



Hydrogeological Guidelines for Private Servicing

Residential Development

Version 1.0, September 2026

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1. General Requirements

1.1. Introduction

Within the geographic boundaries of the County of Brant (the County), there are rivers, streams, ponds and wetlands, which make up watersheds and sub-watersheds that support natural heritage functions within local watersheds. There are also significant groundwater recharge areas which replenish local aquifer systems and influence groundwater quality and quantity. The County's groundwater aquifers and wellheads require protection from human activity that places demand on water resources and can contribute to degraded aquatic communities, the loss of well water supply, aquifer contamination, and deteriorating water quality.

The County depends primarily on groundwater for the supply of drinking water, base flow for creeks and streams, and water sources for ponds and wetlands. The County's environmental health and social wellbeing is linked to the protection of groundwater features. Of particular importance for the protection of groundwater are surface and subsurface areas that surround a municipal supply well or private wellfield which supplies drinking water to the community.

The County's Official Plan encourages growth to take place within urban serviced areas of the County. Limited development outside the urban serviced areas is permitted through lot creation for severances (consents), Plan of Subdivision/Condominium and Additional Residential Units (ARUs) where it can be appropriately serviced by private water and wastewater systems.

To ensure these developments can be adequately serviced with private wells and wastewater treatment systems, the County has established a guideline to clarify expectations and simplify the process for rural residential development. This guideline includes requirements for water quality and quantity assessments, prepared by Qualified Professionals. The purpose of this Hydrogeological Guideline for Private Servicing is to provide clear direction for the preparation of hydrogeological studies required to support planning applications within the County in those areas not serviced by municipal water and municipal wastewater. In addition, guidance is provided regarding scoping assessments for Additional Residential Units, Vacant Lots and Lots of Record for the adequacy of water and wastewater servicing.

This document is intended to serve as a general guide for Qualified Professionals preparing hydrogeological assessments in support of developments on private or partial services. The level of detail required in a study will vary depending on the location, scale, and context of the proposed development. This document outlines the minimum study components, technical expectations, and submission requirements to ensure consistency and compliance with applicable policies and regulations. The County reserves the right to request additional information or study components on a case-by-case basis, as deemed appropriate.

This guideline does not remove the obligation of a proponent to meet the requirements of other applicable legislation, policies, or authorities having jurisdiction, including but not limited to:

- The Ontario Provincial Planning Statement;
- The County of Brant Official Plan;
- The Grand River Conservation Authority (GRCA);
- The Long Point Region Conservation Authority (LPRCA);
- The Ministry of the Environment, Conservation and Parks (MECP); and
- Any other relevant local, regional, or provincial authority.

1.2. Definitions

In this specification the following definitions shall apply:

ARU - shall mean an Additional Residential Unit, as described in Part 5, Sections 1.9 & 1.10 of the County Official Plan.

Consultant - shall mean professional engineers or hydrogeologists, licensed to practice in Ontario, who are responsible for the preparation of studies to the satisfaction of the Planning Authority and that is contracted with the owner.

County - shall mean County of Brant.

Hydrogeologist - shall mean a Qualified Professional Engineer or Professional Geoscientist (P.Eng. or P.Geo.) licensed to practice in Ontario and has training and experience in hydrogeology.

Qualified Professional - shall mean a qualified Professional Engineer or Professional Geoscientist (P.Eng. or P.Geo.) licensed to practice in Ontario; and, who has training and experience in private, residential water supply systems including treatment and septic system design.

MECP - shall mean the Ontario Ministry of the Environment, Conservation, and Parks.

OBC - shall mean the Ontario Building Code, as amended.

ODWQS - shall mean Ontario Drinking Water Quality Standards

Procedure D-5-4 - shall mean MECP Technical Guidelines for On-site Sewage Systems: Water Quality Impact Risk Assessment.

Procedure D-5-5 - shall mean MECP Technical Guideline for Private Wells: Water Supply Assessment.

Well Contractor shall mean a well driller or contractor who holds a valid Well License issued in Ontario and has training and experience in providing potable water for private, residential systems.

1.3. Pre-Application and Pre-Permit Consultation

Pre-application and pre-permit consultation is strongly recommended for proposals requiring a planning approval and/or building permit. Consultation with County staff will determine the scope of the hydrogeological assessment based on the proposed development. Proposals relying on private or partial services will require a Hydrogeological Assessment to evaluate the feasibility and long-term sustainability of private water and private wastewater servicing. These matters must be addressed prior to the issuance of a building permit, regardless of whether planning approval is required.

Please refer to Part 6, Section 2.1 (Pre-Consultation and Complete Application Requirements) of the County of Brant's Official Plan for additional information.

1.4. Required Studies

For applications involving new lot creation through Severance (Consent) or Plan of Subdivision, a Hydrogeological Assessment will be required.

Severance (Consent) applications are deemed to include up to three lots, including retained lands (refer to County of Brant Official Plan, Section 5.2.1).

Developments with four or more lots (including retained lands) are deemed a Plan of Subdivision.

The County shall be satisfied that:

- a) An adequate on-site supply of potable groundwater exists;
- b) Soils, terrain and lot sizes are adequate for the required sewage disposal system and replacement system; and,
- c) Adverse impacts on or from existing neighbouring wells and land uses will be avoided.

If development is proposed on private services, a Impact Assessment shall be required as part of a complete application for development in accordance with Section 6 – County Toolbox of the County Official Plan. The report shall address potable groundwater quality, groundwater yield, possible groundwater interference, soil suitability and the lot area for effluent treatment.

Any proposed private potable water and on-site sewage disposal systems must be supported by a Hydrogeological Assessment. The Hydrogeological Assessment shall be prepared by a Qualified Professional and must demonstrate that the proposed development shall not negatively impact groundwater and surface water quality and quantity, and that each lot is capable of being serviced privately.

For applications involving ARUs that will be connected to existing water supply and wastewater systems, a Scoped Hydrogeological Assessment must be submitted to support the application. The Scoped Hydrogeological Assessment needs to demonstrate that the existing water supply and wastewater systems have reserve capacity to accommodate the additional demands of the ARU.

For applications involving ARUs that will be connected to new private or partial services (either well or septic system), a Scoped Hydrogeological Assessment must be submitted to support the application. The Scoped Hydrogeological Assessment needs to demonstrate that there is available water in the area (i.e. well records/well survey of surrounding wells) and that a septic system, supported by a groundwater impact assessment and compliant with Part 8 of the OBC, can be installed on the lot.

For applications involving vacant lots or lots of record that will be connected to new private or partial services (either well or septic system), a Scoped Hydrogeological Assessment must be submitted to support the application. The Scoped Hydrogeological Assessment needs to demonstrate that there is available water in the area (i.e. well records/well survey of surrounding wells) and that a septic system, supported by a groundwater impact assessment and compliant with Part 8 of the OBC, can be installed on the lot.

It is recommended that the proponent consults with the County to confirm the extent of the supporting studies which must be completed.

2. Hydrogeological Assessments for Privately Serviced Severances (less than 3 new lots)

2.1 Introduction

Applications for developments with less than three lots which require private servicing must meet the full set of guidelines outlined in Procedures D-5-4 and D-5-5 except for the specific requirements described in this section. Proponents of such developments are encouraged to consult the County if further clarification is required.

These guidelines are informed by the Provincial D-Series Guidelines (Ministry of Environment and Energy, 1996):

- Procedure D-5-5. Technical Guideline For Private Wells: Water Supply Assessment.
- Procedure D-5-4. Technical Guideline For Individual On-site Sewage Systems: Water Quality Impact Risk Assessment.

2.2 Water Supply

2.2.1 Well Construction

Any new wells used for a proposed development must be drilled and constructed by a licensed Well Contractor in accordance with Ontario Regulation 903 (R.S.O. 1990), as amended.

Dug and bored wells are discouraged and will only be considered where a drilled well is not feasible.

2.2.2 Water Quantity

2.2.2.1 Test Well Selection

On-site well testing shall be completed to confirm the available groundwater resources of the water supply aquifer. The on-site well testing can be completed on either the existing supply well, or a newly installed test well or supply well on the subject lands. The testing shall meet the requirements of Procedure D-5-5.

Private wells yielding between 4.5 and 13 litres per minute shall require a cistern as supplemental water storage to service peak demand (see Section 5.8.4 of the County Official Plan). Wells yielding less than 4.5 litres per minute shall not be considered an adequate well.

It is considered reasonable to test an existing on-site well, in support of the proposed severance, so long as the following conditions are satisfied:

- i. The location of the existing well is provided;
- ii. A description of the well construction and stratigraphy is provided – including a well record;
- iii. If it can reasonably be justified and demonstrated that any wells installed in the future as part of the proposed development will intercept the same aquifer in which the existing well is installed;
- iv. If it can be reasonably justified and demonstrated that testing the existing well will be representative of conditions within the proposed Consent lands; and
- v. If points i, ii, iii and iv, can be satisfactorily addressed then an existing well can be tested as per Procedure D-5-5 to support the proposed severance.

If points i, ii, iii and iv, cannot be satisfactorily addressed, then a new well shall be installed on the Consent lot(s) (note: if there are two Consent lots that directly abut each other and justification can be provided to confirm that the wells are within the same aquifer unit, then one test well would satisfy this requirement). The test well shall be constructed to the requirements described in Section 2.2.1 Well Construction.

The testing of any subject test well shall address all requirements outlined by Section 4.3 & 4.4 of Procedure D-5-5 including, but not limited to, well yield, test duration, water quality sampling (including all parameters outlined in Table 1 through 3 of Procedure D-5-5), proper chlorination and monitoring.

The assessment shall also include a review of potential off-site well impacts from the proposed water use if there are neighbouring well users within 500 meters of the new lot boundary (or the closest wells sourced in the same aquifer if there is a greater density of wells). If applicable, a Water Well Survey shall be completed to inventory nearby wells in addition to monitoring subject supply wells, if permission is granted. The Water Well Survey shall adequately document all locations that were contacted for participation, as well as the details of the communication. This assessment must also include a review of potential interference between the existing wells and proposed well while both are in service.

2.2.2.2 Pumping Test Requirements

A pumping test must be completed on the subject test well which demonstrates a well yield sufficient to provide the anticipated water demand for the proposed development.

Pumping tests shall conform to the standards defined in Section 4.3 of Procedure D-5-5 which includes:

- Applicable flow rate calculation with a minimum flow rate of 18 L/min (based on a four-bedroom dwelling);

- Must be performed at a fixed rate ($\pm 5\%$) for a minimum duration of six hours (longer where supplementary storage systems are necessary);
- If the minimum flow rate is not achievable, then the duration of the pumping test shall be extended to achieve the total water demand;
- In this case, the rate of test pumping may be decreased, but the duration must be proportionately increased such that the total amount pumped equals the amount that would have been pumped if the test had been conducted using the procedures and minima discussed above.
- Where cisterns are required to meet the peak demand, the tank shall be sized for 2 hours of peak usage.
- Water levels must be monitored in the test well and observation wells (closest wells within 500 m sourced in the same aquifer) at an appropriate frequency;
- Water must be discharged at an appropriate distance from the test well to ensure that artificial recharge does not occur;
- Field parameters (turbidity, pH, conductivity, temperature) shall be measured throughout the duration of the pumping test;
- Residual chlorine shall be confirmed to be absent with a handheld digital colorimeter prior to collecting water quality samples;
- Recovery must be monitored in the test well until 95% recovery occurs or for 24 hours, whichever is less; and
- Where sufficient recovery does not occur, the issue of the long-term safe yield of the aquifer is especially significant and must be addressed.

Well yield must be assessed with respect to the required water demand of the development. In addition to the requirements outlined in Procedure D-5-5, an assessment shall be made on the acceptability of drawdown interference caused by the test well on surrounding water supply wells within 500 meters of the Lot and evaluate and report on the likelihood of the new water use impacting surrounding groundwater resources and water supply wells.

Shallow wells completed into unconfined aquifers may be susceptible to seasonal fluctuations in water level and therefore well yield. As such, shallow well pumping tests must be completed between the months of Mid-May and Mid-October to assess the respective well yield during drier conditions.

2.3 Water Quality Assessment

A water supply well is considered to be adequate with respect to quality where the water:

- a) Reports all health-related parameters in the untreated (raw) water at concentrations less than their Maximum Acceptable Concentration as per the Ontario Drinking Water Quality Standards (ODWQS), for those parameters listed in Procedure D-5-5 Tables 1, 2 and 3 (see Appendix A); or,

- b) Can be reasonably treated to concentrations below the ODWQS for aesthetic parameters listed in Tables 1, 2 and 3 (see Appendix A).

A water supply is considered inadequate with respect to quality where:

- a) A health-related parameter of the listed ODWQS is exceeded or is projected to be exceeded; or,
- b) An aesthetic parameter of the listed ODWQS is exceeded and is not considered reasonably treatable, at the sole discretion of the County, by means of a private water treatment system; or,
- c) A health hazard is anticipated due to a nearby off-site and/or on-site source of pollution.

The water quality assessment must demonstrate that the new well provides water that is safe for human consumption. Representative groundwater samples are to be collected from the well by a Qualified Professional (or their designates) and tested for water quality parameters outlined in Tables 1, 2, and 3 of Procedure D-5-5, as well as fluoride and metals (see Appendix A). All samples must be submitted to a laboratory certified by the Canadian Association of Laboratory Accreditation, and lab certificates for this analysis must be included in the documentation. Sampling must be carried out using methods consistent with up-to-date practices, sampling and preservation protocols undertaken to current industry standards (e.g., ASTM, CSA, etc.).

Health-Related Ontario Drinking Water Quality Standards (ODWQS) for total coliforms and E.coli (0 CFU/100 mL) must be met without the need for any additional treatment. Non-detect chlorine residual must be demonstrated at the time of sampling with a handheld digital colorimeter.

Sodium concentrations exceeding 20 mg/L (the limit for people with sodium restricted diets) shall be reported to the local Medical Officer of Health, as well as fluoride levels higher than 1.5 mg/L (as per Ministry of Environment Drinking Water Standards, August 2001). A warning indicating the elevated sodium or fluoride concentration must be included in future agreements for purchase, sale, or rental of the property.

2.4 Groundwater Impact Assessment for On-site Sewage Systems

The groundwater impact assessment must evaluate the ability of the lands identified in the development proposal to effectively treat sewage effluent and meet acceptable limits. For developments where each private lot is one hectare or larger, it is assumed that dilution within a one-hectare lot will typically reduce nitrate-nitrogen concentrations to acceptable levels in the groundwater at the property boundary and not impact the water supply of adjacent properties.

For development lots less than one hectare, a groundwater impact assessment following the MECP Procedure D-5-4, Technical Guideline for Individual On-Site sewage

Systems: Water Quality Impact Assessment is required (Section 5.6.2 Predictive Assessment) and groundwater recharge rates provided in Appendix B.

The groundwater impact assessment is required to quantify the risk that the development's individual on-site sewage systems will have on the concentration of nitrate-nitrogen in groundwater at the down-gradient property boundary. Predicted concentration of nitrate-nitrogen must not exceed 10 mg/L at the property boundary.

A soils assessment will be required to characterize subsurface soils and receiving aquifer system with a minimum of one test hole (i.e. test pits, boreholes or hand augers) to a depth of 1.5 metres or refusal on bedrock contact, per Consent lot, at the proposed location of the septic system.

Note: It is recommended that Consultants' coordinate the soils assessment with the County's Ontario Building Code, Part 8 Regulator, in order to record the soil results for any future septic design submission.

Soil shall be classified for the requirements of Part 8 of the Ontario Building Code, including the following:

- soil classification;
- grain size distribution;
- estimated percolation time in min/cm;
- position of seasonal high groundwater; and
- identification of any limited layer.

For the predictive assessment, Procedure D-5-4 states that the "*volume of sewage effluent, if used as dilution water in a mass balance equation, must not exceed 1,000 L/day/lot*".

Further, a nitrate loading of at least 40 g/lot/day per residential dwelling unit shall be used in the predictive assessment. **The area required for a conventional Class 4 sewage system must be available for all new lots.**

A groundwater impact assessment shall be prepared by a Qualified Professional to determine the impact of the proposed sewage system(s) on the shallow, receiving aquifer and adjacent water supplies in order to confirm that the created lot(s) will not pose a risk to groundwater resources or water supply wells. An example of a suggested nitrate dilution model is provided in Appendix C.

Background concentrations of nitrate must be established in the receiving aquifer and referenced in the assessment unless it can be demonstrated that there is hydraulic separation between the water supply and receiving aquifer systems for the development and down-gradient water users. Samples may be collected from water supply wells if the wells are completed into the receiving aquifer system.

Note: If background nitrate concentrations are elevated above 5mg/L, then the County must be consulted about the potential application of a more appropriate assessment procedure such as including groundwater flow through in the nitrate dilution model or the

potential application of MECP Guideline B-7 Reasonable Use Concept and MECP Procedure B-7-1, Determination of Contaminant Limits and Attenuation Zones.

The groundwater impact assessment shall also include an evaluation of the feasibility of servicing the proposed lot with a private sewage system. This must include conceptual layout plans that show the proposed location of sewage treatment system including the leaching beds and dwellings within each severance (including relevant setback distances to surrounding features as required by the OBC. The leaching beds should be appropriately sized as per the guidelines in Section 8.0 of the Ontario Building Code and based on the T-times estimated from the shallow soil investigation grain size analysis or in-situ infiltration testing. **The proposed lot must conform with Part 8 Sewage Systems under the Ontario Building Code as it relates to soil percolation time, depth to high groundwater table elevation, depth to impermeable soil, maximum slopes, drainage characteristics and horizontal clearances.**

3.0 Hydrogeological Assessments for Privately Serviced Subdivisions (greater than 3 new lots)

3.1 Introduction

Applications for subdivisions with three or more lots which require private servicing must meet the full set of guidelines outlined in Procedures D-5-4 and D-5-5. Proponents of such developments are encouraged to consult the County if further clarification is required.

These guidelines are informed by the Provincial D-Series Guidelines (Ministry of Environment and Energy, 1996):

- Procedure D-5-5. Technical Guideline For Private Wells: Water Supply Assessment.
- Procedure D-5-4. Technical Guideline For Individual On-site Sewage Systems: Water Quality Impact Risk Assessment.

3.2 Water Supply

3.2.1 Well Construction

Any new wells used for a proposed development must be drilled and constructed by a licensed Well Contractor in accordance with Ontario Regulation 903 (R.S.O. 1990), as amended.

Dug and bored wells are discouraged and will only be considered where a drilled well is not feasible.

3.2.2 Water Quantity

3.2.2.1 Test Well Selection

On-site well testing shall be completed to confirm the available groundwater resources of the water supply aquifer. The testing shall meet the requirements of Procedure D-5-5.

Private wells yielding between 4.5 and 13 litres per minute shall require a cistern as supplemental water storage to service peak demand (see Section 5.8.4 of the County Official Plan). Wells yielding less than 4.5 litres per minute shall not be considered an adequate well.

The testing of any subject test well shall address all requirements outlined by Section 4.3 & 4.4 of Procedure D-5-5 including, but not limited to, well yield, test duration, water quality sampling (including all parameters outlined in Table 1 through 3 of Procedure D-5-5), proper chlorination and monitoring.

The assessment shall also include a review of potential off-site well impacts from the proposed water use if there are neighbouring well users within 500 meters of the new lot

boundary (or the closest wells sourced in the same aquifer if there is a greater density of wells). If applicable, a Water Well Survey shall be completed to inventory nearby wells in addition to monitoring subject supply wells, if permission is granted. The Water Well Survey shall adequately document all locations that were contacted for participation, as well as the details of the communication. This assessment must also include a review of potential interference between the existing wells and proposed well while both are in service.

3.2.2.2 Pumping Test Requirements

A pumping test must be completed on the subject test well which demonstrates a well yield sufficient to provide the anticipated water demand for the proposed development.

Pumping tests shall conform to the standards defined in Section 4.3 of Procedure D-5-5 which includes:

- Applicable flow rate calculation with a minimum flow rate of 18 L/min (based on a four-bedroom dwelling);
- Must be performed at a fixed rate ($\pm 5\%$) for a minimum duration of six hours (longer where supplementary storage systems are necessary);
- If the minimum flow rate is not achievable, then the duration of the pumping test shall be extended to achieve the total water demand;
- In this case, the rate of test pumping may be decreased, but the duration must be proportionately increased such that the total amount pumped equals the amount that would have been pumped if the test had been conducted using the procedures and minima discussed above.
- Where cisterns are required to meet the peak demand, the tank shall be sized for 2 hours of peak usage.
- Water levels must be monitored in the test well and observation wells (closest wells within 500 m sourced in the same aquifer) at an appropriate frequency;
- Water must be discharged at an appropriate distance from the test well to ensure that artificial recharge does not occur;
- Field parameters (turbidity, pH, conductivity, temperature) shall be measured throughout the duration of the pumping test;
- Residual chlorine shall be confirmed to be absent with a handheld digital colorimeter prior to collecting water quality samples;
- Recovery must be monitored in the test well until 95% recovery occurs or for 24 hours, whichever is less; and
- Where sufficient recovery does not occur, the issue of the long-term safe yield of the aquifer is especially significant and must be addressed.

Well yield must be assessed with respect to the required water demand of the development. In addition to the requirements outlined in Procedure D-5-5, an assessment shall be made on the acceptability of drawdown interference caused by the test well on surrounding water supply wells within 500 meters of the Lot and evaluate

and report on the likelihood of the new water use impacting surrounding groundwater resources and water supply wells.

Shallow wells completed into unconfined aquifers may be susceptible to seasonal fluctuations in water level and therefore well yield. As such, shallow well pumping tests must be completed between the months of Mid-May and Mid-October to assess the respective well yield during drier conditions.

3.3 Water Quality Assessment

A water supply well is considered to be adequate with respect to quality where the water:

- a) Reports all health-related parameters in the untreated (raw) water at concentrations less than their Maximum Acceptable Concentration as per the Ontario Drinking Water Quality Standards (ODWQS), for those parameters listed in Procedure D-5-5 Tables 1, 2 and 3 (see Appendix A); or,
- b) Can be reasonably treated to concentrations below the ODWQS for aesthetic parameters listed in Tables 1, 2 and 3 (see Appendix A).

A water supply is considered inadequate with respect to quality where:

- a) A health-related parameter of the listed ODWQS is exceeded or is projected to be exceeded; or,
- b) An aesthetic parameter of the listed ODWQS is exceeded and is not considered reasonably treatable, at the sole discretion of the County, by means of a private water treatment system; or,
- c) A health hazard is anticipated due to a nearby off-site and/or on-site source of pollution.

The water quality assessment must demonstrate that the new well provides water that is safe for human consumption. Representative groundwater samples are to be collected from the well by a Qualified Professional (or their designates) and tested for water quality parameters outlined in Tables 1, 2, and 3 of Procedure D-5-5, as well as fluoride and metals (see Appendix A). All samples must be submitted to a laboratory certified by the Canadian Association of Laboratory Accreditation, and lab certificates for this analysis must be included in the documentation. Sampling must be carried out using methods consistent with up-to-date practices, sampling and preservation protocols undertaken to current industry standards (e.g., ASTM, CSA, etc.).

Health-Related Ontario Drinking Water Quality Standards (ODWQS) for total coliforms and E.coli (0 CFU/100 mL) must be met without the need for any additional treatment. Non-detect chlorine residual must be demonstrated at the time of sampling with a handheld digital colorimeter.

Sodium concentrations exceeding 20 mg/L (the limit for people with sodium restricted diets) shall be reported to the local Medical Officer of Health, as well as fluoride levels higher than 1.5 mg/L (as per Ministry of Environment Drinking Water Standards, August

2001). A warning indicating the elevated sodium or fluoride concentration must be included in future agreements for purchase, sale, or rental of the property.

3.4 Groundwater Impact Assessment for On-site Sewage Systems

The groundwater impact assessment must evaluate the ability of the lands identified in the development proposal to effectively treat sewage effluent and meet acceptable limits. For developments where each private lot is one hectare or larger, it is assumed that dilution within a one-hectare lot will typically reduce nitrate-nitrogen concentrations to acceptable levels in the groundwater at the property boundary and not impact the water supply of adjacent properties.

For development lots less than one hectare, a groundwater impact assessment following the MECP Procedure D-5-4, Technical Guideline for Individual On-Site sewage Systems: Water Quality Impact Assessment is required (Section 5.6.2 Predictive Assessment) and groundwater recharge rates provided in Appendix B.

The groundwater impact assessment is required to quantify the risk that the development's individual on-site sewage systems will have on the concentration of nitrate-nitrogen in groundwater at the down-gradient property boundary. Predicted concentration of nitrate-nitrogen must not exceed 10 mg/L at the property boundary.

A soils assessment will be required to characterize subsurface soils and receiving aquifer system.

Note: It is recommended that Consultants' coordinate the soils assessment with the County's Ontario Building Code, Part 8 Regulator, in order to record the soil results for any future septic design submission.

Soil shall be classified for the requirements of Part 8 of the Ontario Building Code, including the following:

- soil classification;
- grain size distribution;
- estimated percolation time in min/cm;
- position of seasonal high groundwater; and
- identification of any limited layer.

For the predictive assessment, Procedure D-5-4 states that the "*volume of sewage effluent, if used as dilution water in a mass balance equation, must not exceed 1,000 L/day/lot*".

Further, a nitrate loading of at least 40 g/lot/day per residential dwelling unit shall be used in the predictive assessment. **The area required for a conventional Class 4 sewage system must be available for all new lots.**

A groundwater impact assessment shall be prepared by a Qualified Professional to determine the impact of the proposed sewage system(s) on the shallow, receiving aquifer and adjacent water supplies in order to confirm that the created lot(s) will not

pose a risk to groundwater resources or water supply wells. An example of a suggested nitrate dilution model is provided in Appendix C.

Background concentrations of nitrate must be established in the receiving aquifer and referenced in the assessment unless it can be demonstrated that there is hydraulic separation between the water supply and receiving aquifer systems for the development and down-gradient water users. Samples may be collected from water supply wells if the wells are completed into the receiving aquifer system.

Note: If background nitrate concentrations are elevated above 5mg/L, then the County must be consulted about the potential application of a more appropriate assessment procedure such as including groundwater flow through in the nitrate dilution model or the potential application of MECP Guideline B-7 Reasonable Use Concept and MECP Procedure B-7-1, Determination of Contaminant Limits and Attenuation Zones.

The groundwater impact assessment shall also include an evaluation of the feasibility of servicing the proposed development with private sewage systems. This must include conceptual layout plans that show the proposed location of sewage treatment systems including the leaching beds and dwellings within the development (including relevant setback distances to surrounding features as required by the OBC. The leaching beds should be appropriately sized as per the guidelines in Section 8.0 of the Ontario Building Code and based on the T-times estimated from the shallow soil investigation grain size analysis or in-situ infiltration testing. **The proposed development must conform with Part 8 Sewage Systems under the Ontario Building Code as it relates to soil percolation time, depth to high groundwater table elevation, depth to impermeable soil, maximum slopes, drainage characteristics and horizontal clearances.**

4.0 Scoped Hydrogeological Assessment for ARUs

4.1 Introduction

Development of Additional Residential Units (ARU) within Settlement Areas are described in Part 4, Section 1.9 of the County Official Plan, whereas ARUs outside of Settlement Areas are described in Section 1.10.

4.2 Servicing Requirements

In order to determine the water and wastewater requirements of the ARU, the County has advised using *“the flow equivalent to 1 bedroom apartment i.e. 1.4 persons per unit - 350L/p/d for average daily sewage flow = 490 L/d per ARU”*.

4.2.1 ARUs with Existing Servicing

For applications involving ARUs that are attached or contained within an existing primary residence, and for expansion of use that is considered minimal by the County, a Scoped Hydrogeological Assessment shall be submitted by a Qualified Professional to the County confirming that the private water supply and wastewater system is sufficient to support the ARU in combination with the normal operation of the principal dwelling on the lot. It is recommended that the scope of this work be reviewed with the County to ensure accuracy and adequacy.

The Scoped Hydrogeological Assessment must meet the following requirements:

- (1) Proof of Potable Water
 - a) Adequately demonstrate how the supply well will support the increased demand required by the ARU. The assessment must include a well record and assessment of the driller's pumping test results to confirm that the existing well can support the increased water demand as described in Guideline D-5-5 section 4.3.
 - b) Demonstrate that the existing water source is potable. A water quality sample shall be collected (upstream from any water treatment system) and assessed for the parameters described in Guideline D-5-5 tables 1-3, ensuring that the chlorine residual is tested with a handheld digital colorimeter, must be zero, before any bacteriological sample can be collected from a sampled well.
- (2) Wastewater Capacity
 - a) Include a statement and justification demonstrating that the additional load to the existing wastewater system is feasible and will not create unacceptable groundwater impacts.
 - b) A nitrate dilution assessment must be completed to assess that the additional septic system will not create unacceptable groundwater impacts.

If the Qualified Professional is not able to determine the feasibility of the site through this investigation, then the County may, at their discretion, recommend a Hydrogeological Assessment be conducted. A Hydrogeological Assessment may also be required if there are additional existing or proposed water uses on the property (e.g. a home-based business).

4.2.2 ARUs with New Servicing

For applications involving ARUs that will require new private water and wastewater servicing, a Scoped Hydrogeological Assessment shall be submitted by a Qualified Professional to the County confirming that a new private water supply and wastewater system is feasible on the subject property to support the ARU. It is recommended that the scope of this work be reviewed with the County to ensure accuracy and adequacy.

The Scoped Hydrogeological Assessment must meet the following requirements:

(1) Proof of Potable Water

- a) Adequately demonstrate that the installation of a new supply well is feasible to support the demand required by the ARU (i.e. review of well records/well survey of existing and surrounding wells; including an assessment of the driller's pumping test results to confirm potential well yield, as described in Guideline D-5-5 Section 4.3);
- b) Demonstrate that the existing water source is potable. A water quality sample shall be collected and assessed for the parameters described in Guideline D-5-5 Tables 1-3, ensuring that the chlorine residual is tested with a handheld digital colorimeter, must be zero, before any bacteriological sample can be collected from a sampled well.

(2) Wastewater Capacity

- a) Include a statement and justification demonstrating that the installation of a new septic system is feasible and that it will **conform with Part 8 Sewage Systems under the Ontario Building Code as it relates to soil percolation time, depth to high groundwater table elevation, depth to impermeable soil, maximum slopes, drainage characteristics and horizontal clearances.**
- b) A nitrate dilution assessment must be completed to assess that the additional septic system will not create unacceptable groundwater impacts.

5.0 Scoped Hydrogeological Assessment for Existing Vacant Lots and Lots of Record

5.1 Introduction

The County's Official Plan, Part 5, Section 5 Planning for Infrastructure, provides the policy framework for the development of existing vacant lots and lots of record, including infrastructure management, servicing hierarchy, servicing allocation and growth-related infrastructure.

5.2 Servicing Requirements

In order to determine the water and wastewater requirements of the proposed development, the County has advised to use *“the flow equivalent to 1 bedroom apartment i.e. 1.4 persons per unit - 350L/p/d for average daily sewage flow = 490 L/d per ARU”*.

5.2.1 Vacant Lots and Lots of Record that require New Servicing

For applications that will require new private water and wastewater servicing, a Scoped Hydrogeological Assessment must be submitted by a Qualified Professional to the County confirming that a new private water supply and wastewater system is feasible on the subject property to support the proposed development. It is recommended that the scope of this work be reviewed with the County to ensure accuracy and adequacy.

The Scoped Hydrogeological Assessment must meet the following requirements:

(1) Proof of Potable Water

- a) Adequately demonstrate that the installation of a new supply well is feasible to support the demand required by the proposed development (i.e. review of well records/well survey of existing and surrounding wells; including an assessment of the driller's pumping test results to confirm potential well yield, as described in Guideline D-5-5 Section 4.3);
- b) Demonstrate that the existing water source is potable. A water quality sample shall be collected and assessed for the parameters described in Guideline D-5-5 Tables 1-3, ensuring that the chlorine residual is tested with a handheld digital colorimeter, must be zero, before any bacteriological sample can be collected from a sampled well.

(2) Wastewater Capacity

- a) Include a statement and justification demonstrating that the installation of a new septic system is feasible and that it will **conform with Part 8 Sewage Systems under the Ontario Building Code as it relates to soil percolation time, depth to high groundwater table elevation, depth to**

impermeable soil, maximum slopes, drainage characteristics and horizontal clearances.

- b) A nitrate dilution assessment must be completed to assess that the additional septic system will not create unacceptable groundwater impacts.

6.0 Peer Review

The County may require a peer review of the completed Hydrogeological Assessment at the County's sole discretion and at the expense of the applicant.

7.0 References

The following documents may be considered alongside these Guidelines, as appropriate:

- County of Brant, Official Plan, 2024.
- *Ontario Water Resources Act (R.S.O., 1990, c. O.40); Safe Drinking Water Act (O. 2002, c. 32.); Clean Water Act (S.O. 2006, c. 22.)*
- Ontario Building Code
- Ministry of the Environment and Energy, 1996 – “Technical Guidelines for On-site Sewage Systems: Water Quality Impact Risk Assessment (Procedure D-5-4)”
- Ministry of the Environment and Energy, 1996 – “Technical Guideline for Private Wells: Water Supply Assessment (Procedure D-5-5)”
- Ministry of the Environment and Energy, 2006 – “Technical Support Document for Ontario Drinking Water Standards, Objects and Guidelines”

Appendix A Groundwater Quality Parameter Tables

Tables 1, 2, and 3 which are presented below have been established by Procedure D-5-5 in conjunction with Ontario Drinking Water Quality Objectives, Operational Guidelines and Standards documented in Ontario Regulation 169/03, made under the Safe Drinking Water Act, 2002.

Table 1: Health-related Bacteriological Parameters

PARAMETER	ONTARIO DRINKING WATER QUALITY STANDARD ¹	COMMENTS
Escherichia Coli	0	Indicators of contamination
Total Coliform	0	Indicator of possible or potential contamination

Note 1. These are expressed as CFU per 100 mL of sample. Every bacteriological sample must be submitted for analyses for all the above and lab reports must be accompanied by a report of the chlorine residual as measured at the time of sampling.

Exceedances must be explained and any re-sampling must be fully documented with respect to chlorine residual, rates and duration of pumping, and completeness of well development.

The chlorine residual tested with a handheld digital colorimeter, must be zero, before any bacteriological sample can be collected from a sampled well.

Table 2: Health-related Chemical Parameters

PARAMETER	ONTARIO DRINKING WATER QUALITY STANDARD ²	COMMENTS
Fluoride	1.5 ³	
Nitrate	10.0 mg/L (as N)	Contamination indicator; exceedance may be dangerous to infants and others.
Nitrite	1.0 mg/L (as N)	Contamination indicator
Nitrate plus Nitrite	10.0 mg/L (as N)	Contamination indicator
Sodium	20 mg/L (see note ⁴ below)	Levels may be significant for persons with medical conditions requiring low-salt diets
Turbidity	5 NTU (see note ⁵ below)	Could indicate problems in well construction or a naturally occurring problem; may interfere with water treatment
General Metals	See ⁴ Below	
Other Parameters	See ⁵ Below	

Note 2. Except for sodium, the Ontario Drinking Water Objective for parameters in Table 2 are Maximum Acceptable Concentrations under the Ontario Drinking Water Objectives. Units of measure and, where required, conversion factors must be provided. For more information on the Objectives, refer to the MOEE publication entitled "Ontario Drinking Water Objectives".

Note 3. This health-related limit is a "warning level" only. Exceedance calls for a recommendation that the local Medical Officer of Health be notified in order to alert persons with relevant medical conditions. Sodium also has an Aesthetic Objective of 200 mg/L (see Table 3).

Note 4. NTU = Nephelometric turbidity unit; FTU = Formazin turbidity unit. These terms are interchangeable. NTU is the term used in the ODWOs. For the purposes of this guideline, the consultant must note that if turbidity is present, particular care must be taken during testing to ensure that the bacteria requirements of Table 1 are met.

Note 5. See also section 5.5.1: "Raw Water Quality", above, regarding the responsibilities of the proponent or consultant to add parameters where necessary; the consultant must also provide the relevant information on any drinking water quality limits, including those from other jurisdictions.

If water softening is used, a separate tap supplying unsoftened water should be used for drinking purposes

Table 3: Common Aesthetic, Analytical and Indicator Parameters

PARAMETER	ONTARIO DRINKING WATER QUALITY STANDARD ¹	COMMENTS
Alkalinity	-	Useful analytical parameter
Ammonia		Contamination indicator
Calcium		See Hardness
Chloride	250 mg/L	Associated with salt problems
Colour	5 TCU	Associated with certain metals and organic substances ⁷
Conductivity	-	Useful analytical parameter
Dissolved Organic Carbon (DOC)	5.0 mg/L (as C)	Taste, odour, colour, turbidity precursor for harmful contaminants after chlorination
Hardness	500 mg/L (as CaCO ₃) ²	Taste, encrustation and reaction with soap
Iron	0.3 mg/L (as Fe)	May cause staining of plumbing fixtures and laundry
Magnesium	-	See Hardness
Manganese	0.05 mg/L (as Mn)	May cause staining of plumbing fixtures and laundry
pH	6.5-8.5	Associated with corrosion or encrustation or contamination by other substances
Sodium	200 mg/L (as Na) ³	Taste
Sulphate	500 mg/L (as SO ₄)	Laxative
Total Dissolved Solids (TDS)	500 mg/L	Corrosion or encrustation of metal fixtures or appliances; taste; must be measured independently of conductivity and turbidity
Turbidity	5 NTU	See ⁴ Below
General Metals	See ⁵ Below	
Other Parameters	See ⁵ Below	

Note 1. Except for hardness, the drinking water quality limits in Table 3 are Aesthetic Objectives under the Ontario Drinking Water Objectives. Units of measure and, where required, conversion factors must be provided. For more information on the Objectives, refer to the MOEE publication entitled "Ontario Drinking Water Objectives".

Note 2. Generally, water with a hardness value of more than 300 mg/l is considered "very hard". The Ontario Ministry of the Environment publication entitled "Ontario Drinking Water Objectives", states that waters with hardness "in excess of 500 mg/l are unacceptable for most domestic purposes". A maximum treatable value is not available.

Note 3. Sodium also has a health-related "warning level" of 20 mg/l (see Table2). Since water softening results in high sodium levels, a separate tap, which supplies unsoftened water, should be installed for drinking purposes.

Note 4. For the purposes of this guideline, the consultant must note that if turbidity is present, particular care must be taken during testing to ensure that the bacteria requirements of Table 1 are met.

Note 5. See also section 4.4.1: "Raw Water Quality", above, regarding the responsibilities of the proponent or consultant to add parameters where necessary; the consultant must also provide the relevant information on any water quality limits, including those from other jurisdictions.

Appendix B Groundwater Recharge Rates

Within the County the sewage-system impact assessment only allows the consideration of on-site groundwater recharge for dilution purposes. In these Guidelines, the portion of infiltrating precipitation that reaches the underlying water table is considered groundwater recharge.

The available groundwater recharge is determined by reference to the following table, which was previously assembled by the MECP Regional staff from the results of previous MECP water resource and drainage basin studies.

The listed rates are consistent with the rates previously utilized by the MECP Central Region when that agency was responsible for the technical review of privately serviced developments; and with the typical rates presented in "Ministry of the Environment Hydrogeological Technical Information Requirements for Land Development Applications, April 1995".

The representative groundwater recharge rate for the development parcel shall be the geometric mean of the individual groundwater recharge rates determined by grain-size evaluation of the predominant soil samples.

Soil Texture	Groundwater Recharge Rate (mm/year)
Coarse Sand /Gravel	250
Fine to Medium Sand	200
Silty Sand	175
Sandy Silt	150
Silt	125
Clayey Silt	100
Clay	75

Appendix C Example of Nitrate Dilution Model for Privately Serviced Residential Severance

Parameter	Unit
Number of Residences (P):	2
Volume of Effluent per Residence (V _e):	1,000 L/day
Concentration of Nitrate-Nitrogen/Residence (C _e):	40 mg/L
Volume of Effluent for Development (Q _e):	P x V _e
Development Area (A):	1.5 ha
Impervious Area (S):	0.1
Infiltration Rate (I) (see Appendix B):	0.175 m/yr
Concentration of Nitrate-Nitrogen in Precipitation (C _i):	0.1 mg/L
Total Dilution (Q _t):	Q _e + Q _i

Calculations

1. Calculation of the On-site recharge (Q_i)

$$= (A) \times (1 - S) \times (I)$$

$$= (15,000 \text{ m}^2) \times (1 - 0.1) \times (0.175 \text{ m/yr}) +$$

$$= 2,362.5 \text{ m}^3/\text{yr} \text{ or } 6,470 \text{ L/day}$$
2. Calculated Nitrate-Nitrogen Concentration (C_t) at Property Boundary

$$C_t = \frac{Q_e C_e + Q_i C_i}{Q_t}$$

$$= \frac{\left(2,000 \frac{\text{L}}{\text{day}}\right) \left(40 \frac{\text{mg}}{\text{L}}\right) + \left(6,470 \frac{\text{L}}{\text{day}}\right) \left(0.1 \frac{\text{mg}}{\text{L}}\right)}{\left(2,000 \frac{\text{L}}{\text{day}}\right) + \left(6,470 \frac{\text{L}}{\text{day}}\right)}$$

$$= \frac{\left(80,000 \frac{\text{mg}}{\text{day}}\right) + \left(647 \frac{\text{mg}}{\text{day}}\right)}{\left(8,470 \frac{\text{L}}{\text{day}}\right)}$$

= 9.52 mg/L of nitrate nitrogen at Property Boundary.