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October 27th, 2025

Ritchie Murray
Acting Registrar
Ontario Energy Board
27-2300 Yonge Street
P.O. Box 2319
Toronto, ON M4P 1E4

Re: Wasaga Distribution Inc. – EB-2025-0254
Service Area Amendment Application
Additional Evidence Filing

Dear Mr. Murray,

Wasaga Distribution Inc. (Wasaga Distribution) is submitting additional evidence in the above-noted proceeding. Hydro One Networks Inc. (HONI) filed its evidence on October 17th, 2025, and following our review, Wasaga Distribution submits this supplementary information to further clarify certain aspects of the application and to assist the Ontario Energy Board (OEB) in its consideration of the matter.

Should the Board require additional information, please do not hesitate to contact the undersigned.

Respectfully Submitted,

A. Karamatic

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Wasaga Distribution Inc.

**EB-2025-0254 – Wasaga Distribution Inc. Application for a Service Area Amendment
Supplementary Evidence of Wasaga Distribution Inc.**

Introduction:

Wasaga Distribution Inc. (“WDI”) respectfully submits this supplementary evidence and clarification to the materials previously filed, together with additional information it considers pertinent to the Ontario Energy Board’s (“OEB”) review of this application, acknowledging that certain elements may not directly address the specific issue in dispute but may assist the Board in its broader assessment.

Issue:

Based on the evidence submitted by Hydro One Networks Inc. (“HONI”), and within the scope of this proceeding, WDI can reach no other conclusion than that the property at 400 45th Street, Wasaga Beach, should be served by WDI. The evidence, along with subsequent written submissions, will demonstrate that this is indisputable.

The broader issue - although technically outside the scope of this proceeding - is that WDI operates as an Embedded Distributor and HONI takes every opportunity to favour its own commercial interests over those of WDI, despite the fact that WDI is HONI’s customer as an Embedded Distributor.

At its core, the fundamental issue is customer preference: who is the customer, and, if a choice exists, should that choice be allowed?

The evidence will further demonstrate that HONI’s actions in this matter have not advanced the public interest.

Supplementary Evidence:

HONI has submitted that:

WDI is a fully embedded distributor of Hydro One and is surrounded by Hydro One service area. WDI serves a total service territory of 61 square kilometers and over 85% of that service territory is considered urban. Over 40% of WDI’s 290km of primary distribution circuits are situated underground. WDI’s last OEB-approved rate base was shy of \$23 million and WDI serves approximately 14,000 customers. Conversely, for every WDI customer there are 1,000 Hydro One customers. In total, Hydro One serves over 1.5 million customers, including WDI as an embedded distributor. Less than 10% of Hydro One’s 125,000 primary circuit kilometers are situated underground. Unlike WDI, over 99% of Hydro One’s total service territory is rural. Hydro One’s last OEB-approved rate base was \$9.46 billion in 2023.¹

WDI submits the following evidence and requests that any publicly available information from the OEB’s website be considered relevant to this proceeding.

¹ EB-2025-0254, HONI Wasaga SAA Evidence, October 17, 2025, page 4

Table 1: 5-year OEB Yearbook Data Extraction

HONI	2019² Yearbook	2024³ Yearbook	5-Year Change
OM&A per Customer	419.58	446.64	
Total Customers	1,343,959	1,502,693	12%
OH Line (km)	113,390	114,326	1%
UG Line (km)	9,749	10,903	12%

WDI	2019² Yearbook	2024³ Yearbook	5-Year Change
OM&A per Customer	249.97	247.06	
Total Customers	14,003	15,718	12%
OH Line (km)	168	172	2%
UG Line (km)	118	136	15%

HONI is a publicly traded entity; WDI Holds no ownership stake in HONI.

WDI's preference has always been to work collaboratively with HONI toward solutions that would serve the best interests of all stakeholders. Unfortunately, despite those efforts on behalf of WDI, this proceeding has become necessary.

To put this into perspective: this dispute involves Hydro One, with a rate base of \$9.46 billion, and Wasaga Distribution, with a rate base of \$23 million. It is clear that while HONI is much larger, it is also much less efficient. WDI has consistently been recognized as one of the most efficient utilities in Ontario.

For additional context and relevance, WDI refers the Board to the following proceeding already on public record:

- EB-2023-0054 – WDI Cost of Service, specifically the Independent Load Growth Study⁴ to be included in evidence as part of this proceeding. Attached as Attachment A.

² 2019: Ontario Energy Board Yearbook of Electricity Distributors 2019

³ 2024: Ontario Energy Board Open Data, Electricity Reporting & Record Keeping Requirements (RRR): Section 2.1.7 Trial Balance, Electricity Reporting & Record Keeping Requirements (RRR): Section 2.1.2 Market Monitoring Information, Electricity Reporting & Record Keeping Requirements (RRR): Section 2.1.5.5 Utility Characteristics

⁴ EB-2023-0054, WDI Cost of Service Application, October 20, 2023, Exhibit 2 Rate Base and Capital, Appendix 2 (C) 2024-2028 Wasaga Distribution Inc. Distribution System Plan, Appendix D: Load Growth Analysis Report

1. Licence Area Amendment

WDI would like to reiterate that WDI's licence⁵ identifies WDI as the electricity service provider for the Town of Wasaga Beach. As of today - with the exception of a temporary service for the subject property - 400 45th Street is not currently serviced. Furthermore, upon the construction of the planned development, the property known as 400 45th Street will no longer exist as a distinct address.

WDI has been very clear - and has communicated this directly to HONI on multiple occasions - that it has always understood 400 45th Street would revert back to WDI's licensed service territory if it was ever developed.

In accordance with WDI's licence, these lands fall within the Town of Wasaga Beach boundaries and therefore should properly be determined to be within WDI's licensed service territory.

2. Public Interest, and Prudence

HONI has provided evidence to question WDI's use of the words "purpose built" and seems to suggest that WDI has done so, specifically for this development.⁶

Again, WDI always understood 400 45th Street to fall within its licensed service territory. That interpretation was ultimately correct or not, WDI's actions were based on its genuine and reasonable understanding of its service area and licence obligations. WDI would therefore strongly object to any suggestion or interpretation that it has purpose-built assets in this area specifically for this development, or any other misrepresentation HONI might try and convey.

WDI's intent has always been to develop the most efficient, economical, and reliable distribution network possible - one that benefits the community it serves and contributes to the overall strength of Ontario's electricity system. WDI remains committed to full transparency and, while mistakes can occur, WDI acts with honesty and with integrity in all its operations.

While HONI, on the other hand, may claim that it is acting in the best interest of its roughly one million customers, the reality is that the customers directly impacted on these developed lands, and WDI itself - an embedded distributor and a customer - has effectively been sidelined. The Town of Wasaga Beach - WDI's shareholder - would be the only confirmed permanent connection to be serviced on these developed lands and the developer's interests on the matter has been disregarded by HONI. **Their approach cannot reasonably be said to be serving the public interest.**

⁵ WDI Electricity Distribution Licence (ED-2002-0544), Schedule 1

⁶ EB-2025-0254, HONI Wasaga SAA Evidence, October 17, 2025, page 8 and page 11

3. Discounted Cash Flow (DCF) Analysis

HONI has submitted:

As stated by WDI, when comparing connection cost estimates, WDI presented a total project estimate of \$3.69 million as costs eligible for rate recovery through the WDI discounted cash flow analysis.⁷

WDI objects to the fact that HONI has stated WDI has completed a Discounted Cash Flow Analysis.

WDI has asserted that it is not in a position to provide this information to the developer as the development is going through Subdivision Plan Approval, and WDI was not in position to provide an estimate at that time.⁸

WDI was provided preliminary site plans and used that information to develop cost estimates. WDI notes that costs are on record and is supported by evidence in this proceeding.

This development is anticipated to be phased. Should the first phase be on the south-east corner, WDI's existing assets are in place and multiple options are available to ensure that it works with the developer for a cost effective - purpose built and designed system – something HONI simply cannot do.

4. Developer Preference:

In WDI's application, WDI submitted:

WDI's understanding that, based on an objective assessment of the relevant circumstances, WDI represents the more economically efficient option.⁹

At the time, WDI was aware that an objective, independent assessment was being conducted by the developer but had not seen any evidence beyond confirmation of that assessment.

As part of the intervenor request, the following evidence is now on record, provided by Primont – Land Developers, David Schaeffer Engineering Ltd – Consultant, as part of their October 8, 2025 intervention request:

Below is a portion of an email Tyler sent to Daniel earlier this year: Service Territory Dispute The land was previously in WDI territory, but was being fed from HONI's system. WDI & HONI had an arrangement in place where HONI would charge WDI for the usage, who would then charge the land owner. Around a decade ago, the OEB opted to remove this clause and give all of these lands across the Province to the servicing LDC and not the geographical LDC. This resulted in the service territories being amended, and the land was moved to HONI territory, and they became a HONI customer. WDI's stance is that since this land is now being developed, it should be brought back into WDI territory, so it can be incorporated into the surrounding

⁷ EB-2025-0254, HONI Wasaga SAA Evidence, October 17, 2025, page 12

⁸ EB-2025-0254, WDI Service Area Amendment Application, August 19, 2025, page 4

⁹ EB-2025-0254, WDI Service Area Amendment Application, August 19, 2025, page 23

electrical distribution system. In contrast, if it remains with HONI, this subdivision will be isolated electrically. HONI's stance is that this land is currently in their territory, and they feel they will be able to service this land more cost-effectively than WDI (inconclusive) and therefore should stay with them. On this issue, I align more with WDI. That being said, we can use this situation to our advantage now if we opt to support HONI. Reliability With the information we have, WDI can provide a more reliable system than HONI, although neither is perfect. WDI advised (I have not seen anything to confirm this, but I do not expect they would mislead us) that it has the capabilities to shift the entire load in this area to a different circuit (upstream in the system) in the event something happens to the circuit on which the development is proposed. Additionally, since the surrounding area is all WDI, in the event they ever did extend a second circuit in the area in the future, the development could become significantly more reliable by being able to switch between Circuit A and Circuit B locally at their discretion. The design used in the cost estimate by WDI included two switchgears to provision for this possibility (more on the costs below). HONI has an 8kV and 44kV system on County Road 7. 44kV is not usable for subdivisions, so the 8kV system is the same voltage WDI would be using. We are unsure if HONI can switch the load to a different circuit should there be an issue with the 8kV system, but it would be safe to assume no at this time until we discover otherwise. However, locally within the subdivision itself, both the HONI and WDI designs effectively have the same reliability as they both have a single 8kV circuit as the point of supply. For reliability, I believe WDI has an advantage because they can switch the load for the entire area to a different circuit. Additionally, they are more invested in the area and are much more likely to complete future reinforcements. Preliminary Designs Both preliminary designs are viable options as they will both work. WDI has proposed switchgears with 600A internal to the site. The balancing between the two 200A circuits can be improved, but at a high level, the concept makes sense and aligns with typical industry practice. As stated above, if WDI can access a second 600A circuit (and there potentially could be a second 600A circuit in the adjacent subdivision – we need to confirm), then this design would be much more reliable. The HONI design uses two 4-way 200A kiosks (also known as junctions) to service the site. We typically avoid using junctions in this type of permanent arrangement, but this is one of the situations since there will be no further expansion directly adjacent to the site, where this type of arrangement can work. There is not much HONI could reasonably do in the future to increase the reliability of the design. From an external works perspective, HONI will have to build a pole line in the north boulevard (likely ten poles) to service the site. There would be a pole line in both boulevards of Morgan. WDI will also have to rebuild their existing line. The preliminary plan shows it on the north boulevard, and this section requires ten poles. Since WDI is rebuilding the pole line, there will be some savings as the existing pole line is near the end of its life (in excess of 55 years old), so 100% of the costs will not fall on the developer. From a developer's perspective, both designs use two larger above-grade pieces of equipment to service the site. Both the gears and the junctions will have to be placed on easement, and very likely on the parks. Given the voltage, there is no way around this. From a preliminary design perspective, I believe WDI's philosophy is superior to HONI's, although both are

effective. One advantage is that WDI will allow us to complete the design, and HONI will complete it in-house, so with WDI, the design process and utility coordination aspect will be streamlined. Costs Speaking to both WDI and HONI, we confirmed that both estimates included the same general items. At a high-level, the OTC costs include all the supply and installation of transformers, switching units (gears and kiosks), cables, terminations, and connection to the electrical distribution system. The civil works, which include trenching, ducts, and foundations, are in addition to the OTC. WDI provided an estimate for that work, where Tatham Engineering provided an estimate for HONI's portion. See a summary below: OTC Civil Total WDI \$2.17M \$1.52M \$3.69M HONI \$2.56M \$1.64M \$4.20M The civil works being in the same ballpark does simplify this, as we can effectively ignore them. Those costs are going to be whatever they end up being, and there is no significant difference between HONI and WDI from a civil perspective. The cost savings for the external works are likely the contributing factor in driving WDI's OTC down. The WDI design included more expensive infrastructure with the feeder cable, so it is promising that they are lower with the OTC.¹⁰

This evidence clearly demonstrates the Developer's view that WDI is the superior option for servicing the proposed development. Moreover, the evidence confirms that WDI's cost estimate is lower despite including more robust infrastructure, reflecting **true economic efficiency**.

5. Customer Preference – Customer Choice:

Customers should have a choice. The municipality, as the governing authority of the service area and in the instance of 400 45th Street, the sole known ratepayer of the land, and the developer, as a project partner could have at times, the ability to select their preferred service provider, should a choice exist.

Supporting economic development and building a better future for all Ontarians is a shared priority.

Future ratepayers should have a choice. While the Economic Evaluation (or Discounted Cash Flow Analysis) is generally the most accurate reflection of future ratepayers' interests, its reliability diminishes in the context of relationships between host and embedded distributors. In such cases, reliance on this methodology can result in an inefficient and costlier build out of a distribution system.

WDI's residential customer rates are \$28.68 per month¹¹, with some of the lowest embedded profits in its rates in the province and among the lowest of the 60 LDCs.

With respect to 400 45th Street - The OEB must decide: 100% of developer costs, paid for as described by HONI, based on the principles defined in this proceeding is in the best interest of public interest. In fact, utilities should always have paid 100% of this infrastructure (excluding

¹⁰ EB-2025-0254, Primont Intervention Request, October 8, 2025

¹¹ EB-2024-0057, Decision and Rate Order, March 20, 2025

upstream), because at the end of the day – utilities, like WDI need to replace it and some of the challenges we face today are from decisions made in the past, without the appropriate foresight.

6. Embedded Distribution Challenges, Recommendations and Service Area Amendment

HONI has submitted that:

The risk of adding more load to an existing embedded distribution may be minimal, however, irrespective of the level of risk, as described by the OEB above, the WDI SAA raises unnecessary potential risk regarding long-term planning as well as system safety and reliability responding to local system outages or a major catastrophic failure. Similarly, it inserts pressures to ensure effective network system coordination.¹²

WDI respectfully submits that HONI's characterization of the risks does not fully account for the systemic inefficiencies that arise when a modern urban distribution system, such as WDI, interfaces with a traditional rural distributor, that also acts as a host distributor. This structural misalignment affects not only the efficient build-out of local infrastructure required to support growth in Wasaga Beach, but also the reliability and resilience of the distribution system as a whole. Figure 1 below depicts the Subject Area's development in 2016.

Figure 1: Subject Area 2016



Figure 2 below depicts the Subject Area's development in 2024.

¹² EB-2025-0254, HONI Wasaga SAA Evidence, October 17, 2025, page 16

Figure 2: Subject Area 2024



As shown in the above figures, in 2016 400 45th Street was an isolated parcel of land, surrounded by non-serviced vacant land.

In EB-2023-0054 (WDI Cost of Service), WDI submitted independent evidence of anticipated load growth within its service area of potentially seeing up to 103.6 MW by 2033.¹³ Any concerns that HONI may have regarding the proposed 2.1 MW has the potential to pale in comparison to the potential impacts of additional 65 MW of load.

HONI's position effectively creates a paradigm in which it must serve all future growth within the service territories of embedded distributors, asserting that doing so is necessary to maintain system safety and resilience. WDI submits that this approach serves to discourage legitimate local expansion and undermines the role of embedded distributors in supporting regional growth. Such tactics should be expressly rejected. HONI should instead be required to provide safe, reliable, and resilient service to its embedded distribution customers, consistent with its obligations under the Distribution System Code and the OEB's expectations for host-embedded coordination.

Exploration of Supply Lines, Distribution Station Ownership and Connected Customers

Communities with strong utilities, like WDI, are challenged, but capable of working collaboratively to find solutions and WDI has no doubt they will be in the position to finance future infrastructure and collaborate effectively with cooperative partners, under the right conditions. Regional

¹³ *ibid*

restructuring is a valid consideration, as long as it is done in a fair and equitable way. It may be needed to support grid modernization.

HONI's approach demonstrates a lack of consideration for the interests of affected customers, appearing instead to prioritize shareholder interests over customer outcomes. In light of this, it is prudent for WDI to explore the potential for ownership transfer of HONI distribution assets upstream to enhance planning, reliability, and efficiency to the betterment of local ratepayers, which would be in broader public interest.

WDI preference would be to not remain an embedded distributor and is open to constructive discussions with HONI, and ratepayer representation regarding solutions that improve system efficiency and deliver benefits to local ratepayers.

Specifically, WDI submits that it would be appropriate to consider exploring the potential transfer of the following assets:

- Brocks Beach DS (no capacity) – Currently operated by HONI within Wasaga Beach service territory as a distribution asset. Exploration of the potential for WDI to assume operational responsibility could support more integrated local planning and benefit local ratepayers. WDI does not have a sharing agreement in place for this asset in accordance with DSC Section 6.4.
- Sunnidale DS (minimal capacity) – Exploring the possibility of WDI involvement could allow for better utilization and operability of existing capacity to meet anticipated growth and improve economic efficiency.
- Stayner M4 (shared feed, only serving WDI), M5 (shared feed with one large customer and Sunnidale DS), M8 Supply lines (shared feed with HONI, WDI, and EPCOR) - collectively, as of the most recent figures reported by HONI on capacity– there is only 60 MVA of available capacity on these feeders.

WDI submits that although out of scope in this proceeding, a proceeding should take place that encompasses a comprehensive review of all assets and connections upstream to, and including, the Stayner Transformer Station ("Stayner TS"). WDI further submits that EPCOR Electricity Distribution Ontario Inc. may be directly or indirectly impacted by the outcome of this proceeding and should therefore be included as a party to ensure a complete and informed assessment by the Board.

WDI emphasizes that these matters are not raised as definitive proposals at this stage, but as areas worthy of consideration and evaluation by HONI, WDI, and the OEB, and all other interested parties to support a long-term, efficient, and locally accountable distribution framework in the surrounding area.

WDI has paid and continues to pay a substantial cost to HONI as an embedded distributor, potentially on lines that were either paid for by a large, connected customer or are long fully depreciated and hold no book value, and socialized line loss costs. WDI anticipates substantial upstream economic benefits to be driven by the sheer growth proposed in the area. Evidence is on record, by an independent party (Primont) that demonstrates HONI does not build to the same standard as WDI and unfortunately, that probably means upstream investment and reliability for WDI. It is debatable that HONI is making the necessary investments in this area needed for WDI's

benefit and that there is a substantial economic outflow of funds being driven out of the surrounding area. This is a terrifying thought considering the recent events of the Ice Storm – in which WDI was able to restore 100% of its power within ~21 hours, and support HONI in its restoration efforts.

WDI could be in a position to be an economic engine for the surrounding area having contiguous boundaries from and around, and up to the Stayner TS.

WDI will prove without a doubt that it acts in public interest.

If the OEB agrees with HONI that the SAA proposal brings system reliability risks (which WDI disputes), then those risks associated with the proposed SAA should be assessed alongside potential operational or ownership solutions to improve system efficiency. WDI would submit that its position is unique in part due to the age of the assets in the surrounding area, and the proximity to Stayner TS.

WDI will again reiterate, but with respect to the challenges of being an embedded distributor - WDI does not feel it is treated as fairly, as a customer. HONI have shown a complete disregard for its customers as evidence provided in this proceeding reflect this.

Attachment A
Load Growth Analysis



Load Growth Analysis

Wasaga Distribution Inc.

Prepared for:
Wasaga Distribution Inc.
10/11/2023

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Document Summary

Client: Wasaga Distribution Inc.

Document Name: Wasaga Distribution Inc.

Versions

VERSION	DATE	AUTHOR	COMMENTS
1.0	10/11/23	Imtiaz Ahmed	

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Essex Energy Corporation shall only be liable to Wasaga Distribution Inc. for damages that arise directly out of the negligence or the willful misconduct of Essex Energy in meeting its obligations under this report.

Notwithstanding the foregoing, Essex Energy Corporation shall not be liable under any circumstances whatsoever for any loss of profits or revenues, business interruption losses, loss of contract, or loss of goodwill, or for any indirect, consequential, incidental, or special damages, including but not limited to punitive or exemplary damages, whether any of the said liability, loss or damages arise in contract, tort or otherwise.

In any event, the total liability of Essex Energy Corporation to Wasaga Distribution Inc. for any claim for damages will not exceed the amounts paid by Wasaga Distribution Inc. for this report.

ASSUMPTIONS AND RELIANCE'S

Essex Energy Corporation has assumed the authenticity of all submitted documents and relied on the available representations and information to prepare this report. We have not undertaken any special or independent investigation to determine the existence or absence of such facts or circumstances.

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Executive Summary

This study assesses the impact of adding new loads to the Wasaga Distribution Inc. distribution system.

An overview of the key findings is as follows:

- Some substations are near the peak limit with the addition of new loads. Due to the amount of potential load, installation of BESS wouldn't be an optimal solution, but a new substation installation is recommended to handle load growth.
- Breaker pickup settings may require changes for some feeders.
- Some conductors become overloaded with additional peak loads. Load should be distributed accordingly.
- Distribution system planning needs to consider Building and Transportation Electrification and develop near-term/longer-term strategies.



Scope of Assessment

This report aims to analyze the impact of load growth on the Wasaga Distribution Inc. distribution system. The following potentially high-impact issues are considered:

- Equipment Thermal Loading
- System Voltage
- Breaker Settings
- Building and Transportation Electrification Analysis

System Data

The assessment findings are based on a series of load flow studies performed using DESS v7 software. The assessment was performed with the following assumptions:

- All loading and voltage data were validated based on SCADA and station inspection reports.
- The effect of load growth includes the normal system configuration and peak loading conditions.
- Load growth was projected based on planned and potential developments of subdivisions, and commercial and town strategies as shown in the tables below.
- It was assumed that the peak demand load at each condo, townhome/semi, and detached units are 2kW, 3kW, and 4kW respectively. Loading for some commercial units was distributed based on assigned transformer sizes.

Subdivision Plans:

Feeder	#Townhouse Units	#Detached Units	#Semi-detached Units	Est. Load kW
1F3	307			921
2F1	62		11	219
2F2	35			105
3F1	102			306
3F3		156		624
3F4	338	210	62	2,040
4F1	292	891	228	5,124
4F2			40	120
4F3	21			63
5F2	31			93
5F3	46			138
5F4	31			93
6F1	40			120
6F2	104	398	48	2,048
6F3	100	369	14	1,818
6F3,6F4	57	259	8	1,231
6F4	79	72	106	843
BF1	268	7	48	976
BF2	116		10	378
Total	2,029	2,362	575	17,260

Commercial Plans:

Feeder	#Commercial Units	#Condo Units	Est. Load kW
2F1	4	120	340
3F1	1		20
3F3	3	0	75
44kV	2	392	834
4F1	3	140	355
4F2	2	0	50
4F4	37	495	1,915
5F3	3	33	201
5F4	10	32	314
6F2		30	980
6F4	1		200
BF1	1	0	25
BF2	5	269	663
Total	70	1,511	5,972

Town Growth Strategy:

Feeder	# Residential +Commercial Units	Est. Load kW
1F1	501	1,503
1F2	198	594
1F3	999	2,451
3F1	253	773
3F3	50	238
4F1	109	591
5F3	355	1,182
5F4	6	18
Total	2,470	7,350

Equipment Thermal Loading

The results below show the impact of load growth at the line and station.

44kV System loading

	P (MW)	Q (MVar)	MVA	PF	Curr (A)	Line Type @Boundary	Line Loading %
Existing System loading							
2M5	13.1	4.4	13.8	0.95	178	336 AL	33%
2M4	22.4	6.7	23.2	0.96	300	336 AL	55%
Planned + Potential Load Growth (50%)							
2M5	17.8	6.4	18.9	0.94	243	336 AL	45%
2M4	32.5	10	34	0.96	441	336 AL	80%
Planned + Potential Load Growth (100%)							
2M5	22.3	8.5	23.8	0.93	306	336 AL	56%
2M4	42.2	13.7	44.2	0.95	577	336 AL	105%

Comments: The highlighted section of the conductor peaks at 100% of capacity with the inclusion of planned and potential loads. Conductor upgrade or partial load transfer should be considered with the load increase.

Substation Loading

Station Name	Name Plate Limit	Existing peak MVA	Planned + Potential Load Growth (50%) MVA	Planned + Potential Load Growth (100%) MVA
MS1	7.5 MVA	4.2	7	9.7
MS2	5 MVA	2.4	2.7	3
MS3	10 MVA	7.8	10	11.9
MS4	10 MVA	10.5	14.6	18.7
MS5	10 MVA	9.9	10.9	11.8
Brocks Beach DS	5 MVA	0.45	1.5	2.5
MS6	10 MVA	N/A	3.7	7.4

Comments: Highlighted stations at over 100% of capacity, including planned and potential loads. It is recommended that a new 10MVA substation be installed, tapping into the 2M5 supply. More to be reviewed in the “Results and Discussion” section below.

System Voltage

Voltages were observed at SCADA points between ~1.03 pu (see appendix). Station tap settings were adjusted to output similar voltages during voltage drop analysis. The table below shows the impact on voltages due to the load growth.

System Condition	Existing loading		Planned + Potential Load Growth (50%)		Planned + Potential Load Growth (100%)	
Station	Max Volt pu	Min Volt pu	Max Volt pu	Min Volt pu	Max Volt pu	Min Volt pu
M2 @ 44kV	1.02	1.0	1.02	1.0	1.02	0.987
M4 @ 44kV	1.02	1.0	1.02	1.0	1.02	0.988
MS1 @8.32kV	1.035	1.007	1.03	0.993	1.015	0.966
MS2 @8.32kV	1.026	1.003	1.011	0.992	1.001	0.981
MS3 @8.32kV	1.025	0.975	1.021	0.963	1.02	0.947
MS4 @8.32kV	1.028	0.982	1.025	0.967	1.0	0.95
MS5 @8.32kV	1.036	0.998	1.029	0.988	1.02	0.975
Brocks Beach DS @8.32kV	1.021	1.019	1.017	1.012	1.017	1.012
MS6 @8.32kV	N/A	N/A	1.023	1.011	1.023	1.008

Comments: The existing operating voltages at all substations are sufficient for all feeders to maintain acceptable Voltages (between 0.94pu – 1.06pu). However, with the inclusion of new loads, some feeders may experience voltage drops closer to the 0.94pu threshold which shall be mitigated by the inclusion of a new substation as mentioned in the previous section.

Line Loading

Feeder	Cable Type	Rated Current	Existing Peak Load	Loading %	Planned + Potential Load Growth (50%)	Loading %	Planned + Potential Load Growth (100%)	Loading %
					Max Current (A)		Max Current (A)	
MS1-F1	500 kcmil Cu-UG	414	162	39.13%	215	51.93%	270	65.22%
MS1-F2	500 kcmil Cu-UG	414	85	20.53%	106	25.60%	126	30.43%
MS1-F3	500 kcmil Cu-UG	414	82	19.81%	202	48.79%	255	61.59%
MS2-F1	500 kcmil Cu-UG	414	154	37.20%	174	42.03%	193	46.62%
MS2-F2	500 kcmil Cu-UG	414	31	7.49%	35	8.45%	38	9.18%
MS3-F1	250 kcmil Cu-UG	344	260	75.58%	296	86.05%	376	109.30%
MS3-F2	250 kcmil Cu-UG	344	NA	NA	NA	NA	NA	NA
MS3-F3	250 kcmil Cu-UG	344	246	71.51%	280	81.40%	314	91.28%
MS3-F4	250 kcmil Cu-UG	344	126	36.63%	198	57.56%	269	78.20%
MS4-F1	500 kcmil Cu-UG	414	264	63.77%	527	127.29%	784	189.37%
MS4-F2	500 kcmil Cu-UG	414	216	52.17%	221	53.38%	225	54.35%
MS4-F3	500 kcmil Cu-UG	414	205	49.52%	205	49.52%	205	49.52%
MS4-F4	500 kcmil Cu-UG	414	151	36.47%	220	53.14%	287	69.32%
MS5-F1	500 kcmil Cu-UG	414	199	48.07%	199	48.07%	199	48.07%
MS5-F2	500 kcmil Cu-UG	414	261	63.04%	264	60.63%	266	64.25%
MS5-F3	500 kcmil Cu-UG	414	184	44.44%	237	57.25%	289	69.81%
MS5-F4	500 kcmil Cu-UG	414	117	28.26%	131	31.64%	145	35.02%
MS6-F1	500 kcmil Cu-UG	414	NA	NA	4	0.97%	8.6	2.08%
MS6-F2	500 kcmil Cu-UG	414	NA	NA	109	26.33%	217	52.42%
MS6-F3	500 kcmil Cu-UG	414	NA	NA	88	21.26%	175	42.27%
MS6-F4	500 kcmil Cu-UG	414	NA	NA	60	14.49%	119	28.74%

Comments: Most conductors near stations are within capacity except near MS-3 and MS-4 which are observed to be over 100% threshold with all planned load inclusion. Some loads from MS-3 can be transferred into the MS-6 feeder to avoid overloading. Most of the planned loads at the MS4-F1 feeder are in the River Rd West area and a new substation should be able to offset the overloading concern.

Breaker Settings

Breaker	Element	Breaker Settings	Planned + Potential Load Growth (50%)	Planned + Potential Load Growth (100%)
		Pickup (A)	Max Current (A)	Max Current (A)
MS1-F1	Phase Timed	400	215	270
MS1-F2	Phase Timed	400	106	126
MS1-F3	Phase Timed	400	170	255
MS2-F1	Phase Timed	400	174	193
MS2-F2	Phase Timed	400	35	38
MS3-F1	Phase Timed	400	296	376
MS3-F2		NA	NA	NA
MS3-F3	Phase Timed	400	280	314
MS3-F4	Phase Timed	400	198	269
MS4-F1	Phase Timed	400	527	784
MS4-F2	Phase Timed	400	221	225
MS4-F3	Phase Timed	400	205	205
MS4-F4	Phase Timed	400	220	287
MS5-F1	Phase Timed	400	199	199
MS5-F2	Phase Timed	400	264	266
MS5-F3	Phase Timed	400	237	289
MS5-F4	Phase Timed	400	131	145
MS6-F1	Phase Timed	600	4	8.6
MS6-F2	Phase Timed	600	109	217
MS6-F3	Phase Timed	600	88	175
MS6-F4	Phase Timed	600	30	59

Comments: Peak loading on some feeders is greater than breaker pickup Normal settings or closer to the safe threshold (pickup ~ 2.4X peak load). Alternate breaker pickup settings should be considered with the load growth.

EV Growth

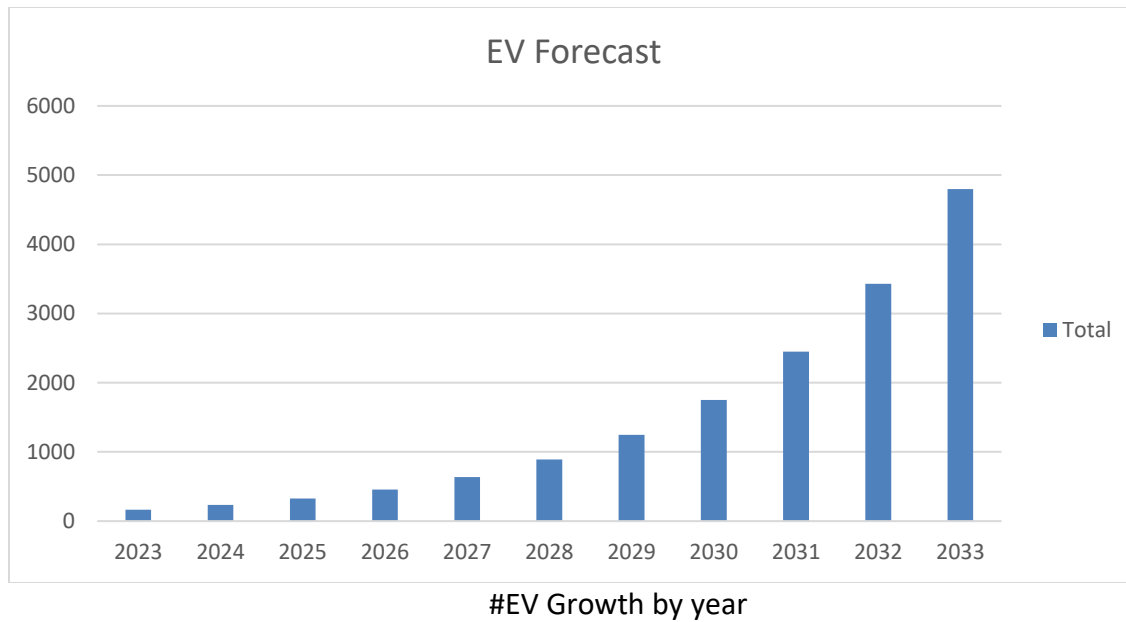
- The federal government set a mandatory target for all sales of new light-duty cars and passenger trucks to have zero emissions by 2035, with an interim target of 6 percent by 2030, and the IESO assumes that these targets will be achieved.
- At the end of 2022, there were 104,093 EVs registered in Ontario. The 2022 IESO Annual Planning Outlook Report (<https://www.ieso.ca/en/Sector-Participants/Planning-and-Forecasting/Annual-Planning-Outlook>) projects 1.7 million EVs (~16x growth) in Ontario by 2030, with an annual charging demand of 6.2TWH.

Methodology of EV growth in Wasaga:

- Identify EVs at each feeder from the ESA registered list (table below)
- Identify % growth of EVs/Year from registered EVs in Ontario by postcode and apply in the table below.
 - There seems to be an increase of 40% in #EVs since 2022

#EV Growth (40%/year)

Feeder	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
1F1	14	20	28	40	55	77	108	152	213	298	417
1F2	8	11	15	21	29	40	56	79	111	155	217
1F3	8	11	15	21	29	40	56	79	111	155	217
2F1	8	11	15	21	29	40	56	79	111	155	217
2F2	8	11	15	21	29	40	56	79	111	155	217
3F1	10	14	20	27	38	54	75	105	148	207	289
3F3	13	18	25	34	48	67	94	132	184	258	362
3F4	13	18	25	34	48	67	94	132	184	258	362
4F1	8	11	15	21	29	40	56	79	111	155	217
4F2	8	11	15	21	29	40	56	79	111	155	217
4F3	13	18	25	34	48	67	94	132	184	258	362
4F4	8	11	15	21	29	40	56	79	111	155	217
5F1	8	11	15	21	29	40	56	79	111	155	217
5F2	10	14	20	27	38	54	75	105	148	207	289
5F3	13	18	25	34	48	67	94	132	184	258	362
5F4	10	14	20	27	38	54	75	105	148	207	289
6F1	1	1	2	3	4	5	8	11	15	21	29
6F2	1	1	2	3	4	5	8	11	15	21	29
6F3	1	1	2	3	4	5	8	11	15	21	29
6F4	1	1	2	3	4	5	8	11	15	21	29
BF2	8	11	15	21	29	40	56	79	111	155	217
Total	166	232	325	455	637	892	1,249	1,749	2,448	3,428	4,799



EVs to # WDI customers ratio

#Existing Accounts	# Existing Accounts +50% planned	# Existing Accounts +100% planned
15,000	19,731	24,462
%Accounts with EV		
1.1%	4.52%	19.62%

Comments: It seems that 19.6% of households will own an EV by 2033, while currently there are on average 1.1% of households that own an EV. WDI had 128 registered EVs and the projected number of EVs by 2030 is 1,749 (~14x growth) which seems to be closely aligned with the IESO's forecast.

Source IESO's Annual Planning Outlook 2022: Canadian Vehicle Survey shows that an average car in Ontario drives about 16,000 km per year. Natural Resources Canada manages a database of vehicle fuel efficiency including EVs. Based on data from dozens of EV models, the average 0.2 KWh per km is estimated and used in the IESO's annual planning outlook forecast. In addition, the charger efficiency is assumed at 85%. Based on the numbers the annual charging demand of WDI EV is estimated to be 6.5 GWh by 2030.

Results and Discussion

The following table shows the total loading including planned and potential developments. Also, the estimated load due to building electrification (electric water heaters, resistive electric heaters, etc.) is calculated with an assumption of a **5%** adoption rate. Charging demand was calculated assuming a 7kW/EV demand load.

Substation total load growth

Existing System peak	Development Load	Electrification load	Unmanaged EV Charging Demand at Peak Hour	Total Peak Demand	Existing Substation Capacity
MVA	MVA	MVA	MVA	MVA	MVA
Existing+ Potential Load Growth (50%) by 2028					
35.25	15	2.5	6.2	59	57.5
Existing+ Potential Load Growth (100%) by 2033					
35.25	30	4.9	33.5	103.6	57.5

Comments: With the planned and potential development of 50% completed, 5% Electrification adoption, and 40% EV growth rate the peak demand will surpass existing station capacity.

Development load:

The highest loaded substation is MS#4 and most of the new developments planned are around the River Road West area. Therefore, a new 10MVA substation is recommended to install tapping from the 2M5 feeder to supply the new developments.

Building and Transportation Electrification:

In the table above, the EV charging load was assumed to be at a peak state when all EVs are being charged simultaneously. However, EVs can be charged any time when not on the move, which represents over 90% of the time. Customer preference, battery size, and status, driving conditions, time-of-use electricity rate, and active EV charging load management programs are among the factors affecting charging profiles. A managed EV charging system with visibility of EVs and time-differentiated rates can reduce the peak by 50% or more.

Also, with Canada's GHG reduction goal, adopting net-zero build codes, and transformation of space and water heating it is expected that there will be an increase in electricity demand during winter peak.

Wasaga Distribution System Electrification Readiness Recommendations:

Studies suggest that utilities should begin to prepare now for future electrification demands and there are metrics created for electrification readiness. The following metric is analyzed for Wasaga Distribution's electrification readiness:

Operation Capability	Present State	Suggested State Near-Term	Costs
Load forecasting	Relies on historical demand data at substation SCADA level, with no granular visibility of loads in real-time	Implementing tools i.e. line monitors, and MDMS that utilize AMI 1.0 with improved data analytics and meter data management to have increased visibility to the grid.	MDMS Software and analytics development that can incorporate existing Smart Meter data. Software maintenance, operation, and training cost
Advanced Metering Infrastructure	Basic Smart meter (AMI 1.0)	Develop next-generation smart meters AMI 2.0 deployment strategy. Consider a pilot program with a few AMI 2.0 capable meters on the system.	Pilot costs. (Advanced MDMS tool described in Load forecasting shall use existing Smart Meters for data analysis)
EV Charging Management	Currently, there is no visibility or control over customer-owned EVs.	Consider EV observability utilizing smart meter data (MDMS as described above) for existing connections. For new EV connection, the customer can submit charger specifications and charging schedule, V2G capability to utilities such that nearby transformer and grid limitation can be identified.	Advanced MDMS tool described in Load forecasting shall use existing Smart Meters for EV Detection
Load Management	Monthly meter readings on the billing system, usage snapshot for load flow model.	Implement a data analytics tool that utilizes AMI 1.0 and develop a predictive load model to assess features of customer loads including DER and EV detection.	Advanced MDMS tool described in Load forecasting shall use existing Smart Meters for near real-time visibility of customer load and detect DERs, and EVs on the system.

Operation Capability	Suggested State Longer Term	Costs
Load forecasting	Implement Short-term load/DER forecasting at the feeder level utilizing AMI 2.0 which includes enhancing the existing model for loads as well as electric space heating and various DER resources including EVs, Solar PV, and energy storage.	Capital costs to build tool and system
Advanced Metering Infrastructure	Implement AMI 2.0 meters in the entire system	Capital costs for equipment and installation
EV Charging Management	Implement direct Controllability of EV chargers or have indirect control by allowing customers to follow instructions to charge their EVs during off-peak hours. This will require tools compatible with Open Charge Point Protocol (OCPP 2.0.1), Smart Meter with granular data, and analytics tools.	API costs Potential incentives to customers or charger vendors. Increased O&M cost
Load Management	Implement data analytics with machine learning capability that utilizes granular smart meter (AMI 2.0) data and analyzes customer usage to generate load profiles. Incorporate forecasts with system planning. Develop a demand response management system initiative to enable the capability for customers to participate in dynamic pricing and receiving dispatch signals for major electrification equipment.	Capital costs for software Home automation controller Incentives to participants cost

Other considerations:

Operation Capability	Present State	Suggested State Near-Term	Suggested State Longer Term	Costs
Grid Modernization	Reclosers at feeder boundary.	Implement SCADA controllable switches/reclosers at feeder tie points.	Implement feeder automation by utilizing centralized controllers and smart switches.	Feasibility Study Capital cost upgrading existing switch. Implement SCADA software and communication. Cost of automation controller and developing logic program.
Non-wire alternatives	No DER visibility and alternative investment models	Enhanced DER visibility as described above. Consider alternative model planning such as Utility as Distribution System Operator (DSO) to enable near real-time electricity market. Enable collaboration between stakeholders and identify opportunities for synergies.	Enhanced grid operation by demonstrating the ability to manage and settle grid service transactions between utility and DERs	Capital costs for business case development and pilot projects.

In summary, Wasaga Distribution must initiate plans for the incorporation of a new substation, geared towards accommodating forthcoming developments and ensuring grid operations readiness. This strategic approach will enable the utility to operate at an advanced level, achieved through the integration of cutting-edge systems such as Advanced Meter Data Management, Distributed Energy Resource Management (DERMS), and innovative load management services.

Appendix and References

<https://www.ieso.ca/en/Sector-Participants/Planning-and-Forecasting/Annual-Planning-Outlook>

<https://natural-resources.canada.ca/energy-efficiency/transportation-alternative-fuels/resource-library/3489>

<https://electricautonomy.ca/2022/01/13/canada-grid-readiness-ev/>

<https://www.gridsmartcity.com/wp-content/uploads/2023/06/Hatch-GSC-Spring-Partner-Forum-2023.pdf>