

EFI

ENGINEERING
ARCHITECTURE
PROCESS PROFESSIONALS

Matheson and Rosedale Subdivision

Serviceability Report

Project Number: 7213

Date: November 22, 2024

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1 Introduction

The following Serviceability and Stormwater Management Report is prepared on behalf of Smart Homes Ottawa in support of the Matheson Subdivision's application for Draft Plan Approval. The proposed development is located in Lanark County, specifically the Township of Montague; refer to **Figure 1 – Key Plan** for location details.

The subject site is 23.53 hectares in area and is bordered by Matheson Drive to the North, rural residential properties to the East and South, and County Road 23 (also known as Rosedale Road South) to the West. Refer to **Appendix B – Referenced Plans** for a copy of the Legal Plan of Survey.

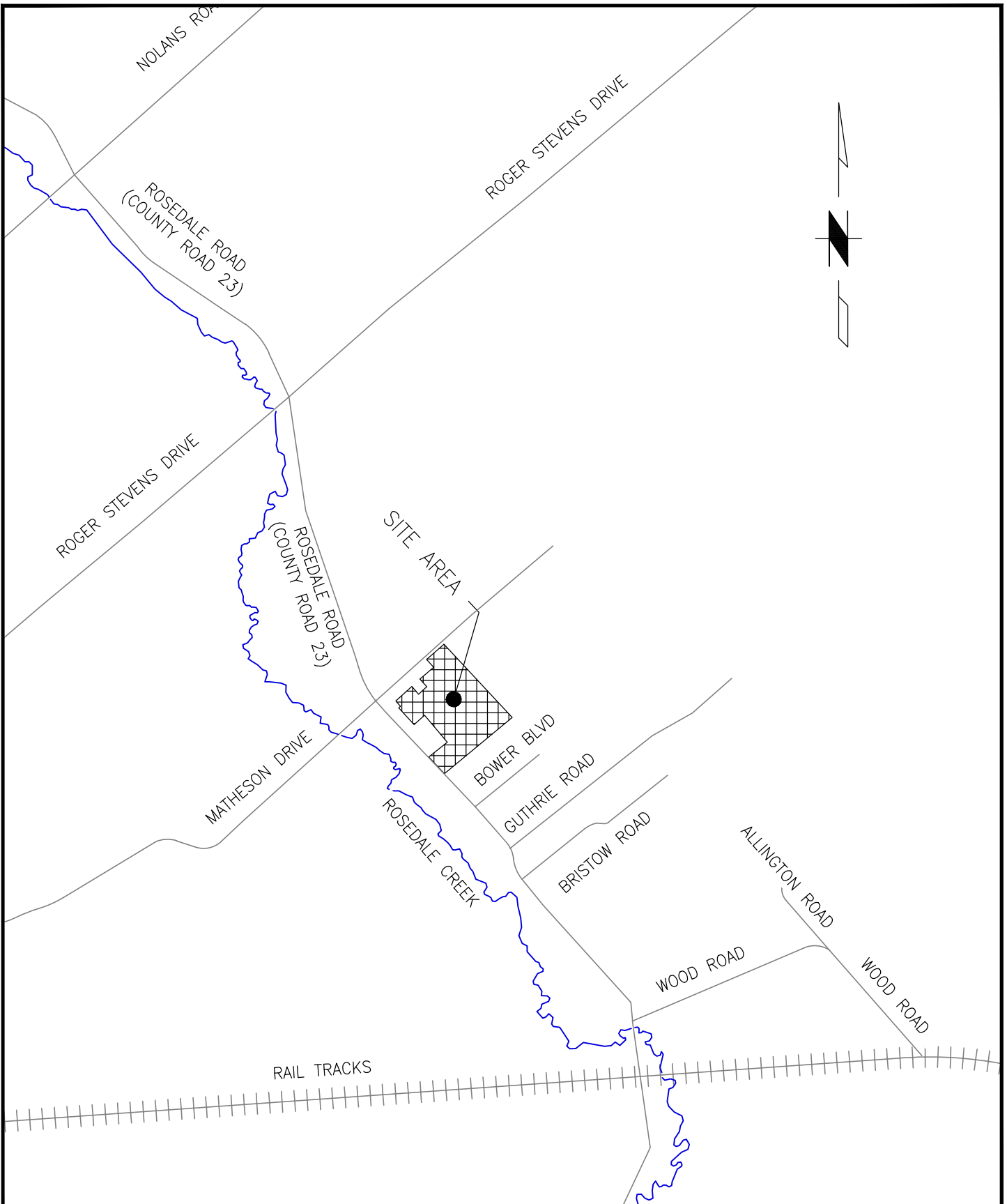
The Concept Plan for the development contains 41 Rural Residential lots, multiple greenspace areas, and an area for a Stormwater Management Pond. The residential lots will be serviced by private wells and septic systems. **Refer to Appendix B – Referenced Plans** for a copy of the proposed Concept Plan, for the subdivision's site plan details.

At the time of writing this report, limited house details were available from the developer. The known design details are the houses will be single family homes, one story high, and with no basements. For the purposes of design calculations, it has been assumed that the homes will have four bedrooms and a floor area of 2,000 square feet.

2 Existing Conditions

The site is currently undeveloped and consists of a grassed field, some existing trees and bush, and rail/post and wire fencing. Refer to **Figure 2 – Existing Conditions** for current site conditions which are compiled from a site survey conducted by Monument Urso Surveying Ltd. and Civil 3D aerial imagery.

The site's existing grading is comprised of a gentle slope towards the western property limits and the overland stormwater is conveyed to the roadside ditches along Matheson Drive and Rosedale Road South.



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SCALE	N.T.S
DATE	2024/11/15

CLIENT: SMART HOMES OTTAWA INC.

PROJECT NO. 23-7213

EFI
ENGINEERING ARCHITECTURE
PROCESS PROFESSIONALS

34 SOUTH BRANCH ROAD
CORNWALL ON K6K 1T4
T: (613) 936-0148
F: (613) 936-8451
engineer@efiengineering.com
www.efiengineering.com

TITLE: FIGURE 1
KEY PLAN

DISCIPLINE CIVIL
DRAWING NO. FIG 1
REV. 1



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SCALE N.T.S.
DATE 2024/11/15

CLIENT:
SMART HOMES OTTAWA INC.

PROJECT NO.
23-7213

DISCIPLINE
CIVIL

DRAWING NO.
FIG 2

REV.
1



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TITLE:
**FIGURE 2
EXISTING CONDITIONS PLAN**

2.1 Hydrogeological and Geotechnical Summary

The existing hydrogeological and geotechnical conditions were assessed by Cambium Inc. to review the subject site's feasibility for the proposed development. The following is a summary of the notable criteria and findings:

- The subdivisions suitability for private septic system lots was determined by identifying and characterizing the native soils and bedrock, surficial slopes, and the location of the shallow water table.
- Cambium completed 18 Test Pits to assess the site's subsurface conditions. The maximum depth was predetermined at 2.0m below the surface, only 1 test pit reached 2.0m deep. The others encountered refusal on bedrock at depths ranging from 0.14m to 1.74m below the surface.
- A nitrate impact assessment concluded that the site's nitrate concentrations at the property boundaries will be 9.81mg/L which is less than the required Ontario Drinking Water Quality Standards limit of 10mg/L.
- The water supply assessment included the installation and hydraulic testing of wells, and water quality testing of the aquifer.
- As per the Ministry of the Environment, Conservation and Parks (MECP) D-5-5 Guideline, four test wells were required to characterize the water supply aquifer for the site; three new Test Wells (TW1, TW2, and TW3) and one existing well (RW1).
- The site is situated within a Well Head Protection Area D (WHPA-D) as per the MECP Source Water Protection Information Atlas. The site's vulnerability score is 2, which is the lowest score available and indicates the area poses a relatively insignificant risk for source water contamination.
- The test pit results indicate the site also above a Highly Vulnerable Aquifer (HVA) with a vulnerability score of 6. HVAs are aquifers that are more sensitive to contamination.
- As there are no site-specific building designs at this time, Cambium utilized a four-bedroom design home for sanitary and water demand calculations.
- Based on the water pumping and quality tests performed by Cambium, it is their position that all test wells can sustainably provide sufficient quantity of potable water to meet the daily demand for a residential dwelling, without detrimental effects to surrounding water users.
- Cambium's conceptual wastewater design indicates that site soils conditions may require raised filter beds as part of the private septic systems. The area of the raised filter beds was determined to be 500m²; each lot will require individual evaluation for septic system designs. But site conditions appear feasible to install on-site wastewater systems.

Refer to the complete report ("Hydrogeological Assessment Report – Matheson and Rosedale Subdivision, Part Lot 20 Concession 3, Montague Ontario") dated July 10, 2024, for further details.

3 Water Servicing

3.1 Domestic Water Demands

There is no municipal water supply available in the vicinity of the proposed subdivision. The 41 residential lots will have their domestic water supply provided by drilled wells.

Water Demand Calculations have been prepared based on the following Guidelines and Criteria:

- The Ministry of the Environment, Conservation and Parks (MECP) Guideline D-5-5 Private Wells: Water Supply Assessment. Refer to **Appendix C – Water Supply Calculation References** for guideline excerpts.

The MECP Criteria for Water Demand:

- Average Daily Demand = 450L/Person/day
- Peak Demand = 3.75L/Person/min
- # People for single family residence = Number of bedrooms + 1
- A minimum of 4 bedrooms shall be used unless otherwise established to MOEE's satisfaction
- Regardless to calculation results, the flow rate shall not be less than 13.7L/min

Water Demand Calculations based on the MECP D-5-5 Guidelines are as follows:

$$\frac{4 \text{ Bedrooms}}{\text{House}} \times \frac{1 \text{ Person}}{\text{Bedroom}} + 1 = \frac{5 \text{ People}}{\text{House}}$$

$$\frac{5 \text{ People}}{\text{House}} \times 450\text{L/person/day} = \mathbf{2,250\text{L/house/day}}$$

During the Water Supply testing completed by Cambium Inc., the four test wells each had 5,000-6,000L of water discharged over a 6-hour period with minimal or no observable water level response. The results indicate all test wells can sustainably provide a residential dwelling demand without affecting the surrounding water users.

3.2 Fire Flow Demands

As there is no municipal water system in the vicinity of the Matheson and Rosedale Subdivision, alternative methods to provide adequate water supply for firefighting purposes have been assessed. Fire Flow Calculations to confirm the required water volumes have been prepared based on the following Guidelines and Criteria:

- National Fire Protection Association (NFPA) 1142 – Water Supplies for Suburban and Rural Firefighting

NFPA 1142 Criteria for Fire Flow Demands:

NFPA 1142 calculates firefighting water supply for two scenarios. The first is for structures with no exposure hazards, and the second is for structures with exposure hazards. The standard classifies an exposure hazard as a structure with a 100 square foot floor area and within 50 feet of the other structure. Without individual lot layouts, utilizing the more conservative calculation (Structures with Exposure Hazards) is required and the equation for minimum water supply can be seen below.

$$WS_{min} = \frac{VS_{tot}}{OHC} (CC) \times 1.5$$

Where:

WS_{min} = minimum water supply in gallons

VS_{tot} = total volume of structure in ft^3

OHC = Occupancy Hazard Classification number

CC = Construction Classification Number

The Volume of the homes was calculated based on the assumed 2,000 ft^2 footprint and 20-foot in height (12-foot walls and 8-foot ceilings). The total building volume equaling 40,000 ft^3 .

The Occupancy Hazard Classification is based on the level of fire hazard associated with the occupancy activity; Chapter 5 of NFPA 1142 lists the OHC numbers and the occupancy types associated with each number. The number for the proposed homes is Number 7 and is based on the NFPA 1142 Section 5.2.5. Refer to **Appendix C - Water Supply Calculation References** for excerpts of the NFPA standard which explain the numbering classification system in more detail.

The Construction Classification Number for the proposed homes is based on the combustion level of the buildings structural and non-structural construction components (e.g. walls, beams, floors, roofing materials, etc.) It is assumed the homes will be wood frame construction and therefore the applicable Construction Type per NFPA 1142 section 6.3.3 through 6.3.7 is Type V.

The Construction Classification Number for Type V construction is 1.5. However, section 6.2.2 states "For dwellings, the maximum Construction Classification Number shall be 1.0".

Based on the above details the following is the Minimum Water Supply volume:

$$WS_{min} = \frac{40,000ft^3}{7} (1.0) \times 1.5$$

$$WS_{min} = 8,571.43 \text{ gallons}$$

The minimum water supply to be available for firefighting purposes is 8,571.43 gallons.

3.3 Water Tanks for Fire Protection

Through correspondence with the Montague Fire Department (Chief Miles Greer), it has been determined that the fire department will utilize water tankers and pumper trucks in the event of a fire. Refer to **Appendix A – Precon Minutes and Municipal Correspondence** for a copy of the discussions. The fire department would arrive with 2,500 gallons of water and will require two onsite storage tanks connected to dry hydrants. Each tank should hold, at a minimum, the Fire Water Supply requirement (8,571.43 gallons) minus the 2,500 gallons the fire department would arrive with; the tank size shall be no smaller than 6,071.43 gallons.

The onsite tanks are placed at each end of the subdivision to evenly service the developments firefighting needs. Refer to the Grading and Servicing Plans for exact storage tank locations.

The Water Supply Tanks shall conform to the following standard with regards to the design, construction, installation, inspection, and maintenance details:

- National Fire Protection Association (NFPA) 22 – Standard for Water Tanks for Private Protection

NFPA 22 offers criteria for a variety of tank designs including Bladder Tanks, Break Tanks, Gravity Tanks, Pressure Tanks, and Suction Tanks. Construction material, standard sizes, access considerations, piping layouts all vary depending on which tank design is utilized. These details, and a final tank design, will be assessed at the detailed design stage.

4 Sanitary Servicing

4.1 Domestic Sanitary Demand

There are no municipal sanitary sewers available in the vicinity of the proposed subdivision. The sanitary flows from the 41 residential lots will be treated on-site by individual private septic systems.

The private sanitary septic system design are based on the following Guidelines and Criteria:

- The Ministry of the Environment, Conservation and Parks (MECP) Guideline D-5-4 Individual On-Site Sewage Systems – Water Quality Impact Risk Assessment

MECP Guideline D-5-4 states that every proposed development that relies on individual on-site sewage systems must follow a three-step process.

1. Lot Size Considerations
2. System Isolation Considerations
3. Contaminant Attenuation Considerations

The average size of the lots for the Matheson Subdivision is 0.4 hectares; Step 1 of the MECP Guideline D-5-4 states that developments with lots less than 1 hectare in size will require a detailed Hydrogeological Assessment to assess the potential risk to groundwater.

Cambium Inc. prepared a Hydrogeological Report for the Matheson and Rosedale Subdivision. The nitrate Impact Assessment predicted that each lot would produce a nitrate concentration of 9.81mg/L which is less than the allowable limit of 10mg/L. Refer to the Cambium Inc. report for the full analysis details.

5 Conclusions

This report was prepared in support of the Draft Plan Approval submission for the Matheson and Rosedale Subdivision. The report assessed the Domestic and Fire Flow Water demands as well as summarized the On-Site Sanitary Septic details for the rural residential development.

5.1 Domestic Water Conclusions

Domestic Water Demand is calculated at 2,250L/day for each lot based on the MECP Guidelines D-5-5 Private Wells: Water Supply Assessment. Cambium Inc. conducted a water supply assessment (pumping test and water quality analysis) and the results suggest the test wells can provide a sufficient quantity of potable water to meet the development's daily demand.

5.2 Fire Flow Conclusions

Through discussions with the Montague Fire Chief (Miles Greer), the proposed approach to address fire fighting is the use of the fire department's water tankers and pumper trucks and on-site storage tanks.

The proposed development's Fire Flow Demand was calculated using National Fire Protection Association (NFPA) 1142 – Water Supplies for Suburban and Rural Firefighting. The total demand based on the current site criteria is calculated at 8,571.43 gallons.

The Fire Department will supply 2,500 gallons of water, via water tanker, when they arrive to site in the event of a fire. The remaining water volume will be provided by two on-site tanks. Each tank will supply a minimum volume of water of 6,071.43 gallons (the overall demand minus the volume of water provided by the Fire Department).

5.3 Domestic Sanitary Conclusions

The proposed lots will each be serviced with on-site private septic systems. Cambium Inc. completed a Hydrogeological Assessment. The report assessed and confirmed the site's feasibility for private septic systems. However, locations with shallow soils may require raised filter beds and each lot will need to be individually evaluated.

6 Closing Statement

This report has been prepared in support of a Draft Plan Approval submission, for the review of the Township of Montague and Lanark County. Please provide any comments, or requests for additional information, to the undersigned parties.

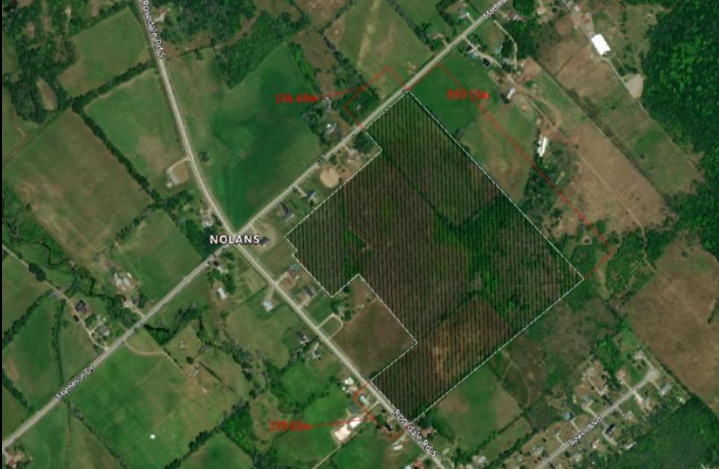


Prepared By: Ryan Good, C.E.T
Senior Civil Designer



Approved By: Troy Gove, P.Eng
Project Engineer

Appendix A
Pre-Consultation Minutes and
Approval Correspondence

Subdivision Name:	Smart Homes Project Rosedale Drive & Matheson Drive Subdivision
Agents:	EFI Engineering
Subject Lands:	
Participants:	<p>Dennis Gratton – EFI Engineering Mario Castillo – EFI Engineering Matthew Linton – EFI Engineering Rebecca Scott – EFI Engineering Lucy Clare – EFI Engineering Pat – Smart Homes Ottawa Kirsten Cote, Township of Montague Forbes Symon, Consultant for the Township of Montague Stephen Rothwell, Township of Montague Sarah MacLeod-Neilson, Rideau Valley Conservation Authority Koren Lam, Lanark County Anthony Hommik, Consultant for Lanark County Cindy Deachman, Lanark County Kristy Warwick, Lanark County</p>

Introduction to Proposed Plan of Subdivision

- Mr. Linton, on behalf of the owner Smart Homes Ottawa, kicked off the pre-consultation meeting with an introduction to the proposed subdivision in the Township of Montague and outlined the subdivision plan to develop 43 residential single dwelling lots with approximately 1 ac for each lot. He mentioned that the draft preliminary

hydrogeological study for this parcel indicated a presence of nitrate dilution on the subject lands.

- In the proposed Conceptual plan for the Draft Plan of Subdivision, Mr. Linton identified the Rights of Way limits that are currently 18-20 m for proposed streets with ditching on both sides and a culvert. Additionally, the subdivision would be constructed in 2 phases but was unsure of which lots were included in which phase.
- The subject lands drain from the SE to NW corner and the drainage outlet into the Rideau River
- A recent severance application (B20/105) to the North of the subject lands was completed and Mr. Linton indicated that a portion (southern) of the severed lot is to be included in the draft plan of subdivision. It is recommended to let the severance application lapse and then include the lands in the plan of subdivision with Hydrogeological study. Staff indicated the applicant should get legal advice on how to approach this.

Agency Comments

Lanark County

- Mr. Hommik identified the importance of the property’s Stormwater Management Plan and the need to review drainage plans.
- Mr. Hommik mentioned the subdivision should be a phased approach since it would be beneficial from a tax relief point of view
- Ms. Lam asked how the subdivision will meet affordable housing initiatives. Mr. Gratton responded with the location and context of the application being a rural subdivision and would include a market needs assessment in the submission.
- Mr. Derouin stated a Traffic Impact Study would be required for the proposed development and specifically the right turn lane at the intersection at Matheson and Rosedale Dr.
- Mr. Derouin mentioned an entrance permit process might be required and a widening and reserve on Lot 16 and Lot 17

Township of Montague

- Mr. Symon noted that for parkland dedication, cash-in-lieu would be preferred considering the near-by recreational amenities. He recommended the conceptual plan to include a gazebo area as a gathering place

- Mr. Symon recommended streets with paved shoulders based on the density of the proposed development
- Mr. Rothwell expressed interest in Stormwater Management concerns and the Operations and Maintenance of the equipment
- Township Official Plan Right of Way width is 20 m and would like to see a revised sketch with the modifications
- Township Official Plan also states cul-de-sacs must be 30 m minimum.

Rideau Valley Conservation Authority

- Mrs. Macleod-Neilson also mentioned the Stormwater Management Plan should note increasing flows, LID and management of stormwater. There is currently a 5 year flow and onsite flow into Rosedale ditching system for the intended flow route
- Mrs. Macleod-Neilson noted there are no natural hazards on site that would trigger further review
- A permit from the RVCA is required for watercourse and outlet to a waterbody

Report	Comments	Required (Y/N)
Planning Rationale	<ul style="list-style-type: none"> • Describe development proposal and why this application should be considered • Proposal should conform with Provincial and Local interests: <ul style="list-style-type: none"> ○ Lanark County Sustainable Communities Official Plan ○ Official Plan & Zoning By-Law 	<p style="text-align: center;">Y</p>
Draft Plan of Subdivision Survey Plan <i>(Planning Act S50(7) & OReg 544/06)</i>	<ul style="list-style-type: none"> • Draft Plans of Subdivision should include: <ul style="list-style-type: none"> ○ Location, dimensions, boundaries of surrounding and proposed: <ul style="list-style-type: none"> ▪ Lots, blocks, streets, and reserve configuration ▪ Environmental features ▪ Utilities ▪ Public amenities (Parks, Open Space) ▪ Easement and Right-of-way (20 m) ▪ Topography, contour, elevation and drainage patterns ▪ Stormwater management facilities 	<p style="text-align: center;">Y</p>
Hydrogeological Assessment & Terrain Analysis	<ul style="list-style-type: none"> • Assessment of quality and quantity of water and waste water • Assessment of surficial geological mapping, well records and onsite test pits • Hydrogeological study should reference: <ul style="list-style-type: none"> ○ MOE – D-5-4 Guidelines ○ MOE – D-5-5 Guidelines ○ Ontario Drinking Water Standards, Objectives and Guidelines (ODWSOG) ○ Lanark County Hydrogeological Checklist & Sign Off 	<p style="text-align: center;">Y</p>
Servicing Options Statement <i>(Provincial Policy Statement, Section 3)</i>	<ul style="list-style-type: none"> • Evaluation of safe supply of drinking water and a proper collection, treatment and disposal of sewage wastewater, without causing adverse impact on the natural environment or public health. • Report should reference: <ul style="list-style-type: none"> ○ MOE D-5-3 Guidelines ○ Provincial Policy Statement, Section 3 	<p style="text-align: center;">Y</p>

Report	Comments	Required (Y/N)
Environment Impact Assessment	<ul style="list-style-type: none"> • Identification of environmental features present on and near the proposed development which include: <ul style="list-style-type: none"> ○ Species at Risk ○ Wetlands (Unevaluated, Evaluated) ○ Organic Soils ○ Natural Heritage Features, Corridors and Linkages ○ Significant Woodlands, Valleylands, Wildlife Habitat ○ Areas of Natural and Scientific Interest (ANSI) 	Y
Stormwater Management Plan	<ul style="list-style-type: none"> • Report and Site Plan should reference and include: <ul style="list-style-type: none"> ○ Guidelines - MOE-2003 / MNR-2001 ○ Stormwater Management practices that will be used to control runoff ○ Hydrologic and hydraulic analysis that calculates the runoff volumes and peak flows 	Y
Grading and Drainage Plan	<ul style="list-style-type: none"> • Identification and assessment of sloping land within lot to direct flow of surface water away from foundations & abutting properties. Site Plan should include: <ul style="list-style-type: none"> ○ Grading network plan (Slopes, swales, berms, retaining walls etc.) ○ Design elevation plan ○ Drainage network plan 	Y
Archaeology Assessment (Provincial Policy Statement, Section 3)	<ul style="list-style-type: none"> • Evaluation of how the proposed development has on potential cultural heritage value of archaeological resources and mitigation of development impacts 	Y
Traffic Impact Assessment (Provincial Policy Statement, Section 3)	<ul style="list-style-type: none"> • Evaluation of the proposed development and it's impact on the roadway capacity, pedestrian movements and safety concerns. 	Y

Appendix B
Referenced Plans

REQUIRE THIS PLAN TO BE DEPOSITED UNDER THE LAND TITLES ACT.
DATE: _____

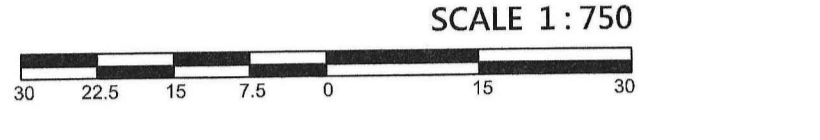
PLAN 27R-5155
RECEIVED AND DEPOSITED DATE: _____

REPRESENTATIVE FOR THE LAND REGISTRAR FOR THE LAND TITLES DIVISION OF LANARK NO. 27

STEFAN BAZAR
ONTARIO LAND SURVEYOR

SCHEDULE			
PART	LOT	CONCESSION	PIN
1			ALL OF 05264-0170
2			ALL OF 05264-0162
3	PART OF 20	3	ALL OF 05264-0163
4			ALL OF 05264-0169

PLAN OF SURVEY OF
PART OF LOT 20
CONCESSION 3
GEOGRAPHIC TOWNSHIP OF MONTAGUE
COUNTY OF LANARK
MONUMENT-URSO SURVEYING LTD.



METRIC
DISTANCES AND COORDINATES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

SURVEYOR'S CERTIFICATE

I CERTIFY THAT:

- THIS SURVEY AND PLAN ARE CORRECT AND IN ACCORDANCE WITH THE SURVEYS ACT, THE SURVEYORS ACT, THE LAND TITLES ACT AND THE REGULATIONS MADE UNDER THEM.
- THE SURVEY WAS COMPLETED ON THE 8TH DAY OF DECEMBER, 2023.

December 10, 2023
DATE

STEFAN BAZAR
ONTARIO LAND SURVEYOR

This plan of survey relates to AOLS Plan Submission Form Number V-59105

- LEGEND
- DENOTES FOUND SURVEY MONUMENT
 - PLANTED SURVEY MONUMENT
 - SB IRON BAR
 - SSB STANDARD IRON BAR
 - SSSB SHORT STANDARD IRON BAR
 - RSB IRON ROD
 - WT WITNESS
 - MEAS MEASURED
 - MONUMENT-URSO SURVEYING LTD.
 - (P1) PLAN 27R-1191B
 - (P2) PLAN 27R-1191B
 - (P3) PLAN 27R-1191B
 - (P4) PLAN 27R-1191B
 - (P5) PLAN 27R-1191B
 - (P6) PLAN 27R-1191B
 - RF RAIL FENCE
 - CLF CHAIN LINK FENCE
 - BF BOARD FENCE
 - PWF POST & WIRE FENCE
 - CL CENTRI LINE
 - OWP WOOD POST
 - OH OVERHEAD WIRE

BEARING NOTES

BEARINGS ARE MTM GRID, DERIVED FROM CAN-NET GPS OBSERVATIONS ON REFERENCE POINTS A & B, HAVING A BEARING OF N00°13'30"W AND ARE REFERRED TO THE CENTRAL MERIDIAN (7° 30' WEST LONGITUDE) OF MTM ZONE 18NDB3 (CGRS0210).

FOR BEARING COMPARISONS A ROTATION OF 80°22'00" COUNTER-CLOCKWISE WAS APPLIED TO PLAN P2, P3 AND P4 AND 80°23'30" COUNTER-CLOCKWISE TO PLAN P5 AND 80°23'30" COUNTER-CLOCKWISE TO PLAN P6 TO CONVERT TO GRID BEARINGS.

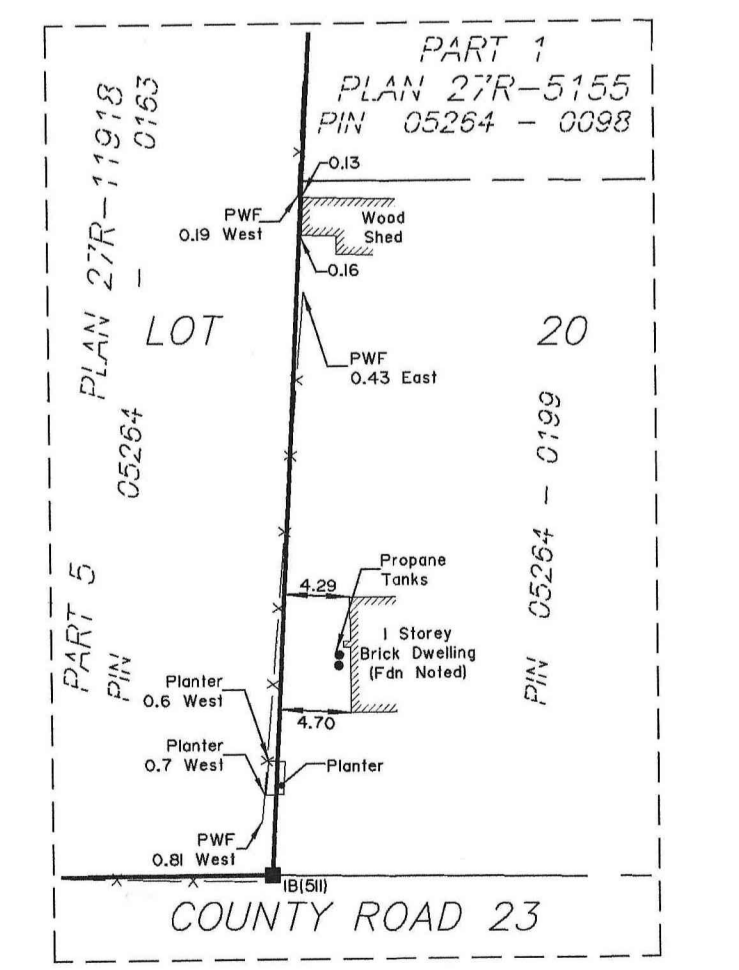
CO-ORDINATE NOTES

CO-ORDINATES ARE DERIVED FROM CAN-NET REAL-TIME NETWORK GPS OBSERVATIONS, MTM ZONE 18NDB3 (CGRS0210).

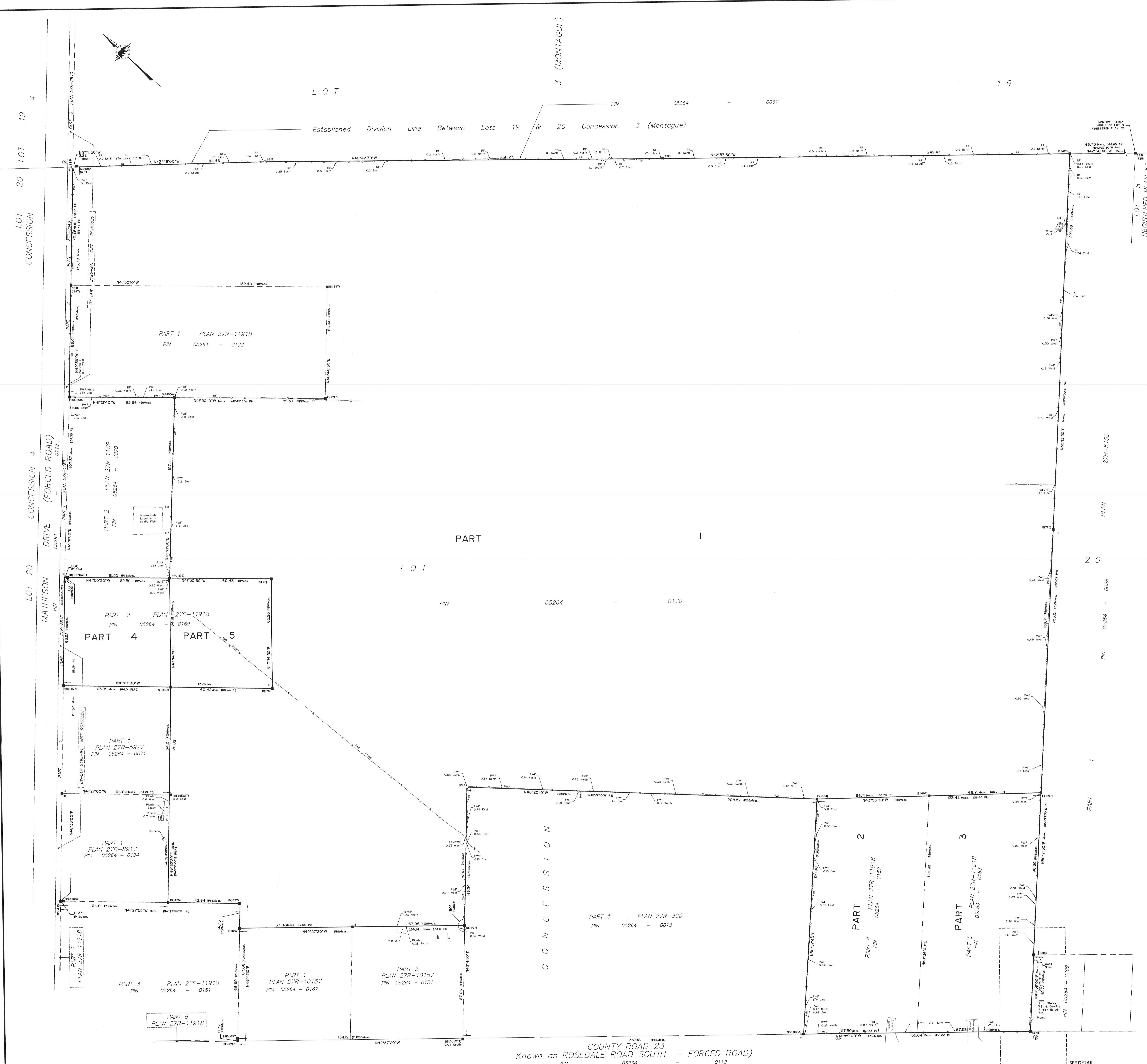
COORDINATES ARE TO URBAN ACCURACY PER SECTION 14(2) OF OREG 216/10.

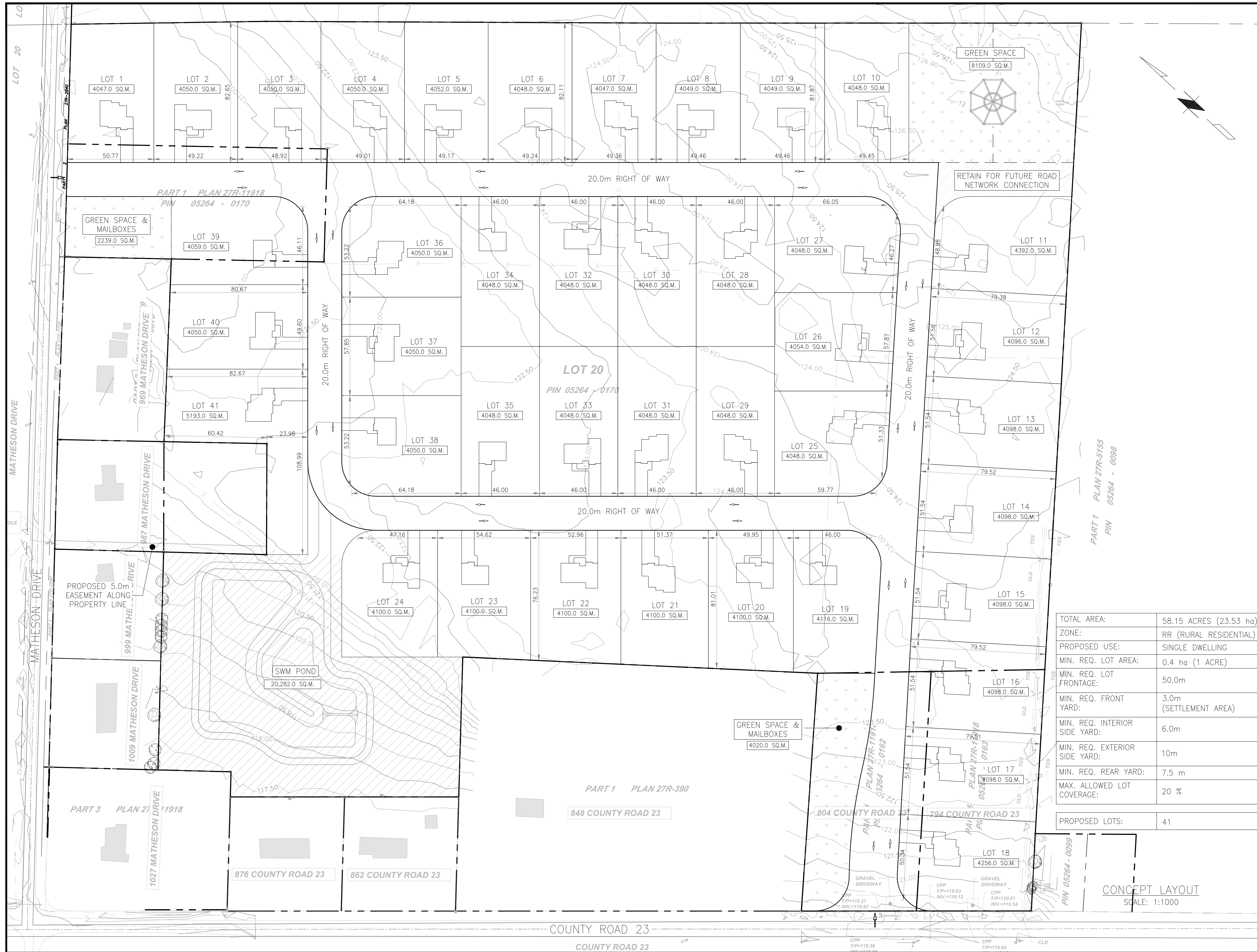
COORDINATES CANNOT, IN THEMSELVES, BE USED TO RE-ESTABLISH CORNERS OR BOUNDARIES SHOWN ON THIS PLAN.

POINT ID	NORTHING	EASTING
A	4976837.28	347976.07
B	4976069.87	347979.09



DETAIL
Scale 1:500





USE AND INTERPRETATION OF DRAWINGS:
DRAWINGS ARE NOT TO BE SCALED.
BY USE OF THE DRAWINGS FOR CONSTRUCTION OF THE PROJECT, THE OWNER REPRESENTS THAT HE HAS REVIEWED AND APPROVED THE DRAWINGS. THE CONTRACTOR REPRESENTS THAT HE HAS VISITED THE SITE, FAMILIARIZED HIMSELF WITH THE LOCAL CONDITIONS, VERIFIED FIELD DIMENSIONS AND CORRELATED HIS OBSERVATIONS WITH THE REQUIREMENTS OF THE CONTRACT DOCUMENTS.
THIS DRAWING ILLUSTRATES THE WORK TO BE DONE. THE ENGINEER IS NOT RESPONSIBLE FOR THE MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES USED TO DO THE WORK, OR THE SAFETY ASPECTS OF CONSTRUCTION, AND NOTHING ON THIS DRAWING EXPRESSED OR IMPLIED CHANGES THIS CONDITION. CONTRACTOR SHALL DETERMINE ALL CONDITIONS AT THE SITE AND SHALL BE RESPONSIBLE FOR KNOWING HOW THEY AFFECT THE WORK.
UNAUTHORIZED CHANGES:
IN THE EVENT THE CLIENT, THE CLIENTS CONTRACTORS OR SUBCONTRACTORS, OR ANYONE FOR WHOM THE CLIENT IS LEGALLY LIABLE, MAKES OR PERMITS TO BE MADE ANY CHANGES TO ANY REPORTS, PLANS, SPECIFICATIONS OR OTHER CONSTRUCTION DOCUMENTS PREPARED BY EFI WITHOUT OBTAINING EFI'S PRIOR WRITTEN CONSENT, THE CLIENT SHALL ASSUME FULL RESPONSIBILITY FOR THE RESULTS OF SUCH CHANGES. THEREFORE THE CLIENT AGREES TO WAIVE ANY CLAIM AGAINST EFI AND TO RELEASE EFI FROM ANY LIABILITY ARISING DIRECTLY OR INDIRECTLY FROM SUCH CHANGES.
IN ADDITION, THE CLIENT AGREES, TO THE FULLEST EXTENT PERMITTED BY LAW, TO INDEMNIFY AND HOLD HARMLESS EFI FROM ANY DAMAGES, LIABILITIES OR COST, INCLUDING REASONABLE ATTORNEY'S FEES AND COST OF DEFENSE, ARISING FROM SUCH CHANGES.
IN ADDITION, THE CLIENT AGREES TO INCLUDE IN ANY CONTRACTS FOR CONSTRUCTION APPROPRIATE LANGUAGE THAT PROHIBITS THE CONTRACTOR OR ANY SUBCONTRACTORS OF ANY TIER FROM MAKING ANY CHANGES OR MODIFICATIONS TO EFI'S CONSTRUCTION DOCUMENTS WITHOUT PRIOR WRITTEN APPROVAL OF EFI AND THAT FURTHER REQUIRES THE CONTRACTOR TO INDEMNIFY BOTH EFI AND THE CLIENT FROM ANY LIABILITY OR COST ARISING FROM SUCH CHANGES MADE WITHOUT SUCH PROPER AUTHORIZATION.

REFERENCES

NO. REF.	NO. DWG.	TITLE	BY
1			

DATE	REV.	REVISIONS	BY	APP'D
2024-11-18	G	ISSUED FOR DRAFT PLAN	KT	
2024-09-27	F	REDUCED LOTS	KT	RS
2024-08-30	E	MISC. REVISION	KT	RS
2024-06-10	D	REVISED LAYOUT	KT	RS
2024-05-23	C	REVISED W/ 20m ROW	KT	RS
2024-02-05	B	REVISED FOR REVIEW	KT	RS
2023-12-15	A	ISSUED FOR REVIEW	KT	RS

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TITLE: SUBDIVISION
CONCEPT LAYOUT PLAN

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Appendix C
Water Supply Calculation
References

MECP - Guideline D-5-5 Private Wells -
Water Supply Assessment Excerpts

hydrogeological study report and must be implemented by the development agreement. To ensure that the recommendations of the report are properly implemented, the consultant's report may include recommendations for supervision of well construction by a qualified consultant at the time the well is being constructed by the (licensed) well contractor.

4.3 Well Water Quantity Testing

Each of the test wells must be subjected to a pumping test. The tests may be done sequentially, using the other wells as observation wells, or several wells could be pumped simultaneously. The report must contain all well logs, Water Well Records, raw pumping test data and graphs, and hydrogeological cross section(s), and must discuss the sustainability of domestic well yields, the potential for supply interference and site aquifer characteristics such as hydraulic gradient, transmissivity and boundary conditions. (Note that in most cases where on-site sewage systems are proposed, the impact assessment requires a determination of the hydraulic gradient.)

4.3.1 Pump Test Procedure

The following pumping test procedure is recommended:

- the test wells should be fully developed prior to the pumping test in order to avoid unacceptable turbidity levels at the time of sampling;
- the pumping test must begin with a static water level and must be performed at a fixed rate ($\pm 5\%$) for a minimum period of six hours² (<https://www.ontario.ca/page/d-5-5-private-wells-water-supply-assessment#fn02>) (longer where supplementary storage systems are necessary) of "continuous" pumping (no stoppages); water levels must be monitored in the test well and observation wells at an appropriate frequency; water must be discharged at an appropriate distance from the test wells to ensure that artificial recharge does not occur;
- immediately following the pumping test, water level recovery must be monitored in the test wells until 95% recovery occurs or for 24 hours, whichever is less; where sufficient recovery does not occur, the issue of the long-term safe yield of the aquifer is especially significant and must be addressed; and
- the test rate will be at least the minimum rate discussed below (also see Section 4.4.1.).

4.3.2 Calculation of Minimum Test Rate and Well Yield

The minimum pumping test rate and well yield required for a particular development must be calculated as follows:

The per-person requirement shall be 450 litres per day. Peak demand occurs for a period of 120 minutes each day³ (<https://www.ontario.ca/page/d-5-5-private-wells-water-supply-assessment#fn03>). This is equivalent to a peak demand rate of 3.75 litres/minute for each person. The basic minimum pumping test rate is this rate multiplied by the "likely number of persons per well" which, for a single family residence, shall be the number of bedrooms plus one. Unless it is otherwise established to MOEE's satisfaction, a minimum of four bedrooms shall be used in the calculation. However, regardless of the results of this calculation, this rate shall not be less than 13.7 litres/minute.

The only instance where rates lower than these may be used is where preliminary results indicate that the pumping test rate cannot be sustained in the long term, and consideration is given to systems which would compensate for low well yields. 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. The yield requirement must then be applied to the well and to the compensatory system on a daily basis. These systems and any special water treatment devices that may be necessary for their proper functioning must be fully described in the report.

Regardless of whether systems to compensate for low yields are required, the report must demonstrate that future domestic wells will sustain repeated pumping at the test rate and duration at 24hour intervals over the long-term.

Where a test well can safely provide water at the calculated rate, it is not acceptable to conduct pumping tests at low rates and subsequently recommend the use of systems to compensate for low well yields simply in order to limit the migration of poorer quality water into the well.

Consultants must provide a statement indicating that, in their professional opinion, the probable well yields determined on the basis of their investigations are representative of the yields which residents of the development are likely to obtain from their wells in the long term.

4.3.3 Additional Information

NFPA 1142 - Water Supplies for Suburban
and Rural Firefighting Excerpts

4.2 Structures Without Exposure Hazards.

4.2.1* For structures with no exposure hazards, the minimum water supply, in gallons (liters), shall be determined by calculating the total enclosed volume, in cubic feet (cubic meters), of the structure, including any attached structures, dividing by the occupancy hazard classification number as determined from Chapter 5, and multiplying by the construction classification number as determined from Chapter 6 as follows:

[4.2.1]

$$WS_{min} = \frac{VS_{tot}}{OHC}(CC)$$

where:

WS_{min} = minimum water supply in gal (For results in L, multiply by 3.785.)

VS_{tot} = total volume of structure in ft³ (If volume is measured in m³, multiply by 35.3.)

OHC = occupancy hazard classification number
 CC = construction classification number

4.2.2 The minimum water supply required for any structure without exposure hazards shall not be less than 2000 gal (7600 L).

4.3 Structures with Exposure Hazards.

4.3.1* For structures with unattached structural exposure hazards, the minimum water supply, in gallons (liters), shall be determined by calculating the total enclosed volume, in cubic feet (cubic meters), of the structure, dividing by the occupancy hazard classification number as determined from Chapter 5, multiplying by the construction classification number as determined from Chapter 6, and multiplying by 1.5 as follows:

[4.3.1]

$$WS_{min} = \frac{VS_{tot}}{OHC}(CC) \times 1.5$$

where:

WS_{min} = minimum water supply in gal (For results in L, multiply by 3.785.)

VS_{tot} = total volume of structure in ft³ (If volume is measured in m³, multiply by 35.3.)

OHC = occupancy hazard classification number
 CC = construction classification number

4.3.2 The minimum water supply required for a structure with exposure hazards shall not be less than 3000 gal (11,355 L).

4.4* Structures with Automatic Sprinkler Protection.

4.4.1 The AHJ shall be permitted to reduce the water supply required by this standard for manual firefighting purposes when a structure is protected by an automatic sprinkler system that fully meets the requirements of NFPA 13, NFPA 13D, or NFPA 13R. (See Annex F.)

4.4.2 If a sprinkler system protecting a building does not fully meet the requirements of NFPA 13, NFPA 13D, or NFPA 13R, a water supply shall be provided in accordance with this standard.

4.5 Structures with Other Automatic Fire Suppression Systems. For any structure fully or partially protected by an automatic

fire suppression system other than as specified in Section 4.4, the AHJ shall determine the minimum water supply required for firefighting purposes.

4.6 Water Delivery Rate to the Fire Scene.

4.6.1 The minimum water supply determined using Sections 4.2 through 4.5 shall be delivered in accordance with Table 4.6.1.

Table 4.6.1 Water Delivery Rate

Total Water Supply Required		Water Delivery Rate	
gal	L	gpm	L/min
<15,000	<56,780	250	950
15,001–22,500	56,785–85,170	500	1,900
22,501–30,000	85,175–113,560	750	2,850
>30,000	>113,560	1,000	3,800

4.6.2 The AHJ shall be permitted to adjust the water delivery rate, giving consideration to local conditions and need.

4.6.3 The minimum water delivery rate shall not be less than 250 gpm (950 L/min).

4.7 Other Uses. Water supplies developed to meet this standard shall be permitted to be used for fighting fires in other than structures or for use during other emergency activities.

Chapter 5 Classification of Occupancy Hazard

5.1 General.

5.1.1 This chapter shall be used to determine the occupancy hazard classification number used in the calculation of water supply requirements in Chapter 4.

5.1.2 Where more than one occupancy is present in a structure, the occupancy hazard classification number for each occupancy shall be determined separately, and the classification number for the most hazardous occupancy shall be used for the entire structure.

5.2* Occupancy Hazard Classification Number.

5.2.1 Occupancy Hazard Classification Number 3.

5.2.1.1* Occupancy hazard classification number 3 shall be used for severe hazard occupancies.

5.2.1.2 Occupancies having conditions similar to the following shall be assigned occupancy hazard classification number 3:

- (1) Cereal or flour mills
- (2) Combustible hydraulics
- (3) Cotton picking and opening operations
- (4) Die casting
- (5) Explosives and pyrotechnics manufacturing and storage
- (6) Feed and gristmills
- (7) Flammable liquid spraying
- (8) Flow coating/dipping
- (9) Linseed oil mills
- (10) Manufactured homes/modular building assembly
- (11) Metal extruding
- (12) Plastic processing
- (13) Plywood and particleboard manufacturing

- (14) Printing using flammable inks
- (15) Rubber reclaiming
- (16) Sawmills
- (17) Solvent extracting
- (18) Straw or hay in bales
- (19) Textile picking
- (20) Upholstering with plastic foams

5.2.2 Occupancy Hazard Classification Number 4.

5.2.2.1* Occupancy hazard classification number 4 shall be used for high hazard occupancies.

5.2.2.2 Occupancies having conditions similar to the following shall be assigned occupancy hazard classification number 4:

- (1) Barns and stables (commercial)
- (2) Building materials supply storage
- (3) Department stores
- (4) Exhibition halls, auditoriums, and theaters
- (5) Feed stores (without processing)
- (6) Freight terminals
- (7) Mercantiles
- (8) Paper and pulp mills
- (9) Paper processing plants
- (10) Piers and wharves
- (11) Repair garages
- (12) Rubber products manufacturing and storage
- (13) Warehouses, such as those used for furniture, general storage, paint, paper, and woodworking industries

5.2.3 Occupancy Hazard Classification Number 5.

5.2.3.1 Occupancy hazard classification number 5 shall be used for moderate hazard occupancies, in which the quantity or combustibility of contents is expected to develop moderate rates of spread and heat release. The storage of combustibles shall not exceed 12 ft (3.66 m) in height.

5.2.3.2 Occupancies having conditions similar to the following shall be assigned occupancy hazard classification number 5:

- (1) Amusement occupancies
- (2) Clothing manufacturing plants
- (3) Cold storage warehouses
- (4) Confectionery product warehouses
- (5) Farm storage buildings, such as corn cribs, dairy barns, equipment sheds, and hatcheries
- (6) Laundries
- (7) Leather goods manufacturing plants
- (8) Libraries (with large stockroom areas)
- (9) Lithography shops
- (10) Machine shops
- (11) Metalworking shops
- (12) Nurseries (plant)
- (13) Pharmaceutical manufacturing plants
- (14) Printing and publishing plants
- (15) Restaurants
- (16) Rope and twine manufacturing plants
- (17) Sugar refineries
- (18) Tanneries
- (19) Textile manufacturing plants
- (20) Tobacco barns
- (21) Unoccupied buildings

5.2.4 Occupancy Hazard Classification Number 6.

5.2.4.1 Occupancy hazard classification number 6 shall be used for low hazard occupancies, in which the quantity or

combustibility of contents is expected to develop relatively low rates of spread and heat release.

5.2.4.2 Occupancies having conditions similar to the following shall be assigned occupancy hazard classification number 6:

- (1) Armories
- (2) Automobile parking garages
- (3) Bakeries
- (4) Barber or beauty shops
- (5) Beverage manufacturing plants/breweries
- (6) Boiler houses
- (7) Brick, tile, and clay product manufacturing plants
- (8) Canneries
- (9) Cement plants
- (10) Churches and similar religious structures
- (11) Dairy products manufacturing and processing plants
- (12) Doctors' offices
- (13) Electronics plants
- (14) Foundries
- (15) Fur processing plants
- (16) Gasoline service stations
- (17) Glass and glass products manufacturing plants
- (18) Horse stables
- (19) Mortuaries
- (20) Municipal buildings
- (21) Post offices
- (22) Slaughterhouses
- (23) Telephone exchanges
- (24) Tobacco manufacturing plants
- (25) Watch and jewelry manufacturing plants
- (26) Wineries

5.2.5 Occupancy Hazard Classification Number 7.

5.2.5.1 Occupancy hazard classification number 7 shall be used for light hazard occupancies, in which the quantity or combustibility of contents is expected to develop relatively light rates of spread and heat release.

5.2.5.2 Occupancies having conditions similar to the following shall be assigned occupancy hazard classification number 7:

- (1) Apartments
- (2) Colleges and universities
- (3) Clubs
- (4) Dormitories
- (5) Dwellings
- (6) Fire stations
- (7) Fraternity or sorority houses
- (8) Hospitals
- (9) Hotels and motels
- (10) Libraries (except large stockroom areas)
- (11) Museums
- (12) Nursing and convalescent homes
- (13) Offices (including data processing)
- (14) Police stations
- (15) Prisons
- (16) Schools
- (17) Theaters without stages