Building Retrofit to Achieve Sustainability Goals - Work Plan

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2025-10-06

Statement of originality

"We do hereby verify that this written report is our own individual work and contains our own original ideas, concepts, and designs. No portion of this report has been copied in whole or in part from another source, with the exception of properly referenced material."

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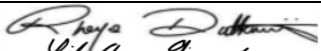
Rheya Dutkiewicz		2025-10-06
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October 6th, 2025
120 Bremner Blvd Fourth Floor, Toronto, ON M5J 0A8
York Region North District Road Maintenance Facility Sustainable Retrofit Project

Dear Ms. Erin Holwell and Mr. Hayden Bellows,

As discussed in the pre-commencement meeting on September 26th, 2025, the following report, *Building Retrofit to Achieve Sustainability Goals – Work Plan*, is for Envera's CIVL 460 Capstone Project. This report specifies:

- project definition
- preliminary project concepts
- background information
- timeline
- deliverable expectations
- assigned roles and statement of qualifications

If you have any concerns, inquiries, or comments regarding the report, please contact the team by email, and we will happily respond or schedule a Microsoft Teams meeting for further discussion.

Kind regards,

Rheya Dutkiewicz, Lily-Anna Girard, Sophia Mariani, and Jordan Raftis

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1.0 Introduction

Envera has been awarded the design contract to develop a building retrofit for the York Region North District Road Maintenance Facility to achieve sustainability goals, in collaboration with Entuitive. The two-storey maintenance building in Georgina, Ontario, is to undergo a deep energy retrofit to reduce the building's carbon footprint and achieve the EnerPHit Net Zero Carbon energy standards. The 724.8 m^2 building contains office space, two truck maintenance shops, and a wash bay for municipally owned vehicles, including snowplows and triaxle dump trucks. Through the completion of a two-phase design package, a feasibility study to identify required building system modifications will be executed, in conjunction with a structural impact assessment. A project budget has not been specified, meaning Envera will collaborate with Entuitive to produce a design that supports the sustainability goals while remaining cost-conscious. The retrofit design will be completed in accordance with the EnerPHit Net Zero Carbon energy standard, the National Building Code of Canada (NBCC), the Canadian Electrical Code (CEC), the National Energy Code of Canada for Buildings (NECB), and the project specifications.

2.0 Background Information

For Envera to complete the design, the necessary information and standards will be collected in collaboration with Entuitive and additional online research. The York Region North District Road Maintenance Facility was originally built in the late 1990s to operate two large shop bays and a truck washing station. Six large 24 m^2 maintenance bay doors allow egress for the maintained vehicles, each using up to 2,000 W to operate, while causing interior bay temperatures to fluctuate [1]. To shift towards a more sustainable business model, the York Region Roads Department aims to complete a full deep energy retrofit to achieve the EnerPhit Net Zero Carbon energy standard. EnerPHit is a building standard developed by the Passive House Institute for refurbishing existing buildings that cannot be renovated to adhere to the Passive House Classic Standard, which is tailored towards new builds, due to extensive construction and cost barriers [2].

The EnerPHit certification focuses on energy efficiency by lowering the overall energy demand of the building, including heating, cooling, and dehumidification demand, in combination with the installation of renewable energy generation methods, such as solar panels, to lower the building's carbon emissions. The retrofit standard focuses on five major refurbishment principles: insulation, thermal bridge-free design, airtightness, Passive House windows, and ventilation with heat recovery. Through Phase 1 of the design, each applicable retrofit principle will be evaluated against the client's needs for the maintenance

building, concerning total project cost, safety, and applicable industrial renovations. The standard employs two methods, the first, the energy demand method, requires the building to consume a maximum of 30 kWh/(m^2a) as determined through the Passive House Planning Package (PHPP) for Southern Ontario retrofits. The second method, the building component method, is applied to a retrofit when it is determined that, due to building layout, the 30 kWh/(m^2a) limit for the heating demand must be exceeded. Under this method, each of the five principles of the building is targeted individually to meet the required EnerPHit certification criteria [3] [4].

In addition to the client's business goals, the Canadian Government has developed the Canada Green Buildings strategy, which aims to prioritize increasing the rate of energy-efficient, climate-resilient, and deep building retrofits. Canada has a net-zero emissions goal for the commercial sector by 2050. Within Canada, there are over 480,000 commercial and institutional buildings that, in combination with residential buildings, account for 18% of national greenhouse gas (GHG) emissions [5]. The direct building emissions are over 96% and are a result of the combustion of fossil fuels for heating sources, electricity for cooling, and lighting, which the EnerPHit retrofit certificate aims to eliminate [5]. In addition, Canada's Energy Efficiency Act (EE Act) includes recent amendments regarding energy efficiency and testing standards for energy-using products, including air conditioners, heat pumps, and commercial gas-fired furnaces that must be assessed prior to installation and use [6] [7].

The most recent success under the EE Act was the Ken Soble Tower Passive House Retrofit (EnerPHit) Project in Hamilton, Ontario, where Entuitive was responsible for the design of the building envelope and structural restoration [8]. The 18-storey affordable housing building was CityHouse Hamilton's oldest residential social high-rise, which was deteriorating [8]. The federal government invested $16.5 million to complete the retrofit to achieve climate resilience, thermal comfort, and supply housing for vulnerable seniors [9]. Throughout the design, Entuitive modelled thermal bridge conditions, floor air leakage testing plans, and a building air leakage testing plan [8] [6].

3.0 Problem Definition

The following section of this report consists of specific details and considerations that Envera will account for when proposing a retrofit design to align with sustainability goals established by the client, Entuitive.

3.1 Project Scope

This project includes a two-phase feasibility study and structural assessment to determine the required modifications needed to achieve the EnerPhit Net Zero Carbon standard. Phase one for this design will focus on evaluating energy retrofit measures, including upgrades to the building envelope, improvements to mechanical and electrical systems, and the potential integration of on-site power generation methods, such as solar photovoltaic panels. Phase two will analyze the structural implications of the proposed retrofit, ensuring the modifications do not compromise the integrity of the existing steel frame and metal sliding. This project will not extend to the construction or direct implication of retrofit measures, as discussed with the client.

3.2 Objectives and Deliverables

The primary objective for this retrofit design is to identify strategies that enable the building to maintain its functionality as a winter maintenance facility, while implementing a deep energy retrofit to meet the EnerPhit Net Zero Carbon standard. This requires a holistic approach that not only reduces carbon emissions but also ensures that all proposed upgrades are structurally sound, practical to implement, and financially viable. Maximizing energy efficiency through building envelope and system improvements, safeguarding structural integrity against additional retrofit loads, minimizing disruptions to daily facility operations, and delivering a cost-effective solution are critical considerations. In addition, the solution must account for environmental challenges that Georgina's climate faces, such as heavy snow accumulation, high wind pressures, ice formation, and repeated freeze-thaw cycles that accelerate material deterioration.

To communicate all work produced, Envera will present six major deliverables to the client throughout the term of this project. These six deliverables include the initial work plan, the progress report, the poster presentation, the draft final report, an oral presentation, and the final report. Following the initial work plan, a progress report will be submitted in November, outlining all potential design ideas, research, and an updated schedule of work. Along with providing information regarding progress made, this report will act as a checkpoint for Entuitive, informing them on how the team plans to proceed. A poster presentation will be presented in January, outlining the contents of the progress report to other capstone groups. In March, the draft final report will then be completed, outlining the final design through detailed drawings, evaluation matrices, research, and other related communication styles. Following the draft final report, an oral presentation of the final draft report will be given in March to other capstone groups, discussing technical issues and critiques. Lastly, upon final revisions of the draft report, the final report will be completed in April.

3.3 Constraints

Given the current information and research completed, this project is subject to several constraints that will guide the feasibility assessment and design recommendations. The building must continue to operate as a winter maintenance transport facility during the retrofit planning process, limiting the degree of disruption that can be considered in proposed solutions. Structurally, the facility is composed of steel framing and metal siding, which restricts the extent of modifications without the need for additional reinforcement. The presence of the six 24 m^2 bay doors within the facility poses a significant influence on the retrofit design, as they represent a major source of air leakage, thermal bridging and rapid heat loss during frequent operation in winter months. Compliance with the EnerPHit Net Zero Carbon standard imposes strict requirements for airtightness and thermal efficiency, further narrowing the range of viable retrofit measures. Although no formal budget has been established for this project, budgetary considerations still present as a constraint, as recommendations must be justified with a strong feasibility rationale. Additionally, due to software licensing restrictions on more advanced tools such as SAP2000, the team is limited to Microsoft Excel and hand calculations.

3.4 Stakeholders

Due to the requirements, location, and size of the facility, a variety of stakeholders will be impacted during the planning, execution, and completion phases of this project. Each stakeholder has been classified as either primary, secondary or tertiary, with a description of each classification found in Table 1 below:

Table 1: Classification descriptions for Primary, Secondary and Tertiary.

Classification	Description
Primary Stakeholder	Primary stakeholders are those who are directly involved in the project's decision-making, execution or outcomes. They have significant influence on the project's success and are directly impacted by its results. Their engagement is critical throughout all project phases.
Secondary Stakeholder	Secondary stakeholders are those who are indirectly involved in the project. They may provide support, oversight, regulation or services but are not directly responsible for decision-making or daily project activities. They are affected by the project's outcomes.
Tertiary Stakeholder	Tertiary Stakeholders are those who are peripherally affected by the project. They do not influence the project directly, but may experience indirect impacts such as environmental,

	economic, or social effects resulting from the project's implementation.

Based on the table above, 12 stakeholders have been identified for this project, and in Table 2 below, each stakeholder with their respective classification can be seen:

Table 2: Classification of each Stakeholder.

Stakeholder	**Classification**
Entuitive	Primary
Envera	Primary
Facility Owner	Primary
Queen's University	Primary
Energy Providers	Primary
EnerPHit Certification Bodies	Primary
York Region	Secondary
Supervisors, Managers and Employees	Secondary
Regulatory Authorities	Secondary
Nearby Property Owners and Businesses	Tertiary
Nearby Georgia Residents	Tertiary
Contractors and Suppliers (future phase)	Tertiary

To further expand on each stakeholder's position, the following section outlines their respective roles:

To begin, Entuitive, specifically Erin Holwell and Hayden Bellows, are the clients for this project. They will provide project direction, approve proposed design solutions, and offer professional feedback on feasibility. They are also responsible for ensuring the retrofit design aligns with the EnerPHit Net Zero Carbon energy standard and the York Region Roads Department sustainability goals, making them a primary stakeholder. Entuitive's active involvement ensures that all proposed solutions are practical, cost-effective, and aligned with both client and sustainability expectations.

Following Entuitive, Envera is a stakeholder that will be conducting all research, performing structural and energy feasibility assessments, and providing design options to Entuitive. The team is also accountable for preparing progress reports, final deliverables, and presentations in accordance with academic expectations. As the executing body, Envera will integrate input from all stakeholders to develop feasible and data-driven retrofit strategies. The team's technical performance and ability to balance sustainability with functionality will directly influence the success and academic evaluation of the project.

Queen's University, specifically CIVL 460 instructor Dr. Moore and project manager Zaid Kasim, is the academic institution overseeing the capstone project, ensuring academic requirements are met. They will provide supervision, resources, and evaluate project deliverables. Their involvement ensures academic integrity, adherence to research and reporting standards, and that project outcomes align with course learning objectives.

The York Region Roads Department is another primary stakeholder, as they hold ultimate authority over decisions related to funding, scope, and adaptation of retrofit measures. Their priorities include sustainability targets, reducing operational costs, and ensuring the facility continues to function effectively as a winter maintenance hub. Their decision-making will also affect contractor selection, material sourcing, and the timing of implementation.

The District Road Maintenance Facility is located in York Region, near the town of Georgia. Due to this, York Region oversees the operations of the winter maintenance facility, providing tools, vehicles, and staff. They are responsible for ensuring the facility remains operational during retrofit planning and that public services, such as road and sidewalk plowing, are not disrupted. Their cooperation will be crucial in coordinating scheduling and temporary adjustments during construction phases to minimize service interruptions and maintain safety for both staff and the public.

Due to the nature of this project being a sustainable retrofit, energy providers, such as Hydro One [10], Enbridge Gas [11], etc., are the electricity and natural gas providers for the facility, who will provide critical information for decision-making. Energy supply characteristics, such as grid reliability, carbon intensity, and utility costs, directly influence the feasibility of proposed upgrades. Their technical data will inform decisions on renewable energy integration, heat recovery, and energy storage systems.

Along with energy providers, EnerPHit certification bodies (Passive House Canada) oversee compliance with EnerPHit standards, providing formal certification that the retrofit meets performance criteria for airtightness, insulation, and energy efficiency. Their approval validates the success of the project's sustainability objectives [12]. They also serve as a key reference point for performance testing and design validation, ensuring that all retrofit measures are auditable and meet the stringent requirements of a Net Zero Carbon facility.

Within the District Road Maintenance Facility, supervisors, managers and employees work at the facility and depend on uninterrupted building access and functionality. Construction or retrofit work has the potential to interfere with daily operations, creating both productivity and safety concerns. These internal stakeholders provide valuable insight into daily operational needs, allowing the project team to tailor retrofit measures that minimize disruption and enhance working conditions.

Regulatory bodies, including the Ontario Building Code inspectors and municipal permitting offices, must ensure that all retrofit measures comply with safety, energy efficiency, and construction standards. Their oversight ensures legal compliance and the safety of all structural and energy-related modifications.

Located in proximity to the facility, nearby property owners and businesses may be affected by construction activities, noise, traffic, or other temporary disruptions, making them stakeholders throughout the duration of the project. Although their involvement is indirect, effective communication and mitigation strategies, such as controlled working hours and site safety measures, will be essential in maintaining good relations.

Additionally, the population of Georgina relies on the facility for snow and ice removal, road upkeep, and safe winter roadways. Any disruptions to the facilities' function could directly impact community mobility, safety, and quality of life during the winter months. Public transparency about the project's schedule and contingency plans will be critical in maintaining trust and ensuring continued service reliability during implementation.

Lastly, should retrofit implementation move forward, contractors and material suppliers will become key stakeholders in executing the design recommendations. Their role includes ensuring constructability, cost control, and adherence to design intent. They will work closely with the design team and regulatory bodies to translate retrofit plans into tangible outcomes. Expertise in sustainable construction practices and familiarity with high-performance building materials will both be crucial for achieving EnerPHit level performance.

4.0 Project Timeline

The following section outlines the major tasks throughout the project, a timeline, an overview of deliverables, and project expectations.

4.1 Major Tasks

To ensure the success of the retrofit design project, the team has developed a detailed work breakdown structure (WBS), as seen in Figure 1 in Appendix A: Work Breakdown Structure. All stages of the project are outlined across five main phases. Phase 1, Project Definition, includes, but is not limited to, identifying the project objectives, constraints, stakeholders, and initial planning. Phase 2, Research, will delve into pertinent details, such as the building’s location, loads, and applicable energy standards. Phase 3, Preliminary Design, includes the project phase where alternative solutions will be developed, and detailed

assessments will be outlined. The team will develop various categories that will be used to evaluate the proposed alternatives, and weights will be assigned to later decide on a final solution. Phase 4, Final Design, will implement a weighted evaluation matrix to evaluate the proposed solutions and assess the final design. Additionally, the environmental impact of the project will be assessed, as well as applicable loads, the building envelope, and other details as required. The last phase, Phase 5, Design Proposal, is the deliverable section of the project, where finer details will be assessed, conclusions will be drawn, and the final report and presentation will be made.

Refer to Appendix B: Gantt Chart with Responsibilities, for a breakdown of delegated tasks and designated team leads and reviewers. All individual expectations and the conflict resolution plan are outlined in the Envera Team Charter. Responsibilities were assigned based on assumed role and previous experiences; tasks include, but are not limited to:

Rheya Dutkiewicz – Project Manager: Define initial project conditions, including identifying initial project stakeholders, reviewing the supplied engineering drawings, determining evaluation categories and weights, implementing the evaluation matrix, and assessing the project's feasibility.

Lily-Anna Girard – Environmental Coordinator: Research applicable energy standards and potential energy generation technologies, investigate the environmental impact of alternative solutions, develop a detailed plan for the final solution's environmental impact, and develop a long-term environmental mitigation plan if needed. She will also create the project schedule and edit the Gantt Chart.

Sophia Mariani – Structural Coordinator: Define project objectives, assess site conditions to support load calculations, determine applicable forces and loads, calculate final design loads, and develop a maintenance plan to ensure the structural integrity of the proposed retrofit.

Jordan Raftis – M&E Coordinator: Develop preliminary project concepts, review similar projects, evaluate the mechanical and electrical structure of alternative solutions, and prepare a detailed cost estimate for the final solution.

4.2 Timeline Estimates

The detailed Gantt Chart in Figure 2, Figure 3, and Figure 4 in Appendix B: Gantt Chart with Responsibilities outlines the main tasks and deliverables required for the project's overall success throughout the year. The five project phases are outlined to describe the main

activities required in each phase, with some tasks extending into the next phase to allow time for iteration and refinement.

Tasks are divided into three main categories with varying colours. Deliverables are shown in red, which are dates for items to be submitted to OnQ. Milestones, which are shown in yellow, act as key indicators for progress reporting and submissions for review. Activities are shown in blue, which are ongoing work or research required to meet milestones and deliverable dates. Additionally, leeway time is built into the schedule to account for unexpected delays, such as illness or the need for additional work on a task. Accounting for buffer provides flexibility in the schedule and ensures the overall success of the team and the project timeline. Please note that there are no tasks throughout the winter holidays.

4.3 Deliverables and Expectations

To ensure the timely completion of major deliverables, the team will submit drafts to the project manager, Zaid Kasim, seven days prior to the official deadline date. This will allow sufficient time for review and revisions as necessary. The team has also created an ongoing internal deadline of 48 hours prior to any deliverable submission for all report writing and computations. This allows for adequate time for editing and formatting.

Every Sunday, the team's scheduler, Lily-Anna, will review the Gantt Chart and adjust as necessary. Items that may be allocated more or less time will be communicated with the group via the team's iMessage group chat to ensure everyone is aligned with the project timeline and upcoming tasks.

The team will have a mandatory weekly meeting on Mondays at 2:30 PM to discuss the requirements for the week, and an additional optional meeting on Fridays at 10:30 AM to review expectations or work as needed. Meetings with the project clients, Hayden Bellows and Erin Howell from Entuitive, will be held a minimum of once a month for one hour, to review expectations and address questions. The clients have expressed their flexibility, so if meetings are to be switched to bi-weekly, the team will communicate 72 hours in advance.

4.4 Evaluation of the Project's Success

The team will evaluate the project's success based on its alignment with the proposed timeline, deliverables, and outlined objectives. In the early stages, progress will be assessed against the timeline to track milestones and deliverables. As the project advances into later phases, the proposed design will be evaluated in relation to the established objectives and client expectations. Key areas of assessment will include energy performance, structural integrity, cost-effectiveness, and the integration of equitable engineering practices.

Evaluation methods will be based on SAP models, hand calculations, environmental impact assessments, a detailed cost estimate, and an assessment of the social impacts of the design. The evaluation matrix developed in Phase 3 and implemented in Phase 4 will be used to compare the alternative solutions to select the most suitable final design.

Lastly, a feasibility assessment will determine the project's practicality in the real-world application. A comparison of the actual outcomes against the initial outcomes will be presented in the final report in Phase 5. The final report will also present recommendations for future improvements based on the feasibility assessment.

5.0 Preliminary Project Concepts

This section provides retrofit concept ideas for the York Region North District Road Winter Maintenance Facility. The concepts are categorized into five main sections. These include building envelopes, mechanical and electrical systems, renewable energy, water and structural considerations. All proposed ideas will help minimize the carbon footprint of the building while retaining the functional purpose of the truck maintenance facility. The existing building plans have been annotated in Appendix C to show possible retrofit interventions.

5.1 Building Envelope Upgrades

The existing envelope is made of corrugated metal siding and a light, insulated roof system. These assemblies have low thermal resistance by current standards. Proposed upgrades include:

Wall system: Replace or overclad the existing metal siding with new high R-value insulated metal panels to improve thermal performance in line with EnerPHit retrofit guidelines [12].

Roof system: Add additional insulation and high-performance membrane (Blueskin) to seal off the roof. Could also plan for solar panels attached to the roof.

Air sealing: Apply continuous air and vapour barriers around building joints, penetrations, and transitions, especially around bay doors.

Commercial Bay Doors: Replace with high-speed insulated roll-up doors as well consider air curtains to reduce air losses when doors are opens.

Refer to Appendix C, Figure 5 for drawings highlighting the proposed envelope upgrades described in this section.

5.2 Mechanical and Electrical Systems

The current mechanical drawings show that the facility is run by gas-fired infra-red heaters in the truck bays and a roof top unit for cooling. Both systems rely on natural gas, which significantly contributes to the building's carbon emissions.

Heating and Ventilation: Replace gas-fired infrared heaters with electric radiant panels or heat pump-driven radiant floor heating [13]. Additionally, integrated energy recovery ventilators could be implemented to reclaim lost heat.

HVAC: Replace existing carrier 48TFE008 rooftop units with new high efficiency air source pump system to eliminate the reliance on gas heating while simultaneously achieving adequate cooling [13].

Lighting: Change existing lighting to LED fixtures with occupancy sensors to reduce electrical consumption.

Controls: Integrate a new smart building management system to integrate all the systems and enable energy optimization and reduce operating costs [7].

Refer to Appendix C, Figure 6 for drawings highlighting the proposed mechanical and electrical upgrades described in this section.

5.3 Renewable Energy Options

The existing building has a large level roof surface and site location offer great opportunities to integrate renewable energy. Renewable energy solutions would decrease the dependency on grid electricity, enhance operational resilience, and comply with the EnerPHit Net Zero Carbon standard. Proposed options include:

Solar Photovoltaic (PV) Array: Mount a PV system on the roof that will offset a major part of the yearly electrical usage, using the uncovered roof [12].

Battery Energy Storage: Incorporate battery storage to allow peak shifting, minimize energy charges, and promote serviceability during outages to allow the facility to remain operational in major storms.

Electric Vehicle Chargers: Prepare the site to be electrified with the increase of electrical vehicles, incorporating EV charging stations to facilitate long term decarbonization objectives.

Refer to Appendix C, Figure 7 for drawings highlighting the proposed renewable energy systems described in this section.

5.4 Water Efficiency

The existing plumbing design of the facility consists of trench drains in the wash bay and normal domestic hot water supplies. Since trucks consume a lot of water when they are being serviced and personnel housed, it's a significant retrofit potential to lower water demand. Proposed measures include:

Greywater Reuse: Catch and treat run-off water in wash bays and use it in non-portable water, like truck washing or toilet flushing, eliminating heavy demand on municipal supply. This water would require appropriate treatment to separate any oils and dirt before reuse.

Rainwater Harvesting: Gather roof runoff in a cistern to be reused in either vehicle washing or possible landscaping exploiting the large rooftop catchment area [7].

Fixture Upgrades: Change current washroom and locker fixtures to low flow faucets, showers, and toilets to help minimize domestic water use and increase efficiency.

Refer to Appendix C, for Figure 8 for drawings highlighting the proposed water efficiency upgrades described in this section.

5.5 Structural Considerations

The building is made of steel frames and diagonal bracing to resist sideways forces. Although sufficient in current operations, several retrofit considerations will create additional loads which must be researched [12]. The following has been proposed:

Roof Reinforcement: New rooftop HVAC systems and Solar PV arrays will add dead loads to the roof. The additions may insist on strengthening of purlins or joists.

Wall Girt Upgrades: More substantial insulated cladding systems might impose additional loads on the girths of the wall, and these girts need to be reinforced so that the wall frame can transfer the correct load to the main frame.

Bracing review: The current diagonal bracing systems must be re-assessed to ensure that it is stable latterly with altered loading conditions, such as rooftop penetrations, new equipment foundations, and envelope improvements.

Refer to Appendix C, Figure 9 for drawings highlighting the proposed structural considerations described in this section

The proposed preliminary retrofit concepts form the basis of achieving EnerPHit Net Zero Carbon performance at the York Region North District Road Winter Maintenance Facility. These concepts focus on operational and embodied carbon effects through envelope

insulation, mechanical electrification, onsite renewable generation, water conservation and structural reinforcement. The ideas presented will be streamlined in the feasibility stage to determine if they will be cost effective, constructable, and fit the existing steel frame.

6.0 Summary

Outlined in this Work Plan, Envera has made a comprehensive plan to retrofit the York Region North District Road Maintenance Facility in Georgina, Ontario, to meet the EnerPHit Net Zero Carbon standard. Working under Entuitive, the project aims to significantly reduce the building's carbon footprint through deep energy retrofit while maintaining full operational capacity as a winter maintenance hub. The two-storey, 724.8 m^2 facility will undergo a two-phase design process: the first focusing on evaluating energy and system retrofit measures, and the second, assessing the structural feasibility of proposed upgrades. The retrofit will address key areas, including the building envelope improvements, mechanical and electrical system upgrades, renewable energy integration, water efficiency, and structural reinforcements. Proposed concepts include installing R-value insulated panels, upgrading HVAC systems to electric heat pumps, incorporating solar photovoltaic arrays with battery storage, and implementing greywater reuse and rainwater harvesting systems.

A detailed project timeline and Gantt chart outline the project's five phases, spanning from definition and research to final design and proposal, with clear responsibilities assigned to each team member based on their expertise. Regular meetings and deliverable reviews ensure that design progress aligns with client expectations, academic standards, and real-world feasibility. Ultimately, this project demonstrates Envera's commitment to advancing sustainable engineering practices by integrating energy efficiency, environmental stewardship, and practical design solutions to achieve a low-carbon retrofit for municipal infrastructure.

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Appendix A: Work Breakdown Structure

Figure 1 demonstrates the team's work breakdown structure, which provides a visual representation of major deliverables, milestones, and activities throughout the course of the project.

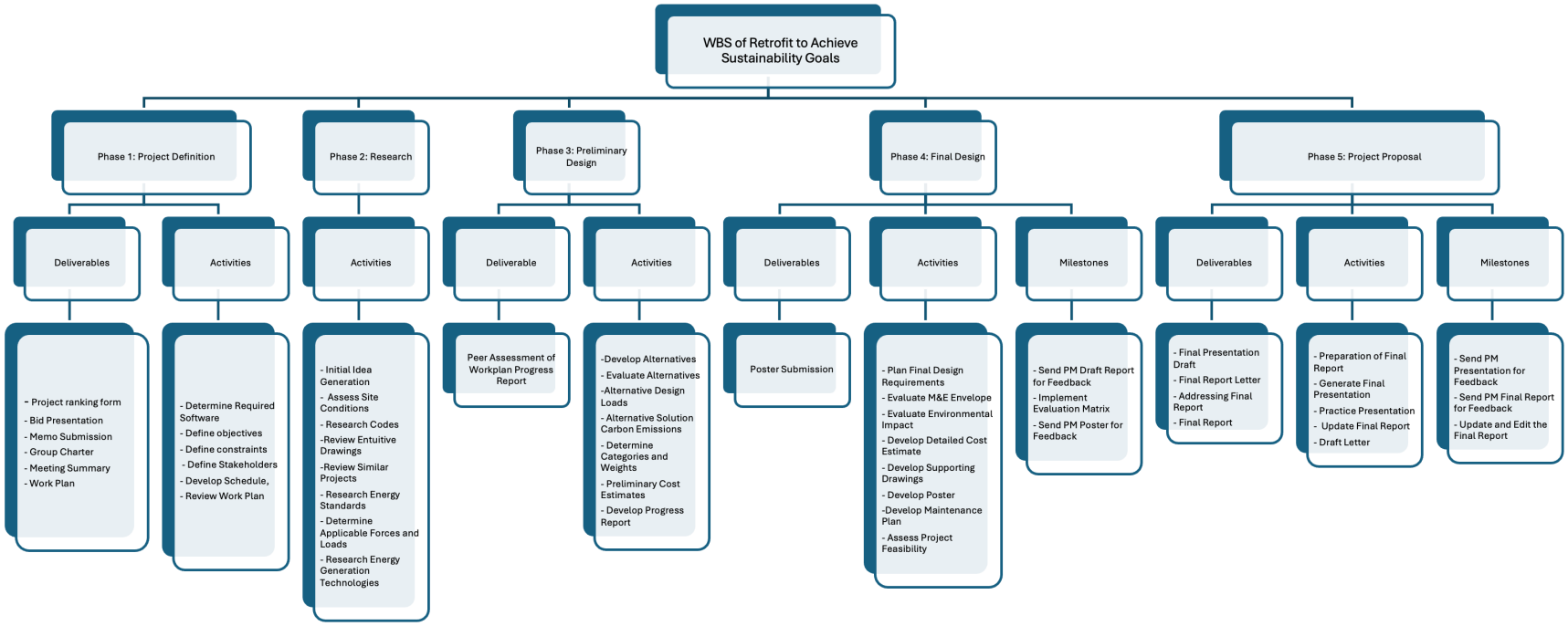
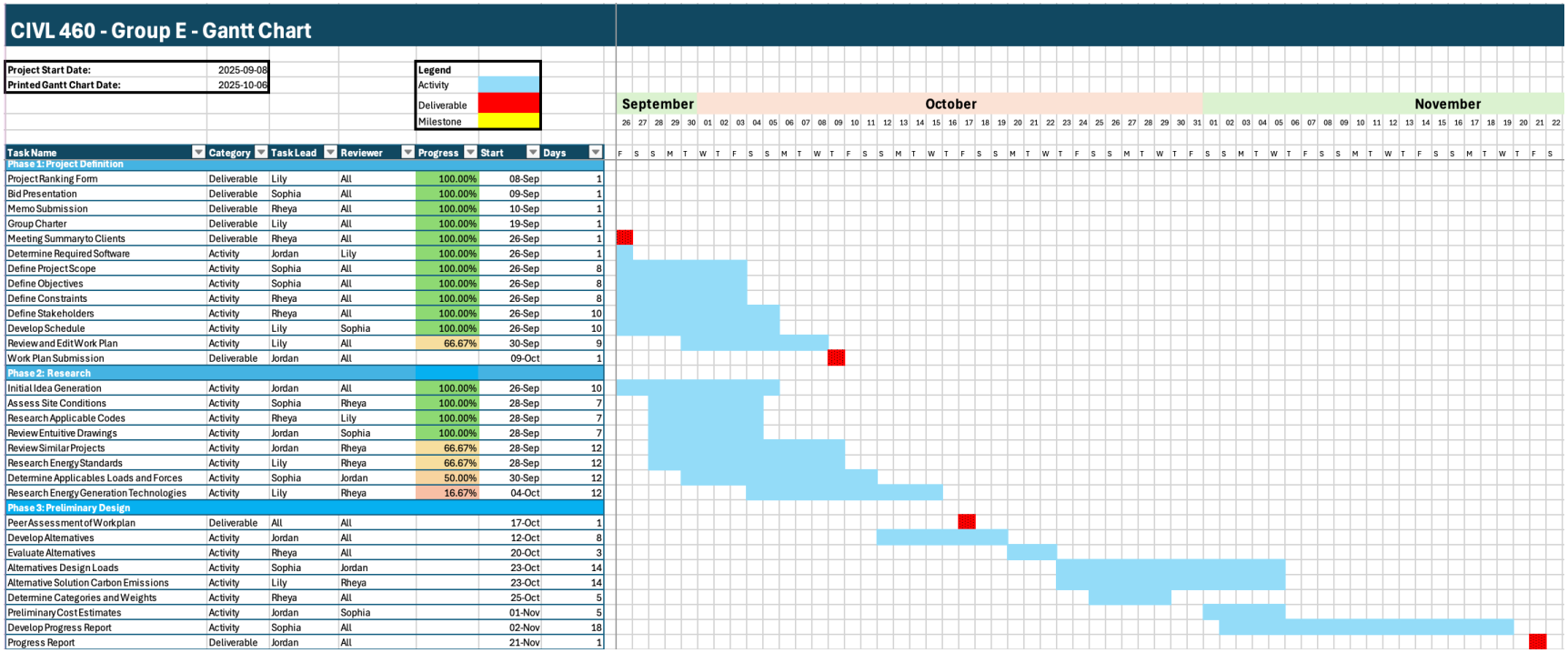


Figure 1: Work breakdown structure of the project.

Appendix B: Gantt Chart with Responsibilities

Figure 2, Figure 3, and Figure 4 illustrate the team's Gantt Chart and the team lead and reviewer for all tasks throughout the project.



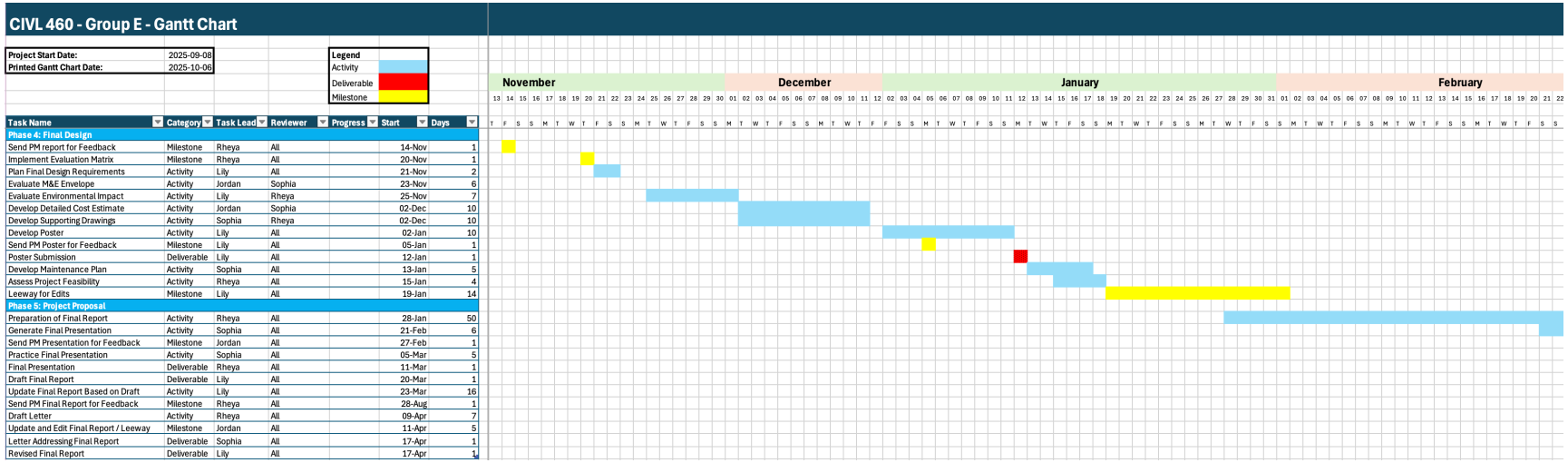
CIVL 460 - Group E - Gantt Chart

Project Start Date:	2025-09-08
Printed Gantt Chart Date:	2025-10-06

Legend
Activity
Deliverable
Milestone

Task Name	Category	Task Lead	Reviewer	Progress	Start	Days
Phase 1: Project Definition						
Project Ranking Form	Deliverable	Lily	All	100.00%	08-Sep	1
Bid Presentation	Deliverable	Sophia	All	100.00%	09-Sep	1
Memo Submission	Deliverable	Rheya	All	100.00%	10-Sep	1
Group Charter	Deliverable	Lily	All	100.00%	19-Sep	1
Meeting Summary to Clients	Deliverable	Rheya	All	100.00%	26-Sep	1
Determine Required Software	Activity	Jordan	Lily	100.00%	26-Sep	1
Define Project Scope	Activity	Sophia	All	100.00%	26-Sep	8
Define Objectives	Activity	Sophia	All	100.00%	26-Sep	8
Define Constraints	Activity	Rheya	All	100.00%	26-Sep	8
Define Stakeholders	Activity	Rheya	All	100.00%	26-Sep	10
Develop Schedule	Activity	Lily	Sophia	100.00%	26-Sep	10
Review and Edit Work Plan	Activity	Lily	All	66.67%	30-Sep	9
Work Plan Submission	Deliverable	Jordan	All		09-Oct	1
Phase 2: Research						
Initial Idea Generation	Activity	Jordan	All	100.00%	26-Sep	10
Assess Site Conditions	Activity	Sophia	Rheya	100.00%	28-Sep	7
Research Applicable Codes	Activity	Rheya	Lily	100.00%	28-Sep	7
Review Entuitive Drawings	Activity	Jordan	Sophia	100.00%	28-Sep	7
Review Similar Projects	Activity	Jordan	Rheya	66.67%	28-Sep	12
Research Energy Standards	Activity	Lily	Rheya	66.67%	28-Sep	12
Determine Applicables Loads and Forces	Activity	Sophia	Jordan	50.00%	30-Sep	12
Research Energy Generation Technologies	Activity	Lily	Rheya	16.67%	04-Oct	12
Phase 3: Preliminary Design						
Peer Assessment of Workplan	Deliverable	All	All		17-Oct	1
Develop Alternatives	Activity	Jordan	All		12-Oct	8
Evaluate Alternatives	Activity	Rheya	All		20-Oct	3
Alternatives Design Loads	Activity	Sophia	Jordan		23-Oct	14
Alternative Solution Carbon Emissions	Activity	Lily	Rheya		23-Oct	14
Determine Categories and Weights	Activity	Rheya	All		25-Oct	5
Preliminary Cost Estimates	Activity	Jordan	Sophia		01-Nov	5
Develop Progress Report	Activity	Sophia	All		02-Nov	18
Progress Report	Deliverable	Jordan	All		21-Nov	1

Figure 2: Gantt Chart with designated team leads and reviewers for Phase 1, Phase 2, and Phase 3 from September 26th to November 22nd.



CIVL 460 - Group E - Gantt Chart

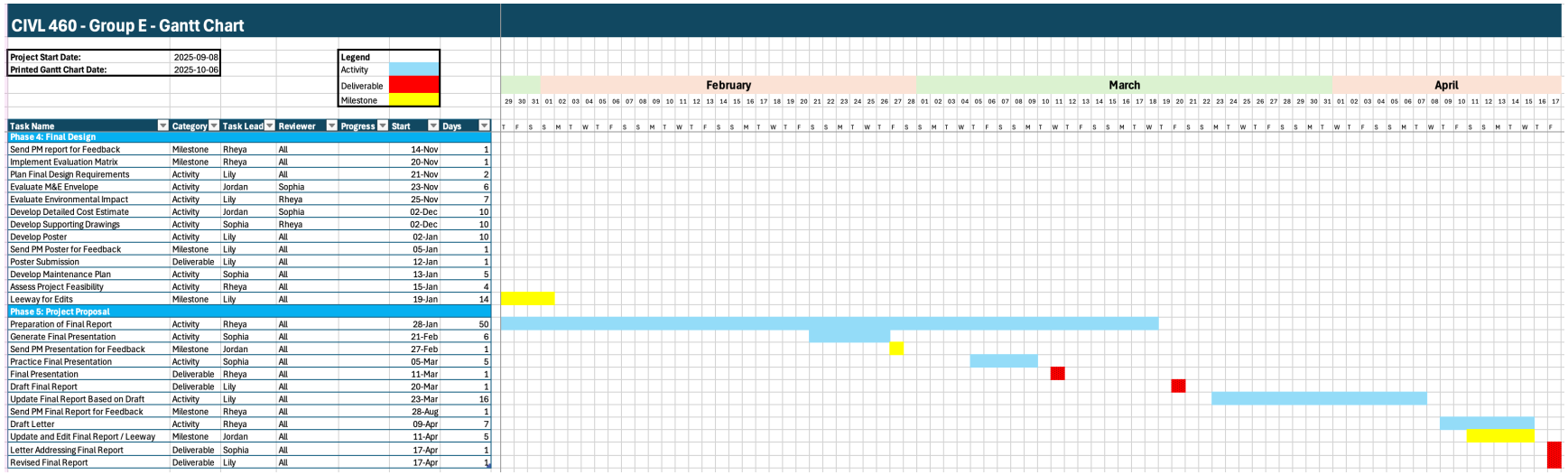
Project Start Date:	2025-09-08
Printed Gantt Chart Date:	2025-10-06

Legend: Activity, Deliverable, Milestone

November | December | January | February

Task Name	Category	Task Lead	Reviewer	Progress	Start	Days
Phase 4: Final Design						
Send PM report for Feedback	Milestone	Rheya	All		14-Nov	1
Implement Evaluation Matrix	Milestone	Rheya	All		20-Nov	1
Plan Final Design Requirements	Activity	Lily	All		21-Nov	2
Evaluate M&E Envelope	Activity	Jordan	Sophia		23-Nov	6
Evaluate Environmental Impact	Activity	Lily	Rheya		25-Nov	7
Develop Detailed Cost Estimate	Activity	Jordan	Sophia		02-Dec	10
Develop Supporting Drawings	Activity	Sophia	Rheya		02-Dec	10
Develop Poster	Activity	Lily	All		02-Jan	10
Send PM Poster for Feedback	Milestone	Lily	All		05-Jan	1
Poster Submission	Deliverable	Lily	All		12-Jan	1
Develop Maintenance Plan	Activity	Sophia	All		13-Jan	5
Assess Project Feasibility	Activity	Rheya	All		15-Jan	4
Leeway for Edits	Milestone	Lily	All		19-Jan	14
Phase 5: Project Proposal						
Preparation of Final Report	Activity	Rheya	All		28-Jan	50
Generate Final Presentation	Activity	Sophia	All		21-Feb	6
Send PM Presentation for Feedback	Milestone	Jordan	All		27-Feb	1
Practice Final Presentation	Activity	Sophia	All		05-Mar	5
Final Presentation	Deliverable	Rheya	All		11-Mar	1
Draft Final Report	Deliverable	Lily	All		20-Mar	1
Update Final Report Based on Draft	Activity	Lily	All		23-Mar	16
Send PM Final Report for Feedback	Milestone	Rheya	All		28-Aug	1
Draft Letter	Activity	Rheya	All		09-Apr	7
Update and Edit Final Report / Leeway	Milestone	Jordan	All		11-Apr	5
Letter Addressing Final Report	Deliverable	Sophia	All		17-Apr	1
Revised Final Report	Deliverable	Lily	All		17-Apr	1

Figure 3: Gantt Chart with designated team leads and reviewers for Phase 4 and the beginning of Phase 5 from November 13th to February 22nd.



CIVL 460 - Group E - Gantt Chart

Project Start Date:	2025-09-08
Printed Gantt Chart Date:	2025-10-06

Legend: Activity, Deliverable, Milestone

February | March | April

Task Name	Category	Task Lead	Reviewer	Progress	Start	Days
Phase 4: Final Design						
Send PM report for Feedback	Milestone	Rheya	All		14-Nov	1
Implement Evaluation Matrix	Milestone	Rheya	All		20-Nov	1
Plan Final Design Requirements	Activity	Lily	All		21-Nov	2
Evaluate M&E Envelope	Activity	Jordan	Sophia		23-Nov	6
Evaluate Environmental Impact	Activity	Lily	Rheya		25-Nov	7
Develop Detailed Cost Estimate	Activity	Jordan	Sophia		02-Dec	10
Develop Supporting Drawings	Activity	Sophia	Rheya		02-Dec	10
Develop Poster	Activity	Lily	All		02-Jan	10
Send PM Poster for Feedback	Milestone	Lily	All		05-Jan	1
Poster Submission	Deliverable	Lily	All		12-Jan	1
Develop Maintenance Plan	Activity	Sophia	All		13-Jan	5
Assess Project Feasibility	Activity	Rheya	All		15-Jan	4
Leeway for Edits	Milestone	Lily	All		19-Jan	14
Phase 5: Project Proposal						
Preparation of Final Report	Activity	Rheya	All		28-Jan	50
Generate Final Presentation	Activity	Sophia	All		21-Feb	6
Send PM Presentation for Feedback	Milestone	Jordan	All		27-Feb	1
Practice Final Presentation	Activity	Sophia	All		05-Mar	5
Final Presentation	Deliverable	Rheya	All		11-Mar	1
Draft Final Report	Deliverable	Lily	All		20-Mar	1
Update Final Report Based on Draft	Activity	Lily	All		23-Mar	16
Send PM Final Report for Feedback	Milestone	Rheya	All		28-Aug	1
Draft Letter	Activity	Rheya	All		09-Apr	7
Update and Edit Final Report / Leeway	Milestone	Jordan	All		11-Apr	5
Letter Addressing Final Report	Deliverable	Sophia	All		17-Apr	1
Revised Final Report	Deliverable	Lily	All		17-Apr	1

Figure 4: Gantt Chart with designated team leads and reviewers for the end of Phase 4 and Phase 5 from January 29th to April 17th.

Appendix C: Preliminary Designs

Building Envelope Upgrades:

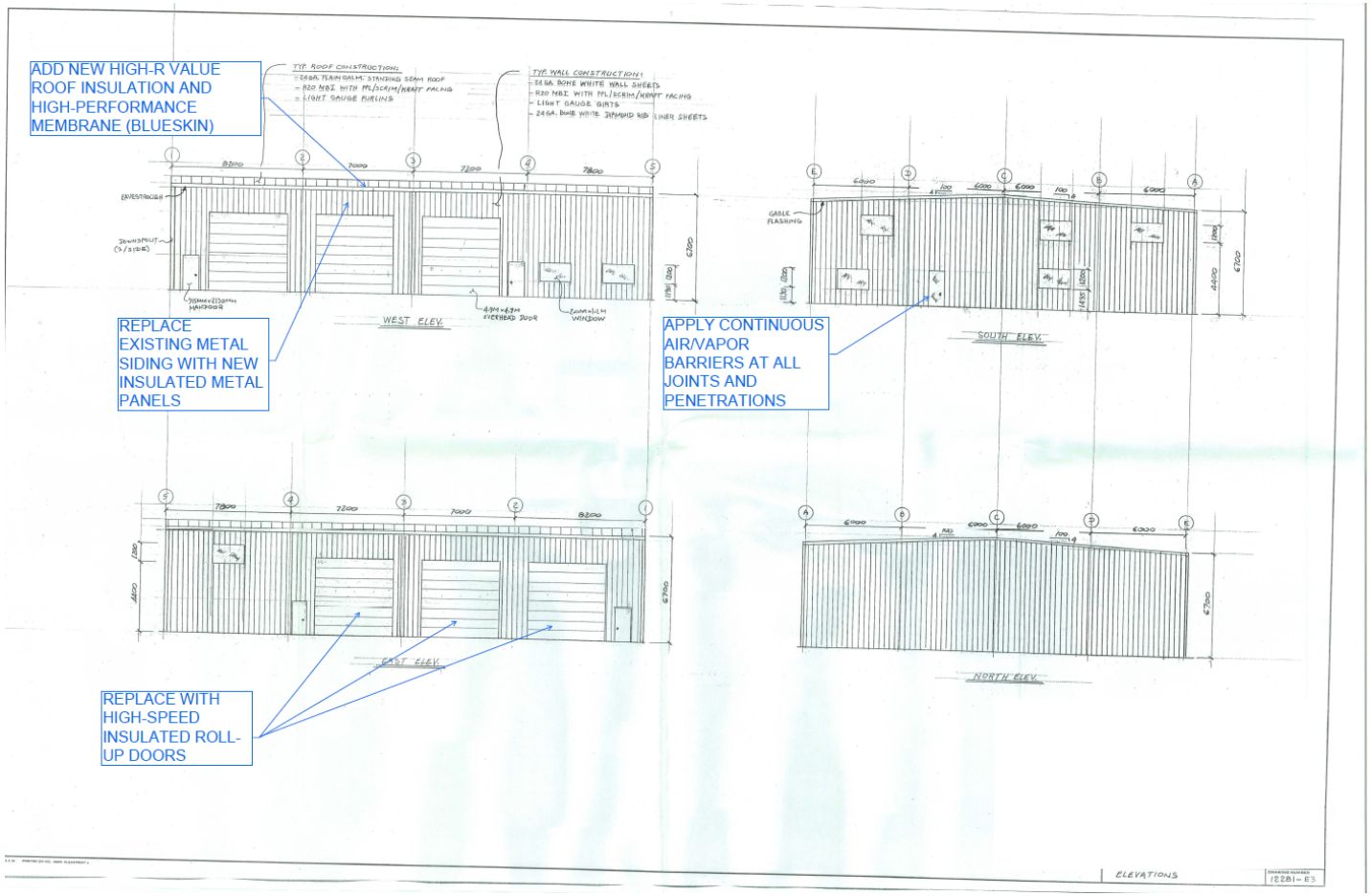


Figure 5: Elevation drawing annotated to highlight proposed wall, roof, air sealing, and truck bay door upgrades.

Mechanical and Electrical System Upgrades:

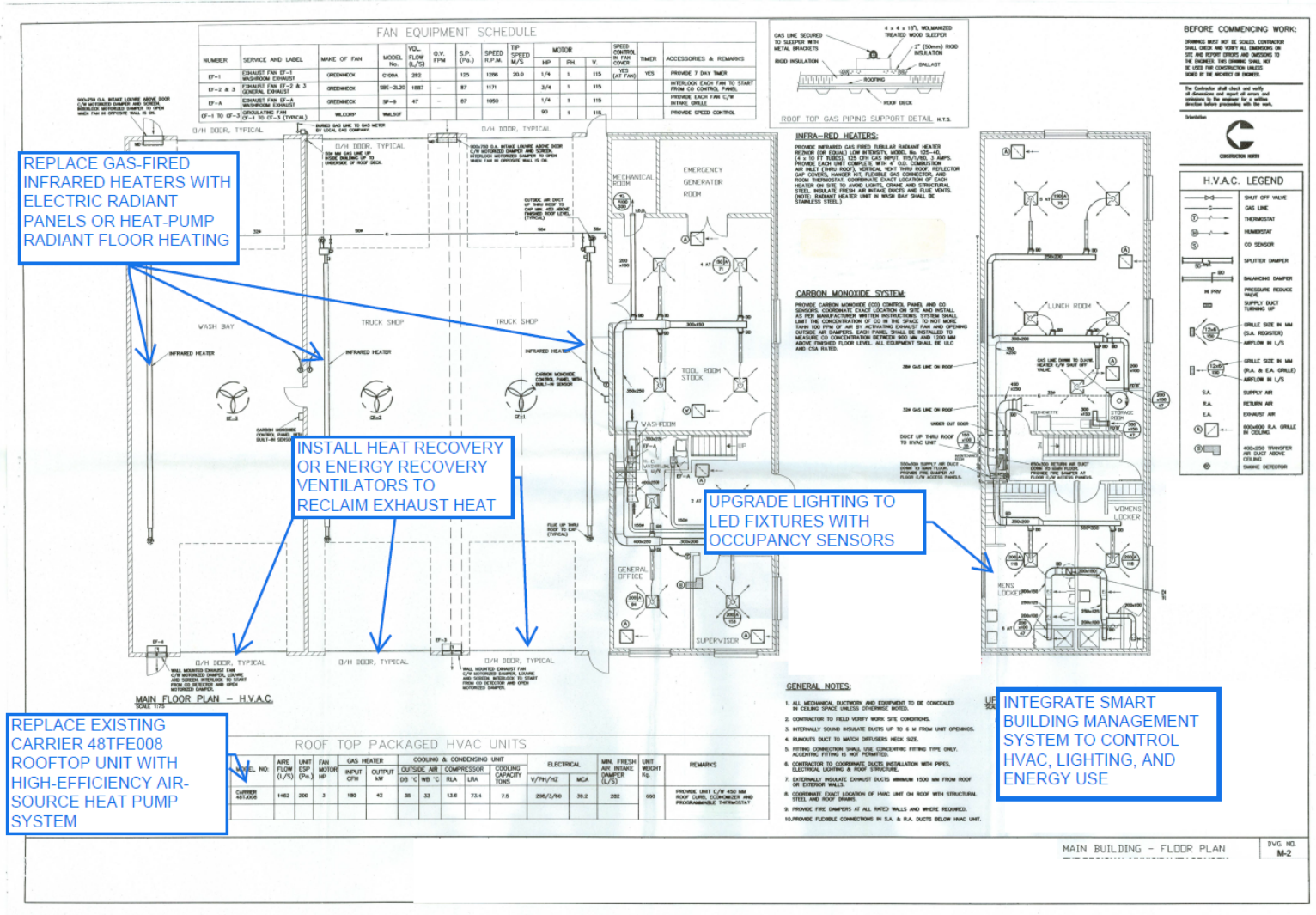


Figure 6: HVAC plan annotated to highlight proposed mechanical and electrical upgrades, including infrared heater replacement, new air-source heat pump RTU, energy recovery ventilators, LED lighting and smart building controls.

Renewable Energy Upgrades:

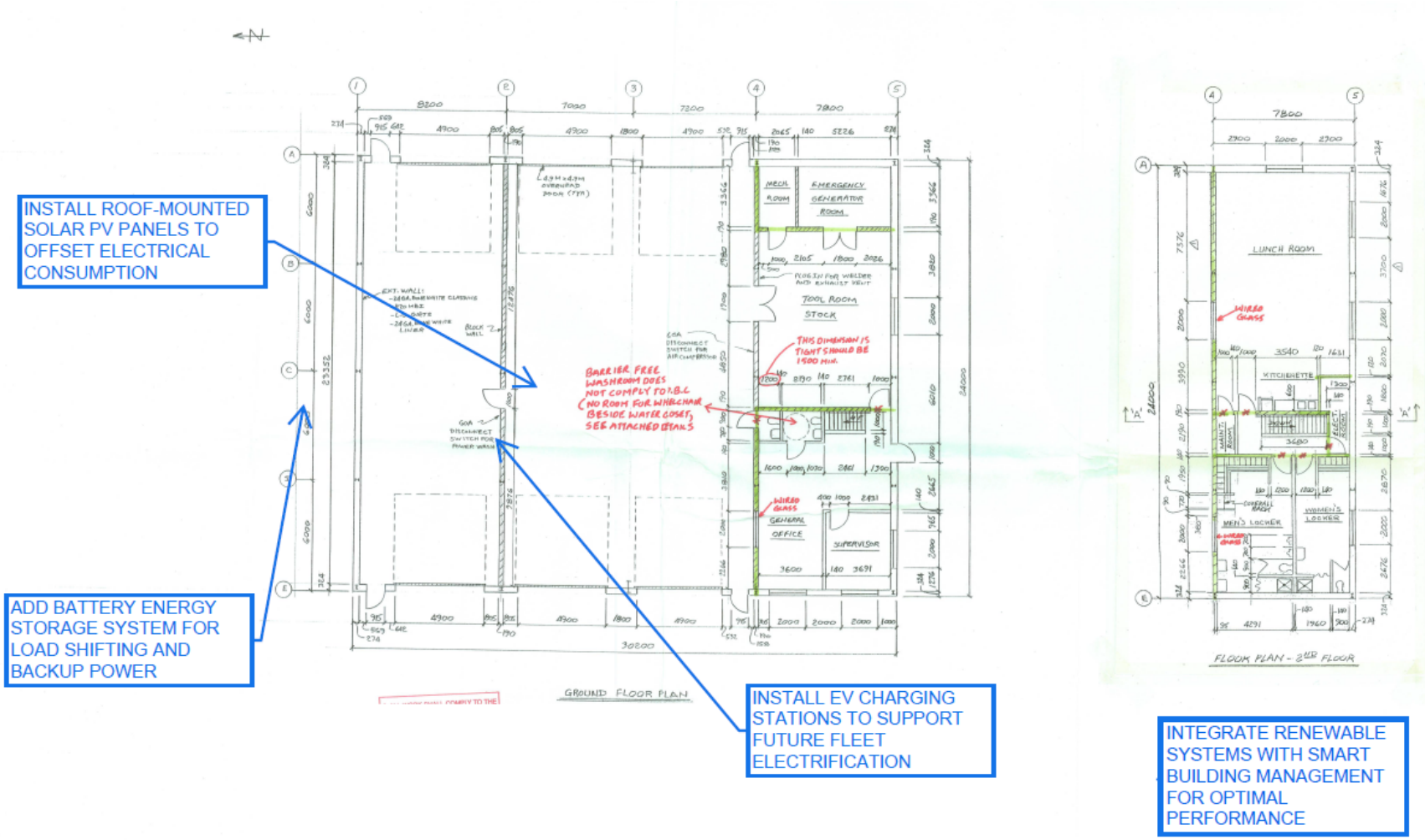


Figure 7: Roof and site plan annotated to highlight proposed renewable energy systems, including solar PV panels, battery energy storage and EV charging stations.

Water Efficiency Upgrades:

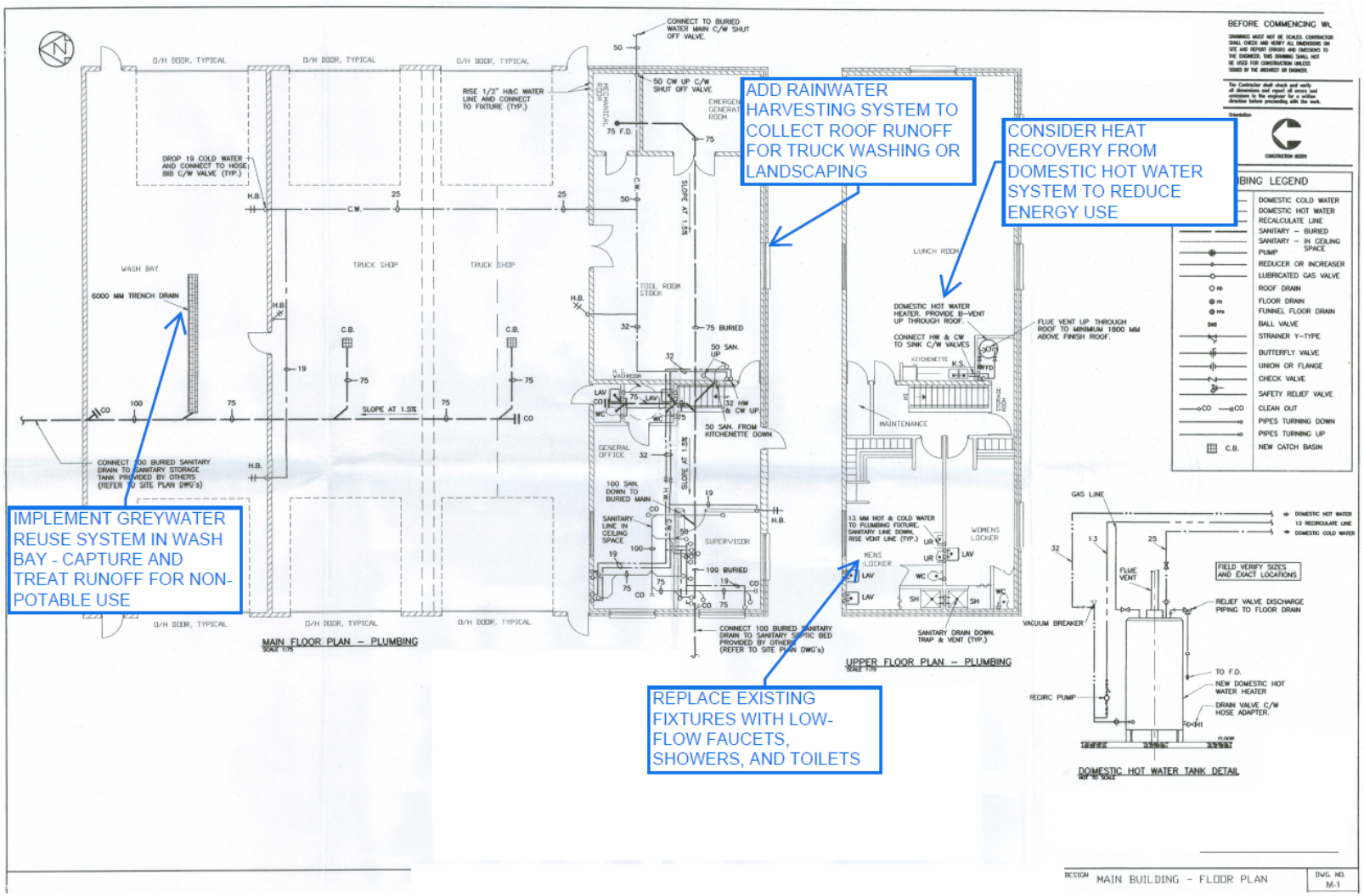


Figure 8: Plumbing plan annotated to highlight proposed water efficiency upgrades, including greywater reuse, rainwater harvesting, low-flow fixtures and domestic hot water recovery.

Structural Upgrades:

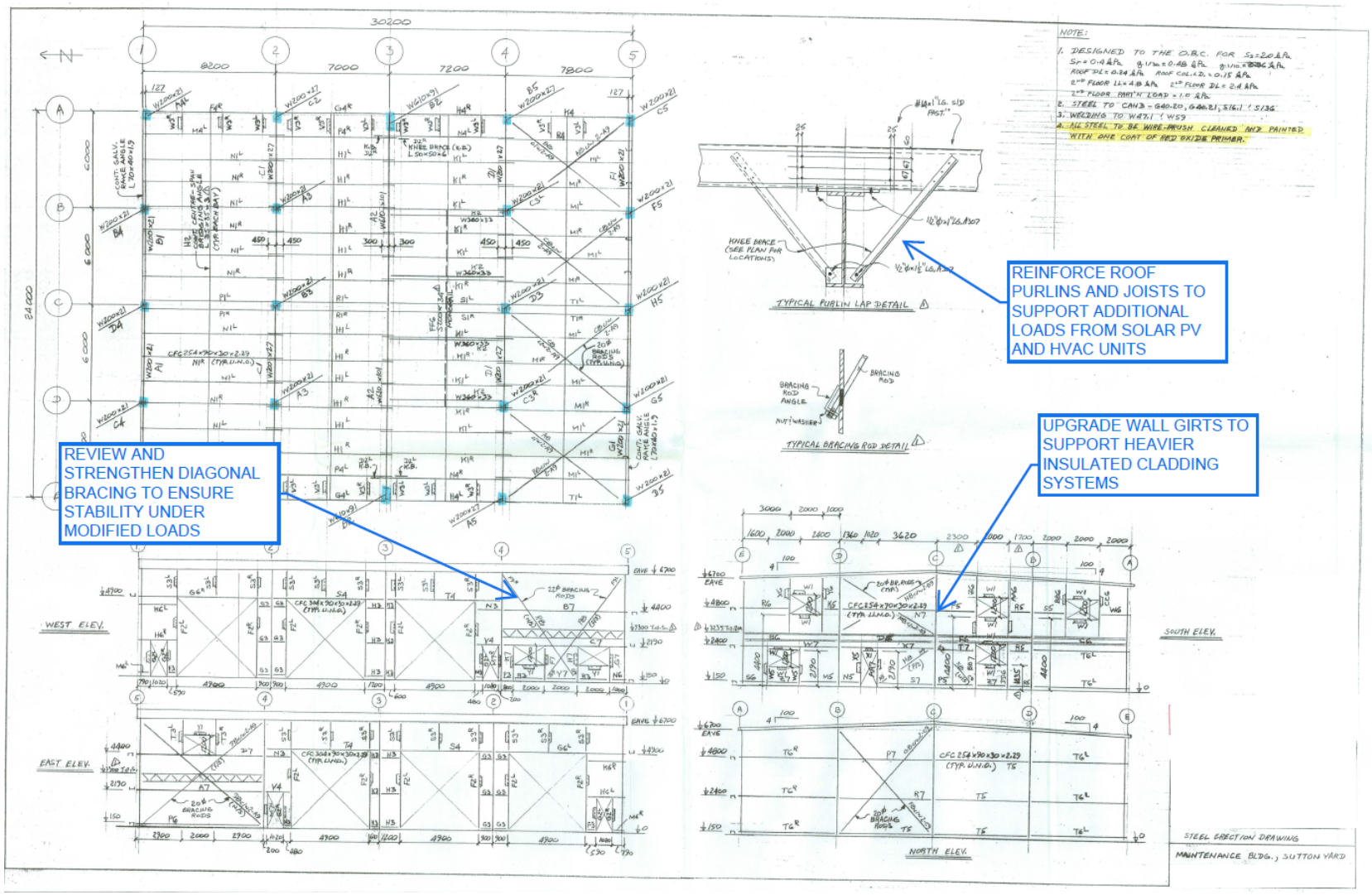


Figure 9: Structural framing plan annotated to highlight roof reinforcement, wall girt upgrades and bracing review.

Appendix D: Statement of Qualifications

Envera successfully bid on the building retrofit to achieve sustainability goals project in collaboration with Entuitive. To complete the deep energy retrofit, Envera is combining each of the four members' varying student engineering experiences. Rheya Dutkiewicz is the Project Manager overseeing the coordination of client-partner and internal meetings, regular communication, and the quality assurance of team deliverables. Lily-Anna Girard is the Environmental Coordinator responsible for researching applicable standards to increase the building's energy efficiency and investigating potential on-site power generation methods. Sophia Mariani is the structural coordinator, managing the review of the existing building structure and evaluating the structural elements impacted by the retrofit. Jordon Raftis is the Mechanical and Electrical Coordinator, analyzing existing systems, reviewing sustainable heating, ventilation, and air conditioning upgrades, and evaluating renewable onsite power generation options.

The Project Manager, Rheya Dutkiewicz, has 12 months of contract management experience with Defence Construction Canada (DCC) as a Construction Services Coordinator at Canadian Forces Base Trenton. With DCC, she focused on minor and major capital projects varying in size, including the replacement of taxiway culverts, the widening of Canadian Forces Base Trenton's runway, and a complete interior retrofit of an office space with a radar maintenance bay. For 8 months, Rheya focused on the retrofit completed on Building 169 for the 8 Air Communications and Control Squadron. This retrofit involved the refurbishment of an 85-year-old heritage building, which formerly acted as a wooden airplane hangar, into a functional office space. Through the project completion, Rheya learned the mechanical and electrical additions necessary for maintenance bay safety, structural impacts, and the importance of open communication to fulfill client needs. Each project incorporated on-site and in-office aspects of management. On-site, Rheya managed concrete pours, steel stud and drywall installation, and daily inspections of work being completed on various sites. In the office, she managed change order processes, reviewed and tracked contractor submittals, financial estimation, and payment completion. In addition, she chaired internal and external biweekly and progress meetings with consultants, contractors, project managers, and clients. In summation, these experiences provided Rheya with the project management, coordination, and technical skills for her to confidently fulfill the role of Project Manager for the York Region North District Road Maintenance Facility retrofit.

The Environmental Coordinator, Lily-Anna Girard, has completed three four-month co-op terms, providing her with a strong foundation in both construction and environmental operations. During her co-op with Ledcor's Health, Safety & Environment team, she wrote safety programs for construction machinery on-site. She conducted multiple post-incident reviews and worked closely with industry experts, gaining valuable insight in workplace safety. Lily-Anna completed a co-op at the new Vancouver Art Gallery project in downtown Vancouver, which allowed her to expand her knowledge on commercial building environmental standards. Most recently, Lily-Anna completed a four-month co-op at Woodfibre LNG in Squamish, BC, as a Project Coordinator on the concrete team. In this role, she oversaw concrete pours, managed procurement, and completed concrete take-offs based on engineering drawings. She collaborated with clients, engineers, subcontractors, and trades to coordinate deliveries, timesheets, invoices, and construction activities. Because the site is located near the ocean and surrounded by forest, she was actively involved in implementing environmental mitigation strategies, which provided her with experience in sustainable engineering practices. These experiences gave Lily-Anna a well-rounded background in research, project coordination, and environmental practices. Her technical knowledge and hands-on experience will allow her to fulfill her duties in the role of Environmental Coordinator.

The Structural Coordinator, Sophia Mariani, recently completed a four-month co-op as a Building Science Consultant with WSP in Toronto, where she gained hands-on experience in both fieldwork and technical documentation. On-site, Sophia managed concrete pours, conducted steel and asphalt reviews, monitored expansion joint repairs, and carried out thermographic roof scans. She also performed garage, roof assembly, and building envelope evaluations, ensuring compliance with project specifications and industry standards. In addition to her site work, Sophia was involved in preparing technical documentation. She drafted technical specifications, completed building condition assessments, and prepared change orders, certifications of payment, and bid summaries for repair projects. She also reviewed CAD drawings, verified contractor and client submittals, and produced meeting minutes and site visit reports. Sophia developed strong communication and coordination skills through her role at WSP. She collaborated directly with project managers, contractors, manufacturers, and clients to align project goals, resolve design challenges, and communicate progress. Together, these skills and experiences provide Sophia with the technical knowledge, professional communication, and problem-solving abilities that will support her contributions as the Structural Coordinator for the design retrofit.

The Mechanical and Electrical Coordinator, Jordan Raftis, has just finished a 16-month internship at EllisDon, where he developed a wide range of experience in the field operations, project coordination, pursuits, as well as infrastructure advisory. Jordan worked on-site, leading concrete pours, rebar procurement, and sub-trades on Forma, a 73-story residential building, and Portland Commons, a 16-Storey Commercial building in downtown Toronto. He also worked within pursuits responding to RFQs and RFPs under the Design Build Civil Division by conducting feasibility research and writing technical narratives. Most recently, under EllisDon Capital, he worked on national public-private partnerships (P3) and helped with financial modelling, research on delivery models and further affordability analysis. All these combined experiences equip Jordan with solid technical skills, analytical skills and coordination skills that would help in working as the Mechanical and Electrical Coordinator of the building retrofit.

Appendix E: Envera CVs

RHEYA DUTKIEWICZ

Belleville, ON | rheyadutkiewicz@gmail.com | 613-848-5576 | Rheya Dutkiewicz

EDUCATION

B.A.Sc. in Civil Engineering, Queen's University, Kingston, ON **September 2021 – Present**

- Specializing in structural applications
- Proficient in Microsoft 365 applications and SAP2000

PROFESSIONAL EXPERIENCE

Coordinator, Construction Services, Defence Construction Canada, Trenton, ON **May – August 2023/2024/2025**

- Contributed to civil and structural projects through **facilitating change management** processes, managed project submittals, and **chaired site/progress meetings** with contractors, project managers, and internal staff.
- **Reviewed specifications and drawings** to ensure adherence to compliance standards and contractual obligations.
- Completed detailed **financial estimates**, meeting minutes, and on-site **quality assurance reviews** while implementing technology applications into inspections.

PROFESSIONAL AND ACADEMIC PROJECTS

8 Air Communications and Control Squadron Renovation, Bldg. 169, DCC Trenton **May – August 2024/2025**

- **Managed** daily site **inspections/progress reports** of various aspects of the interior and exterior retrofit.
- **Collaborated** with general and sub-contractors on matters involving civil work, additional rooms, and HVAC.
- Applied Microsoft Excel in the completion of financial estimates, project submittal tracking, and change management processes.
- Chaired project meetings and **issued meeting minutes** regularly to contractors, consultants, and internal project representatives.

Permeable Pavement Parking Lot, APSC 200, Queen's University **October – December 2023**

- **Iterative engineering processes** and prototyping was applied to achieve a reliable and environmentally conscious design by curating various designs and testing numerous materials.
- Demonstrated **collaboration and organization** in a team environment as the acting project manager through scheduling meetings, managing submissions, and delegating tasks.
- Emphasized **problem-solving skills** through resolving operational and design challenges during prototyping.

Replace Culvert, Taxiway Golf, DCC Trenton **June – August 2023**

- Completed daily progress reports, photographs, and site visits with the use of mobile applications.
- Engaged Microsoft Excel to complete **project submittal tracking**.
- Reviewed and revised civil engineering drawings and design.

REFERENCES

Judith Tromp, Site Manager
Defence Construction Canada
judith.tromp@dcc-cdc.gc.ca

Xiaying Xin PhD. HKIE, Assistant Professor
Department of Civil Engineering, Queen's University
x.xin@queensu.ca

Lily-Anna Girard

21lajg@queensu.ca | (778) 953-1402

OBJECTIVE

Driven and adventurous student working on capstone project as the environmental coordinator for a Toronto building retrofit to achieve sustainability goals. Looking forward to transforming a passion for sustainable design in urban areas into a tangible project for Entuitive. Applies enthusiastic and creative problem-solving skills to thrive under pressure and efficiently manage multiple tasks to support ongoing projects. Demonstrates strong interpersonal skills and fosters a positive and collaborative environment for others to work in.

EDUCATION

Queen's University September 2022 – April 2026

- Candidate for a Bachelor of Applied Science in Civil Engineering for the year 2026.
- Dean's Scholar distinction
- Relevant coursework: Engineering Geology & the Biosphere, Water and Wastewater Engineering, Structural Analysis, Steel & Timber Design, Materials for Civil Engineers, and Professional Skills.

WORK EXPERIENCE

Student Project Coordinator – Ledcor Construction Limited May 2025 – August 2025

- Supported systems and procedures on the concrete team at the new Woodfibre LNG (Liquified Natural Gas) project in Squamish, British Columbia.
- Implemented environmental mitigation strategies in compliance with regulations and standards to preserve land, water bodies, and surrounding ecosystems.
- Collaborated with the client engineers and the project team to resolve design and constructability issues through procurement and subcontractor management.
- Lived on-site in a camp setting to maintain clear communication with teams and key stakeholders.

Student Project Coordinator – Ledcor Construction Limited May 2024 – August 2024

- Supported and maintained systems and procedures under civil engineers for the new Vancouver Art Gallery start-up project in British Columbia.
- Coordinated and distributed request for information processes, procurement logs, and shop drawings.
- Collaborated with project managers and superintendents to track and manage project milestones.

Health, Safety & Environment Intern – Ledcor Construction Limited May 2023 – August 2023

- Assisted in multiple post incident reviews and conducted on-site research to develop safety programs for heavy-duty construction machinery, which were implemented nationwide.
- Worked with various subcontractors and authorities to gather information and spread awareness on construction site conditions and safe practices.

Engineering Teaching Assistant – Queen's University September 2024 – Present

- Working as an undergraduate project manager for the mandatory first-year engineering design course.
- Providing support and leading weekly team meetings to share insights and analytical tools.
- Mentoring students on multidisciplinary projects including the design of a water filtration system, a planetary soil sample collection scoop for a Mars rover competition, and a waterfowl protection system for the Berkeley Pit in Butte, Montana.
- Assisting in grading work where attention to detail and effective communication is pertinent.

Engineering Mental Health Steward – Queen's University September 2023 – Present

- Serving as the fourth-year Civil Engineering Mental Health Steward, offering guidance and peer support while promoting mental health initiatives within the department.
- Leading efforts to foster an inclusive and supportive environment for peers to reduce the stigma around mental health and promote well-being within the Faculty of Engineering.
- Taking an active leadership role and delivering regular presentations to share available resources.

Barista – The Tea Room at Queen's September 2024 – April 2025
- Worked at a student-run café dedicated to environmental sustainability and equitability.
- Acted in a role that prioritized teamwork and organization to ensure efficient and safe operations.
- Promoted student-led environmental initiatives and advocated for responsible waste management practices on campus and throughout the city of Kingston, Ontario.

Lead Hostess – The Granville Island Keg July 2020 – August 2024
- Organized the guestbook and directed hosts to ensure the functionality of the restaurant.
- Developed strong communication and leadership skills in a fast-paced environment.

Swim Coach – Canadian Dolphin Swim Club January 2021 – July 2022
- Supervised groups of up to 20 children, teaching swimming techniques and promoting sportsmanship.
- Presented leadership and management abilities by motivating young swimmers in a highly competitive environment and effectively resolving conflicts to ensure a fun and safe environment.

CLUBS AND EXTRACURRICULARS

Queen's Concrete Canoe Team September 2023 – April 2025
- Acted as Head of Communications on the executive team of a design team at Queen's University, handling internal communications, writing biweekly newsletters, and managing recruitment.
- Designed and tested various mixes of concrete for a canoe that was used in competition.
- Worked collaboratively to develop an environmental plan and implement strategies to minimize the project's ecological impact.

Third Year Design Project January 2025 – April 2025
- Researched hydraulic structures that could effectively harness potential energy and regulate flows to protect downstream systems.
- Designed and built a functional baffle block prototype, analyzed its performance through multiple flume experiments on campus, and iterated the design throughout the semester.

Orientation Team Implementing Safety August 2024 – September 2024
- Promoted student engagement in Orientation Week 2024 at Queen's University as a member of OTIS.
- Assisted with the setup and takedown of equipment while adhering to safety protocols and strict schedules to ensure smooth operations for the community.

Frosh Regulation Enforcement Committee August 2023 – April 2024
- Supported Orientation Week 2023 at Queen's University as a FREC alongside other group members.
- Served as a positive role model and a valuable resource by easing the academic and social integration of first-year engineering students in a fun and traditionally Queen's manner.
- Applied interpersonal skills to create a welcoming environment for the incoming class.

Queen's Bridge Building Team September 2023 – December 2023
- Assisted in the process of designing a bridge made from popsicle sticks, floss, and glue for competition.
- Worked in an exciting setting to practice solid mechanics and physics with a passionate team.

SKILLS

Technical
- Microsoft Office 365 proficiency
- Experience in SolidWorks, AutoCAD, HEC-RAS, GeoStudio, and SAP2000
- Developing knowledge in statistics and R for data science
- Bilingual: English and French

Interpersonal
- Quick learner and adaptable to new situations
- Strong work ethic with attention to detail
- Responsible and proactive
- Articulate and personable communicator
- Values teamwork and collaboration to promote diverse opinions and respect

Sophia Mariani
5858 Fourth Line, Hillsburgh, ON, N0B 1Z0
647-882-2766; sophiam0027@gmail.com

EDUCATION

Smith Engineering, Queen's University, Kingston, ON, Canada 2022-2026
4th Year Civil Engineering Student

- Appointed to be the team lead of a five person group whose objective was to build an assistive robotic arm to aid individuals with motor deficiencies. Gave detailed instructions, demonstrated effective communication and encouraged collaboration amongst the group which resulted in 100% succession of the robotic arm.
- Provided advanced and innovative solutions to build a model of permeable pavement to analyze the effects of rainwater drainage, durability of new materials, and cost efficiency, which increased performance by 20%.
- Awarded the Queen's Excellence Entrance Scholarship of $1,500 due to a minimum average of 90-94% (2022)

WORK EXPERIENCE

WSP, Toronto, ON, Canada 2025
Building Science Consultant

- Supported building envelope and site operations, including concrete pours, steel reviews, asphalt placements, expansion joint repairs and roof assembly inspections for 8+ projects at a time – ensuring compliance with project specifications and standards within WSP.
- Drafted comprehensive technical documentation including specifications, condition assessments, change orders, bid summaries, as well as meeting minutes and site visit reports. Reviewed CAD drawings and validated contractor/ client submittals to maintain ENR 2025's top International Design Firm.

The Engineering Society, Queen's University, Kingston, ON, Canada 2024-2025
Director of First Year

- One of 15 applicants chosen to collaborate with 20+ directors and faculty staff members part of a student run organization with an annual operating budget of $2.4 million to propose, create and execute various educational, professional development and social activities for 1000 first-year Engineering students.
- Enhanced recognition of resources and events available to first years by 35% through the promotion and management of two social media accounts, weekly emails and in person appearances at lectures.
- Hired, and currently manage a team of five individuals who assist in the organization of planned events, all whilst fostering a welcoming environment which has led to collaborative partnerships among the team.

Civica Infrastructure, Woodbridge, ON, Canada 2024
Field Technician, Co-op Student

- Supported water management solution projects through field investigations and data collection to assist with flow and rainfall monitoring, hydrologic and hydraulic modelling, and both inflow and infiltration evaluations.
- Conducted fog and dye tests to identify and eliminate sources of inflow and infiltration within sewer and stormwater systems and contributed sustainable solutions to reduce testing costs and supplies which cut excess overload in treatment plants by 20-50%.

Earls Kitchen + Bar, Toronto, ON, Canada 2023
Front of House Staff

- Responsible for providing exceptional customer service by managing 200+ guest reservations, seating arrangements, handling customer inquiries and complaints, all whilst ensuring coordination between kitchen staff, servers and front of house staff members remained united.
- Proposed new strategies for online ordering accessibility, selling processes and inventory layout which increased the turnover period, resulting in a 15% increase in the number of tables sat during dining rushes.
- Implemented more accurate waitlist applications to ensure customers were given precise wait times, which decreased the number of complaints by 25% during peak hours of operations, leading to increased customer satisfaction and positive feedback from guests.

CERTIFICATIONS

- Suspended Work Platform Systems 2025
- First Aid & CPR/AED Level C 2024
- WHMIS 2024
- Smart Serve 2021

Jordan Raftis

jraftis@ellisdon.com | (647)-549-0703 | www.linkedin.com/in/jordan-raftis

Skills: Proficient in Microsoft Office, Financial Modeling, Bluebeam Revu, SolidWorks, Revit, Drone Videography; Skilled in developing applications using Python, React, JavaScript, HTML, VBA and CSS

SUMMARY OF QUALIFICATIONS

Emerging infrastructure professional with end-to-end experience across project delivery, from site coordination on complex high-rise developments to research and analysis supporting public-private partnerships (P3s). Currently contributing to EllisDon Capital's work on major Canadian P3 projects, with a focus on financial modeling and delivery model research. Previously supported pursuit efforts in the Design Build Civil division, preparing RFQ and RFP submissions for large-scale public infrastructure projects. On-site experience includes managing concrete operations, rebar procurement, and sub-trade coordination across residential and commercial builds. Also engaged in software development, creating custom tools that enhance workflow efficiency, affordability analysis, and AI innovation.

PROFESSIONAL EXPERIENCE

EllisDon Corporation — Co-op Student, Toronto, Ontario **May 2024 - Present**

Gained diverse experience across field operations, pursuits, and infrastructure advisory through multiple roles supporting major residential, commercial, and public-sector projects. Worked on-site coordinating sub-trades, contributed to RFQ/RFP development in civil pursuits, and enhancing understanding of financial modeling for capital planning on national infrastructure initiatives.

- Capital Services – Capital Co-op Student (Present): Developing financial modeling skills and infrastructure delivery research for active P3 projects across Canada. Responsibilities include assisting with quantitative analysis of different delivery structures, affordability metrics, and long-term value to support investment planning and procurement strategy.
- Design Build Civil – Project Coordinator (January – April 2025): Assisted in RFQ/RFP development, collaborating with consultants to craft strategic technical narratives. Created Civil Opportunity Documents and conducted feasibility research to develop scope presentations that supported early-stage project planning and competitive bidding strategies.
- Forma Condos – Field Coordinator (September – December 2024): Managed concrete pours, rebar procurement, and on-site logistics for a 73-story high-rise residential building. Conducted drone operations for site analysis and maintained rebar orders in Excel, ensuring alignment with structural drawings. Verified concrete mix specifications, monitored placement, and coordinated material deliveries to maintain schedule efficiency.
- Portland Commons – Project Coordinator (May – August 2024): Coordinated sub-trades for finishes, signage, and deficiency management on a 16-story commercial development. Managed RFIs, submittals, and subcontract change orders, ensuring clear communication with consultants and maintaining project alignment. Assisted in LEED certification compliance through monthly reports and on-site verification.

Raftis Realty — Property Coordinator, Toronto, Ontario **2021 - Present**

- Coordinated property maintenance for 10 residential and 2 commercial properties, ensuring top-notch condition and tenant satisfaction.
- Assisted with lease agreements, accurately documenting terms and ensuring legal compliance.
- Fostered positive tenant relationships through effective and responsive communication.

EDUCATION

Queen's University — Bachelor of Applied Science, Civil Engineering **2021 - 2026**

- Relevant Courses: Structural Design, Hydraulics II, Geotechnical Engineering, Water and Wastewater Engineering, Economic and Business Practice
- Involvements: President of Civil Engineering (2025 - Present), Co-Chair of Queen's Reserve Circle (2025 - Present), Varsity Cross Country & Track Team (2021), Queen's Concrete Toboggan Team (2022 - Present), Sponsorship Coordinator at Queen's Global Energy Conference (2023 - 2024), Civil Engineering Society - Merchandise Coordinator (2024 - 2025)

Certifications

Basic Pilot Certificate - Small Remotely Piloted Aircraft
Smart Serve Certified
Standard First Aid & CPR-C

Interests

Golf, hockey, marathon running, personal fitness, app development and travel