedrock
- Catfish Creek Till
- Erie Phase deposits
- Port Stanley Till
- Fine-textured Erie Basin deposits (glacial lakes Maumee, Arkona)
- Coarse-textured Ypsilanti Low deposits
- Fine- to medium-textured Erie Basin deposits (glacial lakes Whittlesay-Warren)
- Wentworth Till
- Indicates where boundaries between units are uncertain

NOTE:

Cross-section sourced from: March, A. S. 2014. An assessment of subsurface sediments in the Central Norfolk Sand Plain, Norfolk and Oxford counties, Southern Ontario. Ontario Geological Survey Groundwater Resources Study 14 (Figure 8).

1				
REV.	DESCRIPTION	YY/MM/DD	BY	CHK

REFERENCES

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PROJECT

Assessment of Water Resources to Support a Review of Ontario's Water Quantity Management Framework

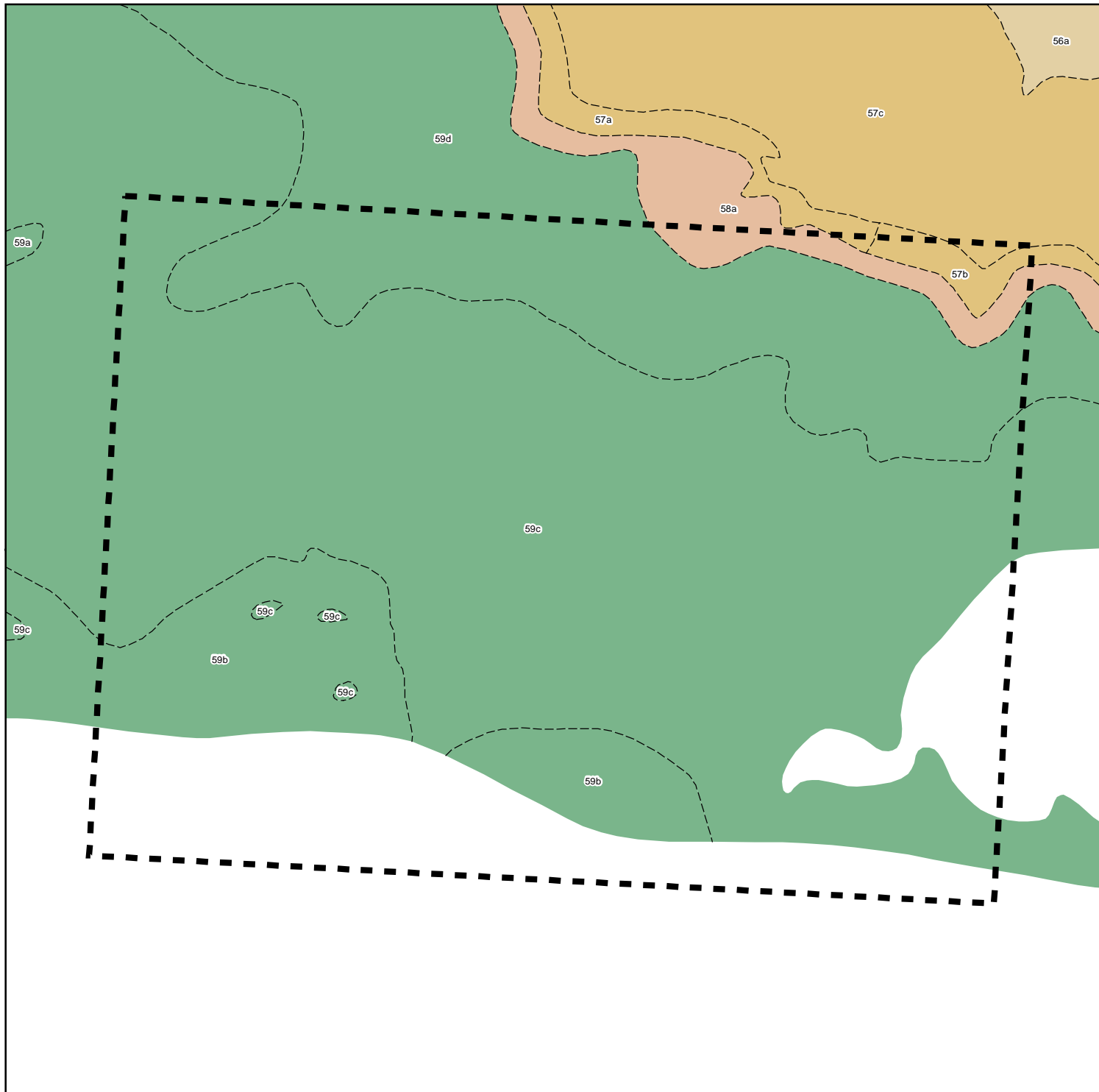
TITLE

Norfolk Hydrogeological Cross-Section



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 FAX: (519) 742-9810
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PROJECT # 180107-06		DATE January 11, 2019	
DRAWN GM	CHECKED HH/PAR	FIG NO. 6-8	REV 0



- LEGEND**
- Preliminary Water Quantity Study Area (WQSA)
 - Contact, Sharp, Trend, Interpreted
 - Upper Ordovician - shale, limestone, dolostone, siltstone**
 - 55a - Queenstone Formation
 - Lower Silurian - sandstone, shale, dolostone, siltstone**
 - 56a - Guelph Formation
 - 56b - Lockport Formation
 - Upper Silurian - limestone, dolostone, shale, sandstone, gypsum, salt**
 - 57a - Bass Islands Formation
 - 57b - Bertie Formation
 - 57c - Salina Formation
 - Lower Devonian - sandstone, dolostone, limestone**
 - 58a - Bois Blanc Formation; Oriskany Formation
 - Middle Devonian - limestone, dolostone, shale**
 - 59a - Hamilton Group
 - 59b - Marcellus Formation
 - 59c - Dundee Formation
 - 59d - Detroit River Group; Onondaga Formation

1				
REV.	DESCRIPTION	YY/MM/DD	BY	CHK

REFERENCES
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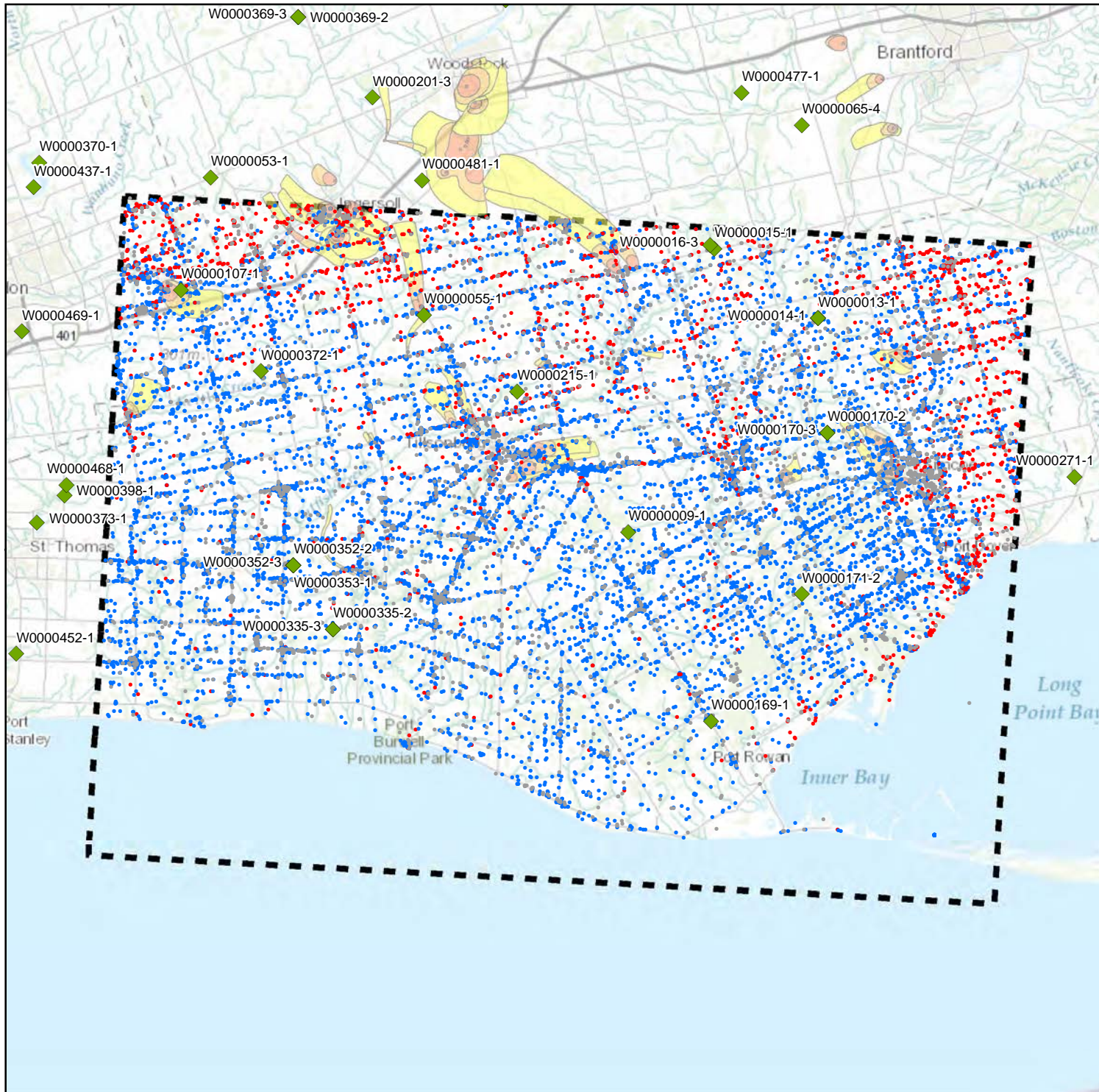
CLIENT
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PROJECT
 Assessment of Water Resources to Support a Review of Ontario's Water Quantity Management Framework

TITLE
 Norfolk Bedrock Geology

171 Victoria St. N.,
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PROJECT # 180107-06		DATE January 11, 2019		
DRAWN GM	CHECKED HH/FAR	FIG NO. 6-9	REV 0	



LEGEND

- ◆ Provincial Groundwater Monitoring Network Wells
- Bedrock Well
- Overburden Well
- Unknown Well Type

Wellhead Protection Areas

- A
- B
- C
- C1
- D
- F

▬ Preliminary Water Quantity Study Area

1				
REV	DESCRIPTION	YY/MM/DD	BY	CHK

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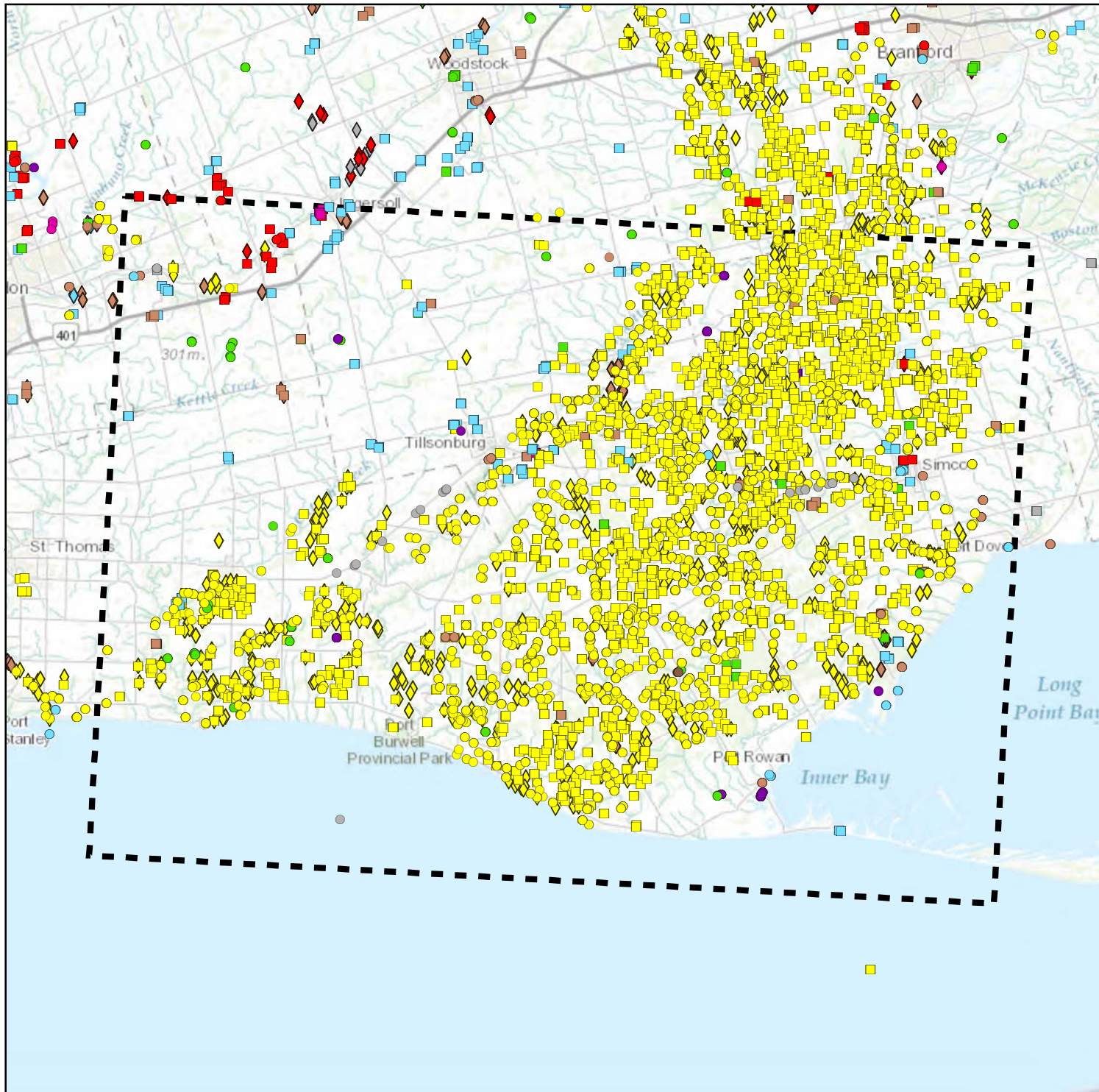
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 Assessment of Water Resources to Support a Review of Ontario's Water Quantity Management Framework

TITLE
 Norfolk Water Well Information System and Provincial Groundwater Monitoring Network Wells

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PROJECT # 180107-06		DATE January 11, 2019	
DRAWN GM	CHECKED HH/FAR	FIG NO. 6-10	REV 0



LEGEND

Preliminary Water Quantity Study Area
Water Taking Permit by Type and
 Agricultural
 Commercial
 Dewatering
 Industrial
 Institutional
 Miscellaneous
 Recreational
 Remediation
 Water Supply

 Surface Water
 Groundwater
 Both

1				
REV	DESCRIPTION	YY/MM/DD	BY	CHK

REFERENCES
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CLIENT
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PROJECT
 Assessment of Water Resources to Support a Review of Ontario's Water Quantity Management Framework

TITLE
 Norfolk Permitted Water Takings

171 Victoria St. N.,
 Kitchener, Ontario, N2H 5C5
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 FAX: (519) 742-9810
 Email: info@blumetric.ca
 Web: http://www.blumetric.ca

PROJECT # 180107-06		DATE January 11, 2019	
DRAWN GM	CHECKED HH/PAR	FIG NO. 6-11	REV 0




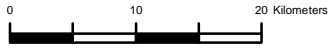
LEGEND

- Revised Norfolk WQSA
- Preliminary Water Quantity Study Area (WQSA)

1					
REV	DESCRIPTION	YY/MM/DD	BY	CHK	

REFERENCES
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CLIENT
 Ministry of the Environment, Conservation and Parks (MECP)

PROJECT
 Assessment of Water Resources to Support a Review of Ontario's Water Quantity Management Framework

TITLE
 Norfolk Revised Water Quantity Study Area Boundary



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PROJECT # 180107-06		DATE January 11, 2019	
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